FEDERAL CLIMATE CHANGE EXPENDITURES REPORT TO CONGRESS

July 2002

THE WHITE HOUSE

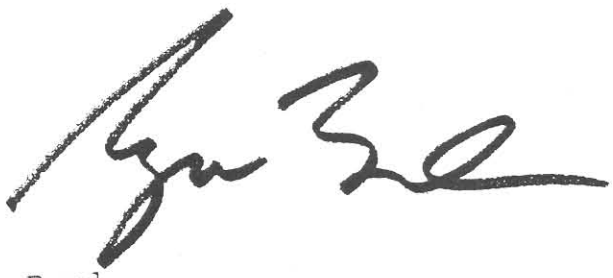
WASHINGTON

July 9, 2002

Dear Mr. Chairman:

In accordance with section 559(b) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 2002 (Public Law 107-115), I transmit herewith an account of Federal expenditures for climate change programs and activities. This report includes both domestic and international programs and activities related to climate change, and associated costs by line item as presented in the President's Budget Appendix.

Sincerely,



The Honorable Robert C. Byrd
Chairman
Committee on Appropriations
United States Senate
Washington, D.C. 20510

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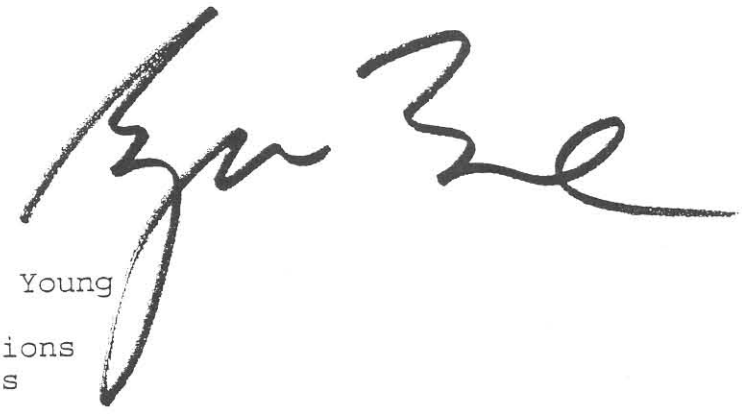

The Honorable C.W. Bill Young
Chairman
Committee on Appropriations
House of Representatives
Washington, D.C. 20515

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FEDERAL CLIMATE CHANGE EXPENDITURES

The challenge is to act in a serious and sensible way, given the limits of our knowledge."

President George W. Bush, June 11, 2001

Introduction

The following is a detailed account of Federal spending and performance goals for climate change programs and activities, both domestic and international, as included in the President's FY 2003 Budget. This report is being provided in response to Section 559(b) of Public Law 107-115, Foreign Operations, Export Financing, and Related Programs Appropriations Act, 2002.

On February 14, 2002, President Bush announced a new national goal to reduce the "greenhouse gas intensity" of the American economy by 18 percent during the next decade. Achieving this goal will require an enhanced and sustained national effort to develop and deploy advanced energy and sequestration technologies, while maintaining a strong American economy. As reflected in the United Nations Framework Convention on Climate Change (UNFCCC), to which the United States is a party, global climate change represents a serious, long-term challenge for all of the nations of the world. The Administration has proposed a comprehensive plan for achieving meaningful progress in tackling this challenge. Progress will be achieved by relying on a range of significant investments in reducing the fundamental scientific uncertainties associated with anthropogenic climate change, advancing the development and introduction of energy-efficient and renewable technologies, and incentivizing emissions reductions throughout our economy. The budget information presented in this Report reflects the Administration's intensified focus and prioritization of meeting our international commitments under the UNFCCC and responsibility to the American people for preserving a strong American economy.

The President's FY 2003 Budget proposes $4,475 million. This figure is $653 million, or 17 percent, higher than FY 2002 enacted for spending programs and tax policies related to or associated with climate change. The Budget request for climate change programs is the highest level ever, though some programs were reduced to eliminate unrequested earmarks or certain projects approaching commercialization that are more properly now funded by the private sector. Other higher priority programs were increased. At this level, the United States leads the world in climate change research, and has invested nearly $20 billion in such research over the past decade. However, in its June 2001 Report, *Climate Change Science: An Analysis of Some Key Questions,* the National Research Council concluded that major challenges still remain to meaningfully improve our current understanding of the science of global climate change:

> "Making progress in reducing the large uncertainties in projections of future climate will require addressing a number of fundamental scientific questions relating to the buildup of greenhouse gases in the atmosphere and the behavior of the climate system. Issues that need to be

addressed include: a) the future usage of fossil fuels; b) the future emissions of methane; c) the fraction of the future fossil-fuel carbon that will remain in the atmosphere and provide radiative forcing versus exchange with the oceans or net exchange with the land biosphere; d) the feedbacks in the climate system that determine both the magnitude of the change and the rate of energy uptake by the oceans, which together determine the magnitude of and time history of the temperature increases for a given radiative forcing; e) details of the regional and local climate change consequent to an overall level of global climate change; f) the nature and the causes of the natural variability of climate and its interactions with forced changes; and g) the direct and indirect effects of the changing distributions of aerosols. Maintaining a vigorous, ongoing program of basic research, funded and managed independently of the climate assessment activity, will be crucial for narrowing those uncertainties."

"Because there is considerable uncertainty in our current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warming should be regarded as tentative and subject to future adjustments (either upward or downward)."

And recently, the US Climate Action Report 2002 to the United Nations stressed:

"One of the weakest links in our knowledge is the connection between global and regional predictions of climate change. The National Research Council's response to the President's request for a review of climate change policy specifically noted that fundamental scientific questions remain regarding the specifics of regional and local projections (NRC 2001). Predicting the potential impacts of climate change is compounded by a lack of understanding of the sensitivity of many environmental systems and resources – both managed and unmanaged – to climate change."

The Report notes the "considerable uncertainty" about the science of global climate change, including the uncertainty regarding natural climate variability and the role of aerosols, and "recognize[s] that definitive prediction of potential outcomes is not yet feasible." The Report does not identify new risks, but rather provides a complete review of the numerous, often conflicting "what if" scenarios of potential impacts of climate change, both dire and beneficial. This Report makes clear that models, such as those used by the prior Administration's 2000 National Assessment, cannot yet be relied upon to make "accurate *predictions* of the specific changes in climate that will occur over the next hundred years." (Emphasis orignal).

The Administration's FY '03 budget request to Congress includes the initial response to President Bush's direction last June for a Climate Change Research Initiative ("CCRI") to address many of these major gaps in our current understanding of global climate change. Specific CCRI priorities will focus on improving our understanding of the North American carbon cycle and the role of aerosols and tropospheric ozone in climate change, enhancing computer modeling of climate and developing high

quality, long term climate observation data. The Administration will continue to determine where financial resources in the climate change portfolio can be redirected from lower priority work to higher priority projects that address specific areas of research identified by the National Research Council.

Additionally although not included in this Report, the recently-enacted Farm Bill will significantly expand conservation programs on farm and forest lands, accompanied by expanded carbon sequestration services. See Addendum B.

In addition to describing our investments in global climate science, the programs and tax policies in this report represent one way to inventory a set of programs and tax policies associated with energy use, carbon sequestration and climate change. Funding generally falls into four major program areas.

U.S. Global Change Research Program. The United States Global Change Research Program (USGCRP) seeks to provide a sound scientific understanding of both the human and natural forces that influence the Earth's climate system. The information produced by USGCRP's scientists is used by national and international policy makers to inform decisions on global change issues. The FY 2003 Budget proposes $1,714 million for the USGCRP, an increase of $44 million over FY 2002 enacted. See Table 2 for detailed information about the USGCRP.

In addition to the USGCRP, the FY 2003 Budget requests $40 million for the new Climate Change Research Initiative (CCRI), which was created by the President to advance and bring focus to and leverage climate change research spending. The CCRI complements the existing USGCRP. CCRI funding will be shared among five agencies (NOAA, NASA, NSF, USDA, DOE), and the program will adopt performance metrics and deliverable products useful to policymakers in a short time frame (2 to 5 years). It will enhance observation and monitoring systems and improve the integration of scientific knowledge, including measures of uncertainty, into effective decision support systems. See Table 3 for information about the CCRI.

Technology Research, Development and Deployment. The programs in this category have the effect of stimulating the development and use of renewable energy technologies and energy efficient products that can help improve energy efficiency and reduce greenhouse gas emissions. The FY 2003 Budget proposes $1,757 million in discretionary spending and tax incentives, an increase of $539 million over FY 2002 enacted. In addition to programs administered by the Department of Energy (DOE), this category also includes programs within the Environmental Protection Agency (EPA) and the Department of Agriculture (USDA). See Tables 4-5 for detailed information about the programs and tax proposals in this category.

In June, 2001, the President committed the United States to work within the United Nation's framework to develop an effective and science-based response to the issue of global climate change. He noted that the United States is a leader in innovation and technology and that technology offers great promise to address this issue. As part of this commitment, he created a National Climate Change

Technology Initiative. The National Climate Change Technology Initiative integrates a number of interdependent facets of the technological component of this approach to the global climate change issue: applied research and development; supporting basic research carried out by universities and national laboratories; partnering with industry and others, including international partners, in order to move technologies into the marketplace; promoting cutting-edge technologies through demonstration projects; and measuring and monitoring greenhouse gas emissions, inventories and flows. This Initiative will provide a framework for guiding the technology component of climate change related Federal R&D.

International Assistance. International assistance programs support developing country efforts to address climate change through improvements in energy efficiency, renewable energy, land use changes and forestry practices. The FY 2003 Budget proposes $211 million, an increase of $32 million over FY 2002 enacted, for climate change programs administered by the U.S. Agency for International Development and to support the Secretariat of the Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change. See Table 6 for information on international assistance programs related to climate change, and Appendix A for obligations and expenditures by country and activity for the Agency for International Development as requested in Section 559 (b)(2) of Public Law 107-115.

Other Climate-Related Programs. There are several programs that have multiple environmental benefits including their contribution to improving energy efficiency and reducing greenhouse gas emissions. The programs identified in this category include: DOE's Weatherization and State Energy Grants; DOE programs that promote cleaner coal and natural gas combustion, and nuclear energy R&D; and; U.S. contributions to the Global Environment Facility (GEF). GEF funding helps address trans-border environmental problems like international water pollution, biological diversity conservation, and climate change. The GEF's climate change projects are related to the U.N. Framework Convention on Climate Change, not the Kyoto Protocol. The FY 2003 Budget proposes $807 million, an increase of $20 million over FY 2002 enacted, for the programs in this category. See Table 7 for more details on these programs.

Summary of Federal Climate Change Expenditures

Table 1. Programs and Tax Policies Related to Climate Change

FY 2003 Budget

(Budget authority and tax incentives; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Directly Related Programs & Policies				
U.S. Global Change Research Program	1,728	1,670	1,714	+44
Climate Change Research Initiative	---	---	40	+40
Technology Research, Development and Deployment				
-- Spending Programs	1,176	1,218	1,202	-16
-- Tax Incentives [1]	—	—	555	+555
-- National Climate Change Technology Initiative [2]	—	—	—	—
International Assistance	177	179	211	+32
Other Climate-Related Programs				
DOE -- Weatherization & State Energy Grants	191	275	316	+41
DOE -- Fossil Energy R&D (cleaner coal & natural gas)	274	442	398	-44
DOE – Nuclear Energy R&D (NERI)	34	32	25	-7
Treasury – Global Environment Facility [3]	41	38	68	+30
TOTAL [4]	**3,603**	**3,822**	**4,475**	**+653**

Note:

[1] The cost of the five energy tax incentives related to climate change included in the President's FY 2003 Budget is $4.6 billion over five years; $7.1 billion over ten years.

[2] The National Climate Change Technology (NCCTI) will build on an existing base of research and development in climate change technology, primarily at DOE, EPA, and USDA. The President's FY 2003 Budget requests $40 million for NCCTI within the DOE budget. Specific research areas are being identified through an interagency review process.

[3] The total FY 2003 request for the Global Environment Facility (GEF) is $177.8 million. Approximately 38% of total GEF funding from all sources supports climate-related projects (e.g. expanding clean energy production and efficient energy use). The GEF, which also provides funding for other global environmental concerns, does not allocate funds by project type.

[4] Total may not add due to rounding. Total adjusted to eliminate double counts.

U.S. Global Change Research Program

Table 2. By Agency/Appropriation Account

FY 2003 Budget

(Discretionary budget authority; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Department of Health and Human Service				
National Institutes of Health	54	60	68	+8
National Aeronautics and Space Administration				
Science, Aeronautics, and Technology	1,176	1,090	1,109	+19
Department of Energy				
Science (Biological & Environmental Research)	116	120	126	+6
National Science Foundation				
Research and Related Activities	181	188	188	0
Department of Agriculture				
Agricultural Research Service	29	30	30	0
Cooperative State Research, Education and Extension Services				
Research and Education	4	9	17	+8
Economic Research Service	1	1	1	0
Forest Service				
Forest and Rangeland Research	17	17	17	0
Subtotal -- USDA	51	57	65	+8
Department of Commerce				
National Oceanic and Atmospheric Administration				
Operations, Research, and Facilities	93	100	100	0
Department of the Interior				
U.S. Geological Survey				
Surveys, Investigations, and Research	27	28	28	-2
Environmental Protection Agency				
Science and Technology	23	21	22	+1
Smithsonian Institution				
Salaries and Expenses	7	7	7	0
TOTAL [1]	**1,728**	**1,670**	**1,714**	**+44**

Note:
[1] Total may not add due to rounding.

Climate Change Research Initiative

Table 3. By Agency/Appropriation Account

FY 2003 Budget

(Discretionary budget authority; dollars in millions)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Department of Commerce				
National Oceanic and Atmospheric Administration				
Operations, Research, and Facilities	---	---	18	+18
National Science Foundation				
Research and Related Activities	---	---	15	+15
National Aeronautics and Space Administration				
Science, Aeronautics, and Technology	---	---	3	+3
Department of Energy				
Science (Biological & Environmental Research)	---	---	3	+3
Department of Agriculture				
Forest Service/Natural Resources Conservation Service [1]	---	---	1	+1
TOTAL	---	---	**40**	**+40**

Note:
[1] Based on $500,000 for the Forest Service and $500,000 for the Natural Resources Conservation Service.

U.S. Global Change Research Program. Much of the U.S. investment in research on climate and other global environmental changes is coordinated through the U.S. Global Change Research program (USGCRP). The USGCRP has existed for more than a decade, and provides funding at nine different agencies for fundamental research on natural and human-induced changes in the global environment, with the goal of attaining a more complete understanding of global climate change to better respond to the challenges it presents. The FY 2003 Budget proposes $1,714 million for the USGCRP, an increase of $44 million over the FY 2002 enacted level.

Climate Change Research Initiative. In addition to the USGCRP, the FY 2003 Budget requests $40 million for the new Climate Change Research Initiative (CCRI), which was created by the President to advance and bring focus to climate change research. The CCRI complements the existing USGCRP. CCRI funding in FY 2003 will be shared among five agencies (NOAA, NASA, NSF, USDA, DOE), and the program will adopt performance metrics and deliverable products useful to policymakers in a short time frame (2 to 5 years). It will enhance observation and monitoring systems as well as improve the integration of scientific

knowledge, including measures of uncertainty, into effective decision support systems. CCRI funding in 2003 will focus on two main areas: reducing the uncertainties in climate science, and supporting policy and management decisions. In the first category, specific priorities include understanding the North American carbon cycle, developing reliable representation of global and regional climatic forcing by atmospheric aerosols, and investing in computer modeling. In the second category, specific priorities include developing tools for risk management under uncertainty and ensuring high-quality, long-term climate data records.

Energy Policy Proposals

Table 4. Tax Incentives

FY 2003 Budget

(Revenue effect in millions of dollars)

	2003	2004	2005	2006	2007	Total 2003-07
Homes						
Provide tax credit for residential solar energy systems.	-6	-7	-8	-17	-24	-62
Renewable Energy						
Extend the tax credit for electricity produced from wind and biomass for three years; expand eligible biomass sources to include certain biomass produced from forest-related resources, agricultural sources, and other specified sources.	-227	-303	-212	-143	-146	-1031
Transportation						
Provide tax credit for purchase of certain hybrid and fuel cell vehicles.	-80	-181	-349	-530	-763	-1903
Industry						
Provide tax credit for energy produced from landfill gas.	-34	-59	-86	-120	-140	-439
Provide tax credit for combined heat and power property.	-208	-235	-238	-296	-139	-1116
TOTAL [1]	**-555**	**-785**	**-893**	**-1106**	**-1212**	**-4551**

Note:
[1] Total may not add due to rounding.

Energy Policy Proposals – Tax Incentives. The President is proposing $4,551 million in clean energy tax credits over five years ($7.1 billion over ten years) for investments in renewable energy (solar, wind, and biomass), hybrid and fuel cell vehicles, co-generation, and landfill gas conversion. (see Table 2). These incentives are important to meeting the nation's long-term energy supply and security needs, reducing pollution, and projected greenhouse gas emissions. The following is an explanation of the clean energy tax incentives proposed in the FY 2003 Budget.

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 nonbusiness purchases of solar energy equipment. The Administration proposes a new tax credit for individuals who purchase photovoltaic equipment and solar water heating systems for use in a dwelling unit that the individual uses as a residence. Equipment would qualify for the credit only if used exclusively for purposes other than heating swimming pools. An individual would be allowed a cumulative maximum credit of $2,000 per residence for photovoltaic equipment and $2,000 per residence for solar water heating systems. The credit for solar water heating equipment would apply only if placed in service after December 31, 2001 and before January 1, 2006, and to photovoltaic systems placed in service after December 31, 2001 and before January 1, 2008.

Renewable Energy

- **Tax credit for electricity produced from wind or biomass.** Current law provides taxpayers a 1.5 cent-per-kilowatt hour tax credit (adjusted for inflation after 1992) for electricity produced from wind, "closed-loop" biomass, and poultry waste. Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. 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 placed in service before January 1, 2002, after which it expires. The new proposal would:

  - **Extend current biomass credit.** This proposal would extend for three years the 1.5 cent-per-kilowatt hour biomass credit for facilities placed in service before January 1, 2005.

  - **Expand definition of eligible biomass.** This proposal expands the definition of eligible biomass to include certain forest-related resources and agricultural and other sources for facilities placed in service before January 1, 2002. Electricity produced at such facilities from newly eligible sources would be eligible for the credit only from January 1, 2002, through December 31, 2004. 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 only from January 1, 2002, through December 31, 2004.

Transportation

- **Tax credit for hybrid and fuel cell vehicles.** Currently, a 10 percent tax credit up to $4,000 is provided for the cost of a qualified electric vehicle. 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. Electric and hybrid vehicles have the potential to increase energy efficiency as well as reduce air pollution and greenhouse gas emissions. To encourage the purchase of such vehicles the Administration is proposing the following tax credits:

    - A credit of up to $4,000 for qualified hybrid vehicles purchased after December 31, 2001 and before January 1, 2008. 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, 2001 and before January 1, 2008. A minimum credit of $4,000 would be provided, which would increase as the vehicle's fuel efficiency exceeded the 2000 model year city fuel economy, reaching a maximum credit of $8,000 if the vehicle achieved at least 300 percent of the 2000 model year city fuel economy.

Industry

- **Tax credit for energy produced from landfill gas**. Taxpayers that produce gas from biomass 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 new proposal would extend the credit to fuel produced from landfill methane produced from a facility in service after December 31, 2001 and before January 1, 2011. The credit for fuel produced at landfills subject to EPA's 1996 New Source Performance Standards/Emissions Guidelines would be limited to two-thirds of the otherwise applicable amount if any portion of the facility for producing fuel at the landfill was placed in service before July 1, 1998, and beginning on January 1, 2002, in all other cases.

- **Tax credit for combined heat and power property**. Combined heat and power (CHP), also known as co-generation, is a highly efficient form of electric generation that recycles heat which is normally lost under traditional power combustion methods. CHP captures the heat left over from industrial use, providing a source of residential and industrial heating and air conditioning in the local area around the power plant. CHP systems achieve a greater level of overall energy efficiency, thereby reducing energy consumption, costs, and carbon emissions. 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, 2001 and before January 1, 2007.

Technology Research, Development and Deployment

Table 5. Program Details by Agency/Account

FY 2003 Budget

(Discretionary budget authority; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Department of Energy (DOE)				
Energy Supply	375	393	408	+15
Renewable Energy Resources R&D	(370)	(386)	(408)	(+22)
Nuclear Energy	(5)	(7)	(0)	(-7)
Energy Conservation R&D	619	640	588	-52
Fossil Energy R&D (sequestration R&D)	18	32	54	+22
Science	35	35	35	0
Energy Information Administration	3	3	3	0
Subtotal -- DOE	1,050	1,103	1,088	-15
Environmental Protection Agency (EPA)				
Environmental Programs & Management	96	89	91	+2
Science and Technology	27	26	17	-9
Subtotal -- EPA	123	115	108	-7
Department of Agriculture (USDA)				
Forest Service				
Forest and Rangeland Research	3	0	1	+1
Agricultural Research Service	0	0	5	+5
Subtotal -- USDA	3	0	6	+6
TOTAL [1]	**1,176**	**1,218**	**1,202**	**-16**

Note:
[1] Total may not add due to rounding.

Technology Research, Development and Deployment. The FY 2003 Budget proposes $1,202 million in discretionary funding, a decrease of $16 million from FY 2002 enacted, for research, development, and deployment of renewable energy technologies and energy efficient products that help reduce the use of fossil fuels and U.S. greenhouse gas emissions. Better methods to measure and monitor carbon dioxide in soils and from forests are also funded. Table 5 provides a detailed accounting by agency of the technology programs in this report related to energy efficiency, conservation, renewable energy, and carbon sequestration. The reduction in funding reflects a decrease in conservation R&D for technologies that can be picked up by the private sector and a shift of conservation funds to weatherization grants. The following sections highlight selected agency programs.

1. BUILDINGS

The buildings sector is responsible for about 33 percent of U.S. greenhouse gas emissions. Most of the emissions result from the electricity needed to run appliances and equipment in buildings, such as heating, ventilation, and air conditioning (HVAC) equipment. The budget includes programs within DOE and EPA designed to develop highly efficient new appliances and HVAC systems, and to more rapidly deploy energy efficient products for buildings and homes throughout the marketplace. The following is a summary of the major activities by agency in the buildings sector:

- **DOE Building Technology Program.** The budget includes $93 million for DOE's building technology and related activities, a decrease of $12 million from FY 2002 enacted. DOE has been working with industry to define technology "roadmaps" toward more efficient buildings, and is using that process to guide its R&D programs.

  One major component is the *Building America* program, which creates partnerships with traditional housing developers and manufacturers of industrialized housing to demonstrate how new technologies can be integrated into homes cost-effectively and to disseminate that knowledge to other builders. DOE works with States to encourage them to voluntarily upgrade their commercial and residential building energy codes to require greater energy efficiency in all new construction. DOE's *Rebuild America* program is the centerpiece of a newly-consolidated Community Energy Program -- community partners in *Rebuild America* have committed to improving the energy efficiency of building space.

  DOE also funds significant research on more efficient building equipment and appliances, such as advanced lighting, heat pumps, chillers, and commercial refrigeration. DOE develops and promulgates energy efficiency standards for many categories of appliances and also develops testing methodologies used to set standards and to provide efficiency rating labels. (DOE's rating and labeling programs are performed in partnership with the Federal Trade Commission.) Standards and test procedure development will continue for a variety of appliances and will continue to support the joint EPA-DOE Energy Star program.

- **EPA Buildings Programs.** The budget proposes $50 million, an increase of $1 million over FY 2002 enacted, for EPA's ENERGY STAR partnerships (including ENERGY STAR Labeling and the ENERGY STAR Buildings Program). EPA will work toward the goal of offsetting about 24 percent of the growth in greenhouse gas emissions above 1990 levels expected by 2010 in this sector.

  EPA will actively promote its new buildings benchmark tool and work with building owners and mangers to benchmark a total of 29,000 buildings nationwide. EPA will expand its public sector work to increase the number of partnerships with schools and universities and state and local governments to over 1,200. EPA will also continue to actively recruit new small

businesses and organizations into ENERGY STAR with the goal of reaching over 7,000 participants in 2003. EPA will continue to play a key role in advancing the efficiency of the Federal Government by enhancing the ability of agencies to procure energy efficient products as well as assist agencies in benchmarking and labeling their high-performing buildings.

2. TRANSPORTATION

Cars, trucks, aircraft, and other parts of the Nation's transportation system emit about one third of the total anthropogenic U.S. greenhouse gases. A range of new technologies should make it possible for Americans to continue to enjoy the best personal transportation in the world while significantly reducing greenhouse gas emissions. Furthermore, many communities are developing innovative ways to reduce congestion and transportation energy needs by improving highway designs and urban planning, and by encouraging mass transit.

- **DOE Transportation Technology Programs**. The budget proposes $223 million, a decrease of $30 million from FY 2002 enacted (excludes $53 million in biofuels R&D funded in Renewable Energy Resources and included in the electricity sector below). DOE's Office of Transportation Technologies (OTT) funds research, development, and deployment of technologies that can significantly alter current trends in oil consumption. Commercialization of innovative vehicle technologies and alternative fuels presents an opportunity for reducing reliance on oil. These advanced technologies could also result in dramatic reductions in criteria pollutants and greenhouse gas emissions from the transportation sector. DOE funds research and development for advanced power-train technology (direct-injection) engines, hybrid-electric drive systems, advanced batteries, fuel cells, and light weight materials and for alternative fuels (including ethanol from biomass, natural gas, methanol, electricity, and biodiesel). About half of OTT's R&D funding supports FreedomCAR, a new partnership with the auto industry that builds on the technical successes of its predecessor (Partnership for a New Generation of Vehicles or PNGV), and improves on management and focus.

  DOE also funds research to improve the engine efficiency of heavy-duty truck engines while reducing oxides of nitrogen emissions to near-zero levels. This research includes both fuel injection/combustion research and exhaust after-treatment for particulates and nitrogen oxide. This research will be complemented by R&D to reduce parasitic loses from aerodynamic drag and rolling resistance (including computer aerodynamic modeling of new truck body designs); and to make greater use of lower-weight, high-strength materials for all classes of trucks.

- **EPA Transportation Programs.** The budget proposes $22 million, a decrease of $9 million from FY 2002 enacted, for EPA's clean automotive technology initiative and activities that promote partnerships with State and local governments and transportation authorities to reduce greenhouse gas emissions and air pollution. The reduction in EPA funding reflects a shift in emphasis from PNGV to the new Freedom CAR program managed by DOE. The funding requested will enable EPA to continue its work under Cooperative Research and Development Agreements (CRADAs) with the automotive industry covering both SUVs and urban delivery

vehicles. The successful technology development patented by EPA, the hydraulic hybrid vehicle technology, will help to lay the foundation for cost-effective commercialization of high fuel economy, low emission vehicles for delivery to market between 2005 and 2010. Funding will also continue EPA's work with companies and State and local governments on transportation improvements that reduce vehicle emissions and congestion. Additionally, EPA will develop projects to reduce diesel idling time at truck stops and along highways. EPA will partner with States and manufacturers of idling control devices to help install idle control technologies on trucks and at truck stops that could save one gallon of diesel fuel for each hour a vehicle idles.

3. INDUSTRY

Programs in the industry sector support Federal research efforts to develop innovative technologies and production methods which can help businesses achieve productivity gains and prosper in a competitive marketplace while leading to major reductions in emissions of greenhouse gases. Many technologies can help reduce emissions.

- **DOE Industry Technology Program.** The budget proposes $138 million, a decrease of $11 million from FY 2002 enacted, for DOE's industrial research and related programs. Key DOE industry programs include:

  - **Industries of the Future.** This DOE program works cooperatively with the nation's most energy-intensive industries -- such as aluminum, glass, chemicals, forest products, mining, and steel -- on developing technologies that increase energy and resource efficiency. Promising collaborative efforts include improvements in the process of making steel, pulp and paper, and other energy-intensive products that could dramatically increase efficiency, lower greenhouse gas emissions, and improve competitiveness.

    The **Industries of the Future/Crosscutting** program supports work that has benefits across many industry sectors. The Integrated Materials program supports development of a range of other advanced materials with special properties, such as intermetallic compounds, metal-matrix composites, and inorganic membranes. Assistance to innovative industries will continue with expanded NICE3 and Inventions and Innovations programs that support the development of energy-efficiency and pollution/waste control technologies. The Industrial Assessment Centers will continue to perform energy and waste-management audits at small and medium sized businesses. The Best Practices programs provide technical expertise and information products to businesses of all sizes on how to use motors, compressed air and steam in an integrated system context. The program also provides plant-wide energy assessments, documented energy savings case studies, and helps to accelerate the adoption by industry of the best available and emerging technologies and best practices.

- **EPA Industry Programs.** The budget proposes $26 million, an increase of less than $l million over FY 2002 enacted, for EPA's programs in the industrial sector focusing on reducing carbon dioxide emissions and continuing the successful initiatives to reduce methane emissions and emissions of the high global-warming potential gases. EPA's goals for these efforts are to: 1) greatly enhance the rate of energy and resource efficiency improvements in industry between now and 2010 (working with DOE); 2) cost-effectively return emissions of methane to 1990 levels or below by 2010; 3) cost-effectively limit emissions of the more potent greenhouse gases (HFCs, PFCs, SF6); and 4) facilitate the use of clean energy technologies and purchases of renewable energy.

  - **Stewardship Programs for the Reduction of Potent Greenhouse Gases.** EPA will continue its programs to reduce the more potent greenhouse gases, including methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). EPA will expand partnerships with the magnesium industry and with the electric power industry to reduce emissions of SF_6 and will work with the semiconductor, aluminum, and chemical industries to reduce HFC and PFC emissions.

  - **Methane Programs.** EPA will continue its programs to reduce emissions of methane, a gas with more than 20 times the heat trapping capability as carbon dioxide. EPA will work with the natural gas industry, the coal mining industry, the waste management industry, and the agricultural industry to promote cost-effective reductions of methane emissions resulting in a return of methane emissions to 1990 levels or below by 2010. This program has significant potential to achieve cost-effective and meaningful greenhouse gas emission reductions in the American economy.

  - **ENERGY STAR for Industry.** EPA's ENERGY STAR for Industry (formerly Climate Wise) program will continue to work with individual partnership companies. EPA will enhance and expand the ENERGY STAR program for industry by developing energy and related productivity benchmarks of industrial plant performance for five U.S. industries.

  - **Combined Heat and Power.** EPA's Combined Heat and Power (CHP) program is currently funded at about $1 million per year and will continue to promote efficient systems that generate heat and electricity simultaneously at greatly improved conversion efficiencies over single purpose units. This program, unveiled in the fall of 2001 with 18 partners, currently has more than 50 partners and is expected to grow to 100 partners by the end of 2003. This program is expected to facilitate about 20 CHP projects in 2001 across the industrial and commercial sector yielding about 450 MW of power and to facilitate an additional 35 projects in 2003 yielding about 850 MW. This effort could double the capacity of U.S. combined heat and power systems employed by commercial, industrial, and institutional buildings, and in communities throughout the nation. EPA will work to identify and eliminate the regulatory and institutional barriers that are currently preventing more rapid dissemination of this important technology.

4. ELECTRICITY

The generation of electricity in the U.S. is responsible for more than a third of U.S. greenhouse gas emissions. The budget funds programs in renewable energy technologies. The key DOE programs in this sector are:

- **DOE Renewable Energy Resources Programs.** The budget proposes $408 million, an increase of $22 million over FY 2002 enacted, for DOE's renewable programs. These include varieties of solar energy (generating electricity either through concentrated heat or photovoltaics), biomass power, wind energy, geothermal power, hydropower, and hydrogen production and storage.

  - **Solar Energy.** Over the past 20 years, Federal R&D has resulted in a 80 percent cost reduction in solar photovoltaics. DOE will maintain R&D of the next generation photovoltaic cells; manufacturing R&D; research in buildings-integrated applications; and fund efforts to develop new, unconventional technologies.

  - **Biopower.** Biomass represents a tremendous renewable resource whose use can help strengthen our energy security, protect the environment, and enhance our rural economy. DOE is testing and demonstrating biomass co-firing with coal; developing advanced technologies for biomass gasification; developing and demonstrating small modular systems; and conducting R&D to help develop "biorefineries" of the future.

  - **Wind.** Use of wind energy is growing very fast. Technologies under development by DOE and its partners can enable a twenty-fold or more expansion of usable wind resources, and make wind energy economically viable without the need for Federal incentives. Wind R&D will now focus on advancing the technology so it can be used in low wind speed areas, greatly enhancing the potential use of this renewable energy source.

  - **Geothermal.** Geothermal represents a huge renewable resource which could provide 25,000-50,000 megawatts of generating capacity from currently identified hydrothermal resources if technology existed to develop these resources at a reasonable cost. DOE's R&D program focuses on exploration and drilling to enable industry to locate and characterize new geothermal fields at reduced risk, and to access deeper resources with lower drilling costs. DOE also supports advanced technology in heat conversion and power systems for application to a broad range of geothermal resources. Researchers work in partnership with U.S. industry to establish geothermal energy as an economically competitive contributor to the U.S. energy supply. DOE's R&D program and activities to reduce barriers to development will allow geothermal energy to supply electrical power and heat to homes and businesses across the country.

- **Hydropower.** DOE is funding the development of a new generation of hydropower turbines that will kill far fewer fish than current designs do, and will also maintain higher levels of dissolved oxygen in the water, which keeps river ecosystems healthier. Hydropower is an important form of zero-carbon electricity generation for the nation.

- **Hydrogen.** DOE will continue to fund its research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel. The program now looks toward the Proton-Exchange Membrane (PEM) fuel cells being developed for hybrid vehicles and for cogeneration in buildings as the first significant markets for hydrogen, which will be ready within 5 years. More than half of the hydrogen budget supports the new FreedomCAR public-private partnership.

  The program funds R&D on thermal (steam and advanced auto-thermal reforming) production on hydrogen from both natural gas and biomass, and on methods to use either algae and bacteria or photocatalytic techniques to produce hydrogen. The hydrogen storage research program is exploring a number of novel adsorption mechanisms, including carbon nanotubes and improved metal hydrides. DOE's Technology Validation effort is funding demonstrations of prototype fuel cells, a fueling station for vehicles, and on-site storage systems for solar production of hydrogen. The latter includes a reversible electrolyzer/fuel cell that can produce hydrogen from electricity while the sun is shining, and electricity from hydrogen when it is dark.

- **Deployment.** DOE funds the Renewable Energy Production Incentive (REPI), which provides payments to public and non-profit utilities in lieu of renewable energy tax credits. Public and non-profit utilities are not eligible for these tax credits because they pay no taxes. DOE's International Renewable Energy program provides technical assistance to developing countries and U.S. industries to help them put together climate change projects. The program also funds market and trade development activities and works with other agencies to incorporate solar and renewable energy into disaster-relief programs.

- **Transmission and Distribution.** DOE funds development of advanced storage systems to supply ultra-high power quality to sensitive loads, smooth the power output form distributed generation sources including intermittent renewable sources, and enhance the reliability of the transmission and distribution systems. DOE also addresses power grid reliability, and efficient electricity market operation issues by developing real-time measurement and control systems for electric grid management. This work also investigates the use of load management techniques to mitigate emergency power shortages and price spikes. In order to promote and facilitate the integration of distributed sources into the grid, DOE funds development of uniform interconnection standards for distributed power generation, and funds studies to identify barriers to the wider use of distributed generation.

- **High Temperature Superconductivity.** DOE supports industry-led projects to capitalize on recent breakthroughs in superconducting wire technology, aimed at developing devices such as advanced motors, power cables, and transformers. These technologies would allow more electricity to reach the consumer without an increase in fossil fuel input.

- **Distributed Energy Resources.** DOE has combined the development of Distributed Energy Resources (distributed generation, energy storage and load management) into one office to lead the seamless integration of these technologies into the distribution system, the power grid, competitive markets, and the individual customer site. The office is supporting work to increase the efficiency, and reduce the cost and emissions of advanced natural gas-driven microturbines, fuel cells, and reciprocating engines, and developing advanced high temperature materials to improve their performance. High system efficiencies are achieved from these sources by linking them into building combined heat and power systems with advanced absorption heat pumps, chillers and desiccant systems that are also being developed in the program.

5. CARBON SEQUESTRATION

Carbon dioxide can be sequestered (stored) through changes in both forestry and agricultural practices. These programs focus on methods to capture and store carbon dioxide, measure and monitor carbon in soils and from agricultural practices, and to improve estimates of carbon fluxes from forests.

- **DOE Carbon Sequestration Science Programs.** The budget proposes $35 million, the same level as FY 2002 enacted, for DOE carbon removal programs in the Office of Science. DOE's programs include research into the feasibility of capturing and storing carbon dioxide in underground geological structures and in the deep ocean.

- **DOE Fossil Energy Carbon Sequestration Programs.** The budget proposes $54 million, an increase of $22 million over FY 2002 enacted, for DOE fossil energy carbon sequestration programs. Carbon sequestration is potentially one of the lowest cost approaches for significantly reducing or perhaps virtually offsetting greenhouse gas emissions. The purpose of the fossil energy program is to develop and demonstrate technically, economically, and ecologically sound methods to capture and reuse, store or permanently isolate carbon dioxide from the environment. The program goal is to make available sequestration options starting in 2015 at a cost of no more than $10 per ton of carbon (or about two tenths of a cent in the cost of electricity). When linked with new advanced clean coal power technologies now under development, the program will enable the deployment of clean coal power plants with essentially zero emissions.

  The principal thrust of the carbon sequestration program is to develop the applied science and new technologies for addressing the cost-effective management/sequestration of carbon

emissions from the production and use of fossil fuels. The program primarily selects research topics and projects through competitive solicitations involving industry, university, and national laboratory performers. Close collaborations with other DOE, government, industry, and international organizations are maintained providing an integrated approach to advancing the science and technology of carbon sequestration.

- **EPA Carbon Removal Programs.** The budget proposes $2 million, about the same level as FY 2002 enacted, to allow EPA to enhance efforts to better quantify the associated environmental co-benefits that result from carbon sequestration. These benefits include improving soil quality, reducing soil erosion, improving water quality, providing wildlife habitat, and enhancing other environmental and conservation goals. EPA will continue to collaborate with USDA to address the misperceptions regarding carbon sequestration and to ensure that this important mitigation option is developed in an environmentally sound and economically efficient way. EPA and USDA will identify and develop specific opportunities to sequester carbon in agricultural soils, forests, other vegetation and commercial products.

- **USDA Technology Research.** The budget proposes approximately $6 million to strengthen basic climate change technology research and to develop methods for measuring carbon in soils. USDA's Agricultural Research Service (ARS) will develop methods to manage crops, soils, and grazing systems to achieve the best balance of agricultural productivity, resource conservation, and carbon sequestration. Work will also focus on methods for managing livestock to minimize methane emissions. The Forest Service will support the development of measuring tools and monitoring technologies to improve estimates of carbon fluxes from forests.

International Assistance

Table 6. International Climate Change Assistance
FY 2003 Budget

(Discretionary budget authority; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Agency for International Development				
Development Assistance (DA)	112	110	109	-1
Economic Support Fund (ESF)	---	12	6	-6
Assistance for the Independent States of the Former Soviet Union (FSA)	31	32	27	-5
Assistance for Eastern Europe and the Baltic States (AEEB)	13	10	8	-2
International Disaster Assistance (IDA)	---	4	5	+1
Development Credit Authority (DCA)	1	---	---	---
Tropical Forest Conservation [1]	---	---	50	+50
Subtotal – AID	157	167	205	+38
Department of Treasury				
Debt Restructuring				
Tropical Forest Conservation [2]	13	5	---	-5
Department of State				
International Organizations and Programs	7	7	6	-1
Total [3]	**177**	**179**	**211**	**+32**

Note:
[1] Prior to the FY 2003 President's Budget request, funding for the Tropical Forest Conservation Act (TFCA) was appropriated to the Treasury Department.
[2] In FY 2002, an additional $20 million in existing balances may be used.
[3] Total may not add due to rounding.

U.S. Agency for International Development (USAID). The budget proposes $205 million, an increase of $38 million over FY 2002 enacted, for USAID's climate change programs and for tropical forest conservation. The goal of USAID's climate change programs are to promote development that minimizes the associated growth in greenhouse gas emissions and reduces vulnerability to climate change. To accomplish this goal, USAID works in developing and transition countries to implement "win-win" solutions that provide climate-related benefits while also meeting development objectives in the energy sector, urban areas, forest conservation, agriculture, and disaster assistance. These solutions include activities that: 1) promote the transfer of clean energy technologies; 2) measure reductions in

greenhouse gas emissions; 3) promote carbon capture through improved land use; 4) support countries to participate more effectively in the U.S. Framework Convention on Climate Change; and 5) assess vulnerability to the impacts of climate change and increase adaptive capacity. Although USAID works on climate change issues in more than 40 countries, the Agency has focused its climate change activities in three sub-regions: Central Africa, Central America and Central Asia, and eight countries: Brazil, India, Indonesia, Mexico, Philippines, Russia, South Africa, and Ukraine.

The President's FY 2003 budget proposal seeks $50 million in funding for tropical forest conservation, of which $40 million may be used for the Tropical Forest Conservation Act (TFCA). One purpose of this initiative is to enable developing countries to play an increased role in addressing the world's climate change problem through storing carbon in forests. The main elements of the initiative will be: (1) remote sensing and developing capacity to monitor deforestation and enable local governments to better control illegal and destructive logging in their countries; (2) addressing the problem of illegal and destructive logging practices, working with governments, non-governmental organizations and private industry; and (3) addressing deforestation through the use of the Tropical Forest Conservation Act as well as other innovative funding mechanisms such as commercial debt for nature swaps under the Foreign Assistance Act Title I, Chapter 7 authority and new partnerships with U.S. industries and non-governmental organizations (NGOs).

Department of State. The budget includes $6 million to support the work carried out by the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC). The Secretariat is responsible for work related to the Convention and oversees the consideration of communications submitted by countries. The Panel's assessment efforts provide information on the scientific and technical underpinnings of domestic and international policies to combat the threat of global climate change, and its findings influence policy options available within and between countries.

Other Climate-Related Programs

Table 7. Other Climate Change-Related Programs
FY 2003 Budget

(Budget authority; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Department of Energy				
Energy Conservation R&D				
Weatherization & State Energy Grants	191	275	316	+41
Fossil Energy R&D (cleaner coal/natural gas)	274	442	398	-44
Energy Supply				
Nuclear Energy R&D (NERI)	34	32	25	-7
Subtotal – DOE	499	749	739	-10
Department of the Treasury				
International Development Assistance				
Global Environment Facility [1]	41	38	68	+30
Total [2]	**540**	**787**	**807**	**+20**

Note:

[1] The total FY 2003 request for the Global Environment Facility (GEF) is $177.8 million. Approximately 38% of total GEF funding from all sources supports climate-related projects (e.g. expanding clean energy production and efficient energy use). The GEF, which also provides funding for other global environmental concerns, does not allocate funds by project type.

[2] Total may not add due to rounding.

Other Climate-Change Related Programs. The FY 2003 budget includes $807 million, an increase of $20 million over FY 2002 enacted, for several programs in which there is, or can be, significant greenhouse gas co-benefits. These include programs that have multiple environmental benefits, including reducing fossil fuel use or improving energy efficiency. The programs in this category include:

- **DOE -- Low Income Weatherization and State Energy Grants.** The budget proposes $316 million, an increase of $41 million over FY 2002 enacted, for programs that facilitate energy efficiency investments at the State and local level. These programs provide energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The State Energy Program provides grants that enable States to tailor energy efficiency programs to local needs and leverage non-Federal resources.

- **DOE -- Cleaner Coal and Natural Gas Efficiencies.** The budget includes $398 million, a decrease of $44 million from FY 2002 enacted, to support DOE's R&D effort to help industry develop advanced technologies to produce and use coal, and gas resources more efficiently and cleanly. Federally-funded development of clean, highly-efficient gas-fired and coal-fired

generating systems aims to reduce gas emission rates, while reducing electricity costs compared to currently available technologies. Programs also include efforts to discover effective, efficient, and economical means of sequestering carbon dioxide.

- **DOE – Nuclear Energy Research Initiative (NERI).** The budget proposes $25 million, a decrease of $7 million from FY 2002 enacted, to continue investigator-initiated research and development at universities, national laboratories, and industry to advance nuclear power technology. NERI research and development focuses on proliferation-resistant reactor and fuel technologies, high performance/efficient reactor technology, advanced nuclear fuels, and new technologies for the minimization and management of nuclear waste.

- **Department of the Treasury – Global Environment Facility (GEF).** See Addendum A.

Detailed Accounting of Federal Climate Change Expenditures

Table 8. Programs and Tax Policies Related to Climate Change
By Appropriation Account/Line Item
FY 2003 Budget

(Budget authority and tax incentives; in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Programs and Tax Policies Directly Related to Climate Change				
U.S. Global Change Research Program (USGCRP)				
Department of Health and Human Services (HHS)				
National Institutes of Health (NIH)				
National Institute of Environmental Health Sciences	9	10	11	+1
National Eye Institute	14	17	18	+1
National Cancer Institute	31	34	39	+5
National Institute of Arthritis & Musculoskeletal & Skin Diseases	*	*	*	*
Subtotal -- HHS/NIH [1]	54	60	68	+8
National Aeronautics and Space Administration				
Science, Aeronautics, and Technology	1,176	1,090	1,109	+19
Department of Energy				
Science (Biological & Environmental Research)	116	120	126	+6
National Science Foundation				
Research and Related Activities	181	188	188	0
Department of Agriculture (USDA)				
Agricultural Research Service	29	30	30	0
Cooperative State Research, Education, & Extension Services				
Research and Education	4	9	17	+8
Economic Research Service	1	1	1	0
Forest Service				
Forest and Rangeland Research	17	17	17	0
Subtotal -- USDA	51	57	65	+8
Department of Commerce				
National Oceanic and Atmospheric Administration				
Operations, Research, and Facilities	93	100	100	0
Department of the Interior				
U.S. Geological Survey				
Surveys, Investigations, and Research	27	28	28	0

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Directly Related Programs (cont'd)				
Environmental Protection Agency				
Science and Technology	23	21	22	+1
Smithsonian Institution				
Salaries and Expenses	7	7	7	0
Subtotal -- USGCRP [2]	**1,728**	**1,670**	**1,714**	**+44**
Climate Change Research Initiative (CCRI)				
Department of Commerce				
National Oceanic and Atmospheric Administration				
Operations, Research, and Facilities	0	0	18	+18
National Science Foundation				
Research and Related Activities	0	0	15	+15
National Aeronautics and Space Administration				
Science, Aeronautics, and Technology	0	0	3	+3
Department of Energy				
Science (Biological & Environmental Research)	0	0	3	+3
Department of Agriculture (USDA)				
Forest Service				
Forest and Rangeland Research	0	0	1	+1
Subtotal -- CCRI	**0**	**0**	**40**	**+40**
Technology Research, Development and Deployment				
Department of Energy (DOE)				
Energy Supply	375	393	408	+15
Renewable Energy Resources R&D	(370)	(386)	(408)	(+22)
Nuclear Energy	(5)	(7)	(0)	(-7)
Energy Conservation R&D	619	640	588	-52
Fossil Energy R&D (sequestration R&D)	18	32	54	+22
Science (Basic Science)	35	35	35	0
Energy Information Administration	3	3	3	0
Subtotal -- DOE	1,050	1,103	1,088	-15
Environmental Protection Agency (EPA)				
Environmental Programs and Management	96	89	91	+2
Science and Technology	27	26	17	-9
Subtotal -- EPA	123	115	108	-7

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Directly Related Programs (cont'd)				
Department of Agriculture (USDA)				
Forest Service				
Forest and Rangeland Research	3	0	1	+1
Agricultural Research Service	0	0	5	+5
Subtotal – USDA	3	0	6	+6
Subtotal -- Technology Research, Development and Deployment [3]	**1,176**	**1,218**	**1,202**	**-16**
Revenue Effect of Tax Proposals	**0**	**0**	**555**	**+555**
International Assistance				
Agency for International Development (AID)				
Development Assistance (DA)	112	110	109	-1
Economic Support Fund (ESF)	---	12	6	-6
Assistance for the Independent States of the Former Soviet Union (FSA)	31	32	27	-5
Assistance for Eastern Europe and the Baltic States (AEEB)	13	10	8	-2
International Disaster Assistance (IDA)	---	4	5	+1
Development Credit Authority (DCA)	1	---	---	---
Tropical Forest Conservation [4]	---	---	50	+50
Subtotal -- AID [5]	157	167	205	+38
Department of Treasury				
Debt Restructuring				
Tropical Forest Conservation [6]	13	5	---	-5
Department of State				
International Organizations and Programs	7	7	6	-1
Subtotal -- International Assistance [7]	**177**	**179**	**211**	**+32**

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Proposed	Change 2002-2003
Other Climate Change-Related Programs				
Department of Energy				
Energy Conservation R&D				
Weatherization & State Energy Grants	191	275	316	+41
Fossil Energy R&D (cleaner coal & natural gas)	274	442	398	-44
Energy Supply				
Nuclear Energy R&D (Nuclear Energy Research Initiative (NERI))	34	32	25	-7
Subtotal -- DOE	499	749	739	-10
Department of the Treasury				
International Development Assistance, Multilateral				
Assistance, International Financial Institutions -- Global Environment Facility [8]	41	38	68	+30
Subtotal -- Other Climate Change Programs [9]	**540**	**787**	**807**	**+20**
Total -- All Programs and Tax Policies [10]	**3,603**	**3,822**	**4,475**	**+653**

Note: Table 8 is a detailed listing of Federal climate change expenditures by agency with account level information as provided in the President's FY 2003 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.

* less than $500,000

[1] Subtotal may not add due to rounding.

[2] Subtotal may not add due to rounding.

[3] Subtotal may not add due to rounding.

[4] Prior to the FY 2003 Budget request, funding for the Tropical Forest Conservation Act (TFCA) was appropriated to the Treasury Department.

[5] Subtotal may not add due to rounding.

[6] In FY 2002, an additional $20 million in existing balances may be used.

[7] Subtotal may not add due to rounding.

[8] The total FY 2003 request for the Global Environment Facility (GEF) is $177.8 million. Approximately 38% of total GEF funding from all sources supports climate-related projects (e.g. expanding clean energy production and efficient energy use). The GEF, which also provides funding for other global environmental concerns, does not allocate funds by project type.

[9] Subtotal may not add due to rounding.

[10] Total may not add due to rounding. Total adjusted to eliminate double counts.

Addendum A
GLOBAL ENVIRONMENT FACILITY (GEF)

FY 2003 Budget Request

The FY 2003 Budget requests $107.5 million for the GEF for the first of four annual payments under the third GEF replenishment (GEF-3) and $70.3 million to clear one-third of the U.S. arrears to GEF-2. The clean energy portion of the GEF portfolio – its climate change focal area – accounts for about 38 percent of its financial commitments, which is about $68 million for climate-related activities in FY 2003.

Background on the Organization

The GEF was created in 1991, before any climate convention or protocol existed, to specialize in trans-border environment problems, of which climate is only one. In addition to climate change, GEF funding is focused on international water pollution and overfishing; better 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 Climate Convention (the "1992 Convention") provided that there should be 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 Climate Convention, in part to avoid creating new institutions. The GEF was by far the best existing institution for the job.

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 1992 Convention or in any standard "UN-configured" institution.

GEF Operations

The GEF focuses on innovative, cost-effective and generally small projects that can be duplicated elsewhere with financing from non-GEF sources. Since beginning regular operations in 1994, the GEF has designed and initiated over 1,047 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 $3.7 billion to date, leveraging over $15 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: $799 million in cofinancing was leveraged in

association with $86 million in GEF grants in FY 2002. 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 and the 1992 Convention, and 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 1992 Convention, since the GEF acts as the financial mechanism for the Convention; it simply underscores existing 1992 Convention agreements on financial assistance for developing countries:

- Supporting developing country reporting requirements under the 1992 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) to assist countries in preparing reports required under the 1992 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 U.S. 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

The GEF's Mexico High Efficiency Lighting Project aimed to reduce energy waste and power plant pollution by proving the commercial viability of energy efficient lighting. $10 million from GEF leveraged

over $13 million in initial cofinancing. Since the project's completion, its long-term impacts have outstripped all expectations. Mexican consumers and businesses have installed almost 40% more 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 has 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

The Brazil Biomass Power Commercial Demonstration Project uses high-efficiency technology to use agricultural byproducts as fuel for electric power and agro-industry process heat. A $40.5 million GEF investment leverages $82 million, mostly from Brazilian public and private sources. The project should help increase economies of scale for this promising technology and thus help it become commercially viable. By conservative estimates, biomass power could supply clean electricity to 100 million rural people, particularly needed in Africa and South Asia.

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.

Addendum B
HIGHLIGHTS OF THE 2002 FARM BILL

Over the next ten year we will invest $47.2 billion for conservation on our farms and forest lands, partnering with farmers and small land owners to protect the water and air, provide habitat for wildlife, and storing carbon in trees and the soil. The 2002 Farm Bill reauthorizes and increases funding for most USDA conservation programs. These programs will provide a range of environmental benefits, including improved air, soil, and water quality and wildlife habitat. Activities implemented through a number of USDA conservation programs can result in positive greenhouse gas benefits by reducing emissions and enhancing terrestrial carbon sequestration.

For example, the Environmental Quality Incentives Program (EQIP) program is expected to reduce greenhouse gas emissions by providing incentives that encourage the voluntary adoption of conservation practices on working lands and waste management systems for livestock operations such as methane capturing technologies. A new provision of EQIP, the Conservation Innovations Grant Program, could be used to promote carbon sequestration practices by leveraging private and public sector investments. In addition, reserve programs, such as the Conservation Reserve Program, are expected to have sizeable greenhouse gas benefits, by sequestering carbon through vegetation growth and improved soil conditions.

Environmental Quality Incentives Program (EQIP) provides technical assistance, cost-sharing, and incentive payments for conservation practices on working lands. The 2002 Farm Bill increased funding for EQIP and increased the flexibility of the program by allowing exceptions to the maximum cost-share amount of 75%, removing restrictions on eligibility based on operation size, and expanding options for contract lengths.

While both crop and livestock producers are eligible, funding is prioritized for livestock producers with 60% of program funding targeted for conservation practices on livestock operations (up from 50% in the 1996-2001 Farm Bill).

The Conservation Innovation Grants program is a new provision under EQIP that allows the Secretary to make grants to governmental and non-governmental entities, as well as persons, to leverage investment in conservation activities. Projects funded through this program may include market-based pollution credit trading, adoption of best management practices, or carbon sequestration.

The 2002 Farm Bill provides for direct spending for regular EQIP activities and the Conservation Innovation Grants program of $5.8 billion in Commodity Credit Corporation (CCC) funding for fiscal years 2002-2007. Funding is scheduled to increase steadily starting at $400 million in 2002 and $700 million in 2003, increasing each year to a maximum of $1.3 billion annually by FY 2007. This represents a substantial increase from the 1996 Farm bill authorization of $200 million per year. Additional CCC funding is provided for a new EQIP provision targeting ground and surface water conservation at $310 million over FY 2002-2007 and an additional $50 million is provided for water conservation activities in the Klamath Basin as soon as possible.

Reserve Programs compensate landowners for taking environmentally sensitive land out of production.

- Conservation Reserve Program *(CRP)* is a voluntary program where the government offers annual rental payments and cost-share assistance to farmers in exchange for taking land out of production and establishing an approved vegetation cover. The 1996 Farm Bill authorized a maximum enrollment of 36.4 million acres in the CRP. The 2002 Farm Bill reauthorizes the program and increases the enrollment cap to 39.2 million acres. Additional provisions allow for automatic extension of expiring contracts. In addition, 2002 Farm Bill provisions permit some management practices to continue on CRP lands (i.e., haying and grazing, and placement of wind turbines). Spending for this program is estimated to increase by $1.5 billion over ten years.

- Conservation Reserve Enhancement Program (CREP) is authorized under the CRP but is administered through a State-Federal partnership and targets State-specific as well as National agricultural environmental problems. Because the CREP is authorized under the CRP, acres enrolled under CREP count towards the CRP enrollment cap. The estimated costs of the CREP are incorporated in the estimate above.

- Wetland Reserve Program (WRP) provides easements or restoration cost-share agreements to producers who agree to restore wetlands on agricultural lands. The 1996 Farm Bill authorizes a maximum area of 1.075 million acres. The 2002 Farm Bill increases the total enrollment acreage to 2.275 million acres, with a maximum annual enrollment set at 250,000 acres per year. Spending for this program is estimated to increase by $1.5 billion over ten years.

APPENDIX A
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
Global Climate Change Funding (GCC)
(Dollars in thousands)

BUREAU/COUNTRY	STRATEGIC OBJECTIVE NAME	Reporting Category	FY 2001 Obligations	FY 2002 Estimate	FY 2003 Proposed
Africa (AFR)					
Guinea	Increased use of Sustainable Natural Resources Mgmt Practices	3	1,000	2,000	2,000
Madagascar	Biologically Diverse Ecosystems Conserved	3	2,500	2,500	2,500
Malawi	Sustainable Use, Conservation, & Mgmt of Renewable Natural Resources	3	2,000	1,000	1,000
Mali	Increased Value-Added of Specific Economic Sectors	3	1,000	1,500	-
	Accelerated Economic Growth	3	-	-	1,500
Mozambique	Increased Rural Household Incomes	3	2,000	2,000	2,000
Senegal	More effective Management of Services & Resources	3	-	1,000	1,000
South Africa	Improved Capacity to Implement Economic Policy	1	500	-	-
	Housing and Municipal Services	1	2,500	3,000	3,000
Uganda	Expanded Opportunities for Rural Sector Growth	3	3,500	2,500	2,500
AFR/Regional/SD	Central Africa Regional Program for Environment (CARPE)	3	3,000	3,000	3,000
	(CARPE) Climate Monitoring & Observing	5			500
	FEWS Climate Monitoring and Observing	5	1,000	6,000	6,000
Western Africa Regional Program	Food Security, ENV and Natural Resource Mgmt Strengthened	3	1,000	-	-
	Climate Monitoring and Observing	5	-	-	500
Initiative for Southern Africa	Increased Regional Cooperation in Natural Resource Mgmt	3	-	500	500
	Climate Monitoring and Observing	5	-	-	500
Regional Economic Dev. Service Office (REDSO/E)	Climate Monitoring and Observing	5	-	-	500
TOTAL AFR			**20,000**	**25,000**	**27,000**
Asia and the Near East (ANE)					
Afghanistan	Climate Monitoring and Observing	5	-	-	1,000
Bangladesh	Improved Performance of the Energy Sector	1	1,000	3,470	3,470
	Improved Performance of the Energy Sector	1	-	1,500	1,500

Egypt	Mgt of Env. and Natural Resources in Targeted Sectors Improved	1	-	7,280	1,155
India	Increased Environmental Protection in Energy, Industry, & Cities	1	2,843	6,050	6,050
	Increased Environmental Protection in Energy, Industry, & Cities	1	-	3,000	3,000
Indonesia	Energy Sector Governance Strengthened	1	3,823	3,130	3,130
Nepal	Increased Private Sector Participation & Investment in Hydropower	1	2,000	2,200	2,200
Philippines	Protection of Productive Life Sustaining Natural Resources	1	2,997	3,000	3,000
USAEP	U.S. Asia Environmental Partnership	1	4,100	2,000	3,100
SARI/E	South Asia Regional Initiative - Energy Program	1	3,900	2,900	2,900
ANE/Regional	Program Development & Learning	1	-	150	150
	Climate Monitoring and Observing	5	-	-	1,000
TOTAL ANE			**20,663**	**34,680**	**30,655**

Latin American and the Caribbean (LAC)

Bolivia	Sustainable Forest Management and Parks	3	4,527	4,550	5,764
Brazil	Env & Socioeconomically Sustainable Alternatives for Sound Land Use	3	2,500	1,465	2,840
	Clean and Efficient Energy Production and Use	1	2,368	1,000	1,000
Dominican Republic	Sustainable Forestry	3	1,492	1,500	1,500
Ecuador	Conserving Ecuador's Forests	3	3,688	3,057	850
Guatemala	Conserving and Sustainable Using Forests	3	570	600	450
G-CAP (Central America)	Improved Management in the Mesoamerican Biological Corridor	3	510	415	595
	Improved Management in the Mesoamerican Biological Corridor	1	1,300	230	230
	Improved Management in the Mesoamerican Biological Corridor	5	1,050	180	580
Honduras	Protecting Honduran Forests	3	3,691	2,600	4,800
LAC Regional	Improved Conservation of the Region's Biological Resources	3	964	4,636	2,800
Mexico	Protecting Tropical Forest	3	4,164	3,365	4,765
	Renewable Energy, Energy Efficiency	5	600	400	500
	Fires	1	1,421	1,750	1,500
Nicaragua	Improving Park Management	3	4,970	4,723	1,129
Panama	Conserving Forests	3	240	-	-
Paraguay	Conserving Paraguay's Sub-Tropical Forests	3	1,000	1,000	1,000
Peru	Improved Environmental Management	3	1,621	-	-
	Strengthen Environmental Management	3	-	1,227	1,500
TOTAL LAC			**36,676**	**32,697**	**31,803**

Europe and Eurasia (E&E)

Albania	Growth in Number of Self-Sustaining Private Enterprises	1	1,500	750	500
Bulgaria	Special Initiatives	3	1,200	500	500
	Accelerated Development & Growth of the Private Sector	1	-	400	450
Croatia	Growth of a Dynamic and Competitive Private Sector	1	-	500	-
Romania	Economically Sustainable and Environmentally Sound Energy Sector	1	1,100	1,900	1,500
CEE Regional	Economically Sustainable and Environmentally Sound Energy Sector	1	7,576	5,726	4,901
	Increased Environmental Mgmt Capacity to Sppt Sustainable Ec Growth	3	932	-	215
	Increased Environmental Mgmt Capacity to Sppt Sustainable Ec Growth	1	214	-	87
Sub-total Europe			**12,522**	**9,776**	**8,153**
Armenia	Economically Sustainable and Environmentally Sound Energy Sector	1	4,750	590	5,100
	More Sustainable Water Management for Enhanced Env Quality	1	-	300	500
Georgia	Economically Sustainable and Environmentally Sound Energy Sector	1	6,860	14,500	6,400
Kazakhstan	Improved Management of Critical Natural Resources, including Energy	1	2,000	1,000	500
Kyrgyzstan	Improved Management of Critical Natural Resources, including Energy	1	750	650	1,500
Moldova	Private Enterprise Growth Creates Jobs and Generates Income	1	4,575	4,575	5,150
Russia	Accelerated Development and Growth of Private Enterprises	1	400	883	718
	Cross-Cutting Programs	3	1,600	2,717	2,282
Tajikistan	Improved Management of Critical Natural Resources, including Energy	1	-	20	30
Turkmenistan	Improved Management of Critical Natural Resources, including Energy	1	10	200	200
Ukraine	Economically Sustainable and Environmentally Sound Energy Sector	1	8,284	3,475	3,275
	Increased Env Mgmt Capacity to Support Sustainable Development	1		1,645	460
NIS Regional	Economically Sustainable and Environmentally Sound Energy Sector	1	1,060	935	935
	Increased Environmental Mgmt Capacity to Spt Sustainable Ec Growth	1	940	340	340
Sub-total Eurasia			**31,229**	**31,830**	**27,390**
TOTAL E&E			**43,751**	**41,606**	**35,543**

Economic Growth, Agriculture & Trade (EGAT)

EGAT/ENV	Office of Environment and Natural Resources	3	8,324	7,626	7,626
EGAT/ENV	Office of Environment and Natural Resources	1	-	-	-
EGAT/ENV	Office of Environment, Energy and Technology	1	16,000	12,000	10,000
EGAT/ENV	Global Climate Change	1	3,000	2,575	1,000
EGAT/ENV	Global Climate Change	5	-	900	750
EGAT/ENV	Global Climate Change	3	3,000	500	325
EGAT/EGAD	AFS	3	2,022	2,775	2,775
EGAT/EGAD	AFS	3	3,000	3,000	3,000
TOTAL EGAT			**35,346**	**29,376**	**25,476**

Democracy, Conflict, and Humanitarian Assistance (DCHA)

DCHA/OFDA	Worldwide Climate Monitoring and Observing	5	-	4,000	5,000
TOTAL DCHA				**4,000**	**5,000**

Tropical Forest Conservation (A)	**[13,000]**	**[5,000]**	**50,000**

Development Credit Authority (DCA)

Bulgaria (B)		1	625	-	-
TOTAL DCA			**625**	**-**	**-**

TOTAL USAID	**157,061**	**167,359**	**205,477**

Notes:

(A) Before the FY 2003 Request, funding for the Tropical Forest Conservation Act was appropriated to the Treasury Department. In FY 2002, up to an additional $20 million in existing Treasury Department balances may be used. The bracketed amounts are not included in AID's totals.

(B) Development Credit Authority is a competitive program funded by transfer authority. The FY2001 level is the subsidy amount obligated. The leveraged amount through FY 2000 is $22.3 million.

FY 2002 Legislative Reporting Categories

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 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 and can be provided upon request.

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