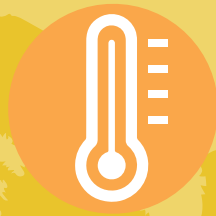


2014

FIRST BIENNIAL REPORT OF THE UNITED STATES OF AMERICA

Under the United Nations Framework
Convention on Climate Change





THE SECRETARY OF STATE
WASHINGTON

Climate change is one of the most urgent and profoundly complex challenges we face. That's why, everywhere I travel as Secretary of State – in every meeting, here at home and across the more than 280,000 miles I've traveled since I raised my hand and took the oath to serve in this office – I have made this issue a top priority.

Today, all the scientific evidence is telling us that we cannot afford to delay the reckoning with climate change. With each passing day, the case grows more compelling and the costs of inaction grow beyond anything that anyone with conscience or common sense should be willing to contemplate.

The IPCC's Fifth Assessment Report is another wakeup call. It marshals unassailable evidence of the perils of inaction: Summertime Arctic sea ice volume has shrunk by 70 percent since 1979, 12 of the hottest 13 years on record have occurred since 2000, and the oceans are 30 percent more acidic than they were a century ago. Bottom line: Climate change is real, it's happening now, and human beings are the cause.

In the face of these risks and these warnings, it is time for all of us to do what the science tells us we must, to do what our faiths require of us, and to do what our fragile planet demands of us: It's time to take strong action to combat a truly life-and-death challenge.

Today, people all over the world are demanding action on climate change, and those of us in positions of authority globally have a responsibility to lead the way toward progress. The United States is committed to doing its part.

That's why I am pleased to present this 2014 Climate Action Report to the United Nations Framework Convention on Climate Change (UNFCCC). This report contains our national communication – a quadrennial report detailing actions the United States is taking at home and internationally to mitigate, adapt to, and assist others in addressing climate change as part of our commitments under the UNFCCC.

The report builds on the most authoritative assessments of climate change. It outlines U.S. efforts to promote the research, development, and deployment of technologies to reduce greenhouse gas emissions. It highlights our substantial and growing efforts to support developing countries in the global response to climate change. It also details the financial assistance, education programs, and policies and measures we've implemented both to reduce greenhouse gases and to adapt to the effects of climate change.

I am especially pleased that the 2014 Climate Action Report contains the United States' first-ever Biennial Report, which outlines our plan to reduce greenhouse gas emissions trends even further through 2020. The agreement within the UNFCCC to submit biennial reports represents one of the most significant outcomes from recent negotiations. It is a critical means of ensuring that the parties are implementing the pledges they made under the Cancun decisions. The U.S. Biennial Report shows we are working toward meeting our Cancun commitments by taking action to reduce emissions across our energy economy, as well as in the land sector.

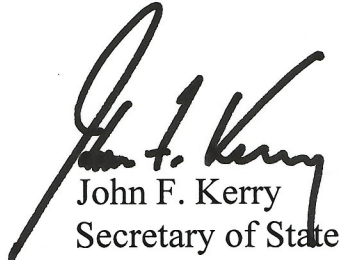
The path to progress has been long. But I'm proud to say that we are closer than we've ever been to a breakthrough.

Under President Obama's leadership, we have doubled wind and solar electricity generation; adopted the toughest fuel economy standards for passenger vehicles in U.S. history; advanced environmental standards to expedite the transition to cleaner and more efficient fuels in power plants; and increased the energy efficiency of our homes, industries, and businesses.

We know from history that fundamental change never comes easily or without a fight. But we're already seeing results. Just look at the facts: Since 2005, our emissions have fallen 6.5 percent, even as our economy continues to grow. What's more, we significantly scaled up our financial assistance to help developing countries mitigate and adapt to the effects of climate change.

We know we must do more, and believe me: we are. President Obama's Climate Action Plan will keep the United States on track to reach our goal of reducing U.S. greenhouse gas emissions in the range of 17 percent below 2005 levels by 2020. Commitments like this are an important signal to the world that America is ready to act.

This is a test of our leadership in the century ahead. We are not just the “indispensable nation” – today we must be the indispensable stewards of our shared planet. Strong, transparent action from all countries contributing to climate change is necessary to solve the global climate challenge. I am pleased to present this report, which demonstrates this Administration’s commitment to leading the fight to confront climate change head-on, for our children and generations to come.



John F. Kerry
Secretary of State

2014

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Acronyms and Abbreviations

AB	Assembly Bill
AIP	Africa Infrastructure Program
Btu	British thermal unit
°C	degree Centigrade
CAP	2013 <i>Climate Action Plan</i>
CAR	<i>U.S. Climate Action Report</i>
CH₄	methane
CO₂	carbon dioxide
CO₂e	carbon dioxide equivalents
COP	Conference of the Parties
CSP	Climate Services Partnership
CTF	Clean Technology Fund
DC	direct current
DOI	U.S. Department of the Interior
DOS	U.S. Department of State
EC-LEDS	Enhancing Capacity for Low-Emission Development Strategies
EOP	Executive Office of the President
EPA	U.S. Environmental Protection Agency
EUPP	Energy Utility Partnership Program
Ex-Im	Export-Import Bank of the United States
°F	degree Fahrenheit
FCMC	Forest Carbon, Markets and Communities
FEWS NET	Famine Early Warning Systems Network
FSF	fast start finance
FY	fiscal year
G-20	Group of Twenty
GHG	greenhouse gas
GWP	global warming potential

HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
HIAMAP	High Mountains Adaptation Partnership
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram
lb	pound
LEAP	Lighting and Energy Access Partnership
LULUCF	land use, land-use change, and forestry
MCC	Millennium Challenge Corporation
MM	million
MMBtu	million British thermal units
MW	megawatts
MWh	megawatt-hour
MY	model year
N₂O	nitrous oxide
NASA	National Aeronautics and Space Administration
NCDC	National Clean Diesel Campaign
NF₃	nitrogen trifluoride
OAP	Office of Atmospheric Programs
OPIC	Overseas Private Investment Corporation
PFAN	Private Financing Advisory Network
PFC	perfluorocarbon
PPD	Presidential Policy Directive on Global Development
REDD+	reducing emissions from deforestation and forest degradation
RGGI	Regional Greenhouse Gas Initiative
RPS	renewable energy portfolio standard
SAR	Second Assessment Report
SEAD	Super-Efficient Equipment and Appliances Deployment
SERVIR	Regional Visualization and Monitoring System
SF₆	sulfur hexafluoride
SNAP	Significant New Alternatives Policy Program
Tg	teragram
UNFCCC	United Nations Framework Convention on Climate Change
U.S.-ACEF	U.S.-Africa Clean Energy Finance
USAID	U.S. Agency for International Development
USFS	U.S. Forest Service
VOCTEC	Vocational Training and Education for Climate Energy



U.S. Biennial Report

The *U.S. Biennial Report*, as part of the 2014 *U.S. Climate Action Report*, outlines how U.S. action on climate change puts the United States on a path to reach the ambitious but achievable goal of reducing U.S. greenhouse gas (GHG) emissions in the range of 17 percent below 2005 levels by 2020.

During 2009-2011, average U.S. GHG emissions fell to the lowest level for any three-year period since 1994-1996, due to contributions from both economic factors and government policies. The United States has made significant efforts over the past five years, and our progress can be attributed in part to these efforts, including stringent, long-term standards for vehicle GHG emissions and efficiency, increased building and appliance efficiency, and doubling electricity generation from wind and solar.

The President's Climate Action Plan (EOP 2013a), released in June 2013, builds upon the progress of the past five years and outlines significant additional actions that are necessary to maintain the downward trend in U.S. GHG emissions, such as putting in place new rules to cut carbon pollution from the power sector, increasing energy efficiency, and reducing methane (CH₄) and hydrofluorocarbon (HFC) emissions. The plan also initiates efforts to bolster the capacity of our forests and other lands to continue sequestering carbon in the face of a changing climate and other pressures. We expect that implementation of these actions will achieve substantial additional emission reductions.

This report is a first step toward tracking our progress toward meeting the U.S. 2020 emission reduction goal. It represents an assessment of the range of GHG emission reductions that implementation of a collection of actions across sectors of the economy, consistent with those included in *The President's Climate Action Plan*, can achieve. Over the coming years, as standards and policies are put in place, we will sharpen our estimates of achievable emission reductions.

In addition, this report discusses U.S. actions to assist developing countries in their efforts to mitigate and adapt to climate change. The United States is engaging the full range of institutions—bilateral, multilateral, development finance, and export credit—to mobilize private finance and invest strategically in building lasting resilience to unavoidable climate impacts; to reduce emissions from deforestation and land degradation; and to support low-carbon development strategies and the transition to a sustainable, clean energy economy.

1. FACING THE CLIMATE CHALLENGE

The most significant long-term environmental challenge facing the United States and the world is climate change that results from anthropogenic emissions of GHGs. The scientific consensus, as reflected in the most recent Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC) is that anthropogenic emissions of GHGs are causing changes in the climate that include rising average national and global temperatures, warming oceans, rising average sea levels, more extreme heat waves and storms, extinctions of species, and loss of biodiversity (IPCC 2007, 2013).¹

¹ The Working Group I contribution (*The Physical Science*) to the IPCC's Fifth Assessment was approved and accepted by governments in Stockholm, Sweden, and ultimately released in September 2013. It is available online at www.climatechange2013.org. The Working Group II (*Impacts, Adaptation and Vulnerability*) and Working Group III (*Mitigation*) reports are scheduled for government approval and release in March and April 2014, respectively.

Climate change is no longer a distant threat. Average U.S. temperature has increased by about 0.8°C (1.5°F) since 1895; more than 80 percent of this increase has occurred since 1980. The warmest year ever recorded in the contiguous United States was 2012, when about one-third of all Americans experienced 10 days or more of 38°C (100°F) temperatures. Globally, the 12 hottest years on record have all come in the last 15 years (NOAA/NCDC 2012b).

These changes come with far-reaching consequences and real economic costs. In 2012 alone, there were 11 different weather and climate disaster events across the United States, with estimated losses exceeding \$1 billion each (NOAA/NCDC 2012a). Taken together, these 11 events resulted in more than \$110 billion in estimated damages, which made 2012 the second-costliest year on record, affecting many regions of the country and virtually all economic sectors. Although no individual event can be attributed to climate change alone, rising global temperatures are increasing the severity and costs associated with extreme weather events.

We have an obligation to current and future generations to take action to meet this challenge. By building on important progress achieved during the President's first term, the United States plans to meet its commitment to cut GHGs in the range of 17 percent below 2005 levels by 2020 and make additional progress toward forging a robust international response to this global challenge. We will also improve our ability to manage the climate impacts that are already being felt at home and around the world. Preparing for increasingly extreme weather and other consequences of climate change will save lives now and help to secure long-term American and global prosperity and security.

2. A COMMITMENT TO ACT

Key Pillars of *The President's Climate Action Plan*

On June 25, 2013, President Obama laid out a comprehensive plan to reduce GHG pollution, prepare the country for the impacts of climate change, and lead global efforts to fight climate change (EOP 2013a). *The President's Climate Action Plan*, which consists of a variety of executive actions grounded in existing legal authorities, has three key pillars.

Reduce U.S. GHG Emissions

During 2009–2011, average U.S. GHG emissions fell to the lowest level for any three-year period since 1994–1996, due to contributions from both economic factors and government policies. To build on this progress, the Obama administration is putting in place robust new rules to cut GHG emissions. The plan includes such steps as developing the first-ever national carbon pollution standards for both new and existing power plants, under the Clean Air Act; establishing post-2018 advanced fuel efficiency and GHG emission standards for heavy-duty vehicles; setting a new goal to double electricity generation from wind and solar power; boosting energy efficiency in appliances, homes, buildings, and industries; reducing emissions of highly potent hydrofluorocarbons (HFCs); developing a comprehensive methane emissions reduction strategy; and advancing efforts to protect our forests and other critical landscapes.

Prepare the United States for the Impacts of Climate Change

Even as we take new steps to reduce carbon pollution, we must also prepare for the impacts of a changing climate that are already being felt across the country. Building on its ongoing efforts to strengthen America's climate resilience, the Obama administration will continue to work with state and local governments to prepare for the unavoidable impacts of climate change by establishing policies that promote national resilience; supporting science and research that allow climate risk to be integrated into decision making; and protecting critical infrastructure and natural resources, to better protect people's homes, businesses, and ways of life from severe weather. In November, 2013, President Obama signed Executive Order 13653, *Preparing the United States for the Impacts of Climate Change* (EOP 2013b), and created the Task Force of Governors, Mayors, Tribal Leaders, and local officials to share approaches and advise the federal government on building preparedness and resilience across the United States.

Lead International Efforts to Combat Global Climate Change and Prepare for Its Impacts

Just as no country is immune from the impacts of climate change, no country can meet this challenge alone. That is why it is imperative for the United States to couple action at home

with leadership internationally. America is working to help forge a truly global solution to this global challenge by galvanizing international action to significantly reduce emissions, prepare for climate impacts, and drive progress through international negotiations.

Building on Success

The President's Climate Action Plan builds on the successes achieved in the first five years of the Obama administration and initiates additional actions that will put the United States on a course to meet its goal of reducing emissions in the range of 17 percent below 2005 levels by 2020. The rest of this report is organized as follows: section 3 outlines the U.S. 2020 emission reduction goal and how progress toward it will be measured; section 4 explains U.S. GHG emission trends from 1990 through 2011 and key emission drivers; section 5 summarizes significant actions taken in the first term of the Obama administration to reduce GHG emissions; section 6 outlines the suite of new major actions in *The President's Climate Action Plan* to tackle this anticipated growth in emissions; section 7 presents projections of the emission reductions that could be achievable through a range of additional actions, consistent with implementation of the Climate Action Plan and measured against the U.S. 2020 goal; and section 8 summarizes international climate finance the United States has provided to developing countries.

3. 2020 GOAL: TRACKING PROGRESS

In 2009, the United States made a commitment to reduce U.S. GHG emissions in the range of 17 percent below 2005 levels by 2020. The President remains firmly committed to that ambitious goal and to building on the progress of his first term to help put the nation and the world on a sustainable long-term emissions trajectory. Although there is more work to do, the United States has already made significant progress, including doubling generation of electricity from wind and solar power and establishing historic new fuel economy standards. Building on these achievements, *The President's Climate Action Plan* lays out additional executive actions the administration will take, in partnership with states, communities, and the private sector, to continue on a path toward meeting the U.S. 2020 goal (EOP 2013a). (Section 7 lays out in detail the full scope of executive actions contained in the President's plan.)

The United States is committed to providing regular, transparent updates on progress toward meeting its 2020 goal. Progress will be tracked and reported annually, using the official national GHG inventory, prepared using IPCC and United Nations Framework Convention on Climate Change (UNFCCC) inventory guidelines (IPCC 2006, UNFCCC 2006). These reports provide annual information on the full scope of our 2020 goal, based on emissions and removals (taking into account emissions absorbed by U.S. forests and other lands) resulting from all sectors of the economy, and including all primary GHGs (carbon dioxide [CO₂], CH₄, nitrous oxide [N₂O], HFCs, perfluorocarbons [PFCs], sulfur hexafluoride [SF₆], and nitrogen trifluoride [NF₃]) (Table 1). This inventory-based accounting approach means that the U.S. goal is truly comprehensive, including the full scope of emissions included under the UNFCCC inventory that contribute to global climate change.

The institutional arrangements for measuring progress toward the goal are explained in more detail in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2011*, in Section 1.2 on Institutional Arrangements (U.S. EPA/OAP 2013). The U.S. Environmental Protection Agency (EPA), in cooperation with other U.S. government agencies, prepares the annual U.S. GHG inventory. A range of agencies and individuals are involved in supplying data to, reviewing, or preparing portions of the inventory, including federal and state government authorities, research and academic institutions, industry associations, and private consultants. Information on methods and arrangements for tracking progress on individual policies and measures implemented or planned by agencies across the U.S. government are provided in Chapter 4 of the *Sixth National Communication*.

4. U.S. GREENHOUSE GAS EMISSIONS AND TRENDS

According to the most recent national GHG inventory, in 2011 U.S. GHG net emissions—including land use, land-use change, and forestry (LULUCF)—were 5,797 teragrams (Tg) of CO₂ equivalents (CO₂e). This represents a 6.5 percent reduction below 2005 levels. Even with

continued economic growth, annual net emissions have declined annually by 1.1 percent on average since 2005, a reversal of past trends of average annual increases of 1.0 percent per year from 1990 to 2005. In 2011, net emissions were down 2.0 percent from 2010 levels (Figure 1).

Carbon Dioxide Emissions

U.S. emissions of carbon dioxide (CO₂), the primary GHG emitted by human activities in the United States, have significantly declined. In 2011, CO₂ emissions represented more

Table 1 **Key Parameters of the U.S. Economy-wide Emission Reduction Targets**

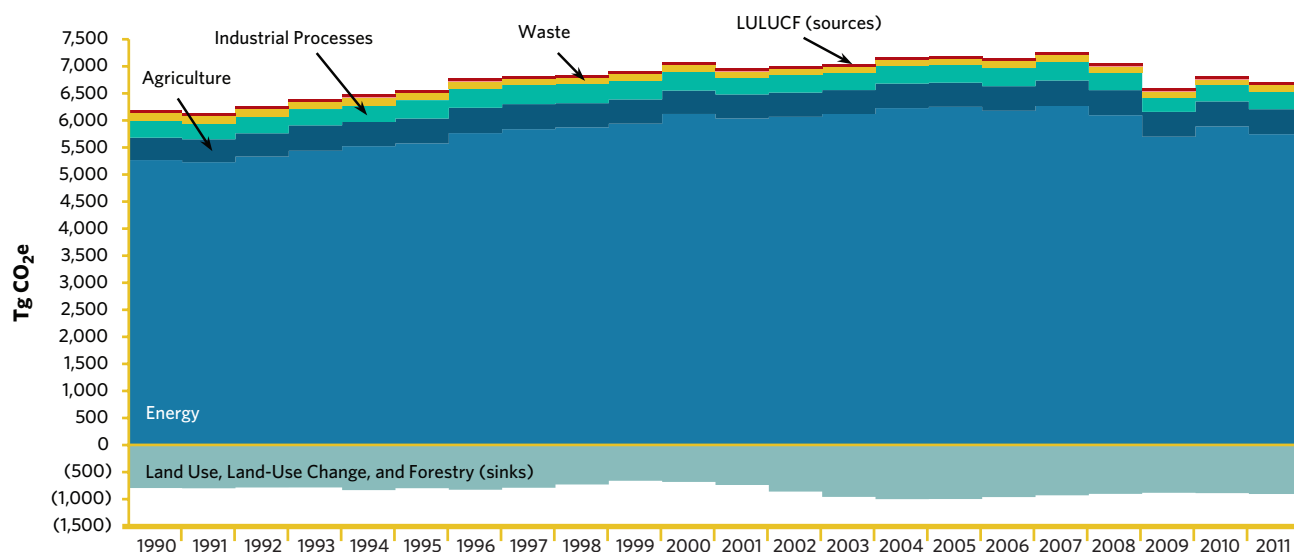
Parameters	Targets
Base Year	2005
Target Year	2020
Emission Reduction Target	In the range of 17 percent below 2005 levels.
Gases Covered	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , and NF ₃ .
Global Warming Potential	100-year values from the IPCC Fourth Assessment Report (IPCC 2007).
Sectors Covered	All IPCC sources and sectors, as measured by the full annual inventory (i.e., energy, transport, industrial processes, agriculture, LULUCF, and waste).
Land Use, Land-Use Change, and Forests (LULUCF)	Emissions and removals from the LULUCF sector will be accounted using a net-net approach and a 2005 base year, including a production approach to account for harvested wood products. The United States is considering approaches for identifying the impact of natural disturbances on emissions and removals.
Other	To be in conformity with U.S. law.

Notes:

- Consistent with the formal UNFCCC inventory reporting guidelines for developed countries (IPCC 2006), the Inventory of U.S. Greenhouse Gas Emissions and Sinks, which will be submitted to the UNFCCC in April 2015, will utilize 100-year global warming potential values from the IPCC Fourth Assessment Report (IPCC 2007).

- CH₄ = methane; CO₂ = carbon dioxide; HFCs = hydrofluorocarbons; IPCC = Intergovernmental Panel on Climate Change; N₂O = nitrous oxide; NF₃ = nitrogen trifluoride; PFCs = perfluorocarbons; SF₆ = sulfur hexafluoride.

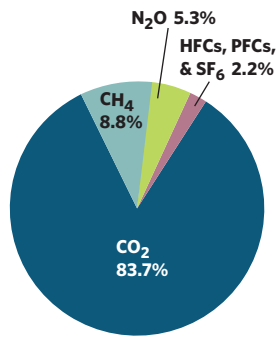
Figure 1 **1990–2011 U.S. Greenhouse Gas Emissions and Removals by Source**



Source: U.S. EPA/OAP 2013.

Note: The 2013 U.S. GHG inventory is calculated using global warming potential values from the IPCC Second Assessment Report (IPCC 1996).

Figure 2
2011 Greenhouse Gas Emissions by Gas



Note: Percentages based on Tg CO₂e. The 2013 U.S. GHG inventory is calculated using global warming potential values from the IPCC Second Assessment Report (IPCC 1996).

Source: U.S. EPA/OAP 2013.

than 80 percent of total U.S. GHG emissions (Figure 2). From 1990 through the mid-2000s, energy-related CO₂ emissions increased from approximately 5,100 Tg to a peak of just over 6,100 Tg in 2007. CO₂ emissions fell sharply, to approximately 5,500 Tg in 2011, down 8.0 percent from 2005 levels.

Emissions from fossil fuel combustion, the largest source of CO₂ emissions (94 percent, excluding removals from LULUCF) and of overall gross GHG emissions (79 percent, excluding removals from LULUCF) decreased at an average annual rate of 1.4 percent from 2005 through 2011. Historically, changes in emissions from fossil fuel combustion have been the dominant factor affecting U.S. emission trends. According to the U.S. Energy Information Administration, in 2012, approximately 82 percent of the energy consumed in the United States (on a British thermal unit [Btu] basis) was produced through the combustion of fossil fuels.² The remaining 18 percent came from other energy sources, such as hydropower, biomass, and nuclear, wind, and solar energy (Figure 3).

The five major fuel-consuming sectors contributing to CO₂ emissions from fossil fuel combustion are electricity generation and the transportation, industrial, residential, and commercial “end-use” sectors. The electricity generation sector produces CO₂ emissions as it consumes fossil fuel to provide electricity to one of the other four sectors. For the following discussion, emissions from electricity generation have been distributed to each end-use sector on the basis of each sector’s share of aggregate electricity consumption.

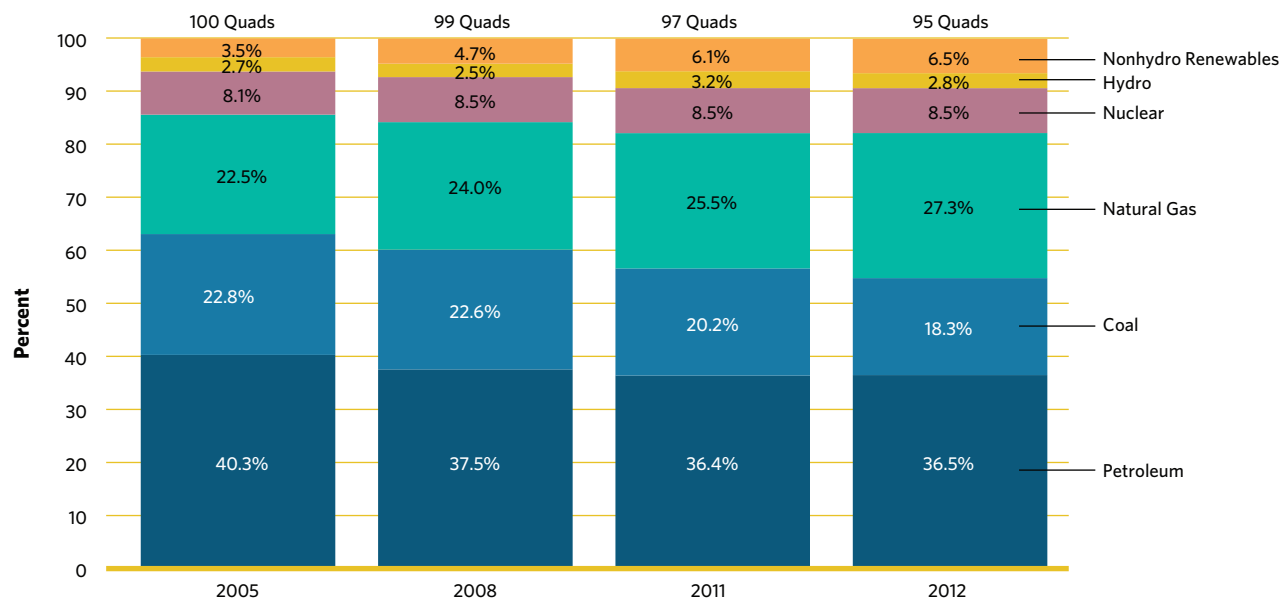
Electricity Generation

The United States relies on electricity to meet a significant portion of its energy demands. Electricity generators consumed 36 percent of U.S. energy from fossil fuels and emitted 41 percent of the CO₂ from fossil fuel combustion in 2011. Principally due to a shift from coal to natural gas, as well as rapidly growing deployment of renewable sources of energy, CO₂ emissions from electricity generation **decreased by 10 percent below 2005 levels in 2011**.

Transportation End-Use Sector

Transportation activities (excluding international bunker fuels) accounted for 33 percent of CO₂ emissions from fossil fuel combustion in 2011. Virtually all of the energy consumed in this end-use sector came from petroleum products. Nearly 63 percent of the emissions resulted from gasoline consumption for personal vehicle use. The remaining emissions came from

Figure 3 **U.S. Primary Energy Profile Highlights: 2005-2012**



Source: U.S. DOE/EIA 2013h.

other transportation activities, including the combustion of diesel fuel in heavy-duty vehicles and jet fuel in aircraft. From 2005 through 2011, transportation emissions **dropped by 8 percent** due, in part, to increased fuel efficiency across the U.S. vehicle fleet, as well as higher fuel prices, and an associated decrease in the demand for passenger transportation.

Industrial End-Use Sector

Industrial CO₂ emissions, resulting both directly from the combustion of fossil fuels and indirectly from the generation of electricity that is consumed by industry, accounted for 26 percent of CO₂ from fossil fuel combustion in 2011. Emissions from industry have steadily **declined since 2005 (11.2 percent)**, due to structural changes in the U.S. economy (e.g., shifts from a manufacturing-based to a service-based economy), fuel switching, and efficiency improvements.

Residential and Commercial End-Use Sectors

The residential and commercial end-use sectors accounted for 21 and 18 percent, respectively, of CO₂ emissions from fossil fuel combustion in 2011, including each sector's "indirect" emissions from electricity consumption. Both sectors relied heavily on electricity to meet energy demands; 71 and 77 percent, respectively, of residential and commercial emissions were attributable to electricity consumption for lighting, heating, cooling, and operating appliances. Emissions from the residential and commercial end-use sectors, including direct and indirect emissions from electricity consumption, have **decreased by 7.3 percent and 6.5 percent since 2005**, respectively.

Methane Emissions

CH₄ emissions **decreased by 1.1 percent since 2005**, primarily resulting from the following sources: natural gas systems, enteric fermentation associated with domestic livestock, and decomposition of wastes in landfills. Emissions from natural gas systems, the largest anthropogenic source of CH₄ emissions, have **decreased by 9 percent since 2005**, due largely to a decrease in emissions from field production.

Nitrous Oxide Emissions

Agricultural soil management, mobile source fuel combustion, and stationary fuel combustion were the major sources of N₂O emissions, which **increased slightly from 2005 levels**. Making up 70 percent of total N₂O emissions, highly variable agricultural sector factors—including weather, crop production decisions, and fertilizer application patterns—are the main factors that influence overall N₂O levels.

Hydrofluorocarbon, Perfluorocarbon, and Sulfur Hexafluoride Emissions

Despite being emitted in smaller quantities relative to the other principal GHGs, emissions of HFCs, PFCs, and SF₆ are a significant and growing share of U.S. emissions because many of these gases have extremely high global warming potentials and, in the cases of PFCs and SF₆, long atmospheric lifetimes. Emissions of substitutes for ozone-depleting substances and emissions of HFC-23 during the production of hydrochlorofluorocarbon (HCFC)-22 were the primary contributors to aggregate HFC emissions, which as a class of fluorinated gases **increased by 12.2 percent since 2005**. PFC emissions **rose by 13 percent**, resulting from semiconductor manufacturing and as a by-product of primary aluminum production. Electrical transmission and distribution systems accounted for most SF₆ emissions, which **were down 37 percent** from 2005 levels in 2011.

Land Use, Land-Use Change, and Forestry

LULUCF activities in 2011 resulted in a net carbon sequestration of 905 Tg CO₂e, which, in aggregate, **offset 13.5 percent of total U.S. GHG emissions**. Forest management practices, tree planting in urban areas, the management of agricultural soils, and growth in other carbon pools resulted in a net uptake (sequestration) of carbon in the United States. Forests (including vegetation, soils, and harvested wood) accounted for 92 percent of total 2011 net CO₂ flux; urban trees accounted for 8 percent; and mineral and organic soil carbon stock changes combined with landfilled yard trimmings and food scraps together accounted for less than 1

percent. The net forest sequestration is a result of net forest growth and increasing forest area, as well as a net accumulation of carbon stocks in harvested wood pools. Forest carbon estimates, with the exception of CO₂ fluxes from wood products and urban trees, are calculated annually based on activity data collected through forest and land-use surveys conducted at multiple-year intervals ranging from 1 to 10 years.

5. FIVE YEARS OF SIGNIFICANT NEW ACTION

The past five years have seen a remarkable turnaround in U.S. GHG emissions, due in part to the unprecedented action taken by the Obama administration to tackle climate change. During the past five years, the United States has taken a series of important steps that not only reduce the harmful emissions that contribute to climate change, but also improve public health, while protecting America's water and air.

In the past five years, the United States has pursued a combination of near- and long-term, regulatory and voluntary activities to reduce GHG emissions. Policies and measures are being implemented across the economy, including in the transportation, energy supply, energy end-use, industrial, agricultural, land use and forestry, and waste sectors, and in federal facilities. These cross-cutting policies and measures encourage cost-effective reductions across multiple sectors. Chapter 4 of the *Sixth National Communication* outlines in more detail the full set of policies and measures adopted and implemented since 2010, organized by sector and by gas. Table 4-2 of the chapter includes measured GHG emission reductions achieved in 2011, and estimated emission reductions expected from each policy and measure in 2020.

National Achievements

Increased the Efficiency of Cars and Trucks

The United States is aggressively working to reduce GHG pollution from America's vehicles. The Obama administration has adopted the toughest fuel economy and GHG emission standards for passenger vehicles in U.S. history, requiring an average performance equivalent of 54.5 miles per gallon by 2025, if achieved through fuel economy improvements alone. These standards are projected to reduce oil consumption by more than 2 million barrels per day in 2025 and will cut 6 billion metric tons of GHGs over the lifetime of model year (MY) 2012–2025 vehicles. The administration has also finalized the first-ever national fuel efficiency and GHG emission standards for commercial trucks, vans, and buses for MYs 2014–2018. Under President Obama's leadership, the nation has also made critical investments in advanced vehicle and fuel technologies, public transit, and high-speed rail.

Delivered on a Commitment to Double Generation of Electricity from Wind and Solar Sources

Since 2008, the United States has doubled renewable generation from wind and solar sources, helping to develop nearly 50,000 new clean energy projects that are supporting jobs throughout the country. In 2012, the President set a goal to permit 10,000 megawatts (MW) of renewable energy sources on public lands—a goal the U.S. Department of the Interior (DOI) has achieved. America is now home to some of the largest wind and solar farms in the world.

Cut Pollution and Saved Money for Consumers through Energy Efficiency

During President Obama's first term, significant progress was made in cutting domestic carbon pollution and reducing consumer energy bills by setting appliance efficiency standards for nearly 40 products; weatherizing more than 1 million homes; recognizing superior energy savings across more than 65 product categories, new single and multifamily homes, 16 commercial building space types, and 12 manufacturing plant types that can earn the ENERGY STAR label; and forging additional private and public partnerships to drive investments in energy efficiency across sectors.

Issued Federal Air Standards for the Oil and Natural Gas Industry

In 2012, EPA issued cost-effective regulations to reduce harmful air pollution from the oil and natural gas industry, while allowing continued, responsible growth in U.S. oil and natural gas production. The final rules include the first national air standards for natural gas wells that are hydraulically fractured. The final rules are expected to yield a nearly 95 percent reduction in volatile organic compound emissions from regulated emission sources and, as a co-benefit, significant methane emission reductions, estimated at 32.6 Tg CO₂e in 2015 and 39.9 Tg CO₂e in 2020.

Cut Federal Government Carbon Pollution

In 2010, President Obama announced that the federal government would reduce its direct GHG emissions by 28 percent from 2008 levels by 2020. Agencies are also meeting the directive to enter into performance-based contracts to achieve substantial energy savings at no net cost to American taxpayers.

Regional, State, and Local Achievements

Within the United States, several regional, state, and local policies and initiatives complement federal efforts to reduce GHG emissions. These include actions that directly regulate GHG emissions, as well as policies that indirectly reduce emissions. The Obama administration supports state and local government actions that reduce GHG emissions by sponsoring policy dialogues, issuing technical documents, facilitating consistent measurement approaches and model policies, and providing direct technical assistance. Such federal support helps state and local governments learn from each other to leverage best practice approaches, helping reduce overall time and costs for both policy adoption and implementation. A full discussion of state and local efforts can be found in Chapter 4 of the *Sixth National Communication*. Following is a sample of major regional, state, and local efforts currently underway.

State Emission Targets

As of August 2013, 29 states had adopted some form of state GHG reduction targets or limits, which vary in stringency, timing, and enforceability. Statewide GHG targets are nonregulatory commitments to reduce GHG emissions to a specified level in a certain timeframe (e.g., 1990 levels by 2020). Such targets can be included in legislation, but are more typically established by the state's governor in an executive order or a state advisory board in a climate change action plan. Statewide GHG *limits* reduce emissions within a certain timeframe, but are regulatory in nature and more comprehensive than emission targets. These policies can include regulations to require GHG emission reporting and verification, and may establish authority for monitoring and enforcing compliance.

Regional Greenhouse Gas Initiative (RGGI)

Launched on January 1, 2009, RGGI is the first U.S. mandatory market-based cap-and-trade program to reduce GHG emissions. RGGI currently applies to 168 electricity-generation facilities in nine Northeast and Mid-Atlantic states, which account for approximately 95 percent of CO₂ emissions from electricity generation in the region. In February 2013, the participating states agreed to make significant revisions to the program, capping CO₂ emissions at 91 million short tons per year in 2014—a 45 percent reduction from the previous cap of 165 million short tons. The cap will then be reduced by 2.5 percent each year from 2015 through 2020.

Under the initiative, nearly 90 percent of allowances are distributed through auction. As of March 2013, cumulative auction proceeds exceeded \$1.2 billion. Participating states have invested approximately 80 percent of auction proceeds in consumer benefit programs, including investments in end-use energy efficiency and renewable energy deployment programs at the state and local levels.³

California's Global Warming Solutions Act (AB 32)

Signed into law in 2006, AB 32 established a statewide GHG emissions limit of 1990 levels to be achieved by 2020. As part of a portfolio of measures implemented to achieve this statewide GHG emissions limit, the California Air Resources Board adopted cap-and-trade regulations in 2011. The regulations established a declining cap on sources responsible for approximately 85 percent of statewide GHG emissions, including refineries, power plants, industrial facilities, and transportation fuels. In addition, the portfolio of programs implemented to achieve the statewide GHG emissions limit under AB 32 includes a mandatory GHG emissions reporting program for large emitters, a renewable portfolio standard, and various energy efficiency measures and incentives.⁴

Power Sector Standards

As of February 2013, three states (New York, Oregon, and Washington) have GHG emission standards for electric-generating utilities, requiring power plants to have emissions equivalent to or lower than the established standard. For example, in New York, new or expanded

³ See www.rggi.org.

⁴ See <http://www.arb.ca.gov/cc/ab32/ab32.htm>.

baseload plants (25 MW and larger) must meet an emission rate of either 925 pounds (lb) of CO₂ per megawatt-hour (MWh) (output based) or 120 lb CO₂/per million British thermal units (MMBtu) (input based). Non-baseload plants (25 MW and larger) must meet an emission rate of either 1,450 lb CO₂/MWh (output based) or 160 lb CO₂/MMBtu (input based).

Three states (California, Oregon, and Washington) also have standards that apply to electric utilities that provide electricity to retail customers. These standards place conditions on the emission attributes of electricity procured by electric utilities. And as of January 2013, 29 states had a renewable portfolio standard, which requires utilities to supply a certain amount of electricity to customers from renewable energy sources or install a certain amount of electricity-generating capacity from renewable energy sources in a set time frame. Standards can vary, with annual or cumulative targets.

Energy Efficiency Programs and Standards

As of August 2013, 18 states have mandatory energy efficiency resource standards in place, which require utilities to reduce energy use by a certain percentage or amount each year. Many of these utilities use public benefit funds to invest in energy efficiency projects. Also, as of August 2013, 19 states, Washington, D.C., and Puerto Rico have some form of public benefit fund policy in place, in which utility consumers pay a small charge to a common fund that is then used to invest in energy efficiency and renewable energy projects and programs. In addition, many state and local governments lead by example by establishing programs to reduce energy bills and emissions in their own operations and buildings.

6. LOOKING AHEAD—THE PRESIDENT'S CLIMATE ACTION PLAN

During the President's first term, the United States made significant progress in several key sectors, through federal as well as state and local actions, in reducing U.S. GHG emissions. Significant new measures will be required to stay on track to reach the U.S. goal of achieving reductions in the range of 17 percent below 2005 levels by 2020. By building on the success of the first term, the United States can achieve substantial further emission reductions consistent with this ambitious goal.

In his 2013 State of the Union Address, President Obama called on Congress to pursue a bipartisan, market-based approach to combating climate change.⁵ In the absence of congressional action to date, the President has laid out a comprehensive *Climate Action Plan* of executive actions, grounded in existing legal authorities, that will be implemented across U.S. government agencies to reduce GHGs, prepare our cities and nation for the worsening effects of climate change, and accelerate the transition to more sustainable sources of energy (EOP 2013a).

The first pillar of the President's plan focuses on tackling U.S. emissions of GHGs by taking the following actions.

Cutting Carbon Pollution from Power Plants

The President has directed EPA to work closely with states and other stakeholders to establish carbon pollution standards for both new and existing power plants. EPA is moving forward on the President's plan. For newly built power plants, EPA issued a new proposal on September 20, 2013. Issuance of the new proposal, together with the ensuing rulemaking process, will advance adoption of carbon pollution standards for new power plants reflect recent developments and trends in the power sector. The new proposal, comment period, and public hearings will allow an open and transparent review and robust input on the broad range of technical and legal issues contained among the more than 2.5 million comments generated by the first proposal submitted by EPA in April 2012. For existing power plants, the plan directs EPA to issue a draft rule by June 2014 and a final rule by June 2015.

Promoting American Leadership in Renewable Energy

During the President's first term, the United States more than doubled generation of electricity from wind and solar sources. To continue U.S. leadership in clean energy, President Obama has set a goal to double renewable electricity generation from wind and solar once again by 2020. To meet this ambitious target, the President directed DOI to permit enough renewable energy projects on public lands by 2020 to power more than 6 million homes; designated the

⁵ See <http://www.whitehouse.gov/state-of-the-union-2013>.

first-ever hydropower project for priority permitting; and set a new goal to install 100 MW of renewable power in federally assisted housing by 2020, while expanding and modernizing the electric grid to make electricity more reliable and promote clean energy sources.

Unlocking Long-Term Investment in Clean Energy Innovation

The plan furthers the President's commitment to keeping the United States at the forefront of clean energy research, development, and deployment. The President's fiscal year (FY) 2014 budget requested increasing funding for clean energy technology across all government agencies by 30 percent, to approximately \$7.9 billion. This includes investment in a range of energy technologies, from advanced biofuels and emerging nuclear technologies to clean coal.

Expanding the President's Better Buildings Challenge

Focused on helping American commercial and industrial buildings become at least 20 percent more energy efficient by 2020, the Better Buildings Challenge is already showing results: first-year results show that the Challenge Partners are on track to meet the 2020 goal. To continue this success, the Obama administration has expanded the program to multifamily housing, partnering with private and affordable building owners and public housing agencies to cut energy waste, and launched the Better Buildings Accelerators to support state and local government-led efforts to reduce energy waste.

Establishing a New Goal for Energy Efficiency Standards

The plan sets a new goal to establish efficiency standards for appliances and federal buildings, which will reduce carbon pollution by at least 3 billion metric tons cumulatively by 2030—more than half of the annual carbon pollution from the U.S. energy sector.

Advancing Vehicle Fuel Efficiency and Greenhouse Gas Emission Standards

In 2011, the Obama administration finalized the first-ever fuel efficiency and GHG emission standards for heavy-duty trucks, buses, and vans, specifically for MYs 2014–2018. The administration will seek input from industry and stakeholders as it develops fuel efficiency and GHG emission standards for heavy-duty vehicles beyond 2018.

Curbing Emissions of Hydrofluorocarbons

The United States will lead efforts to curb global HFC emissions through both international diplomacy as well as domestic actions, building on its success in addressing HFC leakage from vehicle air conditioning systems through flexible approaches within the U.S. vehicle GHG standards. Moving forward, EPA will use its authority through the Significant New Alternatives Policy (SNAP) Program to encourage private-sector investment in low-emission technology by identifying and approving climate-friendly chemicals, while prohibiting certain uses of the most harmful chemical alternatives. In addition, the President has directed the federal government to purchase cleaner alternatives to HFCs whenever feasible, and to transition over time to equipment that uses safer and more sustainable alternatives.

Reducing Methane Emissions

Methane emissions will be addressed by developing a comprehensive, interagency methane strategy, focusing on assessing current emissions data, addressing data gaps, identifying technologies and best practices for reducing emissions, and identifying existing authorities and incentive-based opportunities to reduce methane emissions. As part of this strategy, the administration will also work collaboratively with state governments, as well as the private sector, to reduce emissions across multiple sectors.

Preserving the Role of Forests in Mitigating Climate Change

Mitigation across the forest sector will be addressed by identifying new approaches to protect and restore our forests, as well as other critical landscapes, including grasslands and wetlands, in the face of a changing climate.

Phasing Out Subsidies That Encourage Wasteful Consumption of Fossil Fuels

At the 2009 G-20 meeting in Pittsburgh, Pennsylvania, the United States successfully advocated for a commitment to phase out fossil fuel subsidies, and the administration has since won similar commitments in other fora, such as the Asia-Pacific Economic Cooperation

forum. President Obama has called for the elimination of U.S. fossil fuel tax subsidies in his FY 2014 budget, and the administration will continue to collaborate with partners around the world toward this goal.

Instituting a Federal Quadrennial Energy Review

The administration will conduct a Quadrennial Energy Review to ensure that U.S. federal energy policy meets its economic, environmental, and security goals in this changing landscape. This first-ever review will focus on infrastructure challenges, and will identify the threats, risks, and opportunities for U.S. energy and climate security, enabling the federal government to translate policy goals into a set of analytically based, clearly articulated, sequenced, and integrated actions and proposed investments.

Leading at the Federal Level

President Obama believes that the federal government must be a leader in clean energy and energy efficiency. Federal agencies have a goal of reducing GHG emissions by 28 percent by 2020, and have already reduced them by more than 15 percent between 2008 and 2012. As outlined in the plan, in December 2013, the President issued a Presidential Memorandum on Federal Leadership on Energy Management directing federal agencies to lead by example in acting on climate and increasing the nation's renewable energy use. The memorandum strengthens established administration efforts to increase government-wide energy efficiency and sustainability, and sets a goal of 20 percent renewable energy use by the federal government by 2020—nearly triple the previous goal of 7.5 percent. In addition, the federal government will continue to pursue greater energy efficiency and GHG emission reductions in its operations.

7. SIGNIFICANT REDUCTIONS ACHIEVABLE IN 2020

The administration is already hard at work implementing *The President's Climate Action Plan*. Moreover, all of the actions outlined above are grounded in existing authorities and build on policies and programs already in place, and many of the specific measures that scale up and expand existing efforts are already underway.

However, several of the actions will require U.S. government agencies to develop recommendations, propose new rules, augment existing activities, and undertake processes that entail significant stakeholder outreach and public comment before final rules and programs are in place. Although the purpose of each action is clear, the exact shape and details of each will be developed over time. Until recommendations, rulemakings, and other administrative activities for these specific actions are complete, it will not be possible to estimate the exact scale of emission reductions that will be achieved by each specific action.

Nevertheless, at this early stage, the potential range of GHG reductions achievable by 2020 toward the ultimate goal of achieving economy-wide emission reductions in the range of 17 percent below 2005 levels can be assessed. Light can be shed on the potential scale of additional reductions through 2020 by assessing the broad categories of actions contained in the plan, using integrated models to the extent possible to ensure no double counting of reductions within each category.

Key Categories of Action for Achieving Additional Emission Reductions

Starting with projections of U.S. emissions based on policies enacted before 2012 (the "2012 Policy Baseline"), the additional reductions that are achievable by 2020 were estimated for three key categories of actions: energy CO₂, HFCs, and methane (Table 2).⁶

Energy CO₂

Estimates for energy CO₂ are based on a range of potential actions, including increasing levels of clean electricity generation, extension of energy efficiency standards and actions affecting residential and commercial buildings, and enhanced measures addressing industrial efficiency and transportation. Although these estimates do not explicitly measure projected emission reductions from specific rules, standards, and other efforts laid out in the *Climate Action Plan* but not yet implemented, they do provide a range of potential reductions that can be achieved across the relevant sectors (see Biennial Report Methodologies Appendix for further

⁶ Unless otherwise stated, all GHGs in this document are reported in teragrams of CO₂ equivalents (Tg CO₂e), using the 100-year global warming potentials (GWPs) listed in the IPCC's Second Assessment Report (SAR) (IPCC 1996) to convert non-CO₂ gases to CO₂e. UNFCCC guidelines for inventories and national communications require that emissions be reported using SAR GWP values.

information). As reflected in Table 2, this analysis shows that, taken together, additional actions across the energy sector have the potential to reduce CO₂ emissions by an additional 485–800 Tg relative to the 2012 Policy Baseline or, equivalently, to reduce emissions from 2005 levels by an additional 8–12 percent.

Hydrofluorocarbons

Estimates for potential achievable U.S. reductions for HFCs, reflected in Table 2, are based on analysis conducted by EPA for a proposal for a global commitment to phase down production and consumption of HFCs under the Montreal Protocol on Substances That Deplete the Ozone Layer (U.S. EPA/OAP 2013). The United States can, and will, take several steps domestically as it moves toward an international agreement, including using EPA authority through the SNAP Program and leveraging federal government purchasing power to promote cleaner alternatives. These actions can set the United States on firm ground for reaching reductions proposed under the Montreal Protocol.

Methane

There are many options for continued and further actions to address U.S. methane emissions. The President has called for U.S. agencies to develop a comprehensive interagency methane strategy, and work on this strategy is already underway. Until such a strategy is complete, however, assessing the potential achievable reductions of methane emissions in 2020 involves considerable uncertainty, as reflected in the estimate of potential methane abatement in Table 2.

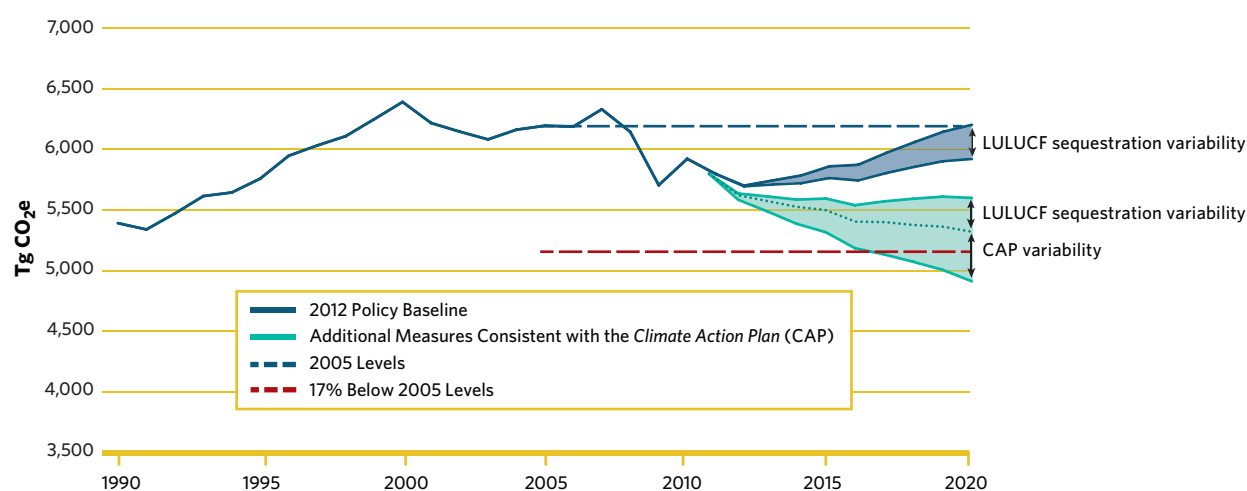
Taken together, these additional reductions have the potential to bring emissions within the range of 17 percent below 2005 levels. In the coming months and years, as the administration works to implement the *Climate Action Plan*, the scope and scale of each policy and measure will become clearer, allowing a more detailed and in-depth assessment of the potential emission reductions than this initial analysis provides. As rules and standards become finalized and programs and partnerships are rolled out, we will be able to assess their expected impacts over time with more accuracy, and thus will narrow the range of potential emission reductions displayed in Figure 4.

Table 2 2020 Ranges of Potential Emission Reductions Relative to Emissions in the 2012 Policy Baseline Scenario (Tg CO₂e)

Pollutant	Potential Reductions
Energy Sector CO ₂	485–800
HFCs	100–135
CH ₄	25–90
Total	610–1,025

Note: HFC values listed for potential abatement in 2020 were calculated using GWP values from the IPCC Fourth Assessment Report (IPCC 2007). CH₄ values listed for potential abatement in 2020 were calculated using GWP values from the IPCC Second Assessment Report (IPCC 1996).

Figure 4 U.S. Emission Projections—2012 Policy Baseline Compared with Potential Reductions from Additional Measures Consistent with the *Climate Action Plan*



Notes: Figure 4 shows the range of projected emissions for both (1) the 2012 Policy Baseline scenario (in blue), which assumes that no additional measures are implemented after 2012; and (2) a scenario (in green) that incorporates post-2012 implementation of Additional Measures Consistent with the *Climate Action Plan*. The range (in blue) for the 2012 Policy Baseline scenario reflects variability in projected net sequestration rates from land use, land-use change, and forestry (LULUCF), much of which will be determined by factors that cannot be directly influenced by policies and measures. The range (in green) for the Additional Measures Consistent with the *Climate Action Plan* scenario reflects both LULUCF sequestration variability, as well as uncertainty regarding projected emission reductions from measures that will be implemented consistent with the *Climate Action Plan*. The dotted line delineates the share of projected variability that is attributable to LULUCF and the *Climate Action Plan*, respectively. Specifically, the portion labeled “CAP variability” illustrates the range of emission outcomes that can be directly influenced by implementation of the *Climate Action Plan*, assuming best-case LULUCF sequestration outcomes. The LULUCF sequestration variability ranges are identical in both scenarios.

The scenarios displayed in Figure 4 illustrate the ranges of projected emissions from the 2012 Policy Baseline (no additional action from 2012 onward) and from implementation of additional measures consistent with the *Climate Action Plan*. The 2012 Policy Baseline range and a portion of the Additional Measures range result from uncertainty and variability in the projected rate of net carbon sequestration from LULUCF in 2020. Specifically, the top of the range (in green) reflects the low end of the potential GHG reduction due to policy and weaker LULUCF sequestration. The bottom of the range reflects the high end of the potential reduction due to policy and stronger LULUCF sequestration. Due to the inherent uncertainty of projected emissions and removals from LULUCF, and the more limited ability to influence these outcomes relative to other sectors of the economy, both scenarios include a wide range of potential LULUCF outcomes.⁷

There are indications that in the long term, U.S. forest carbon stocks are likely to accumulate at a slower rate than in past decades, and eventually may decline as a result of forestland conversion, the maturation of land that has previously been converted to forests, and adverse impacts related to climate change and other disturbances (Haynes et al. 2007, Alig et al. 2010, Haim et al. 2011, USDA/FS 2012). The exact magnitude and timing of these changes are uncertain, but forests are unlikely to continue historical trends of sequestering additional carbon stocks in the future under current policy conditions. These changes may already be starting in U.S. forests: however, major changes in U.S. forest inventory monitoring results are not expected in the next 5–10 years. The ranges presented in the scenarios above use high and low estimates for U.S. LULUCF carbon pathways to 2020: high sequestration (which reflects lower CO₂ emissions to the atmosphere) is an extrapolation based on recent forestland and forest carbon density accumulation rate trends, and low sequestration estimates reflect possible slower accumulation of forestland and carbon density.

2012 Policy Baseline Emission Projections

Comparing the range of reductions possible under the scenarios described above (including actions consistent with the *Climate Action Plan*) with the 2012 Policy Baseline scenario provides a starting point to assess additional reductions needed to continue to make progress toward the 2020 goal (Table 3). The 2012 Policy Baseline (or “with measures” scenario)⁸ takes into account only those policies adopted before September 2012; it shows that U.S. emissions start to trend upward absent additional measures. The *Climate Action Plan* initiates

⁷ For more information on the methodologies used to develop the LULUCF projections, see Chapter 5 of the *Sixth National Communication of the U.S. Climate Action Report 2014*.

⁸ The 2012 Policy Baseline scenario refers to the “with measures” scenario required by the UNFCCC National Communications reporting guidelines (UNFCCC 2006).

Table 3 **Historical and Projected U.S. Greenhouse Gas Emissions Baseline, by Sector: 1990–2030 (Tg CO₂e)**

Sectors ^b	Historical GHG Emissions ^a				Projected GHG Emissions			
	2000	2005	2010	2011	2015	2020	2025	2030
Energy	4,258	4,321	4,104	3,981	3,936	4,038	4,141	4,207
Transportation	1,861	1,931	1,786	1,765	1,710	1,702	1,660	1,627
Industrial Processes	357	335	308	331	378	438	504	536
Agriculture	432	446	462	461	461	485	498	512
Forestry and Land Use	31	25	20	37	30	27	40	35
Waste	136	137	131	128	127	126	125	123
Total Gross Emissions	7,076	7,195	6,812	6,702	6,643	6,815	6,967	7,041
Forestry and Land Use (Sinks) ^c	high sequestration				-884	-898	-917	-937
	low sequestration				-787	-614	-573	-565
Total Net Emissions	high sequestration				5,759	5,918	6,050	6,104
	low sequestration				5,856	6,201	6,394	6,476

^a Historical emissions and sinks data are from U.S. EPA/OAP 2013. Bunker fuels and biomass combustion are not included in 2013 U.S. GHG inventory calculations.

^b Sectors correspond to 2013 U.S. GHG inventory reporting sectors, except that carbon dioxide, methane, and nitrous oxide emissions associated with mobile combustion have been moved from energy to transportation, and solvent and other product use is included within industrial processes.

^c Sequestration is only included in the net emissions total.

Box 1 International Impacts of Measures to Respond to Climate Change

The most significant action the United States can take to positively impact global climate and all those affected by its changes is to mitigate emissions. As appropriate and consistent with domestic law, the United States in many instances also assesses and considers the potential impacts that certain U.S. mitigation actions themselves may have on other countries. The most effective way to maximize the positive and minimize any negative impacts on other countries as a result of U.S. mitigation action is to enhance less developed countries' capacities to transition to clean-energy, low-emission economies themselves. Three basic categories of significant U.S. government support address this cause: policy development support, public-private partnerships, and worker training. The following are examples of programs in each of these three categories.

Policy Development Support

The U.S. Enhancing Capacity for Low Emissions Development Strategies (EC-LEDS) program provides technical assistance to more than 20 partner countries to develop LEDS that grow and strengthen the economy while reducing GHG emissions over the long term. Through this program, U.S. government expertise is mobilized to provide tools, trainings, and resources to practitioners in partner countries that build capacity for these country-driven policy strategies.

Public-Private Partnerships

The Energy Utility Partnership Program (EUPP) was created by the U.S. Energy Association, a nonprofit public-private association devoted to increasing the understanding of energy issues. EUPP establishes voluntary partnerships between energy utilities, energy system operators, energy markets, and other energy service providers in countries assisted by the U.S. Agency for International Development (USAID) and their U.S. counterparts. These partnerships facilitate the sharing of experiences and best practices in the day-to-day planning, operation, and management of utilities and other energy service providers.

Worker Training

The Vocational Training and Education for Clean Energy (VOCTEC) program is a five-year global program funded by USAID and led by Arizona State University. VOCTEC aims to improve the sustainability of renewable energy infrastructure and investments in developing countries by increasing the awareness, knowledge, and capacity of local stakeholders to facilitate renewable energy investments, primarily in decentralized clean energy technologies. VOCTEC's vocational training programs for operators and technicians focus on installation, operations, and maintenance of renewable energy systems in developing countries.

additional actions that will achieve substantial emission reductions and put the United States on a course to meet the 2020 goal. For detailed information on the 2012 Policy Baseline projections, including underlying methodologies and projections "with measures" to 2030, see the *Sixth National Communication*, Chapter 5.

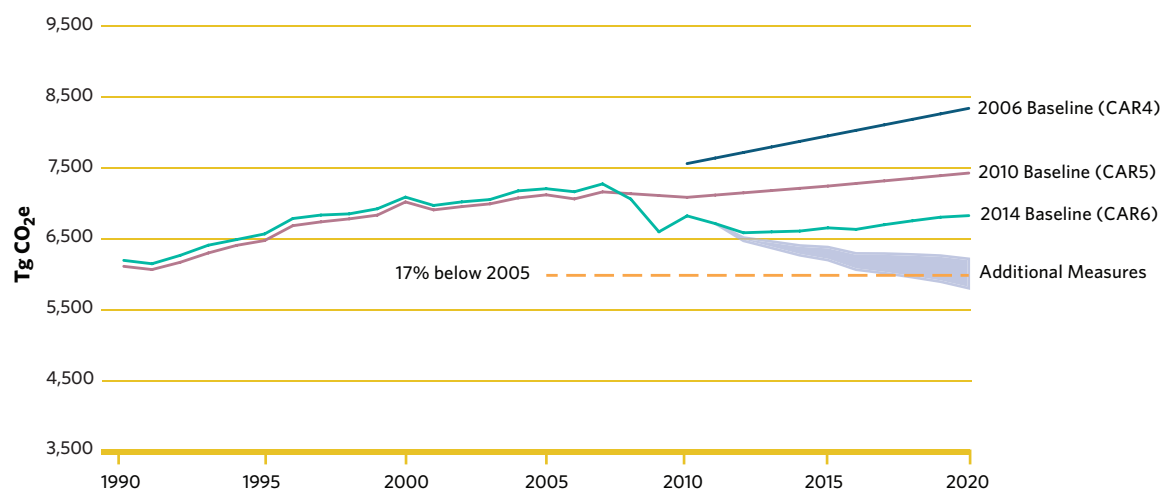
Projections of gross GHG emissions (not including emissions and removals from LULUCF) under the 2012 Policy Baseline case presented in this report are significantly lower than emission projections presented in previous U.S. Climate Action Reports (CARs) (Figure 5). These differences can be traced to a combination of changes in policies, energy prices, and economic growth. In the 2010 CAR, emissions were projected to increase by 4.3 percent from 2005 to 2020, versus a 14–20 percent decline from 2005 levels projected in this report under a range of actions across economic sectors consistent with those included in the 2010 CAR (U.S. DOS 2010). In the 2006 CAR, the expected growth was even higher, totaling 17 percent over the same time period. Actual emissions for 2011 are also significantly below those projected in past reports (U.S. DOS 2007).

8. INTERNATIONAL CLIMATE FINANCE

The United States is committed to assisting developing countries in their efforts to mitigate and adapt to climate change. The United States is using the full range of institutions—bilateral, multilateral, development finance, and export credit—to mobilize private finance and invest strategically in building lasting resilience to impacts; to reduce emissions from deforestation and land degradation; and to support low-carbon development strategies and the transition to a sustainable, clean energy economy. We work to ensure that our capacity-building and investment support is efficient, effective, innovative, based on country-owned plans, and focused on achieving measurable results, with a long-term view of economic and environmental sustainability.

⁹ Fact Sheet: U.S. Global Development Policy. See <http://www.whitehouse.gov/the-press-office/2010/09/22/fact-sheet-us-global-development-policy>.

¹⁰ Foreign Assistance Initiatives. See <http://foreignassistance.gov/InitiativeLanding.aspx>.

Figure 5 **Comparison of Gross GHG Emission Projections from Previous U.S. Climate Action Reports**

Notes:

- Emissions displayed are "Total Gross Emissions" from Table 3, and do not include CO₂ sinks from land use, land-use change, and forestry. Projections from each CAR reflect a baseline or "with measures" scenario, including the effect of policies and measures implemented at the time that the projections were prepared, but not future additional measures.
- Each year, emission and sink estimates are recalculated and revised for all years in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, as attempts are made to improve both the analyses themselves, through the use of better methods or data, and the overall usefulness of the report. In this effort, the United States follows the 2006 IPCC Guidelines (IPCC 2006), which states, "Both methodological changes and refinements over time are an essential part of improving inventory quality."

Climate change has become a major focus of U.S. diplomatic and development assistance efforts and has been integrated into the core operations of all major U.S. foreign assistance agencies. The 2010 Presidential Policy Directive on Global Development⁹ identified the Global Climate Change Initiative as one of three priority U.S. development initiatives.¹⁰ In addition, the 2012 U.S. Agency for International Development (USAID) *Climate Change and Development Strategy* sets out principles, objectives, and priorities for USAID climate change assistance from 2012 through 2016 (USAID 2012). This strategy prioritizes not only clean energy, sustainable landscapes, and adaptation, but also integration—factoring climate change knowledge and practice into all USAID programs to ensure that all sector portfolios are climate resilient and, where possible, reduce GHG emissions.

At the 15th Conference of the Parties (COP-15) in Copenhagen, the United States committed to working with other developed countries to collectively provide resources approaching \$30 billion in the "fast start" finance (FSF) period 2010–2012 to support developing countries in their mitigation and adaptation efforts. The United States also agreed, in conjunction with other developed country Parties, to the goal of collectively mobilizing \$100 billion in climate finance per year by 2020, from a wide variety of public and private sources, to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation.

As noted in Decision 1 of COP-18 in Doha, developed country Parties successfully achieved the FSF goal. U.S. climate finance was \$7.5 billion¹¹ from FYs 2010 through 2012 and reached more than 120 countries through bilateral and multilateral channels, meeting the President's commitment to provide our fair share of the collective pledge.

This section of the *Biennial Report* provides details on U.S. climate finance by channels and instruments, thematic pillar, and region for FYs 2011 and 2012. It also describes U.S. efforts to mobilize private climate finance, and illustrates examples of U.S. contributions to capacity building and transfer of technology. For additional information on U.S. climate finance, including further examples of U.S. activities, see Chapter 7 of the *Sixth National Communication*.

U.S. Climate Finance and International Leadership to Address Climate Change in FY 2011 and FY 2012

In FYs 2011 and 2012, U.S. climate finance was \$5.5 billion, which is comprised of approximately \$3.1 billion in congressionally appropriated assistance, \$496 million of export credit,

¹¹ The totals reported here reflect slight revisions to previously reported levels, based on updated information received since the release of the November 2012 Fast Start Finance report (U.S. DOS 2012).

and \$1.8 billion of development finance. The United States organizes its support according to three pillars: adaptation, clean energy, and sustainable landscapes. Signature initiatives for each of the three pillars follow; they are not intended to be comprehensive.

Adaptation

For adaptation, dedicated U.S. climate assistance prioritizes countries, regions, and populations that are highly vulnerable to the impacts of climate change. By increasing resilience in key sectors, such as food security, water, coastal management, and public health, U.S. programs help vulnerable countries prepare for and respond to increasing climate- and weather-related risks. Assistance identifies and disseminates adaptive strategies, makes accessible the best available projected climate change impact and weather data to counterparts, and builds the capacity of partner governments and civil society partners to respond to climate change risks. This is why the Obama administration has made significant investments in bolstering the capacity of countries to respond to climate change risks. In FYs 2011 and 2012, the United States committed¹² \$960 million in promoting climate resilience in developing countries.

Even in its early stages, U.S. adaptation work has made significant impacts:

- The SERVIR¹³ global program has vastly increased access to and ability to use climate science and data through its three regional knowledge-sharing hubs in MesoAmerica, Africa, and the Himalaya Hindu-Kush region. SERVIR is part of a broader commitment to support climate data and services for meteorological offices and other agencies around the world.
- On-the-ground action is needed to learn what adaptation approaches will work best in different environments. USAID supports the launch of projects, programs, consultations, and planning processes around the world, with an emphasis on country and community ownership. Among these efforts, communities in Peru and Nepal are exploring multiple approaches to adapt to glacier melt in high-mountain areas, while Eastern Caribbean communities are testing water catchment areas, greenhouses, rainwater harvesting systems, and other adaptive practices to deal with increased flooding and drought. Pilot projects in Ethiopia, Senegal, and the Dominican Republic are helping local pastoralists, farmers, and insurance companies experiment with low-cost weather index insurance products, based on a model that reduced hunger following severe drought in neighboring Kenya. The Coral Triangle Initiative has provided tools, training, and projects to help the nine countries of this important region assess risks and increase the resiliency and adaptive capacity of marine resources and the communities that depend on them.

Clean Energy—For clean energy, dedicated U.S. climate assistance focuses on countries and sectors offering significant emission reduction potential over the long term, as well as countries that offer the potential to demonstrate leadership in sustained, large-scale deployment of clean energy. In terms of sector coverage, clean energy includes renewable energy and energy efficiency and excludes natural gas and other fossil fuel power plant retrofits. The United States also supports regional energy programs that improve the enabling environments for regional energy grids to distribute clean energy, as well as global programs that focus chiefly on information sharing and building coalitions for action on clean energy technologies and practices.

Expanding Clean Energy Use and Energy Efficiency—In the past three years, we have reached agreements with more than 20 countries around the world through the Enhancing Capacity for Low Emission Development Strategies program. EC-LEDS supports developing countries' efforts to pursue low-emission, climate-resilient economic development and growth. The program now has official partnerships with more than 20 countries.

Combating Short-Lived Climate Pollutants—Pollutants, such as methane, black carbon, and many HFCs, are relatively short-lived in the atmosphere, but have more potent greenhouse effects than CO₂. In February 2012, the United States launched the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants. The coalition has grown to include more than 30 state partners and nearly an equal number of nonstate partners, such as the World Bank, the United Nations Environment Programme, and civil society. Major efforts include reducing methane and black carbon from waste and landfills, oil and gas, diesel vehicles and engines, brick kilns, and cookstoves, and promoting activities aimed at enabling climate-

¹² While the U.S. fast start finance reports use the term "provided" to describe our support, the term "committed" is used in this report to be consistent with the new Biennial Report Common Tabular Format guidelines (UNFCCC 2012).

¹³ SERVIR is a Spanish language acronym for Regional Visualization and Monitoring System.

friendly alternatives to high-global-warming-potential HFC use and reducing HFC emissions. The United States is also leading through the Global Methane Initiative, which works with 42 partner countries and an extensive network of more than 1,100 private-sector participants to reduce methane emissions.

High-Carbon Energy

Although climate finance generally refers to investing in low-carbon infrastructure, it is equally important from a climate impact point of view to address financing for high-carbon forms of energy. In June 2013, President Obama called for an end to U.S. government support for public financing of new coal power plants overseas, except for (1) the most efficient coal technology available in the world's poorest countries in cases where no other economically feasible alternatives exist, or (2) facilities deploying carbon capture and sequestration technologies (EOP 2013a). As part of this new commitment, the United States is working to secure the agreement of other countries, export credit agencies, development finance institutions, and multilateral development banks to adopt similar policies as soon as possible.

Sustainable Landscapes

For activities related to land-use mitigation (or “sustainable landscapes”), including reducing emissions from deforestation and forest degradation (REDD+), dedicated U.S. climate change assistance works to combat unsustainable forest clearing—for example, for agriculture and illegal logging—and helps ensure good governance at local and national levels to support the sustainable management of forests. U.S. support prioritizes mitigation potential; countries with the political will to implement large-scale efforts to reduce emissions from deforestation, forest degradation, and other land-use activities; and potential for investments in monitoring, reporting, and verification of forest cover and GHG emission reductions.

Reducing Emissions from Deforestation and Forest Degradation—GHG emissions from deforestation, agriculture, and other land uses constitute approximately one-third of global emissions. In some developing countries, as much as 80 percent of GHG emissions come from the land sector. To meet the challenge of reducing these emissions, the Obama administration is working with partner countries to put in place the systems and institutions necessary to significantly reduce global land-use-related emissions, creating new models for rural development that generate climate benefits, while conserving biodiversity, protecting watersheds, and improving livelihoods.

In 2012 alone, USAID's bilateral and regional forestry programs contributed to reducing more than 140 million metric tons of CO₂ emissions.¹⁴ Support from the U.S. Department of the Treasury and U.S. Department of State (DOS) for multilateral initiatives, such as the Forest Investment Program and the Forest Carbon Partnership Facility, is building capacity and facilitating implementation of REDD+ strategies in dozens of developing countries. Together with the Consumer Goods Forum, a coalition of more than 400 global corporations, USAID and DOS launched the Tropical Forest Alliance 2020 to reduce tropical deforestation linked to major commodities and their supply chains. In Indonesia, the Millennium Challenge Corporation (MCC) is funding a five-year “Green Prosperity” program that supports environmentally sustainable, low-carbon economic development in select districts.

Channels and Instruments

U.S. climate finance is provided through multiple channels, which can be broadly grouped into bilateral climate finance, multilateral climate finance, development finance, and export credit. Congressionally appropriated assistance is delivered through both bilateral and multilateral channels.

- **Bilateral Climate Finance**—Grant-based U.S. bilateral climate assistance is programmed directly through bilateral, regional, and global programs. These programs are principally supported by USAID, but are also supported by DOS, MCC, and other U.S. government agencies. In FY 2011–2012, the United States committed more than \$2.4 billion in bilateral climate finance to its developing country partners.
- **Multilateral Climate Finance**—Multilateral climate change funds feature institutional structures governed jointly by developed and developing countries. They play an important

¹⁴ See <http://www.afolucarbon.org/>.

role in promoting a coordinated, global response to climate change. During FY 2011–2012, the United States committed more than \$700 million through multilateral climate change funds.

- **Development Finance and Export Credit**—The Overseas Private Investment Corporation (OPIC) and the Export-Import Bank of the United States (Ex-Im) play a critical role by using public money to mobilize much larger sums of private investment directed at mitigation through loans, loan guarantees, and insurance in developing countries. During FY 2011–2012, OPIC committed \$1.8 billion¹⁵ and Ex-Im committed \$500 million. These numbers do not include private investment leveraged.

New and Additional Climate Finance

International assistance for climate change continues to be a major priority for the United States. The U.S. administration seeks new funding from Congress on an annual basis. Since ratifying the Convention, which is where the term “new and additional” was first used, U.S. international climate finance increased from virtually zero in 1992 to an average of \$2.5 billion per year during the FSF period (2010 to 2012). During the period, average annual appropriated climate assistance increased fourfold compared with 2009 funding levels. U.S. climate assistance has increased in the context of an overall increasing foreign assistance budget.

Ensuring Transparency and Promoting Effectiveness

The United States is committed to transparently tracking and reporting its climate finance in a manner that encourages accountability and effectiveness. In 2010, President Obama issued a Presidential Policy Directive on Global Development (PPD) that emphasized the importance of tracking foreign assistance.¹⁶

During the FY 2010–2012 FSF period, the U.S. government refined its climate finance tracking methodologies to better reflect the totality of climate finance across the full range of government agencies. Each implementing government agency or entity follows strict guidelines and eligibility criteria when collecting and reporting information on support of activities related to adaptation, clean energy, and sustainable landscapes. For instance, activity descriptions provided by USAID missions are reviewed by climate change specialists to ensure compliance with USAID climate change goals. To improve financial reporting, DOS and USAID modified their budget and activity planning database to track climate change funding and developed standardized performance indicators to capture key outputs and outcomes of each agency’s programs.¹⁷

In counting and aggregating climate finance, the United States includes programs that have a primary mitigation and/or adaptation purpose, as well as activities with significant climate co-benefits (e.g., relevant biodiversity and food security activities). In the case of programs for which only part of the activity is targeted toward a climate objective, only the relevant financial support is counted, rather than the entire program budget.

In addition, each implementing agency engages in strategic planning to ensure that climate finance is distributed effectively and is designed to meet U.S. partner countries’ needs. The Enhancing Capacity for Low Emissions Development Strategies (EC-LEDS), a key mitigation program, illustrates one such approach to ensuring partner countries’ priorities are addressed (Box 2). The program supports partner countries in developing their own LEDS. Within the LEDS framework, U.S. climate change funding directly supports the country-led process by providing technical support for developing GHG inventories, conducting technical and economic analyses, and implementing activities under the LEDS. Significantly, the LEDS can be a blueprint guiding the countries’ own development investments.

U.S. government funding for adaptation is also tailored to partner country needs and often works directly through country-led processes. For example, Jamaica worked closely with USAID in 2011 and 2012 to establish a national adaptation planning process owned and led by the Ministry for Water, Land, Environment and Climate Change. In West Africa, USAID is working with ministry-level officials and regional institutions to provide technical support for developing country-owned National Adaptation Plans.¹⁸

¹⁵ This number includes only those OPIC projects that are related to climate change, and are therefore counted under Fast Start Finance (FSF). However, OPIC’s renewable resources portfolio (renewable energy, sustainable water, and agriculture) totals exceed the FSF-eligible totals being reported here.

¹⁶ See <http://www.whitehouse.gov/the-press-office/2010/09/22/fact-sheet-us-global-development-policy/>.

¹⁷ For the three U.S. Fast Start Finance reports, see www.state.gov/faststartfinance.

¹⁸ For additional information on assumptions and methodologies related to U.S. international climate finance, see the accompanying annex at <http://www.state.gov/e/oes/rls/rpts/car6/index.htm>.

Box 2 **EC-LEDS—Strategic Programming of Assistance**

Step 1—Scoping

Once a partner country declares its intent to join the EC-LEDS program, an interagency scoping team, comprised of experts in a variety of fields, travels to the country to interview government officials and other stakeholders to analyze needs and opportunities for assistance.

Step 2—Identification of Opportunities

The scoping team completes an opportunities and options report, which identifies country needs that overlap with U.S. capacities for assistance.

Step 3—Discussions with Partner Country

The U.S. officials operating in the partner country, as part of the USAID Mission or U.S. Embassy, discuss the opportunities identified in the report, and prioritize actions based on available resources and country needs.

Step 4—Formal Agreement

A formal agreement is announced that publicly lays out the work plan.

Step 5—Implementation

The agreement is implemented in partnership with the partner country.

The United States acknowledges the critical role of our partner countries in promoting the effectiveness of climate finance. The PPD declares that where our partners set in place systems that reflect high standards of transparency, good governance, and accountability, the United States will respond directly to country priorities, making new investments in line with established national strategies and country development plans based on broad consultation, and will empower responsible governments to drive development and sustain outcomes by working through national institutions, rather than around them.¹⁹

U.S. Efforts to Mobilize Private Finance

The United States recognizes the role that private investment must play in mitigation and adaptation in developing countries. While maintaining a strong core of public climate finance is essential, the United States also recognizes that private finance must play a key role. Private finance has been and will continue to be the dominant force driving economic growth in most economies. How it is channeled will determine whether that growth is low in carbon emissions and resilient to changes in climate.

The U.S. government is actively pursuing strategies to encourage private investment in low-carbon, climate-resilient activities, both at home and in developing countries. We are working to combine our significant, but finite, public contributions with targeted, smart policies to mobilize maximum private investment in climate-friendly activities. For example, the United States is laying the foundation for larger-scale investments (1) by encouraging OPIC's development finance and Ex-Im Bank's export credit authorities to invest in clean energy technologies and create new products tailored toward climate change solutions; and (2) by leveraging significant private-sector investments across all three pillars through bilateral and multilateral programs.

More efficient leveraging of private investment can enable the use of available public resources in areas and sectors where the private sector is less likely to invest on its own, particularly in adaptation strategies for the most vulnerable and least developed countries. Continuing to execute this vision will be especially important as developed countries, including the United States, work toward a collective goal of mobilizing \$100 billion per year in climate change finance for developing countries by 2020, in the context of meaningful mitigation actions and transparency on implementation.

USAID also contributes to mobilizing private finance, using a range of approaches. For example, the Private Finance Advisory Network (PFAN) provides direct advisory services to help promising clean energy entrepreneurs in developing countries connect with private investors and secure financing. In roughly six years of support from USAID, PFAN has helped more than three dozen clean energy start-ups or small businesses secure nearly \$300 million

¹⁹ See <http://www.whitehouse.gov/the-press-office/2010/09/22/fact-sheet-us-global-development-policy>.

in private financing. Another approach is to leverage local, private capital through partial credit guarantees under USAID's Development Credit Authority.

USAID also supports capacity building for the government and nongovernment staff and institutions that regulate specific sectors and private investment in order to help enhance a country's private financial enabling environment. For instance, USAID's Black Sea Regulatory Initiative links power regulators from Armenia, Azerbaijan, Georgia, Moldova, and Ukraine with midwestern U.S. state regulators to support development of harmonized regulatory practices, including guidelines for renewable energy and energy efficiency, in order to spur private investment in the region.

Another approach to mobilizing private finance is the Africa Clean Energy Finance (ACEF) Initiative, launched in 2012. ACEF seeks to address sub-Saharan Africa's acute energy needs by mobilizing private investment in clean energy projects, ranging from household-level solar energy to utility-scale power plants. ACEF represents a new way of doing business that harnesses the best of the U.S. government's technical and financial expertise. By combining \$20 million in grant-based financing from DOS, project planning expertise from the U.S. Trade and Development Agency, and financing and risk mitigation tools from OPIC, ACEF will catalyze hundreds of millions of dollars in financing from OPIC, which will then leverage hundreds of millions of dollars in private investment. ACEF demonstrates how a very limited amount of grant-based public resources—when surgically applied—can catalyze a much larger pool of finance that can bring climate projects to fruition at scale.

The United States contributed \$714.6 million during FY 2010–2012 to support the critical work of the Clean Technology Fund (CTF). CTF catalyzes clean energy investments in emerging economies with rapidly growing emissions by helping countries achieve access to renewable energy, green growth, and energy efficiency in transport, industry, and agriculture. CTF is working with 18 countries on various projects, such as wind power in Egypt, sustainable urban transportation in the Philippines, and energy efficiency in Turkey. The funds are channeled toward projects that focus on scaling up proven technologies, thereby promoting new markets for maximum impact. To date, CTF has approved 41 projects for a total of \$2.3 billion. These funds have leveraged \$18.8 billion in co-financing, including \$5.8 billion from the multilateral development banks and \$13 billion from other sources, and have contributed to the saving of 525 million metric tons of CO₂ emissions, the equivalent of taking 99 million cars off the road for a year.

Technology Development and Transfer

Since 2010, the United States has engaged in numerous activities with developing countries and economies in transition, with the primary goal of promoting the development and deployment of climate-friendly technologies and practices. Table 4 highlights examples of U.S. involvement in technology development and transfer. Please note that this table is purely illustrative and is not a comprehensive list of U.S. technology development and transfer activities.

Capacity Building

Reflecting its belief that a long-term view of climate change and development is crucial to sustainability and results, the United States is approaching the issue of capacity building for climate change in an integrated manner. Linking capacity building directly to projects and programs helps ensure that capacity built is relevant, effective, and tied to results. Building local capacity through greater reliance on local cooperating agencies is an explicit goal of USAID. In 2012, USAID missions awarded 14.3 percent of their funding, or \$1.4 billion, to local institutions. This number is expected to double by 2015.

Capacity-building needs are addressed throughout all U.S. support activities, not as separate line items or projects, and are provided as a means for taking action on a mutually shared goal. Table 5 highlights examples of U.S. capacity-building support. Please note that this table is purely illustrative and does not represent an exhaustive list of U.S. capacity-building activities.

Table 4 **Sample U.S. Technology Development and Transfer Activities**

Since 2010, the United States has engaged in numerous activities with developing countries and economies in transition, with the primary goal of promoting the development and deployment of climate-friendly technologies and practices.

Recipient Country and/or Region	Targeted Area	Measures and Activities Related to Technology Transfer	Sector	Source of Funding	Activities Under-taken by:	Status	Additional Information
Global Methane Initiative							
Global	Mitigation	Focuses on best practices/technologies for evaluating and measuring methane emissions from target sectors, and mitigation technologies/ best practices, such as coal mine gas and landfill methane capture systems, biodigestors, and technologies for reducing oil and gas sector methane emissions.	Energy	Public	Public	Implemented	Reduced methane emissions by approximately 23 million metric tons (23 Tg CO ₂ e) in 2012 alone; cumulative emission reductions exceed 150 Tg CO ₂ e.
Super-efficient Equipment and Appliance Deployment Initiative (SEAD)							
Global	Mitigation	Peer-to-peer exchange among technical and policy experts from participating governments; complementary activities that develop clear, broadly accepted test procedures for products; and collaboration with industry to ensure its participation in promoting a transition to energy-efficient products.	Energy	Public	Public	Implemented	Employing current best practices in SEAD economies can by 2030 reduce annual electricity demand by more than 2,000 billion kilowatt-hours. These measures would decrease CO ₂ emissions over the next two decades by 11 billion tons (1,000 Tg CO ₂ e).
Global Lighting and Energy Access Partnership (Global LEAP)							
Global	Mitigation	Quality assurance activities for solar-powered lanterns for off-grid lighting, a global competition in two categories (lights and televisions) to identify the best DC-powered products in the market for use in an off-grid context, and efforts to advance commercially viable mini-grid solutions for rural energy access.	Energy	Public	Public	Implemented	An estimated 138,600 metric tons of CO ₂ e (0.1386 Tg CO ₂ e) have been avoided. The climate benefits are even more significant when the black carbon implications of kerosene lighting are considered.

Table 4 (Continued)

Sample U.S. Technology Development and Transfer Activities

Recipient Country and/or Region	Targeted Area	Measures and Activities Related to Technology Transfer	Sector	Source of Funding	Activities Under-taken by:	Status	Additional Information
SERVIR							
Global (Central America, East Africa, and Hindu Kush-Himalaya)	Adaptation and Mitigation	USAID and NASA collaboration to build capacity of regional institutions in developing countries to improve environmental management and climate change resilience through the application of geospatial information in decision making.	Water, agriculture, land cover, climate, disasters, biodiversity, ecosystems	Public	Public	Implemented	Decision support will aid land and forest management, monitoring, emission estimations, and policy improvement, leading to emission reductions, as well as disaster risk reduction and adaptation to climate variability and change.
Famine Early Warning System Network (FEWS NET)							
Afghanistan, Angola, Burkina Faso, Central African Republic, Chad, Djibouti, Ethiopia, Guatemala, Haiti, Honduras, Kenya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Nigeria, Rwanda, Senegal, Somalia, South Sudan, Sudan, Tajikistan, Uganda, Yemen, Zambia, Zimbabwe	Adaptation	Assesses short- to long-term vulnerability to food insecurity with environmental information from satellites and agricultural and socio-economic information from field representatives; conducts vulnerability assessments and contingency and response planning, aimed at strengthening host country food security networks.	Adaptation	Public	Public	Implemented	
SilvaCarbon							
Governments of Colombia, Peru, Ecuador, Vietnam, and Gabon. Regional training activities in South and Central America, Congo Basin, and Southeast Asia.	Mitigation	A multi-agency U.S. government effort to improve developing country capacity for forest and other terrestrial carbon measurement and monitoring, through coordinated support on tool and methodology development and training to use appropriate methods for building and implementing forest carbon monitoring systems.	Forestry	Public	Public	Implemented	Providing countries with improved capacity to measure and report on current carbon stocks and emissions and use information together with other natural resource management data to reduce emissions from future deforestation.

Note: This table is purely illustrative and is not a comprehensive list of U.S. technology development and transfer activities.

NASA = National Aeronautics and Space Administration; USAID = U.S. Agency for International Development.

Table 5 Examples of U.S. Capacity-Building Activities

Capacity-building needs are addressed throughout all of U.S. support activities, not as separate line items or projects, and are provided as a means for taking action on a mutually shared goal.

Recipient Country/ Region	Targeted Area	Program or Project Title	Description of Program or Project
Global	Adaptation	Climate Services Partnership (CSP)	USAID is working with the UK Met Office, the World Bank, the WMO's Global Framework for Climate Services, and developing countries to build the capacity of national weather services to deliver accurate climate information that will facilitate the efforts of government ministries, private-sector entities, and other stakeholders to take effective adaptation actions. CSP is also compiling and disseminating current climate services experiences, conducting case studies and assessments of climate services, exploring economic valuation of climate services, developing a climate information guidebook, and piloting a nation-level climate services analysis.
Peru, the Himalaya Hindu-Kush region of South Asia, and the Pamir Mountain region of Central Asia	Adaptation	High Mountains Adaptation Partnership (HIMAP)	With support from USAID and DOS, HIMAP facilitates South-South learning to understand and manage climate-related challenges in high-mountain communities. The program has pioneered rapid assessment techniques for studying the risks of glacier lakes, and has supported community-led consultation and planning to address these risks in a timely and effective fashion.
Albania, Bangladesh, Cambodia, Colombia, Costa Rica, Gabon, Guatemala, Indonesia, Jamaica, Kazakhstan, Kenya, Macedonia, Malawi, Mexico, Moldova, Peru, Philippines, Serbia, South Africa, Thailand, Vietnam, Zambia	Mitigation	Enhancing Capacity for Low Emission Development Strategies (EC-LEDS)	This program supports partner countries in developing low-emission development strategies (LEDS) and country-led national plans to promote sustainable development while reducing GHG emissions. EC-LEDS provides countries with technical assistance to develop GHG inventories, conduct a range of economic analyses, and plan and implement LEDS across multiple economic sectors. Anticipated actions stemming from LEDS include putting policies, regulations, and infrastructure in place to dramatically increase clean energy use, and energy efficiency and piloting payments for sustainable forest management, including REDD+ arrangements.
Africa	Mitigation	Africa Infrastructure Program (AIP)	AIP works with partner countries in Africa to build capacity for regulatory reforms, tariff formulation, and key analyses required to support clean energy for power grids. AIP also provides transaction advisory services and technical, financial, commercial, regulatory, legal, and environmental support to specific clean energy projects.
Global	Mitigation	Forest Carbon, Markets, and Communities (FCMC)	FCMC provides technical support and capacity building to partner country governments around the world. Capacity building supports analysis, evaluation, tools, and guidance for program design support, training materials, and other services to improve the management and conservation of natural forests.

Note: This table is purely illustrative and does not represent an exhaustive list of U.S. capacity-building activities.

DOS = U.S. Department of State; NASA = National Aeronautics and Space Administration; REDD+ = reducing emissions from deforestation and forest degradation; USAID = U.S. Agency for International Development.

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