

**Federal Climate Change Expenditures**  
**Report to Congress**

**May 2004**

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# **FISCAL YEAR 2005 REPORT TO CONGRESS ON FEDERAL CLIMATE CHANGE EXPENDITURES**

## **INTRODUCTION**

The following is a detailed account of Federal spending for climate change programs and activities, both domestic and international, included in the President's fiscal year 2005 Budget. This report is provided in response to Division D, Title V, Section 555(b) of Public Law 108-199, the Consolidated Appropriations Act, FY 2004.

## **BACKGROUND**

On February 14, 2002, President Bush announced a new national goal to reduce the greenhouse gas emission intensity of the American economy by 18 percent by the year 2012. Achieving this goal will require enhanced and sustained near- and long-term efforts on multiple fronts that are in concert with measures to maintain a strong national economy.

The Administration's portfolio includes actions focused on reducing the fundamental scientific uncertainties associated with climate change; advancing the development and introduction of energy-efficient, renewable, and other low- or non-emitting technologies; and improving standards for measuring and registering emissions reductions. Many elements of the Administration's climate change portfolio are designed to incentivize greenhouse gas emissions reductions throughout the United States economy and provide assistance to developing nations to do the same. Progress in these areas will be achieved through a range of programs and cross-cutting initiatives.

In addition, the Administration's goal directly supports the United States' responsibility as a party to the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC has as its stated objective the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

The budget information presented in this report reflects the Administration's commitment to meeting the aims of the UNFCCC while carrying out its responsibility to the American people to preserve a strong American economy. The President's FY 2005 Budget proposes \$5.8 billion for climate change activities. This figure is \$713 million, or 13.9 percent, higher than the FY 2004 enacted level for climate change programs and related tax policies. This request includes continuing support for many successful climate-related programs and initiatives as well as funding for new activities that will help achieve the Administration's climate goals.

## **REPORT OUTLINE**

The President's FY 2005 Budget supports a wide range of research and development programs, voluntary partnerships, and aid efforts aimed at reducing greenhouse gas emissions. This report outlines the expenditures associated with this portfolio of actions via four main categories: science, technology, international assistance, and tax incentives. In this year's report, the science, international, and tax incentives categories remain the same as in last year's report, but the technology category has been restructured to more accurately reflect the existing range of climate change related technology programs. The Climate Change Technology section presents climate technology spending in terms of this revised structure. For reference, Appendix C provides a brief explanation of the changes that were made and contains a crosswalk table showing the climate technology expenditures for FY 2005 using the method employed in prior years. The four categories are described briefly below.

**Climate Change Science.** This category encompasses the Climate Change Science Program (CCSP). The CCSP has been established to integrate the work of the U.S. Global Change Research Program (USGCRP) with the activities of the Climate Change Research Initiative (CCRI).

**Climate Change Technology.** This category covers the newly established Climate Change Technology Program (CCTP). The CCTP is a multi-agency effort coordinated by the Department of Energy that incorporates a variety of technology research, development, and deployment activities – including voluntary partnerships and grant programs – that reduce greenhouse gas emissions. CCTP activities have the effect of stimulating the development and use of certain renewable, fossil, and nuclear energy technologies, and energy efficient products and process improvements.

**International Assistance.** Programs in this category provide assistance to developing countries to support their efforts to address climate change through improved energy efficiency, renewable energy use, land use and forestry practices.

**Energy Tax Incentives.** This category includes the Administration's clean energy tax proposals for investments in renewable energy (solar, wind, and biomass), hybrid and fuel cell vehicles, co-generation, and landfill gas conversion. These incentives promote deployment of energy efficient or emissions-free technologies, all of which can help reduce greenhouse gas emissions.

The following sections provide further detail for each of these four areas and Table 1 presents an overall summary of the associated climate change expenditures. Several appendices are also included that provide additional information.

Table 1  
**Summary of Federal Climate Change Expenditures**

Programs and Tax Incentives Related to Climate Change  
FY 2005 President's Budget

(Budget authority and tax incentives in millions of dollars)

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Climate Change Science Program (CCSP)</b>				
U.S. Global Change Research Program (USGCRP)	1,725	1,828	1,719	-109
Climate Change Research Initiative (CCRI)	41	168	237	70
<b>Subtotal – CCSP<sup>1</sup></b>	<b>1,766</b>	<b>1,996</b>	<b>1,956</b>	<b>-40</b>
<b>Climate Change Technology Program (CCTP)</b>				
Department of Agriculture	42	45	33	-12
Department of Energy	2,099	2,408	2,557	148
<i>National Climate Change Technology Initiative Competitive Solicitation Program<sup>2</sup></i>	0	0	3	3
Department of Defense	83	41	48	7
Department of the Interior	1	1	1	0
Department of Transportation	27	14	2	-13
Environmental Protection Agency	102	109	110	1
National Aeronautics and Space Administration	152	221	209	-12
Department of Commerce	40	28	10	-18
National Science Foundation	9	11	13	1
<b>Subtotal – CCTP<sup>1</sup></b>	<b>2,555</b>	<b>2,878</b>	<b>2,982</b>	<b>104</b>
<b>International Assistance</b>				
U.S. Agency for International Development	208	181	160	-22
Department of the Treasury	56	73	63	-9
Department of State	6	6	6	0
<b>Subtotal – International Assistance<sup>1,3</sup></b>	<b>270</b>	<b>260</b>	<b>229</b>	<b>-31</b>
<b>Energy Tax Incentives That Reduce Greenhouse Gases<sup>4</sup></b>	<b>0</b>	<b>0</b>	<b>680</b>	<b>680</b>
<b>Total<sup>1,5</sup></b>	<b>4,584</b>	<b>5,128</b>	<b>5,841</b>	<b>713</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> The National Climate Change Technology Initiative (NCCTI) Competitive Solicitation Program will largely fund research and development for technologies on the basis of their potential to reduce, avoid, or sequester greenhouse gas emissions. The Program's innovative approach will augment the existing base of research and development in climate change technology. This is a non-add line.

<sup>3</sup> This subtotal contains funds that are also counted in the Climate Change Science Program subtotal. Table total line excludes this double-count.

<sup>4</sup> The cost of the five energy tax incentives related to climate change included in the President's FY 2005 Budget is \$4.1 billion over five years; \$5.5 billion over ten years.

<sup>5</sup> Total may not add due to rounding. Excludes double-count – see footnote 2.

# **CLIMATE CHANGE SCIENCE**

The cabinet-level Committee on Climate Change Science and Technology Integration (CCCSTI) has the responsibility for overseeing the implementation of climate science and technology initiatives and programs within the Administration. The Climate Change Science Program (CCSP) has been established under this committee to coordinate climate science research and to integrate the work of the U.S. Global Change Research Program (USGCRP) with the Administration's Climate Change Research Initiative (CCRI) activities. The FY 2005 budget request for the CCSP, which includes funding for both USGCRP and CCRI across 12 agencies, is \$2.0 billion. Table 2 provides a breakdown of CCSP funding by agency.

The Department of Commerce National Oceanic and Atmospheric Administration (NOAA) has responsibility for leading the implementation of the CCSP. In July 2003, the Administration released the Strategic Plan for the CCSP, which provides a 10-year strategy and establishes near-term priorities. Since its creation, the CCSP has made progress on its objectives. The Administration will continue to determine where financial resources in the climate change science portfolio can be redirected from lower priority work to higher priority projects, as identified in its Strategic Plan.

## **CLIMATE CHANGE RESEARCH INITIATIVE**

Within the CCSP total, the FY 2005 Budget requests \$237 million for the Climate Change Research Initiative (CCRI), an increase of \$70 million over the FY 2004 enacted level. CCRI focuses on reducing significant uncertainties in climate science, improving global climate observing systems, and developing resources to support policymaking and resource management. In support of these priorities, the FY 2005 Budget includes funding to accelerate efforts to advance understanding of the role of aerosols in climate science, better quantify carbon sources and sinks (a sink is a mechanism that removes carbon from the atmosphere), and improve the technology and infrastructure used to observe and model climate variations. Table 3 provides a breakdown of the CCRI funding by agency.

## **U.S. GLOBAL CHANGE RESEARCH PROGRAM**

Much of the U.S. investment in research on climate science and other global environmental changes is part of the U.S. Global Change Research Program (USGCRP). The USGCRP forms the base of the CCSP and has existed for more than a decade. USGCRP activities involve 10 different agencies that carry out fundamental research on natural and human-induced changes in the global environment. The central goal of the USGCRP is to obtain a more complete understanding of global climate change to better respond to the challenges it presents. The FY 2005 Budget proposes \$1.7 billion for USGCRP activities. Some programs within this base have been either accelerated or refocused to deliver results for CCRI priorities and are now included under the CCRI.



**Table 2**  
**Climate Change Science Program**

By Agency/Appropriation Account

(Discretionary budget authority in millions of dollars)

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Agriculture</b>				
Agricultural Research Service	35	36	40	4
Cooperative State Research, Education and Extension Services	8	12	13	1
Economic Research Service	0	0	0	0
Forest Service – Forest and Rangeland Research	18	17	19	2
<b>Subtotal – USDA<sup>1</sup></b>	<b>62</b>	<b>65</b>	<b>71</b>	<b>6</b>
<b>Department of Commerce</b>				
National Oceanic and Atmospheric Administration – Operations, Research, and Facilities	<b>116</b>	<b>123</b>	<b>142</b>	<b>19</b>
<b>Department of Energy</b>				
Science (Biological & Environmental Research)	<b>115</b>	<b>130</b>	<b>131</b>	<b>1</b>
<b>Department of Health and Human Services</b>				
National Institutes of Health	<b>61</b>	<b>63</b>	<b>65</b>	<b>2</b>
<b>Department of the Interior</b>				
U.S. Geological Survey – Surveys, Investigations, and Research	<b>28</b>	<b>29</b>	<b>29</b>	<b>0</b>
<b>Department of State</b>				
International Organizations and Programs	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>Department of Transportation<sup>2</sup></b>				
Federal Highway Administration – Federal-aid Highways	---	4	2	-1
Federal Transit Administration – Formula Grants and Research	---	0	0	0
Federal Aviation Administration – Research, Engineering, and Development	---	0	1	1
<b>Subtotal – DOT<sup>1</sup></b>	---	<b>4</b>	<b>3</b>	<b>-1</b>
<b>Environmental Protection Agency</b>				
Science and Technology	<b>22</b>	<b>21</b>	<b>21</b>	<b>0</b>

**Table 2, Climate Change Science Program - Continued**

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>National Aeronautics and Space Administration</b>				
Science, Aeronautics, and Technology <sup>3</sup>	1,147	1,334	1,271	-63
<b>National Science Foundation</b>				
Research and Related Activities <sup>4</sup>	203	213	210	-3
<b>Smithsonian Institution</b>				
Salaries and Expenses	6	6	6	0
<b>U.S. Agency for International Development</b>				
Development Assistance	6	6	6	0
<b>Total<sup>1</sup></b>	<b>1,766</b>	<b>1,996</b>	<b>1,956</b>	<b>-40</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> FY 2004 enacted levels for DOT are estimates.

<sup>3</sup> FY 2004 and FY 2005 levels for NASA reflect full cost accounting. FY 2003 does not. The decrease in NASA CCSP funding is due to the natural down cycle resulting from completion of the initial Earth Observing System, removal of Congressional earmarks and the deferral/cancellation of several proposed missions.

<sup>4</sup> The decrease in NSF CCSP funding is the result of normal variances in research solicitations and proposals associated with climate change science.

**Table 3**  
**Climate Change Research Initiative**

By Agency/Appropriation Account

(Discretionary budget authority in millions of dollars)

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Agriculture</b>				
Agricultural Research Service	0	1	7	5
Forest Service - Forest and Rangeland Svc	1	5	7	2
<b>Subtotal – USDA<sup>1</sup></b>	<b>2</b>	<b>6</b>	<b>13</b>	<b>7</b>
<b>Department of Commerce</b>				
National Oceanic and Atmospheric Administration – Operations, Research, and Facilities	<b>18</b>	<b>35</b>	<b>64</b>	<b>29</b>
<b>Department of Energy</b>				
Science (Biological & Environmental Research)	<b>3</b>	<b>25</b>	<b>25</b>	<b>0</b>
<b>Department of State</b>				
International Organizations and Programs	---	<b>1</b>	<b>1</b>	<b>0</b>
<b>Department of Transportation<sup>2</sup></b>				
Federal Highway Administration – Federal-aid Highways	---	4	2	-1
Federal Transit Administration – Formula Grants and Research	---	0	0	0
Federal Aviation Administration – Research, Engineering, and Development	---	0	1	1
<b>Subtotal – DOT<sup>1</sup></b>	---	<b>4</b>	<b>3</b>	<b>-1</b>
<b>National Aeronautics and Space Administration</b>				
Science, Aeronautics, and Technology <sup>3</sup>	<b>3</b>	<b>65</b>	<b>100</b>	<b>35</b>
<b>National Science Foundation</b>				
Research and Related Activities	<b>15</b>	<b>25</b>	<b>25</b>	<b>0</b>
<b>U.S. Agency for International Development</b>				
Development Assistance	---	<b>6</b>	<b>6</b>	<b>0</b>
<b>Total<sup>1</sup></b>	<b>41</b>	<b>168</b>	<b>237</b>	<b>70</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> FY 2004 enacted levels for DOT are estimates.

<sup>3</sup> FY 2004 and FY 2005 levels for NASA reflect full cost accounting. FY 2003 does not.

# CLIMATE CHANGE TECHNOLOGY

The cabinet-level Committee on Climate Change Science and Technology Integration (CCCSTI) has the responsibility for overseeing the implementation of climate science and technology initiatives and programs within the Administration. The Climate Change Technology Program (CCTP) has been established under this committee to coordinate and focus climate change technology research, development, and deployment programs and initiatives. A variety of voluntary partnership and grant activities are also part of the program's portfolio. All CCTP activities have the effect of stimulating the development and use of certain renewable, fossil, and nuclear energy technologies, as well as energy efficient products and process improvements. Though many CCTP activities generate benefits beyond addressing climate change, all CCTP activities improve energy efficiency or reduce greenhouse gas emissions.

The Department of Energy (DOE) has been given the responsibility of coordinating the CCTP. The CCTP strategic plan – which is currently under development – will provide more detail about specific programs and initiatives and will identify key areas in which priority investments should be made as part of the President's National Climate Change Technology Initiative (NCCTI).

In general, the structure of the CCTP and NCCTI parallels that of the Climate Change Science Program (CCSP) and the Climate Change Research Initiative (CCRI). One unique component of the CCTP is a Competitive Solicitation Program that was established as part of the President's NCCTI. This program is intended to promote innovative applied research not currently funded by the Federal government in its portfolio of current programs. Via a series of open competitive solicitations, the NCCTI Competitive Solicitation Program will fund concepts, technologies and advanced technical approaches that could, if successful, contribute significantly to meeting the President's climate change goals.

The FY 2005 Budget proposes \$3.0 billion in discretionary funding for CCTP. Table 4 shows CCTP funding by agency. Administration initiatives included in the CCTP are described below, followed by brief, general descriptions of CCTP activities by agency.

## ADMINISTRATION INITIATIVES

### Hydrogen Fuel Initiative

Announced by the President in his 2003 State of the Union address, this initiative involves working closely with the private sector to accelerate our transition to a hydrogen economy. This initiative, along with the FreedomCAR Partnership launched in 2002, will provide a total of \$1.7 billion through 2008 to develop hydrogen powered fuel cells, hydrogen infrastructure technologies, and advanced automotive technologies. If successful, the initiatives could lead to widespread commercial availability of fuel cell vehicles by 2020. The United States will pursue international cooperation to encourage a more rapid, coordinated advance for these technologies.

Transitioning to hydrogen on a global scale could lead to a significant reduction of air pollutants and greenhouse gas emissions in the transportation sector worldwide.

### **“FutureGen” – Coal-Fired, Zero-Emissions Electricity Generation**

In February 2003, President Bush announced that the United States would sponsor, with international and private sector cost-sharing partners, a \$1 billion, 10-year project to create the world’s first coal-based, zero-emissions electricity and hydrogen power plant. This project is designed to reduce air pollution dramatically and capture and store greenhouse gas emissions.

### **International Thermonuclear Experimental Reactor [ITER] (Fusion Energy)**

In January 2003, President Bush committed the United States to participate in multilateral negotiations to construct and operate ITER with our international partners: the European Union, Japan, Russia, China, and South Korea. ITER will be the largest and most technologically sophisticated energy research project in the world, and is the critical next step on the path toward eventually harnessing the promise of fusion energy – the same form of energy that powers the sun. If successful, this cost-shared \$5 billion research project will advance progress toward developing fusion’s potential as a commercially viable and clean source of energy in the middle of the century.

### **“Climate Leaders” and “Climate VISION” Partnerships**

Announced in February 2002, Climate Leaders is an Environmental Protection Agency (EPA) partnership program encouraging companies to develop long-term, comprehensive climate change strategies. Under this program, corporations set corporate-wide greenhouse gas reduction goals and inventory their emissions to measure progress. Over 50 major companies are now participating, including General Motors, Alcoa, BP, Pfizer, Staples, International Paper, IBM, Miller Brewing, Eastman Kodak, and Target.

Climate VISION (Voluntary Innovative Sector Initiatives: Opportunities Now) is a similar partnership effort announced in February 2003. DOE coordinates this partnership program, which targets industry sectors rather than individual corporations. Twelve major industrial sectors and the membership of the Business Roundtable have committed to reduce their greenhouse gas emissions in the next decade and to work closely with four cabinet agencies (DOE, EPA, DOT and USDA) in pursuing voluntary emissions reduction goals. Participating industries include America’s electric utilities, petroleum refiners and natural gas producers; automobile, iron and steel, chemical and magnesium manufacturers; forest and paper producers; railroads; and the cement, mining, aluminum, and semiconductor industries.

### **AGENCY ACTIVITIES**

A wide range of technology-related activities that address climate change are captured within CCTP, from programs designed to encourage near-term emission reductions via changes in management practices to research and development efforts that focus on advanced low-emission energy supply and carbon dioxide (CO<sub>2</sub>) sequestration technologies. Because each federal

agency possesses some unique expertise in certain areas, these climate change technology research, development, and deployment activities are distributed across multiple federal agencies. Brief descriptions of how each agency contributes to CCTP are included below.

### **Department of Agriculture**

USDA promotes both economic development in rural areas and renewable energy generation and energy conservation by providing grants and loans to farmers, ranchers, and rural small businesses. The agency provides competitive grants and loans to fund energy efficiency improvements and renewable energy systems such as those that derive energy from wind, solar, biomass, or geothermal sources, or hydrogen. In addition, the agency provides Biomass Research and Development Grants which are co-administered with the Department of Energy and are available to eligible entities to carry out research, development, and demonstrations on bio-based products, bioenergy, biofuels, biopower, and related processes. The Department also conducts bioenergy and biomass research through a number of its agencies. Research is focused on such areas as developing enzymatic processes to lower the cost of conversion of cellulosic agricultural biomass into ethanol, creating production technologies and practices to increase carbon sequestration, enhancing opportunities to use small diameter, low-value woody cropping systems to produce energy, and conducting inventories of carbon biomass. The Renewable Energy Program reduction from FY 2004 to FY 2005 reflects a comprehensive review of duplicative programs and right-sizing the program to address unmet needs for renewable energy systems in rural America.

### **Department of Defense**

The Department of Defense sponsors and carries out mission-driven research in areas of alternative fuels, high-density fuels, logistics and energy efficiency, and emissions reduction. This research focuses primarily on fuel cells, batteries, direct energy conversion such as photovoltaics and thermoelectrics, and nanomaterials for energy systems.

### **Department of Energy**

DOE's comprehensive portfolio of research, development, and deployment activities that can reduce greenhouse gas emissions comprises three main areas. In the area of energy efficiency, DOE supports programs to improve the energy efficiency of vehicles, buildings, industrial processes, distributed energy systems, the electric transmission grid, and the Federal government. DOE also supports technology R&D to improve the efficiency of large-scale power generating facilities that use fossil energy resources. DOE's grants programs, such as the Weatherization Assistance Program and the State Energy Program, help deploy energy efficient technologies. In the area of emissions-free energy production, the Department supports programs to reduce the cost and increase deployment of emissions-free energy technologies. These technologies include renewable energy (solar, wind, geothermal, biomass, and hydropower) as well as nuclear energy (fission and fusion). The Department also leads in the government's research efforts on hydrogen, which can be produced from multiple energy resources and used to generate emissions-free power. In the areas of carbon sequestration the Department funds both basic and applied research in carbon sequestration technologies.

### **Department of the Interior**

The Department of the Interior focuses on research programs to assess the impacts of geologic reservoirs and land-use on carbon sequestration, and to study the potential impact of climate change on wildlife. For example, the United States Geological Survey (USGS) is undertaking research to provide new information on the capacity of geologic reservoirs to serve as long-term repositories for carbon dioxide and to evaluate the impacts of land-use on the establishment of repositories. This project will quantitatively assess the capability of geologic reservoirs such as depleted oil and gas reservoirs, unmineable coal beds, and saline aquifers to sequester carbon dioxide. The Fish and Wildlife Service (FWS) is studying the distribution of polar bears along the coast and barrier islands of the Beaufort Sea during the autumn open water and freeze up period in relation to changing polar pack ice conditions.

### **Department of Transportation**

The Department of Transportation focuses on developing technology and infrastructure for commercially viable hydrogen fuel cells to power cars, buses, trucks, homes, and businesses free of air pollution or greenhouse gases. DOT has existing authorities, regulatory responsibilities and expertise for vehicle safety and fuel economy, and for pipeline and hazardous material safety. These include the safety of hydrogen-powered vehicles and hydrogen storage in vehicles, as well as the safe transportation and distribution of hydrogen. DOT's heavy-duty vehicle research includes the leading role in fuel cell research, development, demonstration and deployment for hydrogen fuel cell buses. The efforts in fuel cell buses and heavy-duty vehicles can help pave the way for other transportation markets. The reduction from 2004 to 2005 reflects elimination of earmarked projects.

### **Environmental Protection Agency**

EPA's climate programs are primarily voluntary partnership and outreach programs that encourage the implementation of near-term greenhouse gas reduction actions and energy efficiency improvements. These programs target mainly the transportation and buildings sectors as well as industry in general. As examples, EPA works with companies and industry groups to foster the development and deployment of renewable energy and cogeneration, to develop cost-effective improvements in processes to reduce emissions, and to promote the adoption of pollution control technologies. One highly successful program (administered jointly with the Department of Energy) is ENERGY STAR, which provides a strategic approach to energy management and includes a product labeling program that informs consumers of energy saving merchandise. The programs address a range of greenhouse gases from common compounds such as carbon dioxide (CO<sub>2</sub>) to the less common but potentially more potent gases such as sulfur hexafluoride (SF<sub>6</sub>).

### **National Aeronautics and Space Administration**

The National Aeronautics and Space Administration (NASA) focuses on enabling reduction in the emissions associated with aircraft operations through research programs in its Aeronautics enterprise. The Ultra-Efficient Engine Technology program develops new technologies that will enable efficient and reliable aircraft engines that reduce NO<sub>x</sub> emissions by 70 percent and CO<sub>2</sub> emissions by 15 percent. The Power and Propulsion program and its successor, the Low

Emissions Alternative Power program, focus on long-term and high-risk technologies that further advance the development of low emission aircraft engines as well as alternative aviation propulsion sources designed to produce zero harmful emissions. The reduction from 2004 to 2005 reflects elimination of earmarked projects.

### **Department of Commerce, National Institute of Standards and Technology**

Working closely with industry, academia, and other government agencies, the National Institute of Standards and Technology (NIST) supports advances in instrument calibrations and measurement relevant to global climate change, through activities such as the development of measurement standards for temperature, air pressure, humidity, and other physical and chemical properties that enable researchers to accurately monitor the Earth's atmosphere and oceans. NIST also uses metrology techniques to address key technical barriers adversely affecting the development of hydrogen fuel cells; and NIST develops testing and rating procedures for residential appliances, electric motors, commercial water heaters, and HVAC systems to help quantify their energy efficiency and greenhouse gas emissions.

### **National Science Foundation**

The National Science Foundation (NSF) funds basic research relevant to climate change technologies. The nature of this research portfolio varies from year to year, based on proposals the agency receives. Recent activities have included: research to enable new technologies for producing and conserving energy that minimize generation of greenhouse gases; biochemical techniques for production of hydrogen for use as a clean fuel; and the capture and sequestration of carbon dioxide through chemistry and biotechnology. NSF also has worked with the EPA to support Technology for a Sustainable Environment, including research on pollution prevention in industrial processes. NSF has also supported unsolicited proposals in this general area.



**Table 4**  
**Climate Change Technology Program**

Program Details by Agency/Account

(Discretionary budget authority in millions of dollars)

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Agriculture</b>				
Natural Resources Conservation Service – Biomass R&D (Section 9008 Farm Bill)	14	14	14	0
Natural Resources Conservation Service – Carbon Cycle	1	1	1	0
Forest Service R&D – inventories of carbon biomass	1	0	1	1
Agricultural Research Service – Bioenergy Research	2	2	2	0
Cooperative State Research, Education and Extension Service – Biofuels/Biomass research; formula funds, National Research Initiative	3	5	5	0
Forest Service – Biofuels/Biomass, Forest and Rangeland Research	1	0	1	0
Rural Business Service – Renewable Energy Program	22	23	11	-12
<b>Subtotal – USDA<sup>1</sup></b>	<b>42</b>	<b>45</b>	<b>33</b>	<b>-12</b>
<b>Department of Energy</b>				
Energy Conservation	880	878	876	-2
Energy Supply/Electricity	88	81	91	10
Energy Supply/Nuclear	257	292	313	21
Energy Supply/Renewables	322	357	375	17
Fossil Energy R&D (Efficiency and Sequestration)	253	464	541	77
Science (Fusion, Sequestration, and Hydrogen)	298	337	362	25
<i>National Climate Change Technology Initiative Competitive Solicitation Program<sup>2</sup></i>	0	0	3	3
<b>Subtotal – DOE<sup>1</sup></b>	<b>2,099</b>	<b>2,408</b>	<b>2,557</b>	<b>148</b>
<b>Department of Defense</b>				
Research, Development, Test and Evaluation, Army	45	15	33	18
Research, Development, Test and Evaluation, Navy	16	7	7	-1
Research, Development, Test and Evaluation, Air Force	3	1	0	-1
Research, Development, Test and Evaluation, Defense-wide	19	17	9	-9
<b>Subtotal – DOD<sup>1</sup></b>	<b>83</b>	<b>41</b>	<b>48</b>	<b>7</b>
<b>Department of the Interior</b>				
US Geological Survey – Surveys, Investigations and Research – Geology Discipline, Energy Program	1	1	1	0
US Fish and Wildlife Service – Resource Management, Terrestrial Sequestration	0	0	0	0
<b>Subtotal – DOI<sup>1</sup></b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table 4, Climate Change Technology Program – Continued**

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Transportation</b>				
Federal Transit Administration – Capital Investment Grants	26	10	1	-9
Office of the Secretary of Technology – Transportation, Policy, Research and Development	1	4	0	-4
Research and Special Programs Administration – Research and Special Programs	0	1	1	0
<b>Subtotal – DOT<sup>1,3</sup></b>	<b>27</b>	<b>14</b>	<b>2</b>	<b>-13</b>
<b>Environmental Protection Agency</b>				
Environmental Programs and Management	82	91	91	0
Science and Technology	20	17	19	2
<b>Subtotal – EPA<sup>1</sup></b>	<b>102</b>	<b>109</b>	<b>110</b>	<b>1</b>
<b>National Aeronautics and Space Administration</b>				
Exploration, Science & Aeronautics <sup>4</sup>	<b>152</b>	<b>221</b>	<b>209</b>	<b>-12</b>
<b>Department of Commerce</b>				
Scientific and Technological Research and Services	10	10	10	0
Industrial Technical Services – Advanced Technology Program <sup>5</sup>	30	18	0	-18
<b>Subtotal – NIST<sup>1</sup></b>	<b>40</b>	<b>28</b>	<b>10</b>	<b>-18</b>
<b>National Science Foundation</b>				
Research and Related Activities	<b>9</b>	<b>11</b>	<b>13</b>	<b>1</b>
<b>Total<sup>1</sup></b>	<b>2,555</b>	<b>2,878</b>	<b>2,982</b>	<b>104</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> The National Climate Change Technology Initiative (NCCTI) Competitive Solicitation Program will largely fund research and development for technologies on the basis of their potential to reduce, avoid, or sequester greenhouse gas emissions. The Program's innovative approach will augment the existing base of research and development in climate change technology. This is a non-add line.

<sup>3</sup> FY 2004 enacted levels for DOT are estimates.

<sup>4</sup> FY 2004 and FY 2005 levels for NASA reflect full cost accounting. FY 2003 does not.

<sup>5</sup> Termination of the Advanced Technology Program at NIST is proposed in the FY 2005 President's Budget.

# **INTERNATIONAL ASSISTANCE**

The United States has multiple foreign assistance programs geared towards the environment. Though these programs are not all in place solely for climate change purposes, they do provide climate change benefits. Table 5 provides a summary of this international assistance funding.

## **U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)**

The goal of USAID's Climate Change Program is to promote economic development that is energy-efficient and to improve the ability of populations and ecosystems to respond to climate impacts. The program operates in more than 40 developing and transition countries, through bilateral field missions, regional programs, and central offices, to implement projects that meet development objectives while also lowering greenhouse gas emissions. It supports technology cooperation in renewable energy and energy efficiency, improved urban transportation measures, quantification and monitoring of greenhouse gas emissions, carbon sequestration through improved land management, activities to increase adaptability to climate impacts, and capacity building to help countries meet their responsibilities under the United Nations (UN) Framework Convention on Climate Change.

## **DEPARTMENT OF STATE**

The FY 2005 budget includes \$6 million to support the work carried out by the Secretariat of the UN Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC). The Secretariat assists UNFCCC Parties in compiling and communicating information required under the Convention, and facilitates the work of UNFCCC subsidiary bodies on implementation and on scientific and technological matters. The IPCC assesses scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. The IPCC assessments inform the development of policies within and between countries.

## **DEPARTMENT OF THE TREASURY**

The Treasury Department contributes to the U.S. climate change activities through two funding mechanisms – the Tropical Forestry Conservation Act (TFCA) and the Global Environment Facility (GEF). TFCA funding reduces qualifying countries' concessional debt in exchange for payment of local currency resources into funds to support programs to conserve tropical forests. Since 1998, Congress has appropriated \$51 million for this initiative. In addition, Congress recently provided \$20 million in funding for FY 2004 and the same amount is requested for FY 2005. TFCA debt reduction agreements have been concluded with six countries: Bangladesh, Belize, El Salvador, Peru, Philippines, and Panama. In total, these agreements have generated over \$60 million to support forest conservation. Specific information about the GEF can be found in Appendix A.

## Table 5

# International Climate Change Assistance

### Program Details by Agency/Account

(Discretionary budget authority in millions of dollars)

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Agency for International Development (USAID)</b>				
Development Assistance (DA)	140	123	112	-11
Economic Support Fund (ESF)	6	5	6	1
Assistance for the Independent States of the Former Soviet Union (FSA)	48	38	30	-9
Assistance for Eastern Europe and the Baltic States (AEEB)	8	8	5	-3
International Disaster Assistance (IDA)	4	4	4	0
Andean Counterdrug Initiative (ACI)	2	4	3	0
<b>Subtotal – USAID<sup>1</sup></b>	<b>208</b>	<b>181</b>	<b>160</b>	<b>-22</b>
<b>Department of State</b>				
International Organizations and Programs	6	6	6	0
<b>Department of the Treasury</b>				
Debt Restructuring – Tropical Forestry Conservation <sup>2</sup>	---	20	20	0
Global Environment Facility <sup>3</sup>	56	53	43	-9
<b>Subtotal – Treasury<sup>1</sup></b>	<b>56</b>	<b>73</b>	<b>63</b>	<b>-9</b>
<b>Total<sup>1</sup></b>	<b>270</b>	<b>260</b>	<b>229</b>	<b>-31</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> Funding for the Tropical Forest Conservation Act (TFCA) is normally appropriated to the Treasury Department. In FY 2003, however, the enacted level for tropical forest conservation within the US Agency for International Development's Development Assistance (DA) account was \$50 million, of which \$20 million was transferred to Treasury for TFCA. The FY 2004 enacted level was \$20 million for TFCA in the Treasury Department and up to an additional \$40 million of DA may be available for the subsidy costs of modifying loans and loan guarantees, pursuant to the provisions of TFCA. In FY 2005, \$20 million is being requested for TFCA within the Treasury Department budget with an additional \$30 million for tropical forest conservation within DA.

<sup>3</sup> The total FY 2005 request for the Global Environment Facility (GEF) is \$120.7 million. In FY 2005 approximately 36% of total GEF funding from all sources supports climate-related projects (e.g. expanding clean energy production and efficient energy use). In FY 2003 and FY 2004, 38% of the total GEF supported such projects. The GEF, which also provides funding for other global environmental concerns, does not allocate funds by project type.

# ENERGY TAX INCENTIVES THAT REDUCE GREENHOUSE GASES

The President is proposing \$4.1 billion in tax credits over five years for investments in renewable energy, hybrid and fuel cell vehicles, co-generation, and landfill gas conversion. These incentives are important to meeting the nation's long-term energy supply and security needs, and reducing the projected growth in greenhouse gas emissions. This section summarizes these energy tax incentives as proposed in the FY 2005 President's Budget. For more detailed information about these credits, see the Department of the Treasury's *General Explanations of the Administration's Fiscal Year 2005 Revenue Proposals* document published in February 2004.

## HOMES

**Tax credit for residential solar energy systems:** Current law provides a 10-percent investment tax credit to businesses for qualifying equipment that uses solar energy to generate electricity; to heat, cool or provide hot water for use in a structure; or to provide solar process heat. No credit is available for non-business purchases of solar energy equipment. The Administration proposes a new tax credit for individuals who purchase photovoltaic or solar water heating equipment for use in a unit that the individual uses as a residence. The credit would equal 15 percent of the equipment and installation costs and an individual would be allowed a cumulative per-residence maximum credit of \$2,000 for photovoltaic equipment and \$2,000 for solar water heating systems. The credit for solar water heating equipment would apply only if placed in service after December 31, 2003 and before January 1, 2007, and to photovoltaic systems placed in service after December 31, 2003 and before January 1, 2009.

## TRANSPORTATION

**Tax credit for hybrid and fuel cell vehicles:** Currently there is no generally available income tax credit for hybrid vehicle purchases. A 10 percent tax credit up to \$4,000 is provided for the cost of a qualified electric vehicle. The full amount of the existing credit is available for purchases made prior to 2004. A qualified electric vehicle is a motor vehicle that is powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electric current. The Administration is proposing the following:

- A credit of up to \$4,000 for qualified hybrid vehicles purchased after December 31, 2003 and before January 1, 2009. The amount of the credit would depend on the percentage of maximum available power provided by the rechargeable energy storage system and the amount by which the vehicle's fuel economy exceeds the 2000 model year city fuel economy.
- A credit of up to \$8,000 for new, qualified fuel cell vehicles purchased after December 31, 2003 and before January 1, 2013. A minimum credit of \$4,000 would be provided.

Incremental increases would be available based on the amount by which the vehicle's fuel economy exceeded the 2000 model year city fuel economy.

## **INDUSTRY**

**Tax credit for electricity produced from wind or biomass:** Current law provides taxpayers a 1.5 cent-per-kilowatt hour tax credit for electricity produced from wind, "closed-loop" biomass, and poultry waste. "Closed-loop" biomass refers to plant material that was grown exclusively for the purpose of being used at a qualified facility to produce electricity. The electricity must be sold to an unrelated third party and the credit applies to the first 10 years of production. The current tax credit covers facilities that are owned by the taxpayer claiming the credit and that are placed in service before January 1, 2004. The Administration's proposal would:

- Extend current biomass credit. This proposal would extend for three years the 1.5 cent-per-kilowatt hour wind and biomass credit to facilities placed in service before January 1, 2007.
- Expand definition of eligible biomass. This proposal expands the definition of eligible biomass to include waste from certain forest-related resources, agricultural, and other sources. Electricity produced at facilities placed in service before January 1, 2004 would be eligible for the credit from January 1, 2004, through December 31, 2008. The credit for such electricity would be computed at a rate equal to 60 percent of the generally applicable rate. Electricity produced from newly eligible biomass co-fired in coal plants would be eligible for the credit from January 1, 2004, through December 31, 2006. The credit for such electricity would be computed at a rate equal to 30 percent of the generally applicable rate.

**Tax credit for energy produced from landfill gas:** Currently, taxpayers that produce gas from biomass (including landfill gas) are eligible for a credit equal to \$3 per barrel-of-oil equivalent. To qualify, the gas must be produced domestically from a facility placed in service before July 1, 1998 and sold to an unrelated person before January 1, 2008. The proposal would extend the credit for landfill methane if the fuel is produced at a facility (or portion of a facility) placed in service after December 31, 2003 and before January 1, 2012, and is sold before January 1, 2012. The credit for fuel produced at landfills subject to EPA's 1996 New Source Performance Standards/Emissions Guidelines would be limited.

**Tax credit for combined heat and power property:** Combined heat and power (CHP), also known as co-generation, is an efficient form of electric generation that recycles heat that is normally lost under traditional power generation methods. Currently, no income tax credit is available for investment in CHP property. The Administration is proposing a new 10 percent investment credit for qualified CHP systems placed in service after December 31, 2003 and before January 1, 2009.

**TABLE 6**  
**Energy Tax Incentives That Reduce Greenhouse Gases**

FY 2005 Budget

(Revenue effect in millions of dollars)

	2005	2006	2007	2008	2009	Total 2005-09
<b>Homes</b>						
Provide tax credit for residential solar energy systems.	-12	-11	-17	-23	-10	-73
<b>Transportation</b>						
Provide tax credit for purchase of certain hybrid and fuel cell vehicles.	-79	-223	-376	-556	-542	-1,776
<b>Industry</b>						
Extend the tax credit for electricity produced from wind and closed-loop biomass and expand eligible biomass sources.	-401	-337	-305	-278	-139	-1,460
Provide tax credit for energy produced from landfill gas.	-34	-67	-91	-104	-117	-413
Provide tax credit for combined heat and power property.	-154	-107	-64	-62	-13	-400
<b>Total</b>	<b>-680</b>	<b>-745</b>	<b>-853</b>	<b>-1,023</b>	<b>-821</b>	<b>-4,122</b>

# **APPENDIX A**

## **GLOBAL ENVIRONMENT FACILITY (GEF)**

### **FY 2005 Budget Request**

The FY 2005 Budget requests \$107.5 million for the third of four annual payments under the third GEF replenishment (GEF-3) and \$13.2 million to pay a portion of the U.S. arrears to the GEF-2. The clean energy portion of the GEF portfolio – its climate change focal area – accounts for about 36 percent of its financial commitments, which is about \$43 million for climate-related activities in FY 2005.

### **Background on the Organization**

The GEF was created in 1991, before any climate convention or protocol existed, to specialize in trans-border environment problems. In addition to climate change, GEF funding is focused on reducing international water pollution and overfishing; improving forestry, wildlife management, and biological diversity conservation; and phasing out use of ozone-depleting chemicals (in Eastern Europe, to complement Montreal Protocol Fund work in developing countries).

The 1992 Framework Convention on Climate Change (the “Convention”) called for a “financial mechanism” to: (1) help developing countries evaluate, quantify, and report publicly on their greenhouse gas emissions and (2) make investments in cleaner development in developing countries. In 1994, more than three years before conclusion of the Kyoto Protocol, the U.S. and other countries chose the GEF as the institution to run the financial mechanism of the Convention, in part to avoid creating new institutions.

By 1995, donors had concluded a first GEF replenishment that extensively restructured the GEF and improved its operational effectiveness. This restructuring also cemented a governance structure in which donors exercise much more power than in the Convention or in any standard “UN-configured” institution.

### **GEF Operations**

The GEF focuses on innovative and generally small projects that may be copied elsewhere with financing from non-GEF sources. Since beginning regular operations in 1994, the GEF has designed and initiated over 1,420 investment and capacity building projects in over 161 countries that are now being implemented by developing countries with the help of three agencies – the World Bank, the UN Development Program, and the UN Environment Program. GEF has committed about \$4.5 billion to date, leveraging over \$14 billion from other sources. Cofinanciers include the developing countries themselves, bilateral aid agencies, the GEF’s three implementing agencies and other multilateral financial institutions, and, in some cases, private sector investors and non-governmental organizations. Leveraging for clean energy projects is



significant: \$931 million in cofinancing was leveraged in association with \$176 million in GEF grants in calendar year 2003. GEF operations take two forms: (1) technical assistance to help developing countries frame more environmentally sound policies in key sectors such as energy production and land management; and (2) direct investments to demonstrate innovative technology projects, such as rural solar power, that countries then can copy on a larger scale

### **No Projects That Are Kyoto-Specific**

The GEF predates both the 1997 Kyoto Protocol (the “Protocol”) and the 1992 Framework Convention on Climate Change (the “Convention”). The Protocol places no new obligations on the GEF as the Convention’s financial mechanism. With regard to development finance, the Protocol is related to the GEF through the Protocol’s umbrella, the Convention. Because the GEF acts as the financial mechanism for the Convention, it simply underscores existing Convention agreements on financial assistance for developing countries:

- Supporting developing country reporting requirements under the Convention; and
- Providing the extra cost over normal development costs of reducing greenhouse gas emissions in energy or other projects. For example, the GEF covers only the incremental cost of a clean wind power plant relative to a regular oil-fired plant of identical capacity.

### **GEF Climate Change-Related Clean Energy Activities**

The GEF supports five categories of climate-change related projects, all but one focused on the energy sector. The first category is small activities (generally costing about \$350,000 per project) to assist countries in preparing reports required under the Convention. These reports provide detailed inventories of countries’ greenhouse gas (GHG) emissions and sources (power plants, etc.), their GHG “sinks” (forests, etc.), and policies and programs that affect GHG emissions (energy pricing policies, etc.).

The four other categories, briefly illustrated with project examples below, all support clean energy development, usually combined with capacity-building for good policies and effective institutions. These programs make sense on their own terms and are all initiatives the United States has been pursuing domestically for years. None of them is directed by the Protocol.

The GEF already undertakes systematic annual portfolio performance evaluation. Criteria include quality of overall project management, financial management, policy impacts, country capacity development, civil society engagement, and pollution abatement. For example, for energy efficiency projects, evaluators compare investments in efficient equipment following the GEF intervention to a baseline scenario of efficiency investments. An extensive effort to update and improve measurement criteria at both project and program levels for climate change activities has been concluded. These measurements are now being used to ensure projects and programs achieve their objectives.

### **Promoting Energy Efficiency and Conservation**

Three GEF energy efficiency programs – in Poland, Mexico and Thailand – have substantially transformed efficient lighting markets in these countries, and have led to new energy efficiency programs in other consumer products, such as refrigerators and air conditioners. The three projects resulted in the installation of more than 4.6 million energy efficient lights. In Poland, efficient lighting prices decreased by 34% in real terms from 1995 to 1998, while the number of Polish households using efficient lighting increased from one in ten to one in three. In Thailand, a GEF project helped completely transform the fluorescent light market, representing 20 million lights sold annually; market share of the more efficient lamps went from 40% to 100% during the project. High efficiency refrigerators also increased their market share from 12% to 96%. In Mexico, consumers and businesses have installed almost 40% more of the efficient lights than the GEF's most optimistic projections. The project's success also convinced Mexico to expand dramatically energy efficiency programs in other locations and sectors.

### **Promoting Renewable Energy**

In Sri Lanka, a GEF project has succeeded in supplying electricity by employing renewable technologies and demonstrating the advantages of such technologies to rural households and the country in general. This \$5.9 million GEF grant has leveraged \$49.4 million in cofinancing, including \$24.2 million from the World Bank. Approximately 30 megawatts of mini-hydropower have been added to the grid through private developers, and a total of 8,800 households have been provided with electricity through village hydropower and solar photovoltaic power. The aim is to provide for the replication of such renewable energy schemes by private businesses in Sri Lanka and many other countries.

### **Lowering the Long-Term Cost of Advanced Clean Energy Technologies**

Solar thermal power plants projects financed by the GEF are being developed in India, Morocco, Mexico and Egypt. The GEF projects have lent credibility to this technology, and helped expand ongoing research, development and commercialization programs in several other countries. In addition, a "Fuel Cells Initiative" is being prepared with private sector participation to explore a diverse range of applications in developing countries.

### **Clean Fossil-Fuel Combustion and Other Short-Term Measures**

The GEF's \$10 million Coal Bed Methane Project demonstrated at three sites a wide variety of techniques and technologies that Chinese coal mines can employ to reduce methane emissions and capture clean-burning methane as a fuel. It also spawned landmark policy and institutional reforms, including the creation of the China United Coal Bed Methane Corporation, that support replication of coal-bed methane recovery. The Chinese Ministry of Coal has since negotiated agreements with BP-Amoco and other companies for coal-bed methane projects. Based on the GEF's early work, the Asian Development Bank, Asia-Pacific Economic Cooperation, and the China United Coal Bed Methane Corporation are all working to expand coal-bed methane development in China.

# **APPENDIX B**

## **OPPORTUNITIES CREATED BY THE FARM BILL**

The 2002 Farm Bill provided the Department of Agriculture (USDA) with significant new conservation tools and funding to expand the Department's efforts to protect and enhance natural resources on agricultural lands. In FY 2005 alone, USDA will invest \$3.9 billion in conservation activities on agricultural lands using programs authorized by the 2002 Farm Bill, and this level of funding represents an increase of about \$1.8 billion from FY 2001. Through these Farm Bill programs, USDA is able to partner with agricultural producers and implement a variety of land retirement, resource restoration, and management activities. On June 6, 2003, Secretary Veneman announced that USDA will give consideration to activities that store carbon and reduce greenhouse gases in implementing forest and agriculture conservation programs. Technologies and practices that reduce greenhouse gas emissions and increase carbon sequestration also address other conservation objectives, such as improving water and air quality and enhancing wildlife habitat.

Farm and grazing land conservation actions can play a unique role in reducing the greenhouse gas intensity of the U.S. economy. Most U.S. cropland soils have lost between one-third and 60 percent of their carbon since they were first converted to crop production beginning about 200 years ago. This diminished carbon pool can, however, be replenished by changes in land use and land management. Conversion back into wetlands, grasslands, and forests which occurs on lands enrolled in such USDA programs as the Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), and Wetlands Reserve Program (WRP), fosters the re-accumulation of carbon in soils.

However, cropland does not need to be taken out of production to sequester carbon. Land management practices such as conservation tillage (e.g., reduced or no till), residue management, cover cropping, increasing crop frequency, nutrient and water management and erosion control can increase soil carbon content while the land is still used for crop production. These practices also help preserve cropland and improve long-term productivity.

Crop and grazing lands can also be a source of nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) emissions from nitrogen fertilizers and manure. Actions such as manure management, the use of anaerobic digesters and improving fertilizer and fuel efficiency can significantly reduce greenhouse gas emissions. Overall, the variety of land retirement, resource restoration, and management activities promoted by USDA has multiple benefits. According to Secretary Veneman "The technologies and practices that reduce greenhouse gas emissions and increase carbon sequestration also address other conservation objectives, such as improving water and air quality and enhancing wildlife habitat. This is good for the environment and good for agriculture."

Major elements of the USDA actions to reduce greenhouse gases are as follows:

Environmental Quality Incentives Program (EQIP): The Natural Resources Conservation Service (NRCS) rewards and recognizes actions that reduce greenhouse gas emissions within the EQIP application ranking systems. By including this ranking criterion, NRCS can provide cost-share assistance to livestock producers to install greenhouse gas mitigating technologies, including construction of methane digesters. Producers who improve the quality of their nutrient management systems by achieving a higher level of nitrogen use efficiency can also receive cost-share funds.

Conservation Reserve Program (CRP): The Farm Service Agency (FSA) administers CRP, a program that provides carbon sequestration benefits by contracting with producers to take environmentally sensitive acreage out of agricultural production. Once a conservation cover of grass or trees is established on enrolled land, the acres begin to accumulate carbon in the soils and vegetative matter. In addition, CRP may enroll highly valuable and unique acres from an environmental standpoint on a continuous basis. In FY 2004, FSA announced it will target 500,000 of these unique acres toward hardwood tree planting and wetland restoration – these acres will provide additional carbon sequestration benefits in future years.

# **APPENDIX C**

## **CLIMATE CHANGE TECHNOLOGY FUNDING CROSSWALK**

OMB's annual compilation of budget data related to climate change technology research, development, and deployment (RD&D) has largely been consistent over the years in terms of the activities and budgetary line items included. However this year, this information has been presented differently to reflect the establishment of the Administration's Climate Change Technology Program (CCTP).

The Climate Change Technology section of this report describes CCTP activities. This interagency effort led by DOE uses a specific set of criteria to identify activities that can contribute to reducing current or future greenhouse gas emissions through technology RD&D. Through this crosscut, pertinent activities have been identified at nine agencies. Table 4 of this report summarizes the CCTP funding levels by agency and account.

The major differences between the old and new climate change technology RD&D compositions are: (1) CCTP includes more agencies (nine versus three) and (2) CCTP includes more activities within certain DOE accounts. For example, the CCTP crosscut includes more activities related to research and development of nuclear energy, fusion energy and fossil energy. Both of these changes are consistent with the criteria used to define the CCTP. To facilitate the transition to this new technology RD&D composition, Table 7 shows the climate change technology RD&D funding levels for fiscal years 2003, 2004, and 2005 as they would have been presented using the methodology of previous reports along with the corresponding CCTP levels.

The new CCTP crosscut appropriately captures all climate change technology RD&D and reflects a parallel structure to the CCSP. Hereafter, the former technology RD&D crosscut as shown in Table 7 will not be compiled.

**TABLE 7**  
**Climate Change Technology Funding Crosswalk**

FY 2005 Budget

(Discretionary budget authority in millions of dollars)

	Old Method				CCTP Criteria
	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005	FY 2005 Proposed
<b>Department of Energy</b>					
Energy Conservation	892	878	876	-2	876
<i>Energy Conservation R&amp;D<sup>2</sup></i>	624	607	544	-63	544
<i>State Energy Grants<sup>2</sup></i>	44	44	41	-3	41
<i>Weatherization<sup>2</sup></i>	224	227	291	64	291
Energy Supply	441	449	466	17	778
<i>Nuclear Energy Research Initiative (NERI)<sup>3</sup></i>	24	11	0	-11	313
<i>Renewable Energy Resources R&amp;D<sup>2</sup></i>	327	357	375	17	375
<i>Electric Transmission and Distribution<sup>2</sup></i>	90	81	91	10	91
Fossil Energy R&D	213	253	474	221	541
<i>Sequestration R&amp;D<sup>2</sup></i>	40	40	49	9	49
<i>Greenhouse gas emission reduction<sup>3</sup></i>	174	212	425	213	492
Science	32	44	74	30	362
<i>Sequestration<sup>2</sup></i>	32	36	36	0	36
<i>Fusion: International Thermonuclear     Experimental Reactor (ITER)<sup>2</sup></i>	0	8	38	30	38
<i>Other (Fusion and Hydrogen)<sup>3</sup></i>	0	0	0	0	288
Energy Information Administration <sup>3</sup>	3	2	2	0	0
<i>National Climate Change Technology     Initiative Competitive Solicitation Prog.<sup>2,4</sup></i>	0	0	3	3	3
<b>Subtotal – DOE<sup>1</sup></b>	<b>1,581</b>	<b>1,626</b>	<b>1,892</b>	<b>266</b>	<b>2,557</b>
<b>Environmental Protection Agency</b>					
Environmental Programs and Management <sup>2</sup>	82	91	91	0	91
Science and Technology <sup>2</sup>	20	17	19	2	19
<b>Subtotal – EPA<sup>1</sup></b>	<b>102</b>	<b>109</b>	<b>110</b>	<b>1</b>	<b>110</b>
<b>Department of Agriculture</b>					
Natural Resources Conservation Service – Biomass R&D (Section 9008 Farm Bill) <sup>2</sup>	14	14	14	0	14
Rural Business Service – Renewable Energy Program <sup>2</sup>	22	23	11	-12	11
<b>Subtotal – USDA<sup>1</sup></b>	<b>36</b>	<b>37</b>	<b>25</b>	<b>-12</b>	<b>25</b>
<b>Total<sup>1,5</sup></b>	<b>1,719</b>	<b>1,771</b>	<b>2,026</b>	<b>255</b>	<b>2,692</b>

Notes for Table 7:

- <sup>1</sup> Agency subtotals and table totals may not add due to rounding.
- <sup>2</sup> Funding shown using old method is the same as in the CCTP crosscut (Table 4).
- <sup>3</sup> Funding shown using old method reflects a subset of the activities counted in the CCTP crosscut (Table 4).
- <sup>4</sup> The National Climate Change Technology Initiative (NCCTI) Competitive Solicitation Program will largely fund research and development for technologies on the basis of their potential to reduce, avoid, or sequester greenhouse gas emissions. The Program's innovative approach will augment the existing base of research and development in climate change technology. This is a non-add line.
- <sup>5</sup> The FY 2005 total in the CCTP column does not include \$290 million for new agencies or new portions of listed agencies that reported funding this year for CCTP. The \$290 million when added to the \$2,692 million shown in this table for CCTP equals the total CCTP FY 2005 funding level of \$2,982 million as shown in Table 4.

# APPENDIX D

## ACCOUNTING OF FEDERAL CLIMATE CHANGE EXPENDITURES BY AGENCY

By Appropriation Account/Line Item  
(Budget authority and tax incentives in millions of dollars)

The following is a detailed listing of Federal climate change expenditures by agency with account level information as provided in the President's FY 2005 Budget Appendix. All numbers represent budget authority unless otherwise noted. The line items in the Program and Financing schedule in the Budget Appendix use obligations, not budget authority, so the numbers may not be comparable.

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Agriculture</b>				
Climate Change Science Program	62	65	71	6
Climate Change Technology Program	42	45	33	-12
<b>Subtotal – USDA<sup>1</sup></b>	<b>104</b>	<b>110</b>	<b>105</b>	<b>-5</b>
<b>Department of Commerce</b>				
Climate Change Science Program	116	123	142	19
Climate Change Technology Program	40	28	10	-18
<b>Subtotal – DOC</b>	<b>156</b>	<b>151</b>	<b>152</b>	<b>1</b>
<b>Department of Defense</b>				
Climate Change Technology Program	83	41	48	7
<b>Department of Energy</b>				
Climate Change Science Program	115	130	131	1
Climate Change Technology Program	2,099	2,408	2,557	148
<b>Subtotal – DOE<sup>1</sup></b>	<b>2,214</b>	<b>2,538</b>	<b>2,687</b>	<b>149</b>
<b>Department of Health and Human Services</b>				
Climate Change Science Program	61	63	65	2
<b>Department of the Interior</b>				
Climate Change Science Program	28	29	29	0
Climate Change Technology Program	1	1	1	0
<b>Subtotal – DOI<sup>1</sup></b>	<b>28</b>	<b>30</b>	<b>30</b>	<b>0</b>
<b>Department of State</b>				
Climate Change Science Program	0	1	1	0
International Assistance	6	6	6	0
<b>Subtotal – State<sup>1</sup></b>	<b>6</b>	<b>7</b>	<b>7</b>	<b>0</b>



**Accounting of Federal Climate Change Expenditures By Agency - Continued**

	FY 2003 Actual	FY 2004 Enacted	FY 2005 Proposed	\$ Change 2004-2005
<b>Department of Transportation</b>				
Climate Change Science Program	---	4	3	-1
Climate Change Technology Program	27	14	2	-13
<b>Subtotal – DOT<sup>1</sup></b>	<b>27</b>	<b>18</b>	<b>5</b>	<b>-14</b>
<b>Department of the Treasury</b>				
International Assistance	56	73	63	-9
<b>Environmental Protection Agency</b>				
Climate Change Science Program	22	21	21	0
Climate Change Technology Program	102	109	110	1
<b>Subtotal – EPA<sup>1</sup></b>	<b>124</b>	<b>130</b>	<b>131</b>	<b>1</b>
<b>National Aeronautics and Space Administration</b>				
Climate Change Science Program	1,147	1,334	1,271	-63
Climate Change Technology Program	152	221	209	-12
<b>Subtotal – NASA<sup>1</sup></b>	<b>1,298</b>	<b>1,555</b>	<b>1,480</b>	<b>-75</b>
<b>National Science Foundation</b>				
Climate Change Science Program	203	213	210	-3
Climate Change Technology Program	9	11	13	1
<b>Subtotal – NSF<sup>1</sup></b>	<b>213</b>	<b>225</b>	<b>223</b>	<b>-2</b>
<b>Smithsonian Institution</b>				
Climate Change Science Program	6	6	6	0
<b>U.S. Agency for International Development</b>				
Climate Change Science Program	6	6	6	0
International Assistance	208	181	160	-22
<b>Subtotal – USAID<sup>1,2</sup></b>	<b>214</b>	<b>187</b>	<b>166</b>	<b>-22</b>
<b>Total - ALL AGENCIES<sup>1</sup></b>	<b>4,584</b>	<b>5,128</b>	<b>5,161</b>	<b>33</b>
<b>Energy Tax Incentives that Reduce Greenhouse Gases</b>	<b>0</b>	<b>0</b>	<b>680</b>	<b>680</b>
<b>Total - ALL AGENCIES + TAX INCENTIVES<sup>1</sup></b>	<b>4,584</b>	<b>5,128</b>	<b>5,841</b>	<b>713</b>

<sup>1</sup> Agency subtotals and table totals may not add due to rounding.

<sup>2</sup> The USAID subtotal contains funds that are also counted in the Climate Change Science Program subtotal. Table total line excludes these double-counts.

# APPENDIX E

## U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT GLOBAL CLIMATE CHANGE FUNDING BY BUREAU/COUNTRY

(Dollars in Thousands)

BUREAU/ COUNTRY	STRATEGIC OBJECTIVE NAME	Reporting Category	Fund Account	FY 2003 Obligations	FY 2004 Enacted	FY 2005 Proposed
<b>Africa (AFR)</b>						
DROC	Health, Agriculture and Conflict Mitigation	3	DA	-	1,000	-
Madagascar	Biologically Diverse Ecosystems Conserved	3	DA	2,500	2,800	2,800
Malawi	Sustainable Use, Conservation, & Mgmt of Renewable Natural Resources	3	DA	2,654	2,258	1,811
Mali	Accelerated Economic Growth	3	DA	1,050	1,050	1,050
	Accelerated Economic Growth	1	DA	450	450	450
Mozambique	Increased Rural Household Incomes	3	DA	2,000	-	-
Namibia	Community Based Natural Resource Management	3	DA	500	500	500
Senegal	More effective Management of Services & Resources	3	DA	1,000	1,000	1,000
South Africa	Improved Capacity to Implement Economic Policy	1	DA	118	93	55
	Improved Capacity to Implement Economic Policy	3	DA	650	455	440
	Housing and Municipal Services	1	DA	1,632	1,852	1,905
	Increased Market Driven Employment Opportunities	3	DA	500	500	500
	Democratic Consolidation Advanced	3	DA	100	100	100
Uganda	Expanded Opportunities for Rural Sector Growth	3	DA	2,500	2,500	2,500
	Congo Basin Forest Partnership	3	DA	14,250	15,000	15,000
	Congo Basin Forest Partnership	3	DA	1,200	-	-
Initiative for Southern Africa	Increased Regional Cooperation in Natural Resource Mgmt	3	DA	1,300	1,000	1,000
	Climate Monitoring and Observing	5	DA			
Reg. Econ. Dev. Service Office (REDSO/E)	Climate Monitoring and Observing	5	DA			
REDSO/ESA	Regional Food Security	5	DA	500	500	500
WARP	Increased Food Security	5	DA	500	-	500
<b>Total AFR</b>				<b>33,404</b>	<b>31,058</b>	<b>30,111</b>

**USAID Climate Change Funding by Bureau/Country - Continued**

BUREAU/ COUNTRY	STRATEGIC OBJECTIVE NAME	Reporting Category	Fund Account	FY 2003 Obligations	FY 2004 Enacted	FY 2005 Proposed
<b>Asia and the Near East (ANE)</b>						
Afghanistan	Climate Monitoring and Observing	5	DA			
Bangladesh	Improved Performance of the Energy Sector	1	DA	3,470	3,500	3,000
	Improved Performance of the Energy Sector	1	ESF	1,500	-	1,000
India	Increased Environmental Protection in Energy, Industry, & Cities	1	DA	6,050	6,000	6,000
	Increased Environmental Protection in Energy, Industry, & Cities	1	ESF	2,000	2,500	2,500
Indonesia	Energy Sector Governance Strengthened	1	DA	1,500	500	1,000
	Strengthened & Decentralized Natural Resource Management	3	DA	1,630	3,130	2,000
Nepal	Increased Private Sector Participation & Investment in Hydropower	1	DA	2,200	2,100	2,000
Philippines	Environmental Management Improved	1	DA	2,000	5,600	5,000
Philippines	Environmental Management Improved	3	DA	2,000	-	-
USAEP	U.S. Asia Environmental Partnership	1	DA	2,000	1,200	1,200
SARI/E	South Asia Regional Initiative - Energy Program	1	DA	2,900	7,500	5,000
	Climate Monitoring and Observing	5	DA			
<b>Total ANE</b>				<b>27,250</b>	<b>32,030</b>	<b>28,700</b>
<b>Latin American and the Caribbean (LAC)</b>						
Bolivia	Sustainable Forest Management and Parks	3	DA	4,808	4,000	4,000
Brazil	Env & Socioeconomically Sustainable Alternatives for Sound Land Use	3	DA	4,024	4,000	4,000
	Clean and Efficient Energy Production and Use	1	DA	1,016	1,000	1,000
Ecuador	Conserving Ecuador's Forests	3	DA	875	875	1,100
	Conserving Ecuador's Forests	3	ESF	2,050	2,050	2,050
Guatemala	Conserving and Sustainable Using Forests	3	DA	1,200	-	-
	Economic Freedom	3	DA	-	1,000	700
G-CAP (Cent. America)	Improved Management in the Mesoamerican Biological Corridor	3	DA	3,020	4,000	4,000
	Improved Management in the Mesoamerican Biological Corridor	1	DA	632	-	-
	Improved Management in the Mesoamerican Biological Corridor	5	DA	1,000	1,000	1,000
Honduras	Protecting Honduran Forests	3	DA	1,750	1,750	1,750

**USAID Climate Change Funding by Bureau/Country - Continued**

BUREAU/ COUNTRY	STRATEGIC OBJECTIVE NAME	Reporting Category	Fund Account	FY 2003 Obligations	FY 2004 Enacted	FY 2005 Proposed
LAC Regional	Improved Conservation of the Region's Biological Resources	3	DA	2,800	2,800	2,800
Mexico	Critical Ecosystems and Biological Resources Conserved	5	DA	-	-	-
	Carbon Dioxide Emissions and Pollution Reduced	1	DA	738	-	-
Nicaragua	Improving Park Management	3	DA	700	-	-
	Trade-Led Economic Growth	3	DA	-	500	500
Panama	Conserving Forests	3	DA	2,450	2,000	2,000
Paraguay	Management of Globally Important Eco-regions	3	DA	150	150	150
Peru	Improved Environmental Management	3	DA			
Peru	Strengthen Environmental Management	3	DA	1,553	280	2,550
	Reduced Illicit Coca Production in Targeted Areas	3	ACI	2,451	3,650	3,400
<b>Total LAC</b>				<b>38,902</b>	<b>36,840</b>	<b>36,265</b>
<b>Europe and Eurasia (E&amp;E)</b>						
Albania	Growth in Number of self-sustaining Private Enterprises	1	AEEB	1,000	800	800
Bosnia	Accelerated Development & Growth of the Private Sector	1	AEEB	-	1,000	1,000
Bulgaria	Special Initiatives	3	AEEB	150	-	-
	Accelerated Development & Growth of the Private Sector	1	AEEB	300	300	250
	Cross cutting programs	3	AEEB	50	50	50
Croatia	Growth of a Dynamic and Competitive Private Sector	1	AEEB	500	500	500
Romania	Accelerated Private Sector Growth	1	AEEB	300	400	400
	Accelerated Private Sector Growth	3	AEEB	200	-	-
CEE Regional	Economically Sustainable and Env. Sound Energy Sector	1	AEEB	3,100	3,300	1,900
	Transfer to Dept. of Energy (DOE)	1	AEEB	1,987	2,000	-
<b>Sub-total Europe</b>				<b>7,587</b>	<b>8,350</b>	<b>4,900</b>
Armenia	Economically Sustainable and Environmentally Sound Energy Sector	1	FSA	3,100	2,800	2,800
	Economically Sustainable and Environmentally Sound Energy Sector	5	FSA	-	900	900
	More Sustainable Water Management for Enhanced Environmental Quality	1	FSA	1,600	-	-
	Transfer to Dept. of Energy (DOE)	1	FSA	4,590	4,000	2,750
	Transfer to Nuclear Regulatory Committee (NRC)	1	FSA	800	500	500
		1	FSA	1,950	1,696	50

**USAID Climate Change Funding by Bureau/Country - Continued**

BUREAU/ COUNTRY	STRATEGIC OBJECTIVE NAME	Reporting Category	Fund Account	FY 2003 Obligations	FY 2004 Enacted	FY 2005 Proposed
Georgia	Economically Sustainable and Environmentally Sound Energy Sector	1	FSA	8,431	8,000	8,000
Kazakhstan	Improved Management of Critical Natural Resources, incl Energy	1	FSA	1,000	1,000	500
Kyrgyzstan	Improved Management of Critical Natural Resources, incl Energy	1	FSA	800	800	400
Moldova	Private Enterprise Growth Creates Jobs and Generates Income	1	FSA	298	-	-
	Transfer to Nuclear Regulatory Committee (NRC)	1	FSA			
Russia	Environmental Resources Managed More Effectively	1	FSA	500	250	-
	Environmental Resources Managed More Effectively	3	FSA	3,000	1,250	-
Tajikistan	Improved Management of Critical Natural Resources, incl Energy	1	FSA	100	400	200
Turkmenistan	Improved Management of Critical Natural Resources, incl Energy	1	FSA	300	20	20
Ukraine	Improved Access to Land and Credit		FSA	-	100	-
	Tariff Reform and Communal Enterprise Restructuring		FSA	691	113	-
	Cross cutting programs	3	FSA	653	374	-
	Transfer to Dept of Energy (DOE)	1	FSA	17,900	14,000	12,000
	Transfer to Nuclear Regulatory Committee (NRC)	1	FSA	675	500	500
NIS Regional	Economically Sustainable and Environmentally Sound Energy Sector	1	FSA			
	Increased Environmental Mgmt Capacity to Support Sustainable Economic Growth	1	FSA			
CAR Regional	Improved Management of Critical Natural Resources	1	FSA	1,000	1,000	500
Eurasia Regional	More Economically Sound and Environment Sustainable Environment	1	FSA	750	700	600
<b>Sub-total Eurasia</b>				<b>48,138</b>	<b>38,403</b>	<b>29,720</b>
<b>Total E&amp;E</b>				<b>55,725</b>	<b>46,753</b>	<b>34,620</b>
<b>Economic Growth, Agriculture &amp; Trade (EGAT)</b>						
EGAT/NRM	Office of Environment and Natural Resources	3	DA	4,614	3,933	3,935
EGAT/ENV	Office of Environment and Natural Resources	1	DA			
EGAT/NRM	Office of Environment and Natural Resources	3	DA	4,236	4,000	4,000
EGAT/NRM	Office of Environment and Natural Resources	3	DA	2,775	1,775	1,775

**USAID Climate Change Funding by Bureau/Country - Continued**

<b>BUREAU/ COUNTRY</b>	<b>STRATEGIC OBJECTIVE NAME</b>	<b>Reporting Category</b>	<b>Fund Account</b>	<b>FY 2003 Obligations</b>	<b>FY 2004 Enacted</b>	<b>FY 2005 Proposed</b>
EGAT/EIT	Office of Environment and Information Technology	1	DA	9,964	7,520	7,520
EGAT/ESP	Office of Environment and Science Policy	1	DA	1,000	1,000	1,000
EGAT/ENV	Office of Environment and Science Policy	5	DA	700	1,278	1,280
EGAT/ENV	Office of Environment and Science Policy	3	DA	1,300	1,200	1,200
EGAT/EGAD	Office of Environment and Science Policy	3	DA	3,000	3,000	3,000
EGAT/PR	Office of Poverty Reduction	3	DA	-	63	63
<b>Total EGAT</b>				<b>27,589</b>	<b>23,769</b>	<b>23,773</b>
<b>Democracy, Conflict, and Humanitarian Assistance (DCHA)</b>						
	Worldwide Climate Monitoring and Observing	5	IDA	2,600	2,600	2,600
	Famine Early Warning System	5	IDA	1,300	1,300	1,500
	Famine Early Warning System	5	DA	-	7,100	2,000
<b>Total DCHA</b>				<b>3,900</b>	<b>11,000</b>	<b>6,100</b>
<b>Tropical Forestry Conservation Act (TFCA)</b>						
<b>Total TFCA</b>	Transfer to Department of Treasury	3	DA	<b>20,000</b>	-	-
<b>Development Credit Authority (DCA) (A)</b>						
	Bangladesh	1	DA	229		
	Egypt	1	ESF	230		
	Jamaica	1	DA	106		
	Central America Regional	1	DA	469		
<b>Total DCA</b>				<b>1,034</b>		
<b>TOTAL USAID</b>				<b>207,804</b>	<b>181,450</b>	<b>159,569</b>

(A) Development Credit Authority is a competitive program funded by transfer authority. The FY03 level is the subsidy amount obligated.

## **FY 2005 Legislative Reporting Categories for Appendix E:**

1) Activities that promote the transfer and deployment of United States clean energy technologies. Under USAID's Climate Change Program, technology transfer is promoted to assist developing countries to achieve sustainable economic growth and development but is not tracked as an individual goal within the program. USAID's energy-related climate change programs demonstrate U.S. technologies and/or work to address the policy, legal, and regulatory barriers that limit clean technology deployment.

2) Activities to assist in the measurement, monitoring, reporting, verification, and reduction of greenhouse gas emissions. USAID does not currently separate measuring, monitoring, reporting, and verification of GHG emissions from the energy and land use sector activities in which these occur. All of the activities that assist with technology transfer and carbon capture promote the reduction of greenhouse gas emissions.

3) Activities/programs to promote carbon capture and sequestration measures.

4) Activities/programs to help meet such countries' responsibilities under the Framework Convention on Climate Change. The spending for this category has not been formally tracked under USAID's Climate Change Program. It has been tracked as a performance indicator of program results and information concerning results through FY 2000 can be provided upon request.

5) Activities to develop assessments of the vulnerability to impacts of climate change and response strategies.