

CLIMATE CHANGE 101

Overview



Climate change is happening and it is caused largely by human activity. Its impacts are beginning to be felt and will worsen in the decades ahead unless we take action. The solution to climate change will involve a broad array of technologies and policies—many tried and true, and many new and innovative.

This overview summarizes the eight-part series *Climate Change 101: Understanding and Responding to Global Climate Change*. *Science and Impacts* discusses the scientific evidence for climate change and explains its causes and current and projected impacts. *Adaptation* discusses these impacts in greater depth, explaining how planning can limit (though not eliminate) the damage caused by unavoidable climate change, as well as the long-term costs of responding to climate-related impacts. As explored in greater depth in *Technological Solutions*, a number of technological options exist to avert dangerous climatic change by dramatically reducing greenhouse gas emissions both now and into the future. *Business Solutions*, *International Action*, *Federal Action*, *State Action*, and *Local Action* describe how business and government leaders at all levels have recognized both the challenge and the vast opportunity dealing with climate change presents. These leaders are responding with a broad spectrum of innovative solutions. To address the enormous challenge of climate change successfully, new approaches are needed at the federal and international levels, and the United States must stay engaged in the global effort while adopting strong and effective national policies.

A REAL PROBLEM WITH REAL SOLUTIONS

The overwhelming body of scientific evidence demonstrates unequivocally that the earth is warming. Climate change is happening, it is caused in large part by human activity, its impacts are beginning to be experienced and these damaging effects will only increase in the decades ahead. Greenhouse gas emissions from cars, power plants, and other human activities—rather than natural variations in climate—are the primary cause of contemporary global warming. Due largely to the combustion of fossil fuels, atmospheric concentrations of carbon dioxide (CO₂), the principal human-produced greenhouse gas, are at a level unequalled for at least 800,000 years. The greenhouse

gases (GHGs) from human activities are trapping more of the sun's heat in the earth's atmosphere, resulting in warming. Over the last century, the global average temperatures rose by almost 1.5°F (see Figure 1), and the Arctic warmed about twice as much. The oceans have also warmed, especially within 1,000 feet of the surface (see Figure 1).

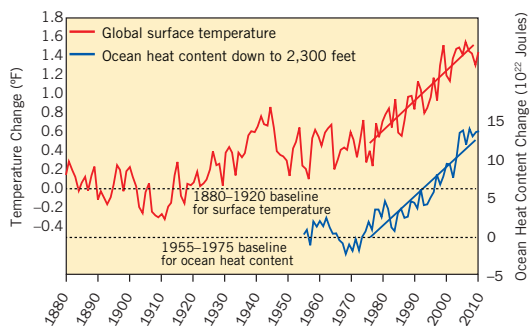
Carbon dioxide and other GHGs always have been present in the atmosphere, keeping the earth hospitable to life by trapping heat and warming our atmosphere. Yet, since the industrial revolution, emissions of these gases from human activity have increased steadily, trapping more heat and amplifying the greenhouse effect (see Figure 2). Since pre-industrial times, atmospheric CO₂ concentrations have



increased by 40 percent, and concentrations of other GHGs have grown significantly as well. As a result, global average temperatures have risen both on land and in the oceans, with observable impacts already occurring that presage

Figure 1

Global Warming Trend: Average Surface Warming and Ocean Heat Content



Global average surface temperature change (left axis) and ocean heat content change in upper 2,300 feet (right axis).

SOURCES

Surface temperature: Smith, T.M., R.W. Reynolds, T.C. Peterson, and J. Lawrimore, 2008: Improvements to NOAA's historical merged land-ocean surface temperature analysis (1880–2006). *Journal of Climate*, 21:2283-2296.

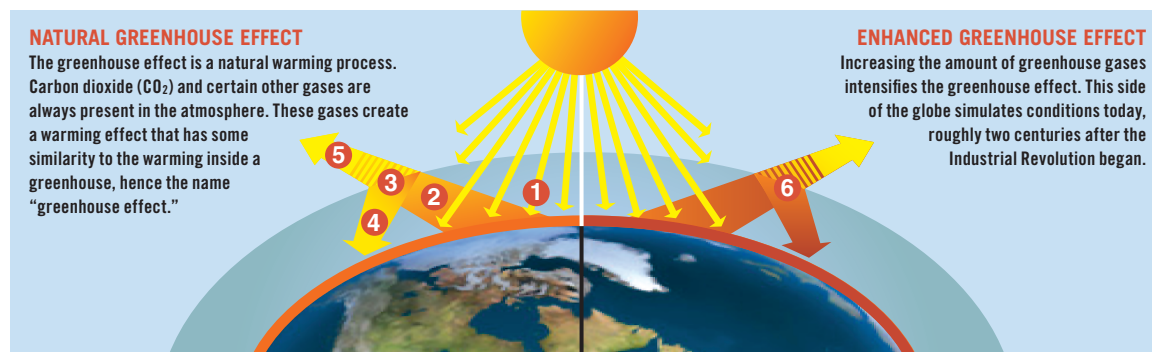
Ocean heat: Levitus, S., J.I. Antonov, T.P. Boyer, R.A. Locarnini, H.E. Garcia, and A.V. Mishonov, 2009: Global Ocean Heat Content 1955–2008 in light of recently revealed instrumentation problems. *Geophys. Res. Lett.*, 36, L07608, doi:10.1029/2008GL037155.

increasingly severe changes in the future. Polar ice is melting at record rates. Glaciers around the globe are in retreat. Storms, including hurricanes, are increasing in intensity. Ecosystems around the world already are reacting as plant and animal species struggle to adapt to a shifting climate.

Scientists project that if the increase in man-made GHG emissions continues unabated, additional warming of 2 to 11.5°F over the next century is likely, depending on how much more GHGs are emitted and how strongly the climate system responds to them. Although the range of uncertainty for future temperatures is large, even the lower end of the range is likely to have many undesirable effects on natural and human systems. Water supplies in some critical areas will dwindle as snow and ice disappear. Sea levels will rise, threatening coastal populations. Droughts and floods will become more common. And hurricanes and other powerful storms will cause more and more damage. Agricultural production could increase with slight warming in northern countries but is already declining in many low-latitude countries and will decrease everywhere with higher levels of warming due to changes in precipitation, weather extremes, and the spread of crop pests and diseases. Changing weather patterns will also change the distribution and incidence of insect-borne and waterborne diseases, such as malaria and cholera. Human health will be jeopardized by all of these changes. Changes in climate also pose substantial national

Figure 2

The Greenhouse Effect



© The National Academy of Sciences, USA

Illustration of the greenhouse effect (adapted with permission from the Marian Koshland Science Museum of the National Academy of Sciences). Visible sunlight passes through the atmosphere without being absorbed. Some of the sunlight striking the earth ① is absorbed and converted to heat, which warms the surface. The surface ② emits heat to the atmosphere, where some of it ③ is absorbed by greenhouse gases and ④ re-emitted toward the surface; some of the heat is not trapped by greenhouse gases and ⑤ escapes into space. Human activities that emit additional greenhouse gases to the atmosphere ⑥ increase the amount of heat that gets absorbed before escaping to space, thus enhancing the greenhouse effect and amplifying the warming of the earth.

security risks by expanding the number of weather-related humanitarian missions for our military, by opening up new areas for military operations (e.g., the Arctic) and by putting at risk military facilities located in coastal areas.

A growing body of scientific research has documented that climate change is already underway and some dangerous impacts have already occurred. Avoiding more severe impacts in the future requires large reductions in human-induced GHG emissions in the coming decades. Consequently, many governments have committed to reduce their countries' emissions by between 50 and 85 percent below 2000 levels by 2050. If achieved, global emissions reductions on this scale will reduce the costs of damages and of adaptation, and will dramatically reduce the probability of catastrophic outcomes. While committing to and achieving such reductions must be a high priority, adapting to climate change that is now unavoidable is also important. Effective adaptation planning while simultaneously reducing emissions is a major challenge that requires unprecedented cooperation and participation throughout the world.

ADAPTATION

Reducing emissions will decrease both the rate of change and the magnitude of those changes in climate and their related impacts. However, CO₂ and other GHGs can remain in the atmosphere for decades to many centuries after they are emitted, meaning that today's emissions will affect the climate far into the future. As a result, the Earth is committed to additional warming no matter what actions are

taken to reduce emissions now. With global emissions on the rise, adaptation efforts are necessary to reduce the cost and severity of climate change impacts for the next several decades.

Recent scientific research demonstrates that many aspects of climate change are happening earlier or more rapidly than climate models and experts initially projected. The rate of change projected for global surface temperatures and related impacts, such as ice melt and sea level rise, is unprecedented in human history. Adapting to climate change will become that much harder and more expensive as changes happen faster, or on a larger scale, than expected.

In general, scientists expect the United States to see overall increases in precipitation (along with decreases in some areas, such as the Southwest), including increases in the intensity of both hurricanes and heavy rainfall events. Projections also indicate declines in snowpack, earlier snow and ice melt in areas including the West and Great Lakes regions, and more land areas affected by drought and wildfires. Sea level rise will affect the U.S. coastline to varying degrees, with the most severe impacts projected along the Gulf of Mexico and Atlantic coastlines, including potentially significant losses of coastal wetlands. More than half the U.S. population lives near the coast, with the most vulnerable areas being the Mid-Atlantic and Gulf Coasts. All of these impacts will affect food and water supplies, natural resources, ecosystems, and human life and property (see Table 1).

Impacts	Region
Coastal flooding/erosion	South, Southeast, Mid-Atlantic, Northeast, Northwest, Alaska
Hurricanes	Atlantic and Gulf of Mexico coastal areas
Decreased snow cover and ice, more intense winter storms	Alaska, West, Great Lakes, Northeast
Flooding/intense precipitation	All regions, increasing with higher northern latitude
Sea-level rise	Atlantic and Gulf of Mexico coastal areas, San Francisco Bay/Sacramento Delta region, Puget Sound, Alaska, Guam, Puerto Rico
Decreased precipitation and stream-flow	Southwest
Drought	Portions of the Southeast, Southwest
Wildfires	West, Alaska
Intense heat waves	All regions

Recognizing these risks, governments and other entities around the world are acting now to build in greater resilience to climate change rather than waiting to take more costly, reactive measures in the future. Although national and international action is essential, many important decisions about how best to manage systems affected by climate change are made at local, state, and regional levels. Comprehensive, proactive adaptation planning is still in the early stages in the United States—yet many states and localities have begun to take action. Every level of government, as well as resource managers, industry, and community leaders, has a role to play in assessing the climate vulnerability of both natural and man-made systems. Together, these stakeholders must take action to help these systems adapt and adequately prepare for unavoidable climate impacts.

Climate change is a real problem, but it also has real solutions. Some of its effects are already inevitable and will require some degree of adaptation. But humanity has the power—working collectively, individually, and at all levels of society—to take serious action to reduce global emissions and thus the threat posed by climate change. The tools exist to begin addressing this challenge now. Throughout the United States and the world, many political, business, and community leaders already are working to prevent the

consequences of global warming by lowering GHG emissions. They are acting because they understand that the science points to an inescapable conclusion: addressing climate change is no longer a choice but an imperative.

REDUCING EMISSIONS: WHAT IT WILL TAKE

Climate change is not just a daunting challenge; it is also an enormous opportunity for innovation. While there is no “silver bullet” technological solution, many tools already exist for addressing climate change, and new options on the horizon could potentially yield dramatic reductions in worldwide emissions of GHGs.

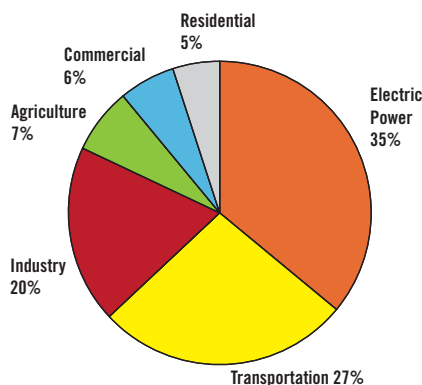
Although GHG emissions are primarily associated with the burning of fossil fuels (chiefly coal, oil and natural gas), they come from many sources. As a result, any effort to reduce the human impact on the climate will need to engage all sectors of the economy. As Figure 3 shows, the largest contributors to total U.S. emissions are the electric power and transportation sectors. Significant emissions also come from the industrial and agricultural sectors. In each of these areas, technologies and practices already exist that can reduce emissions. Other tools that are still being developed hold tremendous promise. However, significant time and money are needed to develop, demonstrate, and commercially deploy these new low-emission technologies that can protect the climate and create new clean energy industries.

Right now, the true costs of GHG emissions are not reflected in the marketplace. Policies that send a clear price signal to the market by putting a financial cost on GHG emissions would make many low-carbon technologies commercially competitive with traditional GHG-emitting technologies. Moreover, putting a price on carbon would spur companies to invest in developing new low-carbon technologies. Governments, however, will also need to invest in research and development to advance technologies for the future.

Significant emission reductions will require a transformation in global energy use through a combination of short-term and long-term commitments. Real reductions are possible today, but we also need more advanced technology to achieve the reductions required to avoid the most serious consequences of climate change—and we need to begin developing it now. Given the many sources of emissions, a comprehensive response to climate change requires a portfolio of solutions.

Figure 3

U.S. GHG Emissions by Source, 2008



SOURCE: U.S. EPA, 2010. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*. EPA 430-R-08-005. Washington, D.C. http://www.epa.gov/climatechange/emissions/downloads10/US-GHG-Inventory-2010_Report.pdf

In the electricity sector, these solutions include improving the efficiency of power plants; generating an increased share of electricity from climate-friendly, renewable sources, such as solar, wind, and tidal power; deploying technologies to store CO₂ emissions underground; and investing in new nuclear power plants. Since most electricity is used in buildings, increased energy efficiency in buildings and appliances also can provide significant and cost-effective reductions. At the same time, transportation-sector emissions can be reduced through investments in new and existing technologies to improve the fuel efficiency of cars and trucks. Other transportation solutions include using low-carbon energy sources, which can include biofuels, fuel cells, or electricity, and adopting “smart growth” policies that reduce driving.

There will certainly be costs associated with adopting these technologies and transforming the way we consume energy. Yet, addressing climate change also offers enormous economic opportunities, starting with the opportunity to avoid the considerable costs that climate change will pose to societies and businesses. In addition, the global technology revolution that is needed to protect the climate will create new economic opportunities for businesses and workers, as well as the localities, states, and nations that successfully position themselves as centers of innovation and technology development for a low-carbon world. However, innovation will not happen quickly enough or at the necessary scale without government action to push the development of new technologies and to pull them into mainstream use. A comprehensive strategy of economy-wide and sector-specific policies is needed. Key policy solutions include investments in science and technology research; efficiency standards for buildings, vehicles, and appliances; and perhaps most importantly, an overall limit on GHG emissions.

EMBRACING CLIMATE SOLUTIONS

In the absence of a strong U.S. federal policy, leaders in business and government at all levels have begun taking significant steps to address climate change. Current efforts cannot deliver the level of reduction needed to protect the climate, but they provide a foundation for future action, as well as proof that progress is possible without endangering economic success.

Business Solutions. Leading businesses around the globe are taking action to reduce their impact on the climate and advocate for sensible policy solutions. Recent years have seen a shift in corporate approaches to climate change from focusing exclusively on risk management and protecting the bottom line to the pursuit of new business opportunities and sustainable practices. Improvements in energy efficiency, for example, can lead to reduced costs; sales of climate-friendly products and services are growing rapidly; and new markets for carbon reductions are taking off. Figure 4 shows a ranking of private sector activities that benefit the bottom line based on a Pew Center on Global Climate Change poll of 33 major corporations.

Addressing climate change offers enormous economic opportunities, starting with the opportunity to avoid considerable costs that climate change will pose to society.

Many corporate leaders increasingly believe that with the growing certainty about the risks of climate change, future regulation is inevitable. Companies want a head start over their competitors in learning how to reduce their emissions. Others in the private sector are responding to growing pressure from investor and consumer groups for disclosure of climate-related risks

and integration of climate concerns into companies' core business strategies. There may also be considerable risk to a company's brand and reputation if customers, partners, investors, and/or employees do not view the firm as responsible with regard to climate change. The potential physical impact of climate change on business operations is another concern among corporate leaders.

Recognizing both that government action is inevitable and policy decisions made on this issue will have substantial implications for future profits, business leaders increasingly are engaging with policymakers to help influence those decisions. Many of these business leaders favor approaches that level the playing field among companies, create more certainty for businesses, and spread responsibility for GHG emission reductions across all sectors of the economy. The Pew Center on Global Climate Change's Business Environmental Leadership Council includes 46 companies at the forefront of corporate action on climate change. Council members' diverse, innovative efforts show the power of business to have a significant impact on reducing GHG emissions

while helping the bottom line. The emergence of the U.S. Climate Action Partnership (USCAP), a coalition of major corporations and non-governmental organizations, which called for the prompt establishment of a binding domestic cap on emissions, was perhaps the most dramatic example of positive business engagement on the climate issue in recent years. The coalition publicly unveiled its “Call for Action” in January of 2007 and followed up with its more detailed “Blueprint for Legislative Action” in January 2009, which urged the adoption of a market-driven, economy-wide approach to reducing GHG emissions 80 percent below 2005 levels by 2050.

Despite concerns that the current global economic turmoil may dampen business and government support for addressing climate change, there are encouraging signs that the climate issue will stay near the top of corporate and government agendas. Governments at all levels remain committed to efforts aimed at reducing GHG emissions, and companies continue to announce new, ambitious programs and voluntary GHG reduction targets. Many analysts also note the potential for investment in clean energy to serve as a powerful economic stimulus tool for the United States and other countries.

International Action. Climate change requires a global response. Energy-related CO₂ emissions have risen 145-fold since 1850 and are projected to increase another 36 percent by 2030. Most emissions come from a relatively small number of countries. An effective global strategy to avert dangerous climate change requires commitments and action by all the world’s major economies.

The United States, with 5 percent of the world’s population, is responsible for 17 percent of global GHG emissions. On an intensity basis (emissions per gross domestic product or GDP), U.S. emissions are significantly higher than the EU’s and Japan’s. On a per capita basis, U.S. emissions are more than twice as high as those of the EU and Japan (and three and a half times the world average). U.S. emissions are projected to remain largely flat through 2020. By

comparison, emissions are projected to decline from current levels (2008) by about 4 percent in the EU and 57 percent in Japan by 2020.

Emissions are rising fastest in developing countries. China’s and India’s emissions are projected to grow compared to current levels by about 45 percent and 47 percent, respectively, by 2020. Annual emissions from all developing countries surpassed those of developed countries in 2004. Their per capita emissions, however, will

remain much lower than those of developed countries. Despite being surpassed by China as the largest annual emitter of GHGs in 2006, the United States accounts for 30 percent of cumulative energy-related CO₂ emissions since 1850 while China accounts for 9 percent. Cumulative emissions are an important measure because of the long-lasting nature of GHGs in the atmosphere. Although developing country emissions are rising, their cumulative emissions are not projected to reach those of developed countries for several more decades.

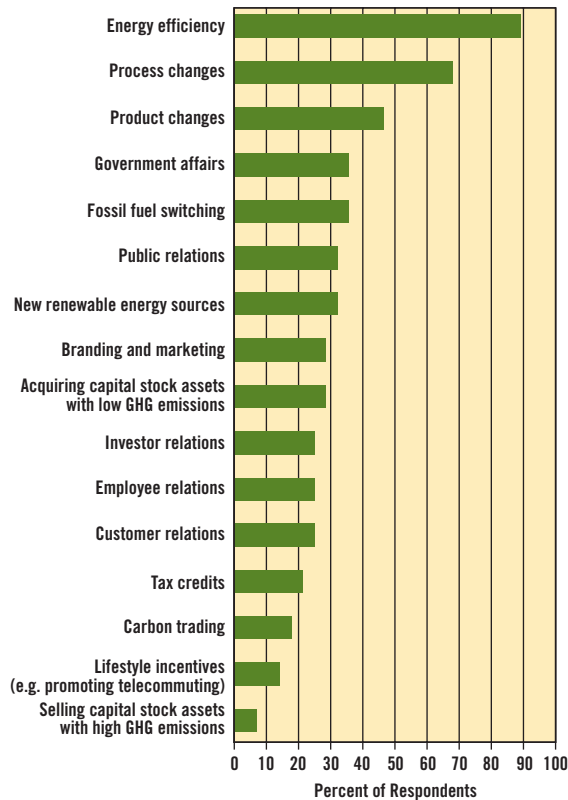
In 1992, countries signed the United Nations Framework Convention on Climate Change (UNFCCC) with the objective of avoiding dangerous human interference in the climate system (194 countries, including the United States, have ratified the agreement). In the Convention, developed countries agreed to “take the lead” in addressing climate change and to the voluntary “aim” of reducing their emissions to 1990 levels by 2000. Soon recognizing that stronger action was needed, governments launched new negotiations on binding emission targets for developed countries. The resulting agreement, the Kyoto Protocol, requires industrialized countries to reduce emissions on average 5.2 percent below 1990 levels by 2008–2012. Kyoto has now been ratified by 182 countries, including all developed countries except the United States.

Meeting in Montreal in 2005, parties to the Kyoto Protocol opened negotiations on post-2012 commitments for developed countries that are party to the protocol. In Bali in

The future of the international effort hinges in large measure on the United States—other major emitters are unlikely to commit to stronger action without the participation of the world’s largest economy and cumulative emitter.

Figure 4

Ranking of Climate-Related Programs That Increase Companies' Profits



Source: Based on findings of survey in *Getting Ahead of the Curve: Corporate Strategies That Address Climate Change*, Pew Center on Global Climate Change, 2006

2007, governments launched a parallel negotiating process under the Framework Convention, that includes the United States, with the aim of an “agreed outcome” in Copenhagen in 2009. While many parties hoped for a binding agreement in Copenhagen, the summit instead produced the Copenhagen Accord, a political agreement negotiated by a group of world leaders, including President Obama. Although the Accord was not formally adopted by UNFCCC parties in Copenhagen, 140 countries have now associated themselves with the agreement and more than 80—including all the major economies—have pledged specific mitigation targets or actions for 2020.

For the past 15 years, the primary thrust of negotiations within the UNFCCC has been the establishment, and then

the extension, of a legally binding regime to reduce GHG emissions. This should remain the long-term objective. The Copenhagen summit, however, demonstrated the difficulty of achieving a new round of binding climate commitments. Under these circumstances, the best course forward may be an evolutionary one. Parties could take incremental steps to strengthen the multilateral architecture in ways that promote stronger action in the near term, while providing a stronger foundation for future binding commitments. Of central importance are a financial architecture to deliver strong, sustained support to developing countries and an improved system of reporting and verifying countries’ actions to ensure transparency and a measure of accountability. Over time, such incremental efforts can strengthen countries’ confidence in one another’s actions and in the emerging climate change regime. The success of the international effort will hinge heavily on domestic action by the United States. Stronger U.S. action will be critical both because it will promote stronger action by other countries and because it will better position the United States to take on the types of binding commitments needed to ensure a sustained and effective global effort.

United States: Federal Action. To date, the federal government has not yet enacted a comprehensive set of policies to reduce GHG emissions. While several senators and representatives—both Democrats and Republicans—have introduced bills or proposed policies in the past few years, in 2009 the House of Representatives became the first body of Congress to ever pass a comprehensive climate and clean energy bill. Despite this success, the Senate did not pass such a bill, and it still remains for Congress to enact comprehensive legislation. Federal policies and programs are already in place, however, that are making a difference at least in slowing the growth of GHG emissions and in promoting low-carbon technologies.

The year 2010 marks the first time for which large GHG emitters must report their emissions to the government. In addition, following a Supreme Court case establishing that the government could regulate GHGs under the existing air pollution law, the federal government has started regulating GHG emissions from vehicles and new large sources, such as new power plants. Efforts to reduce GHG emissions were further aided in 2009 when the economic stimulus bill included roughly \$80 billion in funding, tax credits, and other financial

incentives for energy efficiency and clean energy—ranging from home weatherization programs to research on “break-through” energy technologies.

These recent federal policy developments build upon existing federal policies to promote energy efficiency, develop and deploy new technologies, and reduce emissions. Some of these policies date back many years and were motivated by concerns other than climate change, such as U.S. dependence on foreign oil. Existing federal policies include fuel economy standards for vehicles, minimum energy efficiency standards for appliances, tax incentives for renewable electricity generation, and national requirements for biofuels for transportation.

Existing federal policies have played important roles in improving energy efficiency, helping wind and solar power mature, demonstrating carbon capture and storage technology, and launching the first mass-market electric vehicles. Nonetheless, without new policies from the federal government, the United States cannot achieve the significant emission reductions necessary to address the threat of climate change. Federal policymakers can choose from a variety of policies—including market-based regulations and traditional performance standards—that apply economy wide or that are tailored to certain sectors of the economy or emitters (e.g., power plants). From among these choices, federal policymakers can craft a comprehensive approach to cost-effectively reduce emissions. Moreover, increased federal funding for research, development, and demonstration can accelerate the pace of clean technology innovation.

United States: State Action. The lack of comprehensive action on the climate issue at the federal level has prompted many states to seek their own solutions both individually and cooperatively. Nearly every state is currently engaged in working in some way on climate solutions. By taking action to address climate change, U.S. states are fulfilling their role in American democracy as “policy laboratories,” developing initiatives that serve as models for federal action.

To date, states have implemented a broad spectrum of climate policies. Thirty-six states have completed comprehensive climate action plans, or are in the process of revising or developing one, and 23 states actually have set quantitative targets or goals, ranging from modest to aggressive, to reduce their GHG emissions. Regional climate initiatives, including three cap-and-trade programs are underway among U.S. states and Canadian provinces (see Figure 5).

State action is important, but strong and coherent federal policies are needed to ensure consistency and to mobilize climate solutions throughout the economy and the country.

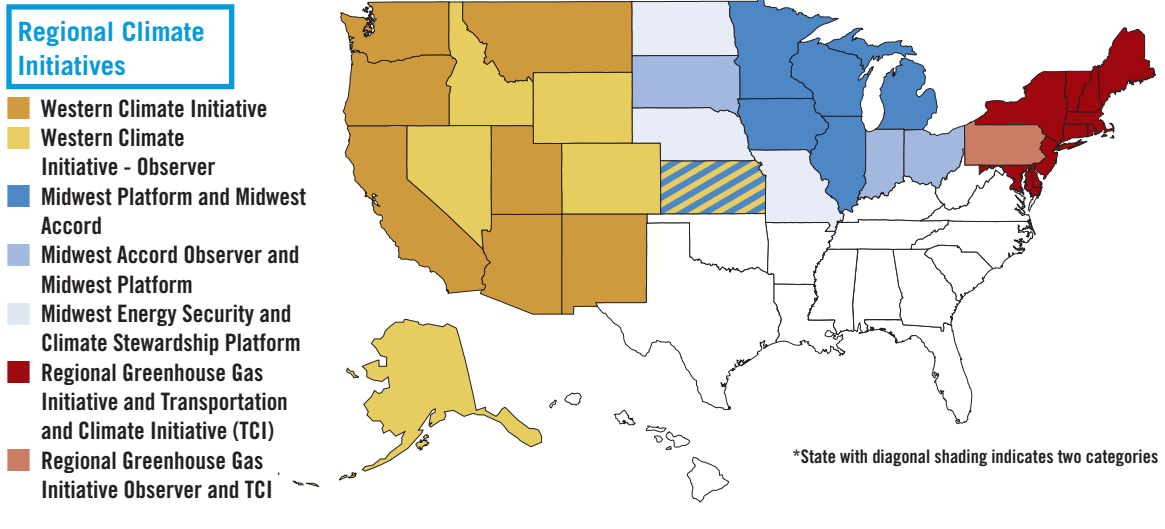
Beyond these broad-based plans and targets, 31 states have adopted policies that reduce emissions from electricity generation by requiring that utilities generate a specified share of power from renewable sources. States also are directing public funds to energy efficiency and renewable energy projects and adopting new standards for power plant emissions and energy efficiency. In the transportation

sector, states are adopting policies and standards to promote efficient, low-emission vehicles (including electric vehicles) and climate-friendly fuels. They are also working on smart growth, zoning reform, and transit-oriented development. Agricultural policies also are being redesigned to promote biomass energy as another solution to climate change.

Among the main motivating factors for state action has been concern about the potential impact of climate change on state economies from consequences, such as sea level rise or extreme weather. However, many state leaders also see enormous and largely untapped economic opportunities that will come with developing new markets for climate-friendly technologies. Climate-related policies have received bipartisan support among the states. This activity on the part of states is significant because some U.S. states are major emitters of GHGs, producing levels comparable to those of many developed countries. In addition, state actions are showing it is possible to reduce emissions and spur technological innovation without endangering economic competitiveness.

Through interstate partnerships, states are demonstrating the power of collective action to reduce costs and to achieve

Figure 5



increased efficiency while cutting emissions across a larger geographic area.

State and regional climate policy analyses and decisions are providing helpful lessons for federal policy makers. In addition to spotlighting what works, however, states also are demonstrating that their efforts alone are not enough. Because of their authorities and responsibilities (for example, in overseeing electric utilities), states have an important role to play in addressing climate change. States could play an important role in implementing federal climate policies, as they do under the federal Clean Air Act. However, they have limited resources and strict budget requirements that make far-reaching climate policies difficult to implement, and they also lack certain powers that would be crucial to a comprehensive climate change policy. Moreover, the patchwork quilt that can result when states take individual approaches to the climate issue can be inefficient and pose challenges for businesses. State action is important, but strong and coherent federal policies are needed to ensure consistency and to mobilize climate solutions throughout the economy and the country.

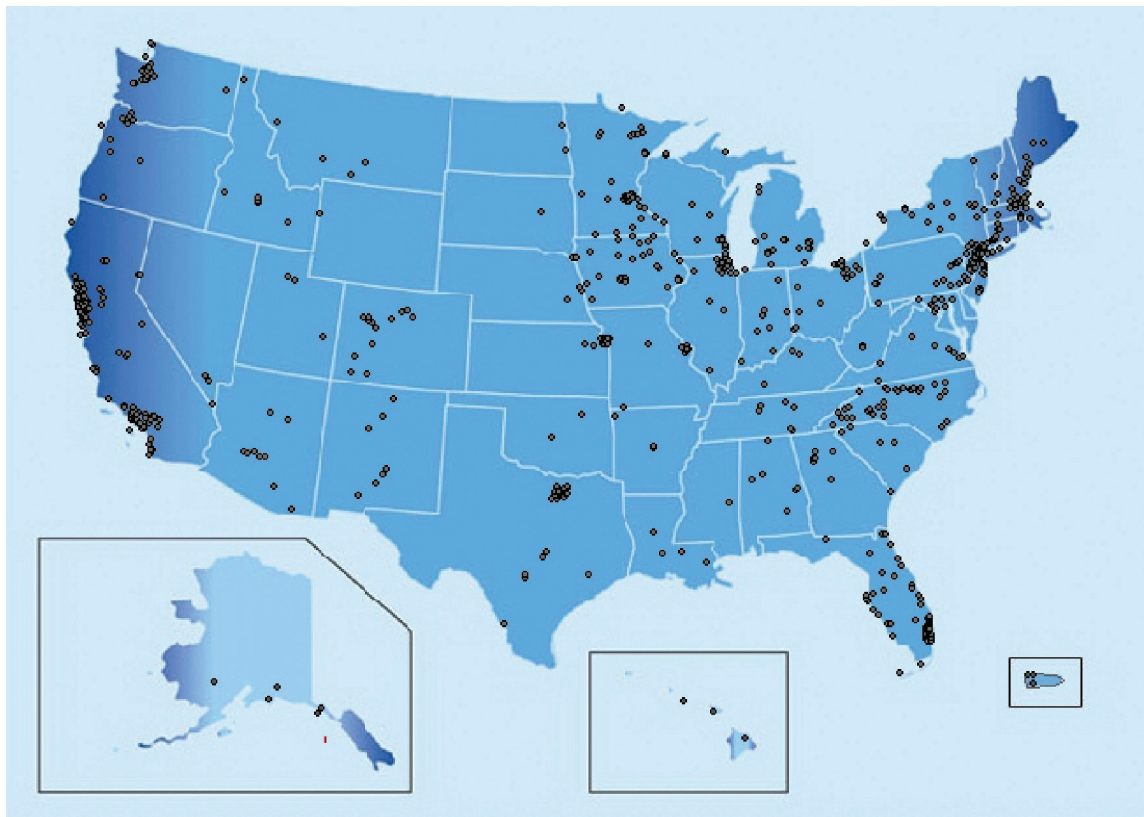
Local Action. State leaders are hardly alone in their movement to address climate change. Across the country and the world, local governments are implementing their own policies aimed at reducing GHG emissions. Localities have a strong history of climate action and continue to mount

responses to climate change that are resulting in emissions cuts. Cities are working together to achieve their goals through a number of programs and mechanisms, including the International Council for Local Environmental Initiatives, the Clinton Climate Initiative, and the U.S. Mayors Climate Protection Agreement, which has experienced dramatic growth in participation (see Figure 6).

Policies adopted by cities and towns within the United States span everything from energy supply to transportation to tree planting. Local leaders are taking action because they recognize that their communities have a lot to lose should emissions remain unchecked and climate change accelerate. Many of the potential effects of climate change—such as extreme weather, higher sea levels, and reduced water supplies—will be felt most sharply by urban populations. In addition to reducing risks, cities and towns also can realize indirect benefits by tackling climate change, such as energy savings and improved air quality. Like their partners at other levels of government, local leaders also see an economic opportunity in addressing climate change. Localities, like the states, have climate-relevant authorities and responsibilities, and are offering lessons in what works to protect the climate. However, as is the case with action by the states, local policies are no substitute for broader action at the federal and international level.

Figure 6

Cities Committed to the U.S. Mayors Climate Protection Agreement



Mayors of 1,044 cities have signed the U.S. Mayors Climate Protection Agreement as of October 2010. Source: <http://www.usmayors.org/climateprotection>

THE PATH FORWARD

The science is clear. Climate change is happening, and the time to act is now. While the actions of local and state governments, nations, and business leaders are significant, climate change remains a global problem requiring a global solution. Ultimately, a fair and effective international approach must engage all of the world's major economies and allow enough

flexibility for all countries to contribute. Substantive U.S. engagement at the international level is crucial to the success of the global effort. On the domestic front, the federal government needs to adopt policies that reduce GHG emissions. With comprehensive federal policy and constructive international engagement, the United States can harness the power of markets to drive innovation and protect the climate.

Pew Center on Global Climate Change
2101 Wilson Blvd., Suite 550
Arlington, VA 22201
Phone (703) 516-4146
www.pewclimate.org

The Pew Center on Global Climate Change is a non-profit, non-partisan, independent organization dedicated to providing credible information, straight answers, and innovative solutions in the effort to address global climate change.

Pew Center on Global Climate Change

More information on climate change solutions is available at www.pewclimate.org.

