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Subseries:

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THE WHITE HOUSE
WASHINGTON

February 16, 2000

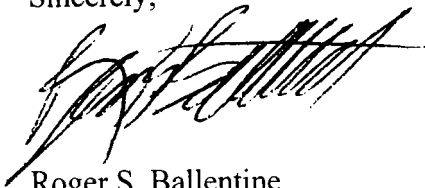
Dear Interested Party:

Attached please find a summary of President Clinton's FY 2001 budget proposal to fight global climate change. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – the FY 2001 budget is proposing \$2.4 billion in funding to combat global climate change, a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to develop clean energy at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution. Recognizing the crucial need for sound science, the President is also proposing more than \$1.7 billion for basic research into the science of climate change, bringing the total request for FY 2001 to over \$4 billion.

President Clinton is also proposing a five-year, \$4 billion tax incentive package to spur clean energy technologies and increase investment in energy efficient technology and renewable energy. The common thread in all these proposals is the conviction that new energy technologies can help us expand the economy and reduce greenhouse gas pollution at the same time.

As the President said in his State of the Union address just a few weeks ago, "The greatest environmental challenge of the new century is global warming." We believe that the President's FY 2001 budget represents an aggressive and innovative approach to this tremendous challenge.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger S. Ballentine", written over a horizontal line.

Roger S. Ballentine
Deputy Assistant to the President
And White House Climate Change Coordinator

President Clinton's FY 2001 Climate Change Budget

"The greatest environmental challenge of the new century is global warming . . . If we fail to reduce the emission of greenhouse gases, deadly heat waves and droughts will become more frequent, coastal areas will flood, and economies will be disrupted. That is going to happen, unless we act. Many people . . . still believe you cannot cut greenhouse gas emissions without slowing economic growth. In the Industrial Age that may well have been true. But in this digital economy, it is not true anymore. New technologies make it possible to cut harmful emissions and provide even more growth."

-- President Bill Clinton, State of the Union Address, January 27, 2000

Meeting the Challenge of Global Warming. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – President Clinton's FY 2001 budget is proposing \$2.4 billion (a 43 percent increase over FY 2000 enacted levels) in funding to combat global climate change. This includes a series of new initiatives, such as accelerated efforts to develop clean energy sources both at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution, as well as a five-year package of tax incentives to spur clean energy technologies and increased investment for R&D in energy efficient technology and renewable energy. In addition, the President is proposing more than \$1.7 billion for global change research, for a total package for FY 2001 of over \$4 billion.

International Clean Energy Initiative. To help accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing \$201 million (a more than 100 percent increase over FY 2000 enacted levels) for a multi-agency initiative to encourage open competitive markets; remove market barriers in developing countries to clean energy technologies; and to provide new incentives for clean energy technology innovation and export. The initiative will promote U.S. clean energy exports, create high-value jobs, and assist developing countries in fighting air pollution and climate change.

Bioenergy & Bio-based Products Initiative. The budget includes \$289 million to accelerate the development of bio-based technologies, which convert crops, trees and other "biomass" into a vast array of fuels and products – an increase of \$93 million over FY 2000 enacted levels. In addition to helping meet environmental challenges like global warming, this initiative will increase the viability of alternative energy sources, support farm incomes, and diversify and strengthen the rural economy.

Clean Air Partnership Fund. The President proposes \$85 million for a new fund to provide grants to state and local governments for projects that reduce both greenhouse gases and pollutants like soot, smog, and air toxics.

Climate Change Technology Initiative (CCTI). The CCTI is a package of targeted tax incentives and investments aimed at increasing energy efficiency and spurring the broader use of renewable energy. The package will save consumers money and reduce greenhouse gas emissions at the same time. CCTI investments have risen substantially each of the past two years. The President's new budget proposes a still more accelerated effort.

\$4.0 billion in Tax Incentives over 5 years. The proposed package contains \$4.0 billion over five years in tax cuts (\$201 million for FY 2001) for consumers who purchase energy efficient products and for producers of energy from renewable sources. This year's CCTI tax package is \$400 million greater than last year's proposed five-year package. Highlights include:

- Tax credits for energy efficient homes. Consumers can receive a \$1000-2000 credit toward the purchase of a new energy efficient home; a 20 percent tax credit for the purchase of selected energy efficient products for homes and buildings; and a \$1000-2000 credit for installing a solar energy system.

- Tax credits for fuel-efficient cars. The package extends the current tax credit (of up to \$4000) through 2006 for qualified electric and fuel cell vehicles and also includes a tax credit of \$500-3000 for the purchase of a qualifying hybrid vehicle from 2003-2006.
- Tax credits for clean energy. The package extends the 1.5 cent per kilowatt hour tax credit for the production of electricity from wind and closed-loop biomass; provides credits for open-loop biomass facilities and coal-biomass cofiring; and provides credits for electricity produced from methane from certain landfills.

\$1.4 billion for Energy Efficiency & Clean Energy. The proposed package contains over \$1.4 billion in FY 2001 to research, develop, and deploy clean technologies for the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- a 30 percent increase over the amount appropriated in FY 2000. Highlights include:

- Partnership for a New Generation of Vehicles. PNGV is a government-industry effort to develop comfortable, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. The combined proposal for PNGV in the FY 2001 budget is \$255 million, an increase of \$30 million over FY 2000 enacted levels.
- Partnership for Advancing Technology in Housing. PATH is a government-industry partnership to improve the energy efficiency of new homes by more than 50 percent and to retrofit 15 million existing homes to make them 30 percent more energy efficient within a decade. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- Renewable Energy. The President proposes \$410 million for the Department of Energy's solar and renewable energy programs, a 32 percent increase over the amount appropriated in FY 2000. The package includes expanded efforts in key renewable technologies, such as wind, bioenergy, photovoltaics, and geothermal energy.

Cleaner Fossil Fuels. The budget request contains \$233 million for R&D to develop next-generation technologies for coal combustion with much higher energy efficiency and lower greenhouse gas emissions.

Weatherization & State Energy Grants. The budget request includes \$191 million -- a \$22 million increase over FY 2000 appropriations -- to deliver energy conservation services to low-income Americans and to assist state energy offices in addressing their energy priorities.

U.S. Global Change Research Program. The FY 2001 request includes over \$1.7 billion for scientific research to improve our understanding of human and natural forces that influence the Earth's climate system and to assess the likely consequences of global warming.

President Clinton's FY 2001 Climate Change Budget

The President's climate change package for FY 2001 totals over \$4.1 billion – an increase of \$760 million from the amount enacted for FY 2000. This includes \$2.4 billion for programs directly aimed at combating global warming – a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to promote the development and deployment of clean energy technologies around the world; a stepped-up program to develop bioenergy and bio-based products; and a new Clean Air Partnership Fund to boost state and local efforts to reduce both greenhouse gases and ground-level air pollutants. It also includes the Climate Change Technology Initiative (CCTI), which mixes tax incentives and direct spending to spur the research, development, and deployment of energy efficient technology and renewable energy and other climate-related investments, such as R&D of highly efficient technologies for the combustion and use of coal and natural gas, weatherization, and state energy grants. The President is also proposing over \$1.7 billion for the United States Global Change Research Program, to enhance our understanding of the human and natural forces that influence the Earth's climate system.

Table 1. Climate Change-Related Domestic Programs (\$ in Millions)

	FY 2000 Enacted	FY 2001 Request	Change
Climate Change Solutions			
International Clean Energy Initiative	98	201	+103
Biofuels & Bioproducts Initiative	196	289	+93
Clean Air Partnership Fund	0	85	+85
Climate Change Technology Initiative--tax incentives ¹	N/A	201	+201
Climate Change Technology Initiative--investments	1,095	1,432	+337
Other Climate-Related Investments (cleaner coal & Natural gas; weatherization; state energy grants)	413	424	+11
Subtotal, Climate Solutions ²	1,665	2,386	+721
Global Change Research Program	1,701	1,740	+39
TOTAL	3,366	4,126	+760

¹ First year of a proposed five year, \$4.0 billion package.

² Subtotal excludes double counts for funds included in new initiatives and cleaner coal which are also part of the CCTI.

International Clean Energy Initiative

To accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing the International Clean Energy Initiative – a \$200 million multi-agency effort (a more than 100 percent increase over FY 2000 enacted levels) to encourage open competitive markets and remove market barriers to clean energy technologies in developing and transition countries and to provide new incentives for clean energy technology innovation and export. This initiative will promote U.S. exports and create high-value jobs, and will assist countries to power their economic development while fighting air pollution and climate change.

Window of Opportunity for America and the World. Developing country energy use will overtake that of industrial countries by 2020. These energy technology markets are projected to total \$4 to \$5 trillion over the next 20 years and \$15 to \$25 trillion over the next 50 years. Developing country energy use is expected to account for three-fourths of the increase in global energy use between now and 2050.

Advanced, low-polluting energy technologies, developed and manufactured in the United States, can provide these energy services efficiently, but existing markets often do not value environmental and efficiency benefits. In addition, environmentally superior options often carry higher up-front costs, may be unfamiliar, or are perceived as more risky by decision-makers in developing countries. The initiative builds on a recent set of recommendations by the President's Committee of Advisors on Science and Technology (PCAST) and is directed at leveling the playing field between cleaner U.S. energy technologies and services and polluting alternatives.

Real Benefits At Home and Abroad. The initiative will help lay the technical and policy foundation that will allow developing and transition countries to build a clean energy future, leapfrogging past the polluting energy technologies used by the industrial countries, while building competitive markets open to U.S. firms. The goals of this initiative include:

- Doubling clean energy technology exports by 2005, creating as much as \$5 billion in new export revenues for U.S. companies and as many as 100,000 new U.S. jobs.
- Cutting energy use in targeted country buildings and appliances in half through advanced building design tools and building equipment codes and standards.
- Developing integrated renewable energy technologies that have the potential to power the full range of energy services for the 2 billion people in developing countries that do not now have electricity.
- Sharply reducing sulfur, particulate, and greenhouse gas emissions by developing advanced coal-fired power plants and low-cost hydrogen fuels.
- Maximizing use of combined heat & power systems through technical and policy assistance.

- Reducing methane emissions from pipelines and other fossil sources by an amount equal to as much as 100 million metric tons of carbon per year by 2005.
- Providing technical and policy support to encourage the development of natural gas grids.
- Reducing energy use in the industrial sector through the introduction of best practice methods, including advanced sensors and controls, and energy efficient motor drive systems.
- Conducting research in nuclear energy to address cost, waste, safety, and proliferation concerns.
- Providing technical and policy assistance in support of energy sector reform that creates open, competitive markets while protecting the public interest.

Initiative Structure. This initiative will strengthen efforts to streamline current bureaucratic procedures to better assist U.S. firms wishing to invest in clean energy projects in developing and transition countries. This initiative will also encourage public-private partnerships with foreign counterparts to demonstrate clean energy technologies, drive down their cost, and facilitate private sector financing for their large-scale deployment. The initiative will employ a range of proven policy tools, including U.S. technical and policy assistance to developing countries through personnel exchanges, conducting collaborative R&D with key foreign research groups, developing integrated renewable energy, energy efficiency, and advanced fossil energy technologies and pilot projects, and providing a range of trade supports to expand clean energy exports.

The initiative's requested \$100 million increase for these activities includes an additional \$46 million for the Department of Energy (DOE); \$30 million for the U.S. Agency for International Development; \$15 million for the Export-Import Bank; \$5 million for the Trade and Development Agency; and \$4 million for the Department of Commerce. A \$3 million increase in base programs is also requested at DOE, bringing the total increase to \$103 million.

Bioenergy & Bioproducts Initiative

President Clinton's FY 2001 Budget includes \$289 million to accelerate the development and use of bio-based technologies, which convert crops, trees, and other "biomass" into fuels, power, chemicals, and other products. This initiative supports the President's August 1999 Executive Order 13134 and Memorandum on Promoting Biobased Products and Bioenergy, aimed at tripling U.S. use of biobased products and bioenergy by 2010. The initiative provides an increase of more than \$93 million (47 percent) over the amounts available for FY 2000, with \$49 million directed towards the Department of Energy (DOE) and \$44 million for stepped-up efforts at the Department of Agriculture (USDA). (Funding in DOE is also considered part of the Climate Change Technology Initiative.) In addition to this increase in R&D, the Commodity Credit Corporation will provide \$100 million in FY 2000 and up to \$150 million in FY 2001 and 2002 in incentive payments to encourage production of biobased fuels. The initiative will increase the viability of alternative energy sources and help meet environmental challenges like global warming, while diversifying and strengthening the rural economy.

New Economic Opportunities for a New Century. Continuing advances in forest and farm technology, molecular biology, and other areas are fueling a revolution in the use of biomass to make low-polluting products, such as:

- **transportation fuels**, like cellulosic ethanol from agricultural waste;
- **electricity**, by burning wood chips and switchgrass along with coal in existing plants and by converting paper industry wastes into fuel gases for advanced gas turbines;
- **commercial products**, such as chemicals, glues, paints, packing materials, and textiles.

Already, creative companies such as **Cargill-Dow Polymers** are making this vision a reality, recently announcing plans to build a \$300 million production facility that will convert corn based sugars into plastic fibers that can be used to make products that are all natural and biodegradable.

Meeting the President's goal of tripling U.S. use of bioenergy and bioproducts will add billions in new income for farmers, producing 50,000 new, high-technology jobs in small processing plants in rural America and up to 130,000 such jobs in biopower, bioproducts, and biofuels industries.

Cleaner Energy, Cleaner Environment. Bioenergy and bioproducts can dramatically reduce greenhouse gas emissions that contribute to global warming. Since crops absorb carbon during growth, their use for energy and other applications results in near zero net carbon release. Tripling our use of bioenergy and bioproducts by 2010 will reduce annual greenhouse gas emissions by up to 100 million tons – the equivalent of taking over 70 million cars off the road.

Making Biomass Competitive With Fossil Fuels. A major goal of this initiative is to make biomass a viable competitor to fossil fuels as an energy source and chemical feedstock while protecting the environment. This goal is achievable, but it will require an unprecedented effort to

support research in universities, companies, and our national laboratories. In the past few years, for example, federal research has developed techniques that greatly accelerate the production of sugars and other useful chemicals from materials like corn stover and wood. The research funded under this initiative will ensure a continuing flow of the basic innovations on which such investments can be made.

Many uses for biomass materials are possible in the near future and this initiative will support research concepts on a competitive basis. This will include support for integrated systems capable of processing feedstocks simultaneously into a variety of products such as fuels, chemicals, and electricity. Much like today's petroleum-based refineries, the mix of products from these facilities will depend on market conditions. The research aims to understand the basic chemistry of cellulose and other materials in biomass, and develop new thermal, chemical, and bio-chemical techniques for converting these materials into useful forms.

Initiative Structure. The President's August 1999 Executive Order instructs DOE, USDA, the National Science Foundation, the Environmental Protection Agency and other agencies, to work closely together in supporting the broad range of needed research and development efforts. These efforts will support research partnerships linking industry, university, and government research facilities selected on a competitive basis. Key areas of new research activity will include:

- Development of inexpensive systems to break down cellulose into low-cost sugars, allowing woody and grassy crops and agricultural waste, such as corn stalks, to take the place of high-value grain and food crops as biofuel feedstocks.
- Renewable bioproducts, using multi-disciplinary and university/industry partnerships to develop and accelerate adoption of possible "leap-frog" technologies for converting crops, trees and residues into chemical feedstocks and consumer products.
- Biopower, promoting both the integration of biomass gasification systems with modern gas-turbine/steam-turbine generation systems, and the co-firing of biomass with coal.
- Expanded Forest Service research on faster-growing trees and the use of small-diameter trees for commercial, biobased products.
- Methane gas recovery pilots to reduce greenhouse gas emissions from livestock operations and provide assistance to farmers that want to produce or market biobased products.
- Expanded Agricultural Research Service research to develop biobased materials from commodities and bioproducts, and convert biomass to energy.
- Competitive resources for research partnerships with universities, complementing the new Initiative for Future Agriculture and Food Systems announced by USDA earlier this month.
- Rural development grants to rural electric cooperatives to develop pilot projects to demonstrate the commercial viability of small-scale biomass fuel generation, grants for technical assistance for processing and marketing biobased products, and loans for facilities and operating capital for organizations engaged in biobased production activities.

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing \$85 million for the creation of a new Clean Air Partnership Fund. The Fund will provide grants to states, localities, and tribes to support efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. First proposed as part of last year's FY 2000 budget, the Fund will be administered by the Environmental Protection Agency under existing authority.

Integrated Pollution Control. The Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state, local, and tribal governments to finance projects and programs that achieve accelerated reductions in both air pollutants, such as soot, smog, and air toxics, and in greenhouse gases.

A Quicker Path to Cleaner Air. By providing new resources for projects that accelerate pollution reductions, the Fund will enable communities to achieve multi-pollutant clean air goals sooner and reduce greenhouse gas emissions at the same time.

Technological Innovation. The Fund will help spur both public and private sector innovations in next-generation pollution control technology.

A Magnet for Local Investment & Innovation. The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level. The Fund can be used to support local revolving funds, low-interest loan programs, matching grants, and other mechanisms that will leverage the original Federal investment, greatly increasing its impact.

"Win-Win" Clean Air Projects. The Fund will support a wide range of practical projects that will mean cleaner air, reduced greenhouse gas emissions, and real savings for taxpayers and consumers. These could include projects such as building combined heat and power facilities that put waste heat to work, reducing emissions of both sulfur dioxide and carbon dioxide; retrofitting municipal buildings to make them more energy efficient, reducing pollution resulting from electricity generation; and upgrading municipal vehicle fleets to make them more fuel efficient.

Climate Change Technology Initiative: \$4.0 Billion in Tax Incentives

The President is proposing a new \$4.0 billion package in tax incentives over five years to help reduce greenhouse gas emissions by spurring the purchase of energy efficient products and the use of renewable energy (see Table 2). This year's CCTI tax package is \$400 million greater than last year's proposed five-year package.

Table 2. CCTI Tax Incentives (\$ in Millions)

		Revenue Effect	
		FY 2001	Total FY01-05
Homes and Buildings			
	Provide tax credit for energy efficient building equipment	-18	-201
	Provide tax credit for new energy efficient homes	- 82	-633
	Provide tax credit for solar energy systems	-9	-132
Vehicles			
	Extend tax credit for electric and fuel cell vehicles and provide tax credits for qualified hybrid vehicles	0	-2078
Clean Energy			
	Extend tax credit for electricity produced from wind and closed-loop biomass; provide credits for open-loop biomass facilities and coal-biomass cofiring; and provide credits for methane from certain landfills	-91	-976
Industry			
	Provide 15-year recovery period for distributed power property	-1	-10
TOTAL*		-201	-4030

*Totals may not add due to rounding.

HOMES AND BUILDINGS

- ***Tax credit to consumers who purchase new energy efficient homes.*** To encourage the purchase of new energy efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2001-2003 that use at least 30 percent less energy than the standard under the 1998 International Energy Conservation Code (IECC) and a credit of \$2,000 for homes purchased from 2001-2005 that use at least 50 percent less energy than the IECC standard.

- ***Tax credit for energy efficient equipment in new and existing homes or buildings.*** This credit will encourage the purchase of electric heat pump water heaters, natural gas heat pumps, and fuel cells. The credit would apply to both residential and commercial equipment. The credit would be 20 percent of the cost of the investment, subject to a cap, for equipment purchased from 2001-2004.
- ***Tax credit for solar energy systems.*** A 15 percent tax credit will encourage the purchase by consumers and businesses of solar energy systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems placed in service from 2001-2007 and \$1,000 for solar water heating systems placed in service from 2001-2005.

VEHICLES

- ***Tax credits for electric, fuel cell, and qualified hybrid vehicles.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric, fuel cell, and hybrid vehicles will help to move advanced technologies from the laboratory to the highway. These technologies can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
 - **Extend the current tax credit for electric vehicles and fuel cell vehicles.** Under current law, a 10 percent credit, up to \$4,000, is provided for the cost of qualified electric vehicles and fuel cell vehicles. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.
 - **Tax credits for hybrid vehicles.** The credit – available for all qualifying vehicles, including cars, minivans, sport utility vehicles, and pickup trucks – would range from \$500 to \$3,000 for qualified hybrid vehicles purchased from 2003-2006, depending upon the vehicle's design performance.

CLEAN ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before January 1, 2002. The President proposes a 2.5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. This package of credits would:
 - **Extend current "closed-loop" biomass credit.** This proposal extends for 2.5 years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which covers facilities placed in service before January 1, 2002.

-- **Provide credits for “open loop” biomass facilities.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources for facilities placed in service from 2001-2005, and provides a 1.0 cent credit for electricity produced from 2001-2003 from facilities placed in service prior to January 1, 2001.

-- **Provide a credit for cofiring biomass and coal.** This proposal adds a 0.5 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants from 2001-2005.

-- **Provide credit for methane from landfills.** This proposal adds a 1.5 cent per kilowatt hour credit for electricity produced from landfills not subject to EPA’s 1996 New Source Performance Standards/Emissions Guidelines (NSPS/EG) and 1.0 cent per kilowatt hour for landfills subject to NSPS/EG. Qualified facilities would be facilities placed in service after December 31, 2000 and before January 1, 2006.

INDUSTRY

- ***15-year recovery period for distributed power property.*** The development of distributed power technologies has made it possible to generate electricity locally at dispersed industrial, commercial, and residential locations. Such technologies can be more energy efficient and generate fewer greenhouse gases than conventional generation methods. This proposal would simplify and rationalize the current depreciation system by assigning a single 15-year recovery period to distributed power property.

Climate Change Technology Initiative: \$1.4 Billion for Efficient Energy and Clean Energy

The President's FY 2001 budget proposes over \$1.4 billion for the research, development, and deployment of renewable energy technologies, energy efficient products and buildings that will help reduce U.S. greenhouse gas emissions. This represents a \$337 million increase (30 percent) over FY 2000 spending (see Table 3). The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- as well as carbon sequestration (see Table 4). The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

Table 3. CCTI Funding by Agency (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Energy	902	980	1,169	+189
EPA	109	103	227	+124
Housing & Urban Development	10	10	12	+2
Agriculture	0	0	24	+24
Commerce	0	2	0	-2
TOTAL*	1,021	1,095	1,432	+337

*Totals may not add due to rounding.

Table 4. CCTI Funding by Area of Activity (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Buildings	176	194	275	+81
Transportation	285	309	382	+73
Industry	187	189	251	+62
Electricity	310	321	406	+85
Carbon Sequestration	14	30	52	+22
Management, Planning & Analysis	48	51	65	+14
TOTAL*	1,021	1,095	1,432	+337

* Totals may not add due to rounding.

BUILDINGS

- ***Partnership for Advancing Technology in Housing.*** PATH is a partnership between the Federal government and building industry to develop and deploy housing technologies to make new homes 50 percent more energy efficient and to make at least 15 million existing homes 30 percent more energy efficient within a decade. PATH has established five pilot communities in Denver, Los Angeles, Pittsburgh, and Tuscon. The program coordinates work in the Department of Housing and Urban Development, the Department of Energy (DOE), the Environmental Protection Agency (EPA), FEMA, the Department of Commerce and other agencies, ensuring, for example, that research conducted in DOE's enhanced residential buildings program is quickly transferred into practice. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- ***Energy Efficient Appliances and Products.*** Various DOE and EPA programs aim to promote the dissemination of energy efficient appliances and products:
 - DOE will accelerate its program to establish **energy efficiency standards** for commercial heating and cooling, water heaters, and electrical distribution transformers, and will begin efforts to harmonize international energy-efficiency standards and test methods to promote exports of efficient U.S. products.
 - EPA and DOE's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy efficient products – everything from computers to refrigerators to central air-conditioning units. New funding will support the launch of new Energy Star product lines and will promote the Energy Star labeling program in 6-10 export markets.
- ***Energy Efficient Commercial Buildings.*** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label.
- ***Energy Smart Schools/Energy Star Label for Schools.*** DOE and EPA have two programs that are working in coordination to improve energy efficiency in U.S. primary and secondary schools, bringing together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- ***Partnership for a New Generation of Vehicles.*** PNGV is a government-industry effort that aims to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon with a two-thirds reduction in carbon emissions by 2004. In January 2000, the auto-industry partners unveiled their PNGV "concept cars" at the Detroit Auto Show, which keeps the program on schedule for meeting its 2004 goal. The FY 2001 budget includes \$255 million for PNGV-related work, an increase of \$30 million over the amount appropriated for FY 2000.
- ***Light and Heavy Trucks.*** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2003, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA and the Department of Defense, aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 10 mpg from the current average of 7 mpg.

INDUSTRY

- ***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, petroleum refining, and steel – 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.
- ***Industrial Combined Heat and Power (CHP) Systems.*** DOE is developing new industrial CHP systems to capture thermal heat would otherwise be wasted. These systems are expected to be 15 percent more energy efficient and 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.
- ***Voluntary Industrial Partnerships.*** EPA will expand its industry partnership programs, such as **Climate Wise** and the **Voluntary Aluminum Industrial Partnership**, to

encourage businesses to take advantage of cost-effective emissions reductions opportunities -- including emissions of the most potent greenhouse gases, such as methane, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF6).

- ***Agriculture and Forestry.*** The Department of Agriculture (USDA) will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and forestry and reducing their vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various means of reducing greenhouse gas emissions in agriculture, such as compost-based waste-handling facilities, rotational grazing systems, and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$8.5 million towards climate change related activities, including the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production.

The FY 2001 budget also includes important USDA funding for developing advanced biomass energy technologies; R&D and demonstration projects for carbon sequestration; research to study the role of farms, forests, and other natural or managed lands in capturing and storing carbon; and a comprehensive U.S. soil carbon inventory (see p.16 below).

ELECTRICITY

- ***Photovoltaic (PV) Energy Systems.*** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next-generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund efforts to develop new, unconventional technologies.

-- **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. To date, DOE has received commitments for over 900,000 solar rooftop installations. In FY 2001, DOE expects 40,000 systems to be installed under this program, bringing the total to 90,000.

-- **Technology Advances.** By 2004, DOE aims to increase the efficiency of thin-film PV modules in multi-megawatt production from 7 percent to 12 percent and to reduce module manufacturing costs by 40 percent (from \$2.50/watt to \$1.50/watt). Specific performance measures for FY 2001 include achieving 14

percent stable efficiency in prototype thin-film modules and, in a new initiative begun in FY 2000, identifying at least three promising non-conventional PV technologies for further development.

- ***Biomass Power.*** DOE supports biopower systems R&D addressing three major technology areas: co-firing biomass with fossil fuels such as coal and natural gas, small modular biopower systems, and advanced biomass gasification. This work is also included in the Bioenergy and Bioproducts Initiative described in above (see pp.4-5 above).
- ***Wind Powering America.*** This initiative, announced in June 1999, will accelerate DOE's research, development, testing and field validation of next-generation wind technologies, with a goal of supplying 5 percent of U.S. electricity through wind technologies by 2020. This will be supported by an aggressive R&D program that will reduce the cost of electricity in favorable wind sites to 2.5 cents per kilowatt hour by 2002, and will move specialized cold-weather wind turbines from development to demonstration in 2000, leading to commercialization in 2001.
- ***Hydrogen.*** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- ***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.

CARBON SEQUESTRATION

- ***R&D for Sequestration.*** Research initiatives are being funded to find ways to sequester (store) carbon. Examples include:
 - **Enhancing Forest and Farmland Sinks.** The **Forest Service**, in conjunction with other USDA agencies, will spend \$3 million for R&D and demonstration projects for optimizing forest, farmland, and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.
 - **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures and in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs for which funding is proposed in the FY 2000 budget that – while not part of the Climate Change Technology Initiative (CCTI) per se – contribute to improving energy efficiency and reducing greenhouse gas emissions. These programs include:

- ***Cleaner Coal and Natural Gas.*** The FY 2000 budget includes a total of \$232 million (of which \$56 million is part of CCTI) to support the Department of Energy's (DOE) aggressive R&D effort to develop next-generation technologies for the combustion and use of coal and natural gas. For example, research and development of integrated gasification combined cycle technology could lead to ultra-high efficiency coal plants with significantly lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2001 budget request for these two programs is \$191 million – a \$22 million increase over FY 2000 appropriations.
- ***Agricultural & Forestry Conservation Programs.*** The Administration's 2001 Farm Safety Net Initiative proposes an increase of \$1.3 billion in FY 2001 funding for Department of Agriculture conservation programs. Many of these same programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the **Conservation Reserve Program**, the **Environmental Quality Incentives Program**, and the **Farmland Protection Program**. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land.

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. USGCRP science results provide useful information for environmental decision-making on issues such as climate change, ozone depletion, changes in ecosystems, and land use. This multi-agency effort is coordinated through the National Science and Technology Council.

For FY 2001, the President is requesting \$1.74 billion for the USGCRP, an increase of \$39 million above the amount enacted for FY 2000. \$843 million is for scientific research and improvements to surface-based monitoring, (an increase of \$79 million, or about 10 percent). \$923 million is for NASA's development of Earth observing satellites to monitor climate change and other global changes (a decrease of \$34 million, reflecting the phasing of funding for large development projects). Important USGCRP budget highlights include:

- ***Improved Climate Observations.*** The FY 2001 budget provides \$26 million to enhance NOAA surface-based observations, including creation of a climate reference network to provide, for the first time, automated, simultaneous, and ideally located measurements of changing temperatures, precipitation, and soil moisture. Measurements of atmospheric trace gases, aerosols, ocean temperatures, and ocean currents will also be expanded.
- ***The Global Water Cycle.*** The FY 2001 budget provides \$308 million (an increase of \$35 million, or about 13 percent) for research on changes in the Earth's water cycle, which is one of the primary determinants of the Earth's climate. The water cycle is emerging as a top research priority because changes appear to be occurring already. The launch of NASA's EOS Aqua spacecraft in December 2000 will support this research by providing new global measurements of humidity, cloud properties, precipitation, snow, and sea ice.
- ***Ecosystem Changes.*** The FY 2001 budget provides \$224 million for research on the potential impacts of climate change and other stresses on forests, coastal areas, croplands, and other ecosystems (an increase of \$19 million, or 9 percent). New studies will improve our understanding of the relationships among land cover, land use, climate, and weather, and help identify "thresholds" for significant changes in ecosystems.
- ***Carbon Cycle Initiative.*** The FY 2001 budget request continues strong support for the multi-agency carbon cycle science initiative begun in FY 2000, providing \$227 million (an increase of \$23 million or 11 percent). This request includes funds to study how carbon cycles between the atmosphere, the oceans, and land, and the role of farms, forests, and other natural or managed lands in capturing carbon. Such carbon "sinks" may help the United States and other nations offset greenhouse gas emissions. Key agencies include the Departments of Agriculture (USDA), Energy, Interior, NASA, the National Science Foundation, and the Smithsonian Institution. Included in the request is \$13.5 million (an increase of over \$12 million) to significantly expand USDA Natural Resources Conservation Service soil carbon inventory and analysis efforts.

THE WHITE HOUSE
WASHINGTON

February 16, 2000

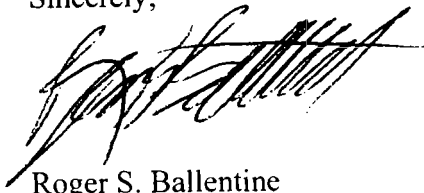
Dear Interested Party:

Attached please find a summary of President Clinton's FY 2001 budget proposal to fight global climate change. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – the FY 2001 budget is proposing \$2.4 billion in funding to combat global climate change, a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to develop clean energy at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution. Recognizing the crucial need for sound science, the President is also proposing more than \$1.7 billion for basic research into the science of climate change, bringing the total request for FY 2001 to over \$4 billion.

President Clinton is also proposing a five-year, \$4 billion tax incentive package to spur clean energy technologies and increase investment in energy efficient technology and renewable energy. The common thread in all these proposals is the conviction that new energy technologies can help us expand the economy and reduce greenhouse gas pollution at the same time.

As the President said in his State of the Union address just a few weeks ago, "The greatest environmental challenge of the new century is global warming." We believe that the President's FY 2001 budget represents an aggressive and innovative approach to this tremendous challenge.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger S. Ballentine", with a stylized, sweeping flourish extending from the end of the name.

Roger S. Ballentine
Deputy Assistant to the President
And White House Climate Change Coordinator

President Clinton's FY 2001 Climate Change Budget

"The greatest environmental challenge of the new century is global warming . . . If we fail to reduce the emission of greenhouse gases, deadly heat waves and droughts will become more frequent, coastal areas will flood, and economies will be disrupted. That is going to happen, unless we act. Many people . . . still believe you cannot cut greenhouse gas emissions without slowing economic growth. In the Industrial Age that may well have been true. But in this digital economy, it is not true anymore. New technologies make it possible to cut harmful emissions and provide even more growth."

-- President Bill Clinton, State of the Union Address, January 27, 2000

Meeting the Challenge of Global Warming. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – President Clinton's FY 2001 budget is proposing \$2.4 billion (a 43 percent increase over FY 2000 enacted levels) in funding to combat global climate change. This includes a series of new initiatives, such as accelerated efforts to develop clean energy sources both at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution, as well as a five-year package of tax incentives to spur clean energy technologies and increased investment for R&D in energy efficient technology and renewable energy. In addition, the President is proposing more than \$1.7 billion for global change research, for a total package for FY 2001 of over \$4 billion.

International Clean Energy Initiative. To help accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing \$201 million (a more than 100 percent increase over FY 2000 enacted levels) for a multi-agency initiative to encourage open competitive markets; remove market barriers in developing countries to clean energy technologies; and to provide new incentives for clean energy technology innovation and export. The initiative will promote U.S. clean energy exports, create high-value jobs, and assist developing countries in fighting air pollution and climate change.

Bioenergy & Bio-based Products Initiative. The budget includes \$289 million to accelerate the development of bio-based technologies, which convert crops, trees and other "biomass" into a vast array of fuels and products – an increase of \$93 million over FY 2000 enacted levels. In addition to helping meet environmental challenges like global warming, this initiative will increase the viability of alternative energy sources, support farm incomes, and diversify and strengthen the rural economy.

Clean Air Partnership Fund. The President proposes \$85 million for a new fund to provide grants to state and local governments for projects that reduce both greenhouse gases and pollutants like soot, smog, and air toxics.

Climate Change Technology Initiative (CCTI). The CCTI is a package of targeted tax incentives and investments aimed at increasing energy efficiency and spurring the broader use of renewable energy. The package will save consumers money and reduce greenhouse gas emissions at the same time. CCTI investments have risen substantially each of the past two years. The President's new budget proposes a still more accelerated effort.

\$4.0 billion in Tax Incentives over 5 years. The proposed package contains \$4.0 billion over five years in tax cuts (\$201 million for FY 2001) for consumers who purchase energy efficient products and for producers of energy from renewable sources. This year's CCTI tax package is \$400 million greater than last year's proposed five-year package. Highlights include:

- Tax credits for energy efficient homes. Consumers can receive a \$1000-2000 credit toward the purchase of a new energy efficient home; a 20 percent tax credit for the purchase of selected energy efficient products for homes and buildings; and a \$1000-2000 credit for installing a solar energy system.

- Tax credits for fuel-efficient cars. The package extends the current tax credit (of up to \$4000) through 2006 for qualified electric and fuel cell vehicles and also includes a tax credit of \$500-3000 for the purchase of a qualifying hybrid vehicle from 2003-2006.
- Tax credits for clean energy. The package extends the 1.5 cent per kilowatt hour tax credit for the production of electricity from wind and closed-loop biomass; provides credits for open-loop biomass facilities and coal-biomass cofiring; and provides credits for electricity produced from methane from certain landfills.

\$1.4 billion for Energy Efficiency & Clean Energy. The proposed package contains over \$1.4 billion in FY 2001 to research, develop, and deploy clean technologies for the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- a 30 percent increase over the amount appropriated in FY 2000. Highlights include:

- Partnership for a New Generation of Vehicles. PNGV is a government-industry effort to develop comfortable, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. The combined proposal for PNGV in the FY 2001 budget is \$255 million, an increase of \$30 million over FY 2000 enacted levels.
- Partnership for Advancing Technology in Housing. PATH is a government-industry partnership to improve the energy efficiency of new homes by more than 50 percent and to retrofit 15 million existing homes to make them 30 percent more energy efficient within a decade. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- Renewable Energy. The President proposes \$410 million for the Department of Energy's solar and renewable energy programs, a 32 percent increase over the amount appropriated in FY 2000. The package includes expanded efforts in key renewable technologies, such as wind, bioenergy, photovoltaics, and geothermal energy.

Cleaner Fossil Fuels. The budget request contains \$233 million for R&D to develop next-generation technologies for coal combustion with much higher energy efficiency and lower greenhouse gas emissions.

Weatherization & State Energy Grants. The budget request includes \$191 million -- a \$22 million increase over FY 2000 appropriations -- to deliver energy conservation services to low-income Americans and to assist state energy offices in addressing their energy priorities.

U.S. Global Change Research Program. The FY 2001 request includes over \$1.7 billion for scientific research to improve our understanding of human and natural forces that influence the Earth's climate system and to assess the likely consequences of global warming.

President Clinton's FY 2001 Climate Change Budget

The President's climate change package for FY 2001 totals over \$4.1 billion – an increase of \$760 million from the amount enacted for FY 2000. This includes \$2.4 billion for programs directly aimed at combating global warming – a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to promote the development and deployment of clean energy technologies around the world; a stepped-up program to develop bioenergy and bio-based products; and a new Clean Air Partnership Fund to boost state and local efforts to reduce both greenhouse gases and ground-level air pollutants. It also includes the Climate Change Technology Initiative (CCTI), which mixes tax incentives and direct spending to spur the research, development, and deployment of energy efficient technology and renewable energy and other climate-related investments, such as R&D of highly efficient technologies for the combustion and use of coal and natural gas, weatherization, and state energy grants. The President is also proposing over \$1.7 billion for the United States Global Change Research Program, to enhance our understanding of the human and natural forces that influence the Earth's climate system.

Table 1. Climate Change-Related Domestic Programs (\$ in Millions)

	FY 2000 Enacted	FY 2001 Request	Change
Climate Change Solutions			
International Clean Energy Initiative	98	201	+103
Biofuels & Bioproducts Initiative	196	289	+93
Clean Air Partnership Fund	0	85	+85
Climate Change Technology Initiative--tax incentives ¹	N/A	201	+201
Climate Change Technology Initiative--investments	1,095	1,432	+337
Other Climate-Related Investments (cleaner coal & Natural gas; weatherization; state energy grants)	413	424	+11
Subtotal, Climate Solutions ²	1,665	2,386	+721
Global Change Research Program	1,701	1,740	+39
TOTAL	3,366	4,126	+760

¹ First year of a proposed five year, \$4.0 billion package.

² Subtotal excludes double counts for funds included in new initiatives and cleaner coal which are also part of the CCTI.

International Clean Energy Initiative

To accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing the International Clean Energy Initiative – a \$200 million multi-agency effort (a more than 100 percent increase over FY 2000 enacted levels) to encourage open competitive markets and remove market barriers to clean energy technologies in developing and transition countries and to provide new incentives for clean energy technology innovation and export. This initiative will promote U.S. exports and create high-value jobs, and will assist countries to power their economic development while fighting air pollution and climate change.

Window of Opportunity for America and the World. Developing country energy use will overtake that of industrial countries by 2020. These energy technology markets are projected to total \$4 to \$5 trillion over the next 20 years and \$15 to \$25 trillion over the next 50 years. Developing country energy use is expected to account for three-fourths of the increase in global energy use between now and 2050.

Advanced, low-polluting energy technologies, developed and manufactured in the United States, can provide these energy services efficiently, but existing markets often do not value environmental and efficiency benefits. In addition, environmentally superior options often carry higher up-front costs, may be unfamiliar, or are perceived as more risky by decision-makers in developing countries. The initiative builds on a recent set of recommendations by the President's Committee of Advisors on Science and Technology (PCAST) and is directed at leveling the playing field between cleaner U.S. energy technologies and services and polluting alternatives.

Real Benefits At Home and Abroad. The initiative will help lay the technical and policy foundation that will allow developing and transition countries to build a clean energy future, leapfrogging past the polluting energy technologies used by the industrial countries, while building competitive markets open to U.S. firms. The goals of this initiative include:

- Doubling clean energy technology exports by 2005, creating as much as \$5 billion in new export revenues for U.S. companies and as many as 100,000 new U.S. jobs.
- Cutting energy use in targeted country buildings and appliances in half through advanced building design tools and building equipment codes and standards.
- Developing integrated renewable energy technologies that have the potential to power the full range of energy services for the 2 billion people in developing countries that do not now have electricity.
- Sharply reducing sulfur, particulate, and greenhouse gas emissions by developing advanced coal-fired power plants and low-cost hydrogen fuels.
- Maximizing use of combined heat & power systems through technical and policy assistance.

- Reducing methane emissions from pipelines and other fossil sources by an amount equal to as much as 100 million metric tons of carbon per year by 2005.
- Providing technical and policy support to encourage the development of natural gas grids.
- Reducing energy use in the industrial sector through the introduction of best practice methods, including advanced sensors and controls, and energy efficient motor drive systems.
- Conducting research in nuclear energy to address cost, waste, safety, and proliferation concerns.
- Providing technical and policy assistance in support of energy sector reform that creates open, competitive markets while protecting the public interest.

Initiative Structure. This initiative will strengthen efforts to streamline current bureaucratic procedures to better assist U.S. firms wishing to invest in clean energy projects in developing and transition countries. This initiative will also encourage public-private partnerships with foreign counterparts to demonstrate clean energy technologies, drive down their cost, and facilitate private sector financing for their large-scale deployment. The initiative will employ a range of proven policy tools, including U.S. technical and policy assistance to developing countries through personnel exchanges, conducting collaborative R&D with key foreign research groups, developing integrated renewable energy, energy efficiency, and advanced fossil energy technologies and pilot projects, and providing a range of trade supports to expand clean energy exports.

The initiative's requested \$100 million increase for these activities includes an additional \$46 million for the Department of Energy (DOE); \$30 million for the U.S. Agency for International Development; \$15 million for the Export-Import Bank; \$5 million for the Trade and Development Agency; and \$4 million for the Department of Commerce. A \$3 million increase in base programs is also requested at DOE, bringing the total increase to \$103 million.

Bioenergy & Bioproducts Initiative

President Clinton's FY 2001 Budget includes \$289 million to accelerate the development and use of bio-based technologies, which convert crops, trees, and other "biomass" into fuels, power, chemicals, and other products. This initiative supports the President's August 1999 Executive Order 13134 and Memorandum on Promoting Biobased Products and Bioenergy, aimed at tripling U.S. use of biobased products and bioenergy by 2010. The initiative provides an increase of more than \$93 million (47 percent) over the amounts available for FY 2000, with \$49 million directed towards the Department of Energy (DOE) and \$44 million for stepped-up efforts at the Department of Agriculture (USDA). (Funding in DOE is also considered part of the Climate Change Technology Initiative.) In addition to this increase in R&D, the Commodity Credit Corporation will provide \$100 million in FY 2000 and up to \$150 million in FY 2001 and 2002 in incentive payments to encourage production of biobased fuels. The initiative will increase the viability of alternative energy sources and help meet environmental challenges like global warming, while diversifying and strengthening the rural economy.

New Economic Opportunities for a New Century. Continuing advances in forest and farm technology, molecular biology, and other areas are fueling a revolution in the use of biomass to make low-polluting products, such as:

- **transportation fuels**, like cellulosic ethanol from agricultural waste;
- **electricity**, by burning wood chips and switchgrass along with coal in existing plants and by converting paper industry wastes into fuel gases for advanced gas turbines;
- **commercial products**, such as chemicals, glues, paints, packing materials, and textiles.

Already, creative companies such as **Cargill-Dow Polymers** are making this vision a reality, recently announcing plans to build a \$300 million production facility that will convert corn based sugars into plastic fibers that can be used to make products that are all natural and biodegradable.

Meeting the President's goal of tripling U.S. use of bioenergy and bioproducts will add billions in new income for farmers, producing 50,000 new, high-technology jobs in small processing plants in rural America and up to 130,000 such jobs in biopower, bioproducts, and biofuels industries.

Cleaner Energy, Cleaner Environment. Bioenergy and bioproducts can dramatically reduce greenhouse gas emissions that contribute to global warming. Since crops absorb carbon during growth, their use for energy and other applications results in near zero net carbon release. Tripling our use of bioenergy and bioproducts by 2010 will reduce annual greenhouse gas emissions by up to 100 million tons – the equivalent of taking over 70 million cars off the road.

Making Biomass Competitive With Fossil Fuels. A major goal of this initiative is to make biomass a viable competitor to fossil fuels as an energy source and chemical feedstock while protecting the environment. This goal is achievable, but it will require an unprecedented effort to

support research in universities, companies, and our national laboratories. In the past few years, for example, federal research has developed techniques that greatly accelerate the production of sugars and other useful chemicals from materials like corn stover and wood. The research funded under this initiative will ensure a continuing flow of the basic innovations on which such investments can be made.

Many uses for biomass materials are possible in the near future and this initiative will support research concepts on a competitive basis. This will include support for integrated systems capable of processing feedstocks simultaneously into a variety of products such as fuels, chemicals, and electricity. Much like today's petroleum-based refineries, the mix of products from these facilities will depend on market conditions. The research aims to understand the basic chemistry of cellulose and other materials in biomass, and develop new thermal, chemical, and bio-chemical techniques for converting these materials into useful forms.

Initiative Structure. The President's August 1999 Executive Order instructs DOE, USDA, the National Science Foundation, the Environmental Protection Agency and other agencies, to work closely together in supporting the broad range of needed research and development efforts. These efforts will support research partnerships linking industry, university, and government research facilities selected on a competitive basis. Key areas of new research activity will include:

- Development of inexpensive systems to break down cellulose into low-cost sugars, allowing woody and grassy crops and agricultural waste, such as corn stalks, to take the place of high-value grain and food crops as biofuel feedstocks.
- Renewable bioproducts, using multi-disciplinary and university/industry partnerships to develop and accelerate adoption of possible "leap-frog" technologies for converting crops, trees and residues into chemical feedstocks and consumer products.
- Biopower, promoting both the integration of biomass gasification systems with modern gas-turbine/steam-turbine generation systems, and the co-firing of biomass with coal.
- Expanded Forest Service research on faster-growing trees and the use of small-diameter trees for commercial, biobased products.
- Methane gas recovery pilots to reduce greenhouse gas emissions from livestock operations and provide assistance to farmers that want to produce or market biobased products.
- Expanded Agricultural Research Service research to develop biobased materials from commodities and bioproducts, and convert biomass to energy.
- Competitive resources for research partnerships with universities, complementing the new Initiative for Future Agriculture and Food Systems announced by USDA earlier this month.
- Rural development grants to rural electric cooperatives to develop pilot projects to demonstrate the commercial viability of small-scale biomass fuel generation, grants for technical assistance for processing and marketing biobased products, and loans for facilities and operating capital for organizations engaged in biobased production activities.

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing \$85 million for the creation of a new Clean Air Partnership Fund. The Fund will provide grants to states, localities, and tribes to support efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. First proposed as part of last year's FY 2000 budget, the Fund will be administered by the Environmental Protection Agency under existing authority.

Integrated Pollution Control. The Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state, local, and tribal governments to finance projects and programs that achieve accelerated reductions in both air pollutants, such as soot, smog, and air toxics, and in greenhouse gases.

A Quicker Path to Cleaner Air. By providing new resources for projects that accelerate pollution reductions, the Fund will enable communities to achieve multi-pollutant clean air goals sooner and reduce greenhouse gas emissions at the same time.

Technological Innovation. The Fund will help spur both public and private sector innovations in next-generation pollution control technology.

A Magnet for Local Investment & Innovation. The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level. The Fund can be used to support local revolving funds, low-interest loan programs, matching grants, and other mechanisms that will leverage the original Federal investment, greatly increasing its impact.

"Win-Win" Clean Air Projects. The Fund will support a wide range of practical projects that will mean cleaner air, reduced greenhouse gas emissions, and real savings for taxpayers and consumers. These could include projects such as building combined heat and power facilities that put waste heat to work, reducing emissions of both sulfur dioxide and carbon dioxide; retrofitting municipal buildings to make them more energy efficient, reducing pollution resulting from electricity generation; and upgrading municipal vehicle fleets to make them more fuel efficient.

Climate Change Technology Initiative: \$4.0 Billion in Tax Incentives

The President is proposing a new \$4.0 billion package in tax incentives over five years to help reduce greenhouse gas emissions by spurring the purchase of energy efficient products and the use of renewable energy (see Table 2). This year's CCTI tax package is \$400 million greater than last year's proposed five-year package.

Table 2. CCTI Tax Incentives (\$ in Millions)	Revenue Effect	
	FY 2001	Total FY01-05
Homes and Buildings		
Provide tax credit for energy efficient building equipment	-18	-201
Provide tax credit for new energy efficient homes	- 82	-633
Provide tax credit for solar energy systems	-9	-132
Vehicles		
Extend tax credit for electric and fuel cell vehicles and provide tax credits for qualified hybrid vehicles	0	-2078
Clean Energy		
Extend tax credit for electricity produced from wind and closed-loop biomass; provide credits for open-loop biomass facilities and coal-biomass cofiring; and provide credits for methane from certain landfills	-91	-976
Industry		
Provide 15-year recovery period for distributed power property	-1	-10
TOTAL*	-201	-4030

*Totals may not add due to rounding.

HOMES AND BUILDINGS

- ***Tax credit to consumers who purchase new energy efficient homes.*** To encourage the purchase of new energy efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2001-2003 that use at least 30 percent less energy than the standard under the 1998 International Energy Conservation Code (IECC) and a credit of \$2,000 for homes purchased from 2001-2005 that use at least 50 percent less energy than the IECC standard.

- ***Tax credit for energy efficient equipment in new and existing homes or buildings.*** This credit will encourage the purchase of electric heat pump water heaters, natural gas heat pumps, and fuel cells. The credit would apply to both residential and commercial equipment. The credit would be 20 percent of the cost of the investment, subject to a cap, for equipment purchased from 2001-2004.
- ***Tax credit for solar energy systems.*** A 15 percent tax credit will encourage the purchase by consumers and businesses of solar energy systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems placed in service from 2001-2007 and \$1,000 for solar water heating systems placed in service from 2001-2005.

VEHICLES

- ***Tax credits for electric, fuel cell, and qualified hybrid vehicles.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric, fuel cell, and hybrid vehicles will help to move advanced technologies from the laboratory to the highway. These technologies can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
 - **Extend the current tax credit for electric vehicles and fuel cell vehicles.** Under current law, a 10 percent credit, up to \$4,000, is provided for the cost of qualified electric vehicles and fuel cell vehicles. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.
 - **Tax credits for hybrid vehicles.** The credit – available for all qualifying vehicles, including cars, minivans, sport utility vehicles, and pickup trucks – would range from \$500 to \$3,000 for qualified hybrid vehicles purchased from 2003-2006, depending upon the vehicle's design performance.

CLEAN ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before January 1, 2002. The President proposes a 2.5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. This package of credits would:
 - **Extend current "closed-loop" biomass credit.** This proposal extends for 2.5 years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which covers facilities placed in service before January 1, 2002.

-- **Provide credits for “open loop” biomass facilities.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources for facilities placed in service from 2001-2005, and provides a 1.0 cent credit for electricity produced from 2001-2003 from facilities placed in service prior to January 1, 2001.

-- **Provide a credit for cofiring biomass and coal.** This proposal adds a 0.5 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants from 2001-2005.

-- **Provide credit for methane from landfills.** This proposal adds a 1.5 cent per kilowatt hour credit for electricity produced from landfills not subject to EPA’s 1996 New Source Performance Standards/Emissions Guidelines (NSPS/EG) and 1.0 cent per kilowatt hour for landfills subject to NSPS/EG. Qualified facilities would be facilities placed in service after December 31, 2000 and before January 1, 2006.

INDUSTRY

- ***15-year recovery period for distributed power property.*** The development of distributed power technologies has made it possible to generate electricity locally at dispersed industrial, commercial, and residential locations. Such technologies can be more energy efficient and generate fewer greenhouse gases than conventional generation methods. This proposal would simplify and rationalize the current depreciation system by assigning a single 15-year recovery period to distributed power property.

Climate Change Technology Initiative: \$1.4 Billion for Efficient Energy and Clean Energy

The President's FY 2001 budget proposes over \$1.4 billion for the research, development, and deployment of renewable energy technologies, energy efficient products and buildings that will help reduce U.S. greenhouse gas emissions. This represents a \$337 million increase (30 percent) over FY 2000 spending (see Table 3). The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- as well as carbon sequestration (see Table 4). The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

Table 3. CCTI Funding by Agency (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Energy	902	980	1,169	+189
EPA	109	103	227	+124
Housing & Urban Development	10	10	12	+2
Agriculture	0	0	24	+24
Commerce	0	2	0	-2
TOTAL*	1,021	1,095	1,432	+337

*Totals may not add due to rounding.

Table 4. CCTI Funding by Area of Activity (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Buildings	176	194	275	+81
Transportation	285	309	382	+73
Industry	187	189	251	+62
Electricity	310	321	406	+85
Carbon Sequestration	14	30	52	+22
Management, Planning & Analysis	48	51	65	+14
TOTAL*	1,021	1,095	1,432	+337

* Totals may not add due to rounding.

BUILDINGS

- ***Partnership for Advancing Technology in Housing.*** PATH is a partnership between the Federal government and building industry to develop and deploy housing technologies to make new homes 50 percent more energy efficient and to make at least 15 million existing homes 30 percent more energy efficient within a decade. PATH has established five pilot communities in Denver, Los Angeles, Pittsburgh, and Tuscon. The program coordinates work in the Department of Housing and Urban Development, the Department of Energy (DOE), the Environmental Protection Agency (EPA), FEMA, the Department of Commerce and other agencies, ensuring, for example, that research conducted in DOE's enhanced residential buildings program is quickly transferred into practice. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- ***Energy Efficient Appliances and Products.*** Various DOE and EPA programs aim to promote the dissemination of energy efficient appliances and products:
 - DOE will accelerate its program to establish **energy efficiency standards** for commercial heating and cooling, water heaters, and electrical distribution transformers, and will begin efforts to harmonize international energy-efficiency standards and test methods to promote exports of efficient U.S. products.
 - EPA and DOE's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy efficient products – everything from computers to refrigerators to central air-conditioning units. New funding will support the launch of new Energy Star product lines and will promote the Energy Star labeling program in 6-10 export markets.
- ***Energy Efficient Commercial Buildings.*** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label.
- ***Energy Smart Schools/Energy Star Label for Schools.*** DOE and EPA have two programs that are working in coordination to improve energy efficiency in U.S. primary and secondary schools, bringing together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- ***Partnership for a New Generation of Vehicles.*** PNGV is a government-industry effort that aims to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon with a two-thirds reduction in carbon emissions by 2004. In January 2000, the auto-industry partners unveiled their PNGV "concept cars" at the Detroit Auto Show, which keeps the program on schedule for meeting its 2004 goal. The FY 2001 budget includes \$255 million for PNGV-related work, an increase of \$30 million over the amount appropriated for FY 2000.
- ***Light and Heavy Trucks.*** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2003, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA and the Department of Defense, aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 10 mpg from the current average of 7 mpg.

INDUSTRY

- ***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, petroleum refining, and steel – 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.
- ***Industrial Combined Heat and Power (CHP) Systems.*** DOE is developing new industrial CHP systems to capture thermal heat would otherwise be wasted. These systems are expected to be 15 percent more energy efficient and 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.
- ***Voluntary Industrial Partnerships.*** EPA will expand its industry partnership programs, such as **Climate Wise** and the **Voluntary Aluminum Industrial Partnership**, to

encourage businesses to take advantage of cost-effective emissions reductions opportunities -- including emissions of the most potent greenhouse gases, such as methane, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF6).

- ***Agriculture and Forestry.*** The Department of Agriculture (USDA) will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and forestry and reducing their vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various means of reducing greenhouse gas emissions in agriculture, such as compost-based waste-handling facilities, rotational grazing systems, and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$8.5 million towards climate change related activities, including the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production.

The FY 2001 budget also includes important USDA funding for developing advanced biomass energy technologies; R&D and demonstration projects for carbon sequestration; research to study the role of farms, forests, and other natural or managed lands in capturing and storing carbon; and a comprehensive U.S. soil carbon inventory (see p.16 below).

ELECTRICITY

- ***Photovoltaic (PV) Energy Systems.*** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next-generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund efforts to develop new, unconventional technologies.

-- **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. To date, DOE has received commitments for over 900,000 solar rooftop installations. In FY 2001, DOE expects 40,000 systems to be installed under this program, bringing the total to 90,000.

-- **Technology Advances.** By 2004, DOE aims to increase the efficiency of thin-film PV modules in multi-megawatt production from 7 percent to 12 percent and to reduce module manufacturing costs by 40 percent (from \$2.50/watt to \$1.50/watt). Specific performance measures for FY 2001 include achieving 14

percent stable efficiency in prototype thin-film modules and, in a new initiative begun in FY 2000, identifying at least three promising non-conventional PV technologies for further development.

- ***Biomass Power.*** DOE supports biopower systems R&D addressing three major technology areas: co-firing biomass with fossil fuels such as coal and natural gas, small modular biopower systems, and advanced biomass gasification. This work is also included in the Bioenergy and Bioproducts Initiative described in above (see pp.4-5 above).
- ***Wind Powering America.*** This initiative, announced in June 1999, will accelerate DOE's research, development, testing and field validation of next-generation wind technologies, with a goal of supplying 5 percent of U.S. electricity through wind technologies by 2020. This will be supported by an aggressive R&D program that will reduce the cost of electricity in favorable wind sites to 2.5 cents per kilowatt hour by 2002, and will move specialized cold-weather wind turbines from development to demonstration in 2000, leading to commercialization in 2001.
- ***Hydrogen.*** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- ***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.

CARBON SEQUESTRATION

- ***R&D for Sequestration.*** Research initiatives are being funded to find ways to sequester (store) carbon. Examples include:
 - **Enhancing Forest and Farmland Sinks.** The Forest Service, in conjunction with other USDA agencies, will spend \$3 million for R&D and demonstration projects for optimizing forest, farmland, and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.
 - **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures and in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs for which funding is proposed in the FY 2000 budget that – while not part of the Climate Change Technology Initiative (CCTI) per se – contribute to improving energy efficiency and reducing greenhouse gas emissions. These programs include:

- ***Cleaner Coal and Natural Gas.*** The FY 2000 budget includes a total of \$232 million (of which \$56 million is part of CCTI) to support the Department of Energy's (DOE) aggressive R&D effort to develop next-generation technologies for the combustion and use of coal and natural gas. For example, research and development of integrated gasification combined cycle technology could lead to ultra-high efficiency coal plants with significantly lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2001 budget request for these two programs is \$191 million – a \$22 million increase over FY 2000 appropriations.
- ***Agricultural & Forestry Conservation Programs.*** The Administration's 2001 Farm Safety Net Initiative proposes an increase of \$1.3 billion in FY 2001 funding for Department of Agriculture conservation programs. Many of these same programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the **Conservation Reserve Program**, the **Environmental Quality Incentives Program**, and the **Farmland Protection Program**. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land.

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. USGCRP science results provide useful information for environmental decision-making on issues such as climate change, ozone depletion, changes in ecosystems, and land use. This multi-agency effort is coordinated through the National Science and Technology Council.

For FY 2001, the President is requesting \$1.74 billion for the USGCRP, an increase of \$39 million above the amount enacted for FY 2000. \$843 million is for scientific research and improvements to surface-based monitoring, (an increase of \$79 million, or about 10 percent). \$923 million is for NASA's development of Earth observing satellites to monitor climate change and other global changes (a decrease of \$34 million, reflecting the phasing of funding for large development projects). Important USGCRP budget highlights include:

- ***Improved Climate Observations.*** The FY 2001 budget provides \$26 million to enhance NOAA surface-based observations, including creation of a climate reference network to provide, for the first time, automated, simultaneous, and ideally located measurements of changing temperatures, precipitation, and soil moisture. Measurements of atmospheric trace gases, aerosols, ocean temperatures, and ocean currents will also be expanded.
- ***The Global Water Cycle.*** The FY 2001 budget provides \$308 million (an increase of \$35 million, or about 13 percent) for research on changes in the Earth's water cycle, which is one of the primary determinants of the Earth's climate. The water cycle is emerging as a top research priority because changes appear to be occurring already. The launch of NASA's EOS Aqua spacecraft in December 2000 will support this research by provide new global measurements of humidity, cloud properties, precipitation, snow, and sea ice.
- ***Ecosystem Changes.*** The FY 2001 budget provides \$224 million for research on the potential impacts of climate change and other stresses on forests, coastal areas, croplands, and other ecosystems (an increase of \$19 million, or 9 percent). New studies will improve our understanding of the relationships among land cover, land use, climate, and weather, and help identify "thresholds" for significant changes in ecosystems.
- ***Carbon Cycle Initiative.*** The FY 2001 budget request continues strong support for the multi-agency carbon cycle science initiative begun in FY 2000, providing \$227 million (an increase of \$23 million or 11 percent). This request includes funds to study how carbon cycles between the atmosphere, the oceans, and land, and the role of farms, forests, and other natural or managed lands in capturing carbon. Such carbon "sinks" may help the United States and other nations offset greenhouse gas emissions. Key agencies include the Departments of Agriculture (USDA), Energy, Interior, NASA, the National Science Foundation, and the Smithsonian Institution. Included in the request is \$13.5 million (an increase of over \$12 million) to significantly expand USDA Natural Resources Conservation Service soil carbon inventory and analysis efforts.

THE WHITE HOUSE
WASHINGTON

February 16, 2000

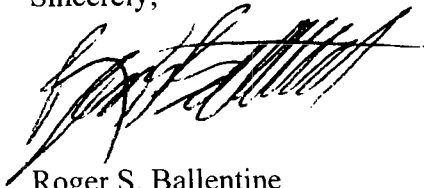
Dear Interested Party:

Attached please find a summary of President Clinton's FY 2001 budget proposal to fight global climate change. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – the FY 2001 budget is proposing \$2.4 billion in funding to combat global climate change, a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to develop clean energy at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution. Recognizing the crucial need for sound science, the President is also proposing more than \$1.7 billion for basic research into the science of climate change, bringing the total request for FY 2001 to over \$4 billion.

President Clinton is also proposing a five-year, \$4 billion tax incentive package to spur clean energy technologies and increase investment in energy efficient technology and renewable energy. The common thread in all these proposals is the conviction that new energy technologies can help us expand the economy and reduce greenhouse gas pollution at the same time.

As the President said in his State of the Union address just a few weeks ago, "The greatest environmental challenge of the new century is global warming." We believe that the President's FY 2001 budget represents an aggressive and innovative approach to this tremendous challenge.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger S. Ballentine", with a stylized, sweeping flourish extending from the end of the name.

Roger S. Ballentine
Deputy Assistant to the President
And White House Climate Change Coordinator

President Clinton's FY 2001 Climate Change Budget

"The greatest environmental challenge of the new century is global warming . . . If we fail to reduce the emission of greenhouse gases, deadly heat waves and droughts will become more frequent, coastal areas will flood, and economies will be disrupted. That is going to happen, unless we act. Many people . . . still believe you cannot cut greenhouse gas emissions without slowing economic growth. In the Industrial Age that may well have been true. But in this digital economy, it is not true anymore. New technologies make it possible to cut harmful emissions and provide even more growth."

-- President Bill Clinton, State of the Union Address, January 27, 2000

Meeting the Challenge of Global Warming. Against a backdrop of growing scientific consensus that the Earth is warming – and that human activities are at least partly to blame – President Clinton's FY 2001 budget is proposing \$2.4 billion (a 43 percent increase over FY 2000 enacted levels) in funding to combat global climate change. This includes a series of new initiatives, such as accelerated efforts to develop clean energy sources both at home and abroad and a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution, as well as a five-year package of tax incentives to spur clean energy technologies and increased investment for R&D in energy efficient technology and renewable energy. In addition, the President is proposing more than \$1.7 billion for global change research, for a total package for FY 2001 of over \$4 billion.

International Clean Energy Initiative. To help accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing \$201 million (a more than 100 percent increase over FY 2000 enacted levels) for a multi-agency initiative to encourage open competitive markets; remove market barriers in developing countries to clean energy technologies; and to provide new incentives for clean energy technology innovation and export. The initiative will promote U.S. clean energy exports, create high-value jobs, and assist developing countries in fighting air pollution and climate change.

Bioenergy & Bio-based Products Initiative. The budget includes \$289 million to accelerate the development of bio-based technologies, which convert crops, trees and other "biomass" into a vast array of fuels and products – an increase of \$93 million over FY 2000 enacted levels. In addition to helping meet environmental challenges like global warming, this initiative will increase the viability of alternative energy sources, support farm incomes, and diversify and strengthen the rural economy.

Clean Air Partnership Fund. The President proposes \$85 million for a new fund to provide grants to state and local governments for projects that reduce both greenhouse gases and pollutants like soot, smog, and air toxics.

Climate Change Technology Initiative (CCTI). The CCTI is a package of targeted tax incentives and investments aimed at increasing energy efficiency and spurring the broader use of renewable energy. The package will save consumers money and reduce greenhouse gas emissions at the same time. CCTI investments have risen substantially each of the past two years. The President's new budget proposes a still more accelerated effort.

\$4.0 billion in Tax Incentives over 5 years. The proposed package contains \$4.0 billion over five years in tax cuts (\$201 million for FY 2001) for consumers who purchase energy efficient products and for producers of energy from renewable sources. This year's CCTI tax package is \$400 million greater than last year's proposed five-year package. Highlights include:

- Tax credits for energy efficient homes. Consumers can receive a \$1000-2000 credit toward the purchase of a new energy efficient home; a 20 percent tax credit for the purchase of selected energy efficient products for homes and buildings; and a \$1000-2000 credit for installing a solar energy system.

- Tax credits for fuel-efficient cars. The package extends the current tax credit (of up to \$4000) through 2006 for qualified electric and fuel cell vehicles and also includes a tax credit of \$500-3000 for the purchase of a qualifying hybrid vehicle from 2003-2006.
- Tax credits for clean energy. The package extends the 1.5 cent per kilowatt hour tax credit for the production of electricity from wind and closed-loop biomass; provides credits for open-loop biomass facilities and coal-biomass cofiring; and provides credits for electricity produced from methane from certain landfills.

\$1.4 billion for Energy Efficiency & Clean Energy. The proposed package contains over \$1.4 billion in FY 2001 to research, develop, and deploy clean technologies for the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- a 30 percent increase over the amount appropriated in FY 2000. Highlights include:

- Partnership for a New Generation of Vehicles. PNGV is a government-industry effort to develop comfortable, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. The combined proposal for PNGV in the FY 2001 budget is \$255 million, an increase of \$30 million over FY 2000 enacted levels.
- Partnership for Advancing Technology in Housing. PATH is a government-industry partnership to improve the energy efficiency of new homes by more than 50 percent and to retrofit 15 million existing homes to make them 30 percent more energy efficient within a decade. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- Renewable Energy. The President proposes \$410 million for the Department of Energy's solar and renewable energy programs, a 32 percent increase over the amount appropriated in FY 2000. The package includes expanded efforts in key renewable technologies, such as wind, bioenergy, photovoltaics, and geothermal energy.

Cleaner Fossil Fuels. The budget request contains \$233 million for R&D to develop next-generation technologies for coal combustion with much higher energy efficiency and lower greenhouse gas emissions.

Weatherization & State Energy Grants. The budget request includes \$191 million -- a \$22 million increase over FY 2000 appropriations -- to deliver energy conservation services to low-income Americans and to assist state energy offices in addressing their energy priorities.

U.S. Global Change Research Program. The FY 2001 request includes over \$1.7 billion for scientific research to improve our understanding of human and natural forces that influence the Earth's climate system and to assess the likely consequences of global warming.

President Clinton's FY 2001 Climate Change Budget

The President's climate change package for FY 2001 totals over \$4.1 billion – an increase of \$760 million from the amount enacted for FY 2000. This includes \$2.4 billion for programs directly aimed at combating global warming – a 43 percent increase over FY 2000 enacted levels. This includes a series of new initiatives, such as accelerated efforts to promote the development and deployment of clean energy technologies around the world; a stepped-up program to develop bioenergy and bio-based products; and a new Clean Air Partnership Fund to boost state and local efforts to reduce both greenhouse gases and ground-level air pollutants. It also includes the Climate Change Technology Initiative (CCTI), which mixes tax incentives and direct spending to spur the research, development, and deployment of energy efficient technology and renewable energy and other climate-related investments, such as R&D of highly efficient technologies for the combustion and use of coal and natural gas, weatherization, and state energy grants. The President is also proposing over \$1.7 billion for the United States Global Change Research Program, to enhance our understanding of the human and natural forces that influence the Earth's climate system.

Table 1. Climate Change-Related Domestic Programs (\$ in Millions)

	FY 2000 Enacted	FY 2001 Request	Change
Climate Change Solutions			
International Clean Energy Initiative	98	201	+103
Biofuels & Bioproducts Initiative	196	289	+93
Clean Air Partnership Fund	0	85	+85
Climate Change Technology Initiative--tax incentives ¹	N/A	201	+201
Climate Change Technology Initiative--investments	1,095	1,432	+337
Other Climate-Related Investments (cleaner coal & Natural gas; weatherization; state energy grants)	413	424	+11
Subtotal, Climate Solutions ²	1,665	2,386	+721
Global Change Research Program	1,701	1,740	+39
TOTAL	3,366	4,126	+760

¹ First year of a proposed five year, \$4.0 billion package.

² Subtotal excludes double counts for funds included in new initiatives and cleaner coal which are also part of the CCTI.

International Clean Energy Initiative

To accelerate the development and deployment of clean energy technologies around the world, President Clinton is proposing the International Clean Energy Initiative – a \$200 million multi-agency effort (a more than 100 percent increase over FY 2000 enacted levels) to encourage open competitive markets and remove market barriers to clean energy technologies in developing and transition countries and to provide new incentives for clean energy technology innovation and export. This initiative will promote U.S. exports and create high-value jobs, and will assist countries to power their economic development while fighting air pollution and climate change.

Window of Opportunity for America and the World. Developing country energy use will overtake that of industrial countries by 2020. These energy technology markets are projected to total \$4 to \$5 trillion over the next 20 years and \$15 to \$25 trillion over the next 50 years. Developing country energy use is expected to account for three-fourths of the increase in global energy use between now and 2050.

Advanced, low-polluting energy technologies, developed and manufactured in the United States, can provide these energy services efficiently, but existing markets often do not value environmental and efficiency benefits. In addition, environmentally superior options often carry higher up-front costs, may be unfamiliar, or are perceived as more risky by decision-makers in developing countries. The initiative builds on a recent set of recommendations by the President's Committee of Advisors on Science and Technology (PCAST) and is directed at leveling the playing field between cleaner U.S. energy technologies and services and polluting alternatives.

Real Benefits At Home and Abroad. The initiative will help lay the technical and policy foundation that will allow developing and transition countries to build a clean energy future, leapfrogging past the polluting energy technologies used by the industrial countries, while building competitive markets open to U.S. firms. The goals of this initiative include:

- Doubling clean energy technology exports by 2005, creating as much as \$5 billion in new export revenues for U.S. companies and as many as 100,000 new U.S. jobs.
- Cutting energy use in targeted country buildings and appliances in half through advanced building design tools and building equipment codes and standards.
- Developing integrated renewable energy technologies that have the potential to power the full range of energy services for the 2 billion people in developing countries that do not now have electricity.
- Sharply reducing sulfur, particulate, and greenhouse gas emissions by developing advanced coal-fired power plants and low-cost hydrogen fuels.
- Maximizing use of combined heat & power systems through technical and policy assistance.

- Reducing methane emissions from pipelines and other fossil sources by an amount equal to as much as 100 million metric tons of carbon per year by 2005.
- Providing technical and policy support to encourage the development of natural gas grids.
- Reducing energy use in the industrial sector through the introduction of best practice methods, including advanced sensors and controls, and energy efficient motor drive systems.
- Conducting research in nuclear energy to address cost, waste, safety, and proliferation concerns.
- Providing technical and policy assistance in support of energy sector reform that creates open, competitive markets while protecting the public interest.

Initiative Structure. This initiative will strengthen efforts to streamline current bureaucratic procedures to better assist U.S. firms wishing to invest in clean energy projects in developing and transition countries. This initiative will also encourage public-private partnerships with foreign counterparts to demonstrate clean energy technologies, drive down their cost, and facilitate private sector financing for their large-scale deployment. The initiative will employ a range of proven policy tools, including U.S. technical and policy assistance to developing countries through personnel exchanges, conducting collaborative R&D with key foreign research groups, developing integrated renewable energy, energy efficiency, and advanced fossil energy technologies and pilot projects, and providing a range of trade supports to expand clean energy exports.

The initiative's requested \$100 million increase for these activities includes an additional \$46 million for the Department of Energy (DOE); \$30 million for the U.S. Agency for International Development; \$15 million for the Export-Import Bank; \$5 million for the Trade and Development Agency; and \$4 million for the Department of Commerce. A \$3 million increase in base programs is also requested at DOE, bringing the total increase to \$103 million.

Bioenergy & Bioproducts Initiative

President Clinton's FY 2001 Budget includes \$289 million to accelerate the development and use of bio-based technologies, which convert crops, trees, and other "biomass" into fuels, power, chemicals, and other products. This initiative supports the President's August 1999 Executive Order 13134 and Memorandum on Promoting Biobased Products and Bioenergy, aimed at tripling U.S. use of biobased products and bioenergy by 2010. The initiative provides an increase of more than \$93 million (47 percent) over the amounts available for FY 2000, with \$49 million directed towards the Department of Energy (DOE) and \$44 million for stepped-up efforts at the Department of Agriculture (USDA). (Funding in DOE is also considered part of the Climate Change Technology Initiative.) In addition to this increase in R&D, the Commodity Credit Corporation will provide \$100 million in FY 2000 and up to \$150 million in FY 2001 and 2002 in incentive payments to encourage production of biobased fuels. The initiative will increase the viability of alternative energy sources and help meet environmental challenges like global warming, while diversifying and strengthening the rural economy.

New Economic Opportunities for a New Century. Continuing advances in forest and farm technology, molecular biology, and other areas are fueling a revolution in the use of biomass to make low-polluting products, such as:

- **transportation fuels**, like cellulosic ethanol from agricultural waste;
- **electricity**, by burning wood chips and switchgrass along with coal in existing plants and by converting paper industry wastes into fuel gases for advanced gas turbines;
- **commercial products**, such as chemicals, glues, paints, packing materials, and textiles.

Already, creative companies such as **Cargill-Dow Polymers** are making this vision a reality, recently announcing plans to build a \$300 million production facility that will convert corn based sugars into plastic fibers that can be used to make products that are all natural and biodegradable.

Meeting the President's goal of tripling U.S. use of bioenergy and bioproducts will add billions in new income for farmers, producing 50,000 new, high-technology jobs in small processing plants in rural America and up to 130,000 such jobs in biopower, bioproducts, and biofuels industries.

Cleaner Energy, Cleaner Environment. Bioenergy and bioproducts can dramatically reduce greenhouse gas emissions that contribute to global warming. Since crops absorb carbon during growth, their use for energy and other applications results in near zero net carbon release. Tripling our use of bioenergy and bioproducts by 2010 will reduce annual greenhouse gas emissions by up to 100 million tons – the equivalent of taking over 70 million cars off the road.

Making Biomass Competitive With Fossil Fuels. A major goal of this initiative is to make biomass a viable competitor to fossil fuels as an energy source and chemical feedstock while protecting the environment. This goal is achievable, but it will require an unprecedented effort to

support research in universities, companies, and our national laboratories. In the past few years, for example, federal research has developed techniques that greatly accelerate the production of sugars and other useful chemicals from materials like corn stover and wood. The research funded under this initiative will ensure a continuing flow of the basic innovations on which such investments can be made.

Many uses for biomass materials are possible in the near future and this initiative will support research concepts on a competitive basis. This will include support for integrated systems capable of processing feedstocks simultaneously into a variety of products such as fuels, chemicals, and electricity. Much like today's petroleum-based refineries, the mix of products from these facilities will depend on market conditions. The research aims to understand the basic chemistry of cellulose and other materials in biomass, and develop new thermal, chemical, and bio-chemical techniques for converting these materials into useful forms.

Initiative Structure. The President's August 1999 Executive Order instructs DOE, USDA, the National Science Foundation, the Environmental Protection Agency and other agencies, to work closely together in supporting the broad range of needed research and development efforts. These efforts will support research partnerships linking industry, university, and government research facilities selected on a competitive basis. Key areas of new research activity will include:

- Development of inexpensive systems to break down cellulose into low-cost sugars, allowing woody and grassy crops and agricultural waste, such as corn stalks, to take the place of high-value grain and food crops as biofuel feedstocks.
- Renewable bioproducts, using multi-disciplinary and university/industry partnerships to develop and accelerate adoption of possible "leap-frog" technologies for converting crops, trees and residues into chemical feedstocks and consumer products.
- Biopower, promoting both the integration of biomass gasification systems with modern gas-turbine/steam-turbine generation systems, and the co-firing of biomass with coal.
- Expanded Forest Service research on faster-growing trees and the use of small-diameter trees for commercial, biobased products.
- Methane gas recovery pilots to reduce greenhouse gas emissions from livestock operations and provide assistance to farmers that want to produce or market biobased products.
- Expanded Agricultural Research Service research to develop biobased materials from commodities and bioproducts, and convert biomass to energy.
- Competitive resources for research partnerships with universities, complementing the new Initiative for Future Agriculture and Food Systems announced by USDA earlier this month.
- Rural development grants to rural electric cooperatives to develop pilot projects to demonstrate the commercial viability of small-scale biomass fuel generation, grants for technical assistance for processing and marketing biobased products, and loans for facilities and operating capital for organizations engaged in biobased production activities.

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing \$85 million for the creation of a new Clean Air Partnership Fund. The Fund will provide grants to states, localities, and tribes to support efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. First proposed as part of last year's FY 2000 budget, the Fund will be administered by the Environmental Protection Agency under existing authority.

Integrated Pollution Control. The Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state, local, and tribal governments to finance projects and programs that achieve accelerated reductions in both air pollutants, such as soot, smog, and air toxics, and in greenhouse gases.

A Quicker Path to Cleaner Air. By providing new resources for projects that accelerate pollution reductions, the Fund will enable communities to achieve multi-pollutant clean air goals sooner and reduce greenhouse gas emissions at the same time.

Technological Innovation. The Fund will help spur both public and private sector innovations in next-generation pollution control technology.

A Magnet for Local Investment & Innovation. The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level. The Fund can be used to support local revolving funds, low-interest loan programs, matching grants, and other mechanisms that will leverage the original Federal investment, greatly increasing its impact.

"Win-Win" Clean Air Projects. The Fund will support a wide range of practical projects that will mean cleaner air, reduced greenhouse gas emissions, and real savings for taxpayers and consumers. These could include projects such as building combined heat and power facilities that put waste heat to work, reducing emissions of both sulfur dioxide and carbon dioxide; retrofitting municipal buildings to make them more energy efficient, reducing pollution resulting from electricity generation; and upgrading municipal vehicle fleets to make them more fuel efficient.

Climate Change Technology Initiative: \$4.0 Billion in Tax Incentives

The President is proposing a new \$4.0 billion package in tax incentives over five years to help reduce greenhouse gas emissions by spurring the purchase of energy efficient products and the use of renewable energy (see Table 2). This year's CCTI tax package is \$400 million greater than last year's proposed five-year package.

Table 2. CCTI Tax Incentives (\$ in Millions)	Revenue Effect
	FY 2001 Total FY01-05
Homes and Buildings	
Provide tax credit for energy efficient building equipment	-18 -201
Provide tax credit for new energy efficient homes	- 82 -633
Provide tax credit for solar energy systems	-9 -132
Vehicles	
Extend tax credit for electric and fuel cell vehicles and provide tax credits for qualified hybrid vehicles	0 -2078
Clean Energy	
Extend tax credit for electricity produced from wind and closed- loop biomass; provide credits for open-loop biomass facilities and coal-biomass cofiring; and provide credits for methane from certain landfills	-91 -976
Industry	
Provide 15-year recovery period for distributed power property	-1 -10
TOTAL*	-201 -4030

*Totals may not add due to rounding.

HOMES AND BUILDINGS

- **Tax credit to consumers who purchase new energy efficient homes.** To encourage the purchase of new energy efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2001-2003 that use at least 30 percent less energy than the standard under the 1998 International Energy Conservation Code (IECC) and a credit of \$2,000 for homes purchased from 2001-2005 that use at least 50 percent less energy than the IECC standard.

- ***Tax credit for energy efficient equipment in new and existing homes or buildings.*** This credit will encourage the purchase of electric heat pump water heaters, natural gas heat pumps, and fuel cells. The credit would apply to both residential and commercial equipment. The credit would be 20 percent of the cost of the investment, subject to a cap, for equipment purchased from 2001-2004.
- ***Tax credit for solar energy systems.*** A 15 percent tax credit will encourage the purchase by consumers and businesses of solar energy systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems placed in service from 2001-2007 and \$1,000 for solar water heating systems placed in service from 2001-2005.

VEHICLES

- ***Tax credits for electric, fuel cell, and qualified hybrid vehicles.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric, fuel cell, and hybrid vehicles will help to move advanced technologies from the laboratory to the highway. These technologies can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
 - **Extend the current tax credit for electric vehicles and fuel cell vehicles.** Under current law, a 10 percent credit, up to \$4,000, is provided for the cost of qualified electric vehicles and fuel cell vehicles. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.
 - **Tax credits for hybrid vehicles.** The credit – available for all qualifying vehicles, including cars, minivans, sport utility vehicles, and pickup trucks – would range from \$500 to \$3,000 for qualified hybrid vehicles purchased from 2003-2006, depending upon the vehicle's design performance.

CLEAN ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before January 1, 2002. The President proposes a 2.5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. This package of credits would:
 - **Extend current "closed-loop" biomass credit.** This proposal extends for 2.5 years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which covers facilities placed in service before January 1, 2002.

-- **Provide credits for “open loop” biomass facilities.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources for facilities placed in service from 2001-2005, and provides a 1.0 cent credit for electricity produced from 2001-2003 from facilities placed in service prior to January 1, 2001.

-- **Provide a credit for cofiring biomass and coal.** This proposal adds a 0.5 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants from 2001-2005.

-- **Provide credit for methane from landfills.** This proposal adds a 1.5 cent per kilowatt hour credit for electricity produced from landfills not subject to EPA’s 1996 New Source Performance Standards/Emissions Guidelines (NSPS/EG) and 1.0 cent per kilowatt hour for landfills subject to NSPS/EG. Qualified facilities would be facilities placed in service after December 31, 2000 and before January 1, 2006.

INDUSTRY

- ***15-year recovery period for distributed power property.*** The development of distributed power technologies has made it possible to generate electricity locally at dispersed industrial, commercial, and residential locations. Such technologies can be more energy efficient and generate fewer greenhouse gases than conventional generation methods. This proposal would simplify and rationalize the current depreciation system by assigning a single 15-year recovery period to distributed power property.

Climate Change Technology Initiative: \$1.4 Billion for Efficient Energy and Clean Energy

The President's FY 2001 budget proposes over \$1.4 billion for the research, development, and deployment of renewable energy technologies, energy efficient products and buildings that will help reduce U.S. greenhouse gas emissions. This represents a \$337 million increase (30 percent) over FY 2000 spending (see Table 3). The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- as well as carbon sequestration (see Table 4). The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

Table 3. CCTI Funding by Agency (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Energy	902	980	1,169	+189
EPA	109	103	227	+124
Housing & Urban Development	10	10	12	+2
Agriculture	0	0	24	+24
Commerce	0	2	0	-2
TOTAL *	1,021	1,095	1,432	+337

*Totals may not add due to rounding.

Table 4. CCTI Funding by Area of Activity (\$ in Millions)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	Change from 2000
Buildings	176	194	275	+81
Transportation	285	309	382	+73
Industry	187	189	251	+62
Electricity	310	321	406	+85
Carbon Sequestration	14	30	52	+22
Management, Planning & Analysis	48	51	65	+14
TOTAL *	1,021	1,095	1,432	+337

* Totals may not add due to rounding.

BUILDINGS

- ***Partnership for Advancing Technology in Housing.*** PATH is a partnership between the Federal government and building industry to develop and deploy housing technologies to make new homes 50 percent more energy efficient and to make at least 15 million existing homes 30 percent more energy efficient within a decade. PATH has established five pilot communities in Denver, Los Angeles, Pittsburgh, and Tuscon. The program coordinates work in the Department of Housing and Urban Development, the Department of Energy (DOE), the Environmental Protection Agency (EPA), FEMA, the Department of Commerce and other agencies, ensuring, for example, that research conducted in DOE's enhanced residential buildings program is quickly transferred into practice. The FY 2001 budget request for building efficiency efforts, such as PATH, Energy Star, and Building America, totals \$275 million, a 42 percent increase over FY 2000 appropriations.
- ***Energy Efficient Appliances and Products.*** Various DOE and EPA programs aim to promote the dissemination of energy efficient appliances and products:
 - DOE will accelerate its program to establish **energy efficiency standards** for commercial heating and cooling, water heaters, and electrical distribution transformers, and will begin efforts to harmonize international energy-efficiency standards and test methods to promote exports of efficient U.S. products.
 - EPA and DOE's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy efficient products – everything from computers to refrigerators to central air-conditioning units. New funding will support the launch of new Energy Star product lines and will promote the Energy Star labeling program in 6-10 export markets.
- ***Energy Efficient Commercial Buildings.*** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label.
- ***Energy Smart Schools/Energy Star Label for Schools.*** DOE and EPA have two programs that are working in coordination to improve energy efficiency in U.S. primary and secondary schools, bringing together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- ***Partnership for a New Generation of Vehicles.*** PNGV is a government-industry effort that aims to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon with a two-thirds reduction in carbon emissions by 2004. In January 2000, the auto-industry partners unveiled their PNGV "concept cars" at the Detroit Auto Show, which keeps the program on schedule for meeting its 2004 goal. The FY 2001 budget includes \$255 million for PNGV-related work, an increase of \$30 million over the amount appropriated for FY 2000.
- ***Light and Heavy Trucks.*** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2003, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA and the Department of Defense, aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 10 mpg from the current average of 7 mpg.

INDUSTRY

- ***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, petroleum refining, and steel – 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.
- ***Industrial Combined Heat and Power (CHP) Systems.*** DOE is developing new industrial CHP systems to capture thermal heat would otherwise be wasted. These systems are expected to be 15 percent more energy efficient and 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.
- ***Voluntary Industrial Partnerships.*** EPA will expand its industry partnership programs, such as **Climate Wise** and the **Voluntary Aluminum Industrial Partnership**, to

encourage businesses to take advantage of cost-effective emissions reductions opportunities -- including emissions of the most potent greenhouse gases, such as methane, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF6).

- ***Agriculture and Forestry.*** The Department of Agriculture (USDA) will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and forestry and reducing their vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various means of reducing greenhouse gas emissions in agriculture, such as compost-based waste-handling facilities, rotational grazing systems, and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$8.5 million towards climate change related activities, including the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production.

The FY 2001 budget also includes important USDA funding for developing advanced biomass energy technologies; R&D and demonstration projects for carbon sequestration; research to study the role of farms, forests, and other natural or managed lands in capturing and storing carbon; and a comprehensive U.S. soil carbon inventory (see p.16 below).

ELECTRICITY

- ***Photovoltaic (PV) Energy Systems.*** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next-generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund efforts to develop new, unconventional technologies.

-- **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. To date, DOE has received commitments for over 900,000 solar rooftop installations. In FY 2001, DOE expects 40,000 systems to be installed under this program, bringing the total to 90,000.

-- **Technology Advances.** By 2004, DOE aims to increase the efficiency of thin-film PV modules in multi-megawatt production from 7 percent to 12 percent and to reduce module manufacturing costs by 40 percent (from \$2.50/watt to \$1.50/watt). Specific performance measures for FY 2001 include achieving 14

percent stable efficiency in prototype thin-film modules and, in a new initiative begun in FY 2000, identifying at least three promising non-conventional PV technologies for further development.

- ***Biomass Power.*** DOE supports biopower systems R&D addressing three major technology areas: co-firing biomass with fossil fuels such as coal and natural gas, small modular biopower systems, and advanced biomass gasification. This work is also included in the Bioenergy and Bioproducts Initiative described in above (see pp.4-5 above).
- ***Wind Powering America.*** This initiative, announced in June 1999, will accelerate DOE's research, development, testing and field validation of next-generation wind technologies, with a goal of supplying 5 percent of U.S. electricity through wind technologies by 2020. This will be supported by an aggressive R&D program that will reduce the cost of electricity in favorable wind sites to 2.5 cents per kilowatt hour by 2002, and will move specialized cold-weather wind turbines from development to demonstration in 2000, leading to commercialization in 2001.
- ***Hydrogen.*** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- ***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.

CARBON SEQUESTRATION

- ***R&D for Sequestration.*** Research initiatives are being funded to find ways to sequester (store) carbon. Examples include:
 - **Enhancing Forest and Farmland Sinks.** The **Forest Service**, in conjunction with other USDA agencies, will spend \$3 million for R&D and demonstration projects for optimizing forest, farmland, and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.
 - **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures and in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs for which funding is proposed in the FY 2000 budget that – while not part of the Climate Change Technology Initiative (CCTI) per se – contribute to improving energy efficiency and reducing greenhouse gas emissions. These programs include:

- ***Cleaner Coal and Natural Gas.*** The FY 2000 budget includes a total of \$232 million (of which \$56 million is part of CCTI) to support the Department of Energy's (DOE) aggressive R&D effort to develop next-generation technologies for the combustion and use of coal and natural gas. For example, research and development of integrated gasification combined cycle technology could lead to ultra-high efficiency coal plants with significantly lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2001 budget request for these two programs is \$191 million – a \$22 million increase over FY 2000 appropriations.
- ***Agricultural & Forestry Conservation Programs.*** The Administration's 2001 Farm Safety Net Initiative proposes an increase of \$1.3 billion in FY 2001 funding for Department of Agriculture conservation programs. Many of these same programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the **Conservation Reserve Program**, the **Environmental Quality Incentives Program**, and the **Farmland Protection Program**. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land.

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. USGCRP science results provide useful information for environmental decision-making on issues such as climate change, ozone depletion, changes in ecosystems, and land use. This multi-agency effort is coordinated through the National Science and Technology Council.

For FY 2001, the President is requesting \$1.74 billion for the USGCRP, an increase of \$39 million above the amount enacted for FY 2000. \$843 million is for scientific research and improvements to surface-based monitoring, (an increase of \$79 million, or about 10 percent). \$923 million is for NASA's development of Earth observing satellites to monitor climate change and other global changes (a decrease of \$34 million, reflecting the phasing of funding for large development projects). Important USGCRP budget highlights include:

- ***Improved Climate Observations.*** The FY 2001 budget provides \$26 million to enhance NOAA surface-based observations, including creation of a climate reference network to provide, for the first time, automated, simultaneous, and ideally located measurements of changing temperatures, precipitation, and soil moisture. Measurements of atmospheric trace gases, aerosols, ocean temperatures, and ocean currents will also be expanded.
- ***The Global Water Cycle.*** The FY 2001 budget provides \$308 million (an increase of \$35 million, or about 13 percent) for research on changes in the Earth's water cycle, which is one of the primary determinants of the Earth's climate. The water cycle is emerging as a top research priority because changes appear to be occurring already. The launch of NASA's EOS Aqua spacecraft in December 2000 will support this research by provide new global measurements of humidity, cloud properties, precipitation, snow, and sea ice.
- ***Ecosystem Changes.*** The FY 2001 budget provides \$224 million for research on the potential impacts of climate change and other stresses on forests, coastal areas, croplands, and other ecosystems (an increase of \$19 million, or 9 percent). New studies will improve our understanding of the relationships among land cover, land use, climate, and weather, and help identify "thresholds" for significant changes in ecosystems.
- ***Carbon Cycle Initiative.*** The FY 2001 budget request continues strong support for the multi-agency carbon cycle science initiative begun in FY 2000, providing \$227 million (an increase of \$23 million or 11 percent). This request includes funds to study how carbon cycles between the atmosphere, the oceans, and land, and the role of farms, forests, and other natural or managed lands in capturing carbon. Such carbon "sinks" may help the United States and other nations offset greenhouse gas emissions. Key agencies include the Departments of Agriculture (USDA), Energy, Interior, NASA, the National Science Foundation, and the Smithsonian Institution. Included in the request is \$13.5 million (an increase of over \$12 million) to significantly expand USDA Natural Resources Conservation Service soil carbon inventory and analysis efforts.

THE WHITE HOUSE

WASHINGTON

October 25, 1999

Dear Interested Party:

This week, delegates from the United States join representatives of more than 160 nations in Bonn, Germany, for the Fifth Conference of the Parties to the United Nations Framework Convention on Climate Change. I would like to take this opportunity to update you on some of the efforts this Administration has under way to meet the challenge of global warming.

With strong leadership from President Clinton and Vice President Gore, the Administration is pursuing a sound, cost-effective strategy to protect our global environment while creating new opportunities for sustainable economic growth. The United States not only has played a pivotal role in shaping the international response to climate change, but also has launched major new efforts to reduce domestic greenhouse gas emissions.

Recently, the President issued two Executive Orders that will achieve significant emissions reductions. One aims to facilitate the goal of tripling U.S. use of bio-energy and bio-products by 2010, cutting greenhouse gas emissions by up to 100 million tons a year -- the equivalent of taking more than 70 million cars off the road. The other directs agencies to improve energy efficiency in federal buildings by 35 percent by 2010, saving taxpayers more than \$750 million a year.

The President and Vice President, having secured a record \$1 billion last year for research and development of energy efficiency and clean energy technologies, are now fighting for additional increases in these vital federal investments. They are seeking \$1.4 billion for research and development in the new fiscal year, plus \$3.6 billion in tax credits over five years to promote broader use of renewable energy and the purchase of energy-efficient cars, homes, and appliances.

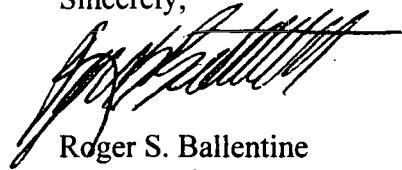
On the diplomatic front, U.S. leadership was critical to forging the Kyoto Protocol, a solid foundation for international efforts to address climate change. The United States is now working with other nations to resolve the critical issues of cost and developing country participation, so the treaty can be ratified. Our overarching goal in Bonn is to keep this process moving forward and achieve the kind of progress we need to ensure that we complete the important work begun in Kyoto.

In a recent address, President Clinton called on all nations to reject the outdated notion that environmental harm is a necessary consequence of economic outgrowth. "All of us, developed and developing countries alike, should take action now to halt global climate change," the President said. "Does this mean developing countries then must sacrifice growth to protect the environment? Absolutely not . . . The challenge and opportunity for developing countries is to

skip the cost of the Industrial Age by using technologies that improve the economy and the environment at the same time."

Enclosed please find materials summarizing the ambitious climate change agenda to which the President and Vice President are so clearly committed. If you have any questions or would like additional information, please contact Paul Bledsoe on my staff at (202) 395-2310. Thank you for your interest.

Sincerely,

A handwritten signature in black ink, appearing to read 'Roger S. Ballentine', written over a horizontal line.

Roger S. Ballentine
Deputy Assistant to the President
For Environmental Initiatives, and
White House Climate Change Coordinator

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United States

TAKING
ACTION
ON
CLIMATE
CHANGE



October 1999

PRESIDENT CLINTON & VICE PRESIDENT GORE SPEAK OUT ON CLIMATE CHANGE

During 1999, President Clinton and Vice President Gore have spoken out time and time again on global climate change. A few of their remarks follow:

"Our most fateful new challenge is the threat of global warming. 1998 was the warmest year ever recorded. Last year's heat waves, floods, and storms are but a hint of what future generations may endure if we do not act now. Tonight I propose a new clean air fund to help communities reduce greenhouse and other pollution, and tax incentives and investments to spur clean energy technology. And I want to work with members of Congress in both parties to reward companies that take early, voluntary action to reduce greenhouse gases."

—President Clinton, January 19, 1999, State of the Union Address

"President Clinton and I are proposing significant new investments in fiscal year 2000 to accelerate our aggressive, common-sense efforts to meet the challenge of global warming... That is why President Clinton and I are proposing a record \$4 billion for expanded research and other programs to better understand and protect our climate, and for tax incentives for consumers and businesses to purchase energy efficient cars, homes, and appliances."

—Vice President Gore, January 25, 1999, On Climate Change Budget Proposal

"We must do more to meet our most profound, common global environmental challenge, the challenge of global warming. I have proposed a clean air partnership fund to help communities reduce both greenhouse pollution and smog, as well as tax and research incentives to spur clean energy technologies. I want to work with members of Congress in both parties to reward companies that take early, voluntary action to reduce greenhouse gases."

—President Clinton, March 4, 1999, U.S. Interior Department 150th Anniversary

"I am directing all federal departments and agencies to take steps to markedly improve the energy efficiency of our buildings. With new technologies and contracts with private companies, the Federal government will cut its greenhouse gas emissions by 30 percent. That is the equivalent of taking 1.7 million cars off the road. By taking these steps, we will also save the taxpayers over \$750 million a year when they are fully implemented."

—President Clinton, June 3, 1999, Issuing Federal Energy Efficiency Executive Order

"For American families and consumers this legislation will mean lower energy costs and the potential for new economic opportunities. For our nation, it will mean more jobs, more innovation, increased competitiveness, and greater energy security. And for our environment, the gains in energy efficiency will mean better air quality and fewer emissions of the greenhouse gases contributing to global warming."

—Vice President Gore, June 29, 1999,
On Introduction of Administration's Energy Efficiency Tax Incentives Into Congress

(over)

PRESIDENT CLINTON & VICE PRESIDENT GORE SPEAK OUT ON CLIMATE CHANGE

"The evidence of global warming grows stronger every day, yet Congress is trying to strangle common-sense programs that save energy, save consumers money, and reduce global warming pollution. I urge Congress to work with us, not against us, to meet the challenges of climate change."

—Vice President Gore, August 2, 1999,
Releasing Declassified Arctic Images to Help Research on Global Warming

"I'm establishing a Cabinet-level council to develop strategic plans to help to bring bio-based technologies from farms, forests and labs to the marketplace...In addition, I am setting a goal of tripling America's use of bioenergy and bio-based products by 2010. That would generate as much as \$20 billion a year in new income for farmers and rural communities, while reducing greenhouse gas emissions by as much as 100 million tons a year—the equivalent of taking more than 70 million cars off the road."

—President Clinton, August 12, 1999, Issuing BioEnergy Executive Order

"One of the big ideas the world has to abandon is the idea that the only way to build a modern prosperous economy is with the industrial energy use patterns of a former era. It is not true."

—President Clinton, September 12, 1999, Auckland, New Zealand

"The overwhelming consensus of world scientific opinion is that greenhouse gases from human activity are raising the Earth's temperature in a rapid and unsustainable way. The five warmest years since the 15th century have all been in the 1990s; 1998 was the warmest year ever recorded, eclipsing the record set just the year before, in 1997. Unless we change course, most scientists believe the seas will rise so high they will swallow whole islands and coastal areas. Storms, like hurricanes, and droughts both will intensify. Diseases like malaria will be borne by mosquitoes to higher and higher altitudes, and across borders, threatening more lives—a phenomenon we already see today in Africa."

—President Clinton, September 15, 1999, Auckland, New Zealand

"All of us, developed and developing countries alike, should take action now to halt global climate change...Does this mean developing countries then must sacrifice growth to protect the environment? Absolutely not...The challenge and opportunity for developing countries is to skip the cost of the Industrial Age by using technologies that improve the economy and the environment at the same time."

—President Clinton, September 21, 1999, UN General Assembly

NEW CLIMATE SCIENCE FINDINGS

Since the Second IPCC Assessment in 1995, the scientific evidence concerning human influences on the global climate system has continued to accumulate. In particular, recent data and analyses strengthen earlier findings that the surface temperature of the Earth is increasing and that this increase can be attributed, in large part, to human-caused increases of greenhouse gases in the atmosphere. The continuation of these trends is likely to be associated with climatic changes capable of adversely affecting ecosystems, wildlife, and large numbers of people.

Northern Hemisphere Temperatures Warmest in 1,000 years

Recent studies published in *Nature*, *Science*, and *Geophysical Research Letters* have provided additional evidence of 20th century warming. Analysis of tree rings, corals, ice cores, and lake sediments showed this century's surface temperatures for the Northern Hemisphere to be the warmest since at least 1400 A.D. A newer study of Northern Hemisphere temperatures found it highly likely that the 20th century has been the warmest century of the millennium; the 1990s have been the warmest decade; and 1998 has been the warmest year. A study of temperature data from 600–1,800-foot deep boreholes in North America, Europe, Africa, and Australia found that the Earth's average surface temperature has increased by about 1.8° Fahrenheit (F) over the last five centuries, and that half of this total warming occurred in this century.

(Mann *et al.*, *Nature*, Vol. 392 (1998), p. 779; Mann *et al.*, *Geophysical Research Letters*, Vol. 26, No. 3 (1999), p. 759; Pollack *et al.*, *Science*, Vol. 282 (1998), p. 279.)

The 11 Warmest Years Have All Occurred Since 1983

Of the 120 to 140 years for which thermometer records are sufficiently complete to define a global average temperature, the 11 warmest years have all occurred since 1983. The three warmest years on record were 1998, 1997, and 1995, in that order. In addition, 1998 was also 1.2° F above the long-term average temperature—the 20th consecutive year in which this benchmark has been exceeded.

(NOAA National Climatic Data Center, UK Meteorological Office.)

Greenhouse Gases from Human Activities Dominant Driver of 20th Century Warming

The 20th century temperature records are consistent with what is expected under human-induced climate change scenarios and cannot be explained solely by other hypothesis, such as solar variability, volcanic eruptions, and El Niño cycles. The case for anthropogenic climate change is further strengthened by the record of regional patterns of temperature changes across the surface of the Earth and the

vertical patterns of temperature changes as one ascends through the atmosphere.

(Mann *op cit.*; Wigley *et al.*, *Science*, Vol. 282 (1998), p. 1676; Peterson *et al.*, *Geophysical Research Letters*, Vol. 26 (1999), p. 329; Wentz and Schabel, *Nature*, Vol. 394 (1998), p. 661.)

Emerging Scientific Evidence Suggests We May Already Be Seeing Impacts of Climate Change

Changes in species distributions and ecosystem dynamics are likely attributable to multiple causes and stresses, but scientists have deduced that climate change is playing a role in the demise of several frog and toad species in Monteverde, shifts in the growing season in Europe, shifts in growth of grass and forb species in Colorado, changes in bird ranges in western Europe, and alterations in patterns of ocean biodiversity.

(Menzel and Fabian, *Nature*, Vol. 397 (1999), p. 659; Pounds *et al.*, *Nature*, Vol. 398 (1999), p. 611; Parmesan *et al.*, *Nature*, Vol. 399 (1999), p. 579; Alward *et al.*, *Science*, Vol. 283 (1999), p. 229.)

New Study Shows Role of CO₂ in Ice Age Warming

A study of Antarctic ice cores published in the March 12, 1999, issue of *Science* compared changes in temperature and levels of atmospheric carbon dioxide during several ice ages. The study showed that as the Earth began to warm due to minor changes in its orbit, carbon was released from the ocean into the air, raising atmospheric CO₂ levels that then greatly magnified and accelerated the warming process. The study confirms that small changes in the factors that affect climate can have large effects on global temperatures.

(Fisher *et al.*, *Science*, Vol. 283, p. 1712.)

FACT SHEET ON THE KYOTO PROTOCOL

At a conference held December 1–11, 1997, in Kyoto, Japan, the Parties to the UN Framework Convention on Climate Change agreed to an historic Protocol to reduce greenhouse gas emissions by harnessing the forces of the global marketplace to protect the environment.

Key aspects of the Kyoto Protocol include emissions targets, timetables for industrialized nations, and market-based measures for meeting those targets. The Protocol makes a down payment on the meaningful participation of developing countries, but more needs to be done in this area. Securing meaningful developing country participation remains a core U.S. goal.

Emissions Targets

A central feature of the Kyoto Protocol is a set of binding emissions targets for developed nations. The specific limits vary from country to country, though those for the key industrial powers of the European Union, Japan, and the United States are similar—8 percent below 1990 emissions levels for the European Union, 7 percent for the United States, and 6 percent for Japan.

The framework for these emissions targets includes the following provisions:

- Emissions targets are to be reached over a five-year budget period rather than by a single year. Allowing emissions to be averaged across a budget period increases flexibility by helping to smooth out short-term fluctuations in economic performance or

weather, either of which could spike emissions in a particular year.

- The first budget period will be 2008–2012. The parties rejected budget periods beginning as early as 2003, as neither realistic nor achievable. Having a full decade before the start of the binding period will allow more time for companies to make the transition to greater energy efficiency and/or lower carbon technologies.
- The emissions targets include all six major greenhouse gases: carbon dioxide, methane, nitrous oxide, and three synthetic substitutes for ozone-depleting CFCs that are highly potent and long-lasting in the atmosphere.
- Activities that absorb carbon, such as planting trees, will be used as offsets against emissions targets. “Sinks” were also included in the interest of encouraging activities like afforestation and reforestation.

Accounting for the role of forests is critical to a comprehensive and environmentally responsible approach to climate change. It also provides the private sector with low-cost opportunities to reduce emissions.

International Emissions Trading

The Kyoto Protocol allows nations with emissions targets to trade greenhouse gas allowances. Using this mechanism, countries can achieve reductions at the lowest cost. Emissions trading was developed in the United States to reduce sulfur dioxide that causes acid rain and has been successful beyond expectations.

Under an emissions trading regime, countries or companies can purchase less expensive emissions permits from countries that have more permits than they need (because they have met their targets with room to spare). Structured effectively, emissions trading can provide a powerful economic incentive to cut emissions while also allowing important flexibility for taking cost-effective actions.

The Kyoto Protocol established emissions trading. Rules and guidelines—in particular for verification, reporting, and accountability—will be developed.

The inclusion of emissions trading in the Kyoto Protocol reflects an important decision to address climate change through the flexibility of market mechanisms. The Conference rejected proposals to require all Parties with targets to impose specific mandatory measures, such as energy taxes. A number of countries, including Australia, Canada, Japan, New Zealand, Russia, Ukraine, and the United States, reached a conceptual agreement to pursue, through an umbrella group, the implementation of a trading regime. Such

a group could further contribute to cost-effective solutions to this problem.

Joint Implementation Among Developed Countries

Countries with emissions targets may obtain credit toward their targets through project-based emission reductions in other such countries. The private sector may participate in these activities.

Additional details may be agreed upon by the Parties at future meetings.

Clean Development Mechanism

Another important market-based component of the Kyoto Protocol is the so-called Clean Development Mechanism (CDM). The CDM embraces the concept of joint implementation for credit in developing countries. With the Clean Development Mechanism, developed countries will be able to use certified emissions reductions from project activities in developing countries to contribute to their compliance with greenhouse gas reduction targets.

This Clean Development Mechanism will allow companies in the developed world to enter into cooperative projects to reduce emissions in the developing world—such as the construction of high-tech, environmentally sound power plants—for the benefit of both parties. The companies will be able to reduce emissions at lower costs than they could

at home, while developing countries will be able to receive the kind of technology that can allow them to grow more sustainably. The CDM will certify and score projects. The CDM can also allow developing countries to bring projects forward in circumstances where there is no immediate developed country partner.

Under the Clean Development Mechanism, companies can choose to make investments in projects or to buy emissions reductions. In addition, Parties will ensure that a small portion of proceeds are used to help particularly vulnerable developing countries, such as island states, adapt to the environmental consequences of climate change.

Importantly, certified emissions reductions achieved starting in the year 2000 can count toward compliance with the first budget period. This means that private companies in the developed world will be able to benefit from taking early action.

Developing Countries

Various Protocol provisions, taken together, represent a down payment on developing country participation in efforts to reduce greenhouse gas emissions.

Developing countries will be engaged through the Clean Development Mechanism noted above.

The Protocol advances the implementation by all Parties of their commitments under the 1992 Framework Convention on Climate Change. For example, the

Protocol identifies various sectors (including the energy, transport, and industry sectors as well as agriculture, forestry, and waste management) in which national programs should be developed to combat climate change. The Protocol also provides for more specific reporting on actions taken.

Securing meaningful participation from key developing countries remains a priority for the United States. The Administration has stated that without such participation, it will not submit the Kyoto Protocol to the Senate for advice and consent to ratification.

Compliance and Enforcement

The Protocol contains several provisions intended to promote compliance. These include requirements related to measurement of greenhouse gases, reporting, and review of implementation.

The Protocol also contains certain consequences for failure to meet obligations. For example, a Party that is not in compliance with its measurement and reporting requirements cannot receive credit for joint implementation projects.

Effective procedures and a mechanism to determine and address noncompliance are to be decided at a later meeting. For both environmental and competitiveness reasons, the United States will be working on proposals to strengthen the compliance and enforcement regime under the Protocol.

Entry Into Force

The Kyoto Protocol opened for signature in March 1998. To enter into force, it must be ratified by at least 55 countries, accounting for at least 55 percent of the total 1990 carbon dioxide emissions of developed countries. U.S. ratification will require the advice and consent of the Senate.

Buenos Aires Action Plan

At the Fourth Session of the Conference of the Parties (CoP-4) held November 2–13, 1998, in Buenos Aires, Argentina, the Parties to the UN Framework Convention on Climate Change agreed to a two-year action plan for advancing the ambitious agenda outlined in the historic Kyoto Protocol.

CoP-4 also saw a significant breakthrough on the issue of developing country participation in international efforts to address climate change. Argentina

became the first developing country to announce its intention to take on a binding emissions target for the 2008–2012 time period. Kazakhstan announced that it intended to do so as well.

During the Buenos Aires conference, on November 12, 1998, the United States signed the Kyoto Protocol at the United Nations in New York. Signing reaffirms the United States' commitment to work with other nations to meet the Protocol's ambitious environmental goals and ensures a continued strong U.S. role in settling issues left unresolved at Kyoto. Signing does *not* impose an obligation on the United States to implement the Kyoto Protocol. (The Protocol cannot become binding on the United States without the approval of the United States Senate.) The President will not submit the Protocol to the U.S. Senate for approval without the meaningful participation of key developing countries in efforts to address climate change.

INTERNATIONAL EMISSIONS TRADING

The Kyoto Protocol combines ambitious environmental targets with innovative market-based mechanisms to help Parties achieve those targets at the lowest possible cost. Recognizing that the cost of reducing greenhouse gas emissions is many times greater in some countries than in others, the Protocol allows each country with a binding target (an Annex B country) to use "emissions trading" and other flexibility mechanisms to meet their commitments.

How Emissions Trading Would Work

In an emissions trading system, Annex B countries and their authorized private entities will be able to purchase emissions allowances from each other. Each Annex B country's binding target determines how many allowances it has. Countries may buy or sell these emissions allowances at the government-to-government level. Countries may also authorize their legal entities (companies, individuals, NGOs, etc.) to buy and sell emissions allowances. If the cost of controlling emissions is different in two countries, both will benefit if the one facing lower costs sells some of its emissions allowances to the other. The environmental impact of reducing greenhouse gases will be the same no matter where the reductions take place. Thus, emissions trading will allow the overall reduction required by the Kyoto targets to be achieved at a lower total cost, with both buyers and sellers gaining from the savings allowed by trading.

U.S. Experience with Emissions Trading

U.S. experience with domestic emissions trading has been highly successful. The acid rain provisions of the U.S. Clean Air Act allow electric power plants to trade sulfur dioxide allowances, resulting in an active private market. Emissions are being cut significantly ahead of schedule—over the last three years, emissions have been reduced over 30 percent more than required—and the cost of emissions reductions has been less than 50 percent of what was expected.

Benefits of Trading

In order to provide real environmental benefits, a trading system must have mechanisms for verification, reporting, and accountability that meet high standards. At the same time, the system must be designed to be as efficient as possible to result in cost-effective reductions. Greenhouse gas emissions trading would bring many benefits. It would:

- Promote ratification of and global compliance with the Protocol by making reductions less costly;

- Provide incentives to reduce emissions below target levels;
- Cut the cost of reducing greenhouse gases by allowing the marketplace to identify the most cost-effective reductions, thereby making efficient use of scarce global resources; and
- Quicken the pace at which countries address climate change by creating a market for innovative ways to reduce emissions cost-effectively and fostering the rapid development and diffusion of new technologies that reduce emissions.

Next Steps

The rules of an emissions trading system need to be clear and predictable—ensuring the integrity of the process while avoiding restrictions that would burden the market or reduce cost savings. To participate in trading, a country must take on a binding target under the Protocol and meet the high standards of the emissions trading system. The U.S. is working with a number of countries to help establish the necessary measurement and reporting capacity.

GREENHOUSE GAS EMISSIONS TRADING: A COUNTRY'S- AND COMPANY'S-EYE VIEW

The Kyoto Protocol combines ambitious greenhouse gas reduction targets with innovative market-based mechanisms to help country Parties achieve those targets at the lowest possible cost. Recognizing that reducing greenhouse gas emissions is many times more expensive in some countries than in others, the Protocol allows the Parties to use "emissions trading" and other flexibility mechanisms to meet their commitments at much reduced cost. This paper describes how emissions trading could work, from the perspective of a country, and from the perspective of companies and other legal entities.

How Will Emissions Trading Work?

The Kyoto Protocol establishes binding greenhouse gas emissions targets for 39 countries. These targets take the form of an "assigned amount"—the number of metric tons of greenhouse gases (counted as carbon dioxide equivalent) that may be emitted by sources within the country during the five-year commitment period running from 2008 through 2012. Each country must make sure that its emissions during the five-year period do not exceed its assigned amount.

Articles 3 and 17 of the Kyoto Protocol allow countries with binding targets to lower the cost of meeting their targets by participating in international emissions trading. In emissions trading, one country transfers part of its assigned amount to another. This transfer of assigned amount lowers the number of tons of greenhouse gases that the first country may emit between 2008 and 2012, and raises the number of tons that the second country may emit by an equal amount. It is useful to think of each one-ton unit of assigned amount as a tradable allowance

for one ton of emissions that may be transferred between countries.

Because the cost of controlling greenhouse gases differs by many times from country to country, emissions trading will allow enormous savings in meeting the Kyoto targets. Countries that have relatively inexpensive ways to control greenhouse gases have incentives to reduce emissions by more than their targets require, because they can sell to others tradable allowances that they will not need. Countries facing the most expensive control measures have incentives to buy less costly allowances from others, and thereby increase the amount they may emit. Since greenhouse gases are global pollutants, the environmental impact of reducing them is the same no matter where the reductions take place. The same overall reduction is achieved, total costs are reduced, and both buyers and sellers gain from the savings allowed by trading.

While countries can benefit by engaging in emissions trading at the government-to-government level, far more savings are possible if countries also authorize their

GREENHOUSE GAS EMISSIONS TRADING: A COUNTRY'S- AND COMPANY'S-EYE VIEW

legal entities (companies, individuals, NGOs, etc.) to trade. The cost of controlling greenhouse gas emissions varies dramatically between companies both within the same country and across borders. The private sector can be much more effective than governments in finding the lowest-cost emission reduction opportunities. The greatest savings can come if private sector companies with the ability to reduce emissions are allowed to buy and sell allowances with other companies in the same country and with companies in other countries.

How Would a Country Engage in Emissions Trading?

Trading rules should require a country that wants to trade to have the necessary capacity and infrastructure to measure and report on its emissions of greenhouse gases, according to the requirements of Articles 5 and 7 of the Protocol. In addition, the rules should require the country to establish a national registry—a computerized system to record who holds tradable allowances; to keep track of changes in allowance holdings due to emissions trading; and to show which allowances have already been used to cover past emissions (these would be permanently retired) and which remain available to be used against future emissions.¹

A country that wants to increase the number of tons of greenhouse gases that it is allowed to emit could seek out other countries that are willing to sell some of

their tradable allowances. Buying and selling countries could arrange their transactions directly or use brokers or exchanges. Trades would be accomplished by removing allowances from the national registry of the selling country and adding them to the national registry of the buying country.

Trading rules should require each country to report to the Secretariat for the Framework Convention on Climate Change in Bonn at least once each year on the trades it has conducted and the appropriate increases or decreases in its assigned amount. These reports would be in addition to the annual reports that countries must make to the Secretariat on their greenhouse gas emissions. Together, this information would serve as the starting point for determining whether a country met its commitment to keep emissions within its assigned amount, as adjusted up or down by trading.

The emissions trading rules could be structured to give countries strong incentives to comply with basic requirements of the Protocol. For example, a country that came out of compliance with the Article 5 and 7 measurement and reporting rules, or that failed to maintain its national registry, could lose its eligibility to trade. The prospect of losing the savings available from trading could be a strong inducement to keep buyer countries in compliance. Likewise, the prospect of losing investment revenue could be a strong encouragement for seller countries to remain in compliance.

GREENHOUSE GAS EMISSIONS TRADING: A COUNTRY'S- AND COMPANY'S-EYE VIEW

How Would a Private Company Engage in Emissions Trading?

In addition to trading at the governmental level, some countries plan to use both domestic and international emissions trading at the company level as part of their program to meet their Kyoto commitments. The highly successful U.S. acid rain program, established in 1990, is a model for how a domestic greenhouse gas trading program could work. The acid rain program sets a strict limit on the total national emissions of sulfur dioxide allowed from electric power plants. There is a fixed number of emission allowances available each year, each one permitting the emission of one ton of sulfur dioxide. These allowances were allocated to power plant owners.² Emissions are rigorously monitored, and at the end of each year, each plant owner must turn back to the government enough allowances to cover its emissions during the year.

The sulfur dioxide allowances can be bought and sold. Companies facing high emission control costs have the flexibility to choose their own compliance strategies. They can reduce their emissions by enough to match their allowance allocation (e.g., by installing pollution controls, switching to cleaner fuels, or improving efficiency). They can also choose to purchase more allowances. Companies with inexpensive opportunities to reduce emissions below their allocations can sell allowances they do not need. A national registry records all allowance holdings

and trades, and shows which allowances have been used and which remain available for future use. Electric utilities, brokers, and private individuals have accounts in the registry recording their allowance holdings, purchases, and sales. Some allowances have even been purchased by school children and environmentalists, who have taken them "off the market" to further reduce emissions.

The results speak for themselves. Sulfur dioxide emissions are being cut about 30 percent more rapidly than expected, bringing cleaner air to millions of Americans. And the total costs of the acid rain program are now projected to be well under half of original expectations.

Countries could establish similar domestic emissions trading programs for greenhouse gases. While private companies and other legal entities would be able to hold and trade allowances, the country would remain fully responsible for compliance with Kyoto commitments. All legal entity holdings would be recorded in the country's national registry. In setting up their domestic programs, countries would have to address many issues, including which sectors to include in the emissions trading system and which to address through other policies. Other issues include how to distribute allowances (allocation or auction?), and how frequently to require emitters to turn them in (every year, or only at the end of the five-year period?). But the potential savings would make the effort well worthwhile.

GREENHOUSE GAS EMISSIONS TRADING: A COUNTRY'S- AND COMPANY'S-EYE VIEW

Companies and other legal entities subject to these programs would have strong incentives to look constantly for innovative ways to control their greenhouse gas emissions. Those who found inexpensive opportunities to reduce their emissions could sell the allowances they do not need to other companies who face higher costs. These tangible rewards for innovation should result in a steady stream of cost-saving breakthroughs and new technologies.

A country's domestic emissions trading program would also connect seamlessly with the international emissions trading system, using the same system of national registries to keep track of every allowance traded. An international trade

between legal entities of different countries would be carried out by moving the traded allowances from the account of the selling entity in the registry of one country, to the account of the buying entity in the registry of the other country. By buying and selling allowances not only within the same country, but also across borders, companies and other legal entities would dramatically reduce the overall cost of meeting the agreed Kyoto targets.

And that is the key to success in meeting the ambitious commitments made in Kyoto, and sustaining and strengthening our efforts to protect the global climate over the coming decades.

- 1 Allowances would be identified by serial number and country of origin. Those that have been used to cover emissions would be marked in the user country's registry as permanently retired. Those not yet used could be kept for use later in the five-year period, traded to other countries, or "banked" for the country's use in the next commitment period.
- 2 A country can distribute allowances in several ways: They can be auctioned to the highest bidders, or they can be allocated (given out) by a variety of formulas to the companies that the country makes responsible for emissions, to consumers, or to others.

THE CLEAN DEVELOPMENT MECHANISM

At Kyoto, industrialized and developing nations came together to shape an innovative, market-based approach to promoting sustainable development and providing cost-effective reductions of greenhouse gas emissions. The Clean Development Mechanism (CDM) is a win-win proposition in which industrialized countries or their companies could earn emissions credits while developing countries acquire technology and capital and earn emission credits that could be banked or sold.

How CDM Could Work

A CDM project might work as follows: a company from an industrialized country could help build a highly efficient plant in a developing country rather than a less efficient plant previously planned. This would result in emissions reductions below what would have been the case without the project investment. Those reductions would be certified as credits, and the developing nation and investing company would then determine how to share the credits. The developing country could acquire technology and capital investment as well as a share of credits it could sell or bank. The company could acquire a share of credits it could use to meet its emissions reduction commitments at home.

Benefits of the CDM

- **Promotes Sustainable Development.** The CDM will create an incentive for environmentally friendly investment in developing countries, contributing to economic growth while providing local environmental and health benefits.

- **Encourages Meeting Environmental Goals.** The CDM, in combination with emissions trading and joint implementation, will allow developed countries to secure the most cost-effective emissions reductions wherever they may be found.
- **Spurs Technology Investment.** The CDM promotes the diffusion of climate-friendly technologies and creates a worldwide market for them.
- **Helps Meet the Costs of Adaptation.** Finally, the CDM will aid those countries that are most vulnerable to climate change since, under the Protocol, a "share of the proceeds" from qualifying projects is to be used to assist those countries in meeting the costs of adaptation.

Next Steps

The U.S. is committed to working with the international community to develop operational rules on a priority basis, especially in view of the Protocol provisions allowing CDM activities to begin as early as 2000. The Parties need to work through a number of issues relat-

ing to how the CDM will function, including determining roles for baselines, verification, institutional structures, and allocation of project proceeds. Work on these issues will continue at the fifth Conference of the Parties in Bonn and should be guided by the following key principles:

- The CDM should assist developing countries in achieving sustainable development;
- The CDM should be a flexible, market-based mechanism that ensures cost-effective reductions through public and private sector investment in clean energy and carbon sequestration projects;
- The CDM should help ensure compliance with targets and be based on principles of efficiency, transparency, and accountability; and,
- Wherever possible, the CDM should use existing institutions to streamline the process.

LAND USE CHANGE ISSUES

Carbon Sequestration

Carbon sequestration refers to the storage of carbon dioxide from the atmosphere by soils, trees, crops, and other plants. Carbon "sinks" such as farmland, rangeland, and forests can make a great contribution to reducing net greenhouse gas emissions. Conservation activities such as planting trees on marginal lands, restoring degraded soils, and adopting best management practices that improve water quality, soil quality, and habitat protection, also have the added benefit of absorbing carbon.

Carbon Sinks and the Kyoto Protocol

The Kyoto Protocol recognizes that sinks must be included as part of an economically and environmentally sound approach to climate change—an approach that the United States worked hard to achieve. Specifically, Article 3.3 of the Protocol allows certain forestry activities—afforestation, reforestation, and deforestation—to be counted toward a party's reduction commitments. Moreover, Article 3.4 allows the Parties of the Protocol to add additional sink activities, such as those related to agricultural soils.

Progress

In 1998, the Parties agreed to move forward with a process to define, measure and verify various categories of carbon sinks. This process includes:

The IPCC Special Report on Land Use Change Issues. The Parties tasked the Intergovernmental Panel on Climate Change (IPCC) with conducting a comprehensive study on land-use, land-use change, and forestry activities. Authors of the Special Report include international technical experts. The Special Report will be released in Spring 2000.

Workshops on Land Use Change and Forestry. In addition, the Subsidiary Body for Scientific and Technological Advice (SBSTA) held two workshops on land use, land use change and forestry issues. The first workshop was held in Rome in September 1998 and the second was held in Indianapolis, Indiana in April 1999. The workshops gave the parties the opportunity to discuss methodological and technical issues related to additional sink categories.

Next Steps

Following the release of the IPCC Special Report next Spring, a workshop will be held to consider its results and to prepare the way for decisions on sinks at the Sixth Conference of the Parties to the UNCCC ("CoP-6"). Considering the complexity associated with these issues, it is critical that the Parties work together to lay out a structure for decision-making between CoP-5 and CoP-6, discuss the criteria for decision-making, and the role of data and information within that framework.

The United States seeks a comprehensive approach to the treatment of sinks that is both environmentally and scientifically sound. Activities added to Article 3.4 should be cost effective, quantifiable and verifiable; cover all relevant sources, sinks, and reservoirs of greenhouse gases; promote sustainable management; and promote sustainable agriculture in light of climate change considerations. The United States looks forward to continuing to engage in a substantive discussion on these land use change issues at CoP-5/SBSTA-11.

COMPLIANCE AND THE KYOTO PROTOCOL

- The Kyoto Protocol contains numerous compliance-related elements, such as stringent reporting requirements and an expert review process to assess implementation and identify potential cases of non-compliance.
- The Protocol calls for further elaboration of the procedure(s) to determine and address cases of non-compliance, as well as the consequences for non-compliance.
- As a result, the Fourth Conference of the Parties (CoP-4) in Buenos Aires established a Joint Working Group on Compliance, whose tasks are to:
 - Identify compliance-related elements in the Protocol;
 - Follow the development of these elements in various groups and identify gaps in order that they are addressed in the suitable forum;
 - Develop procedures by which compliance with obligations should be addressed; and
 - Ensure coherent approaches to developing a comprehensive compliance system.
- At CoP-5, the Joint Working Group will continue to address these issues, taking into account the compliance workshop that was held October 6–7 in Vienna.
- As reflected in its various submissions and interventions, the United States has been a strong proponent of a compliance system that is transparent, credible, and provides reasonable certainty in terms of consequences.
- We have favored a regime that incorporates not only facilitative features (to help prevent non-compliance), but also enforcement features to address non-compliance with emissions targets and related obligations (such as Kyoto mechanisms).
- In terms of the procedural aspects of the regime, we have made proposals as to how compliance questions should be triggered and considered.
- In terms of consequences for non-compliance, the United States has favored binding consequences for cases of non-compliance such as exceeding emissions targets and measurement/reporting violations. Binding consequences should be agreed upon in advance.

U.S. GOVERNMENT ACTIVITIES: TECHNOLOGY COOPERATION & CLIMATE CHANGE

In keeping with its obligations under the United Nations Framework Convention on Climate Change (UNFCCC), the U.S. Government works through a range of agencies to implement technology cooperation activities designed to promote the transfer of climate-friendly technologies to developing and transition countries worldwide. In the U.S. view, technology cooperation extends beyond the simple sale or transfer of hardware. Successfully establishing a program of technology transfer requires the development of in-country enabling conditions and capabilities that support the sustained flow of technologies and expertise.

Since the private sector is the source of most climate-friendly technologies, and the vehicle for their transfer, U.S. technology cooperation activities directly engage the private sector to accelerate the development of markets by removing barriers to investment and facilitating the commercial deployment of technologies. Specific activities focus on policy reform, institutional strengthening, capacity building, information dissemination, technology assessment, technology demonstration and research.

Background

Under the UNFCCC, developed countries have agreed to assist in transferring climate-friendly technologies to developing countries to help them meet their commitments.¹ Technology transfer under the UNFCCC has been defined as both "soft" and "hard" aspects of technology transfer, and address both the mitigation of greenhouse gas emissions, and adaptation to the impacts of climate change.²

To promote technology cooperation under the Convention, the Parties are currently engaged in a consultative process to develop a common under-

standing of technology cooperation models. The U.S. views the consultative process as an important opportunity to establish effective programs that meet UNFCCC goals.

U.S. Government Activities and Projects

Public sector programs can be important vehicles for expanding technology transfer in the area of climate change. In particular, the public sector can play a pivotal role promoting market-based technology transfer by assisting in the removal of market barriers and building human capacity. In recognition of this, the U.S. Government supports a range of bilateral programs that promote the diffusion of climate-friendly technology in developing and transition countries worldwide. Agencies participating in climate technology cooperation activities include the U.S. Agency for International Development, U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Department of State and U.S. Department of Agriculture.

The U.S. Government also actively participates in multilateral efforts to

U.S. GOVERNMENT ACTIVITIES: TECHNOLOGY COOPERATION & CLIMATE CHANGE

strengthen technology cooperation under the UNFCCC. The U.S. Government plays a lead role in the Climate Technology Initiative (CTI), a multilateral initiative of 23 IEA/OECD countries and the European Commission to promote the technology cooperation objectives of the UNFCCC. The U.S. Government is also deeply committed to working to further UNFCCC negotiations on technology transfer and actively participates in the consultative process on technology transfer.

Approach and Tools

Consistent with the role of the private sector as the main vehicle for technology transfer, U.S. government-supported technology cooperation programs focus on creating conditions for expanding markets for clean technology (see "Technology Cooperation Agreement Pilot Project"). Technology markets and institutional conditions, however, are enormously complex and variable from country to country. There is no generic strategy for removing barriers to the diffusion of technology. Rather, measures and activities must be customized to suit the needs and constraints of each country and in many cases the specific technology market within a country. Among the lessons learned by the U.S. from existing programs are the importance of engaging in-country stakeholders, developing public-private partnerships, disseminating information, and ensuring sustainable programs through capacity building.

Public-Private Partnerships. The primary agent of technology transfer is the private sector. Through its technical capabilities, financial resources, and commercial networks, the private sector provides a worldwide mechanism for technology transfer. Public-private partnerships can be important platforms for governments to experiment with various measures and mechanisms for increasing technology transfer. In addition to the removal of policy, economic, legal, and

Technology Cooperation Agreement Pilot Project

Launched in 1997, the *Technology Cooperation Agreement Pilot Project (TCAPP)* is an interagency effort that establishes a model for implementing technology transfer under the United Nations Framework Convention on Climate Change (UNFCCC). TCAPP helps developing and transition countries attract investment in clean energy technologies that meet their existing development priorities. Through TCAPP, the U.S. Government has established partnerships between governments, firms, and the donor community. Participating countries include Brazil, China, Egypt, Kazakhstan, Korea, Mexico, and the Philippines. TCAPP is also assisting 14 countries in the Southern African Development Community with a regional technology cooperation needs assessment initiated by the OECD and the Climate Technology Initiative.

U.S. GOVERNMENT ACTIVITIES: TECHNOLOGY COOPERATION & CLIMATE CHANGE

technical barriers, governments can help promote private sector technology transfer by sharing information on investment opportunities that can lead to technology transfer.

- **Capacity Building.** Effective capacity building focuses on strengthening both human and institutional capacity through training and technical assistance. To ensure success, U.S. Government capacity building programs are country specific, depending on the priorities and needs of a particular country. Participants include members of the regulatory, non-governmental, financial, technical, business, and NGO communities. Training and assistance activities are typically linked to technology priorities that have been developed by in-country stakeholders and show commercial promise.
- **Information Dissemination.** Ready access to accurate technical, commercial, and legal information is critical to the technology transfer process. Specific information needs depend on the requirements and priorities of each country, and information centers play an important role in identifying and meeting these needs. U.S. Government programs work to establish comprehensive and effective systems for organizing and coordinating the flow of technology transfer information.
- **Pilot Projects.** Establishing new markets for technologies can require in-country technology demonstration and verification. U.S. Government programs identify and implement pilot projects for a range of technology applications worldwide.

¹ Article 4.5 reads in part, "[t]he developed country Partners...shall take all practicable steps to promote, facilitate and finance as appropriate, the transfer of, or access to, environmentally sound technologies to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention."

² In a decision adopted under CoP-2 in Geneva, the Parties defined technology transfer for the purposes of Convention activities. In particular, the term "transfer of technology...encompasses practices and processes such as 'soft' technologies, for example, capacity building, information networks, training and research, as well as 'hard' technologies, for example, equipment to control, reduce or prevent anthropogenic emissions of greenhouse gases in energy, transport, forestry, agriculture, and industry sectors, to enhance removals by sinks, and to facilitate adaptation."

THE WHITE HOUSE

WASHINGTON

February 1, 2000

Dear Interested Party:

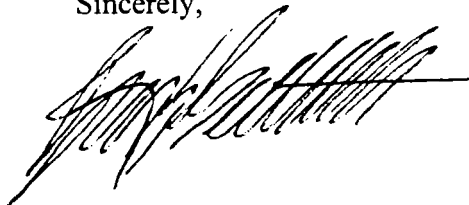
As the new year and the new millennium arrived, so did increasing recognition that global climate change will be among the most important environmental issues of the new century. I want to take this opportunity to send you some updated information on this pressing global issue.

You may have noticed the steady stream of new scientific studies suggesting that global warming is not only occurring, but occurring more rapidly than previously thought. Reports by the World Meteorological Society and the National Climatic Data Center, among others, found that since 1976 the planet has been warming at a rate of .35 degrees Fahrenheit per decade. Attached are summaries of some key studies and associated news stories that may be of interest to you.

Some say that we should not take any action until we have absolute, incontrovertible certainty about global warming and its causes. We believe, however, that the risks of inaction are too great and that balanced, prudent steps are called for now. Fortunately, the initiatives we are working on also create strong economic opportunities. The investments we are already making have helped produce new technologies to begin to address the problems of climate change. For example, new hybrid cars that get more than 80 miles per gallon of gas recently debuted at the Detroit Auto Show. This new breakthrough did not happen by accident. It was a result of the Partnership for a New Generation of Vehicles (PNGV) program created by the President and Vice President -- a joint public-private research and development initiative to produce more environmentally sound and economically viable vehicles. Fuller descriptions of this and of other recent energy technology developments follow.

The Administration will soon announce additional initiatives to fight global warming. You can expect a detailed presentation of these initiatives to reach you in the next several weeks, as part of my commitment to keep you informed of the latest information, news, and events related to global climate change.

Sincerely,

A handwritten signature in black ink, appearing to read 'Roger S. Ballentine', with a long horizontal line extending to the right.

Roger S. Ballentine
Deputy Assistant to the President
for Environmental Initiatives

Climate Update

January 31, 2000

Science News

- The National Climatic Data Center released data near the end of 1999 showing that in the last quarter-century, the rate of warming has been more than double that of the 20th century average, and since the mid-1970's, the global temperature has risen at a rate of about 0.35 degrees per decade, or 3.5 degrees per century. (Complete text of a front page *New York Times* story about the findings is attached.)
- The National Academy of Sciences released a major new study on January 13, which was reported on by *the Washington Post*, *LA Times*, *CNN*, *CBS* and other outlets. The study found that the warming trend over the past two decades "...is undoubtedly real and is substantially greater than the average rate of warming during the 20th century." The report also downplayed a long-standing dispute over temperature data (while ground monitors have shown a sharp increase in Earth's temperatures, satellite and weather balloon observations have shown little or no warming), noting that while this discrepancy cannot yet fully be explained, it "in no way invalidates the conclusion that the Earth's temperature has been rising."
- 1999 will be the fifth warmest year on record, according to a British Meteorological Office study released December 15, 1999. Seven of the 10 hottest years on record occurred in the 1990's, which was the hottest decade of the millennium, the report said. Furthermore, the report suggested a "high probability" of 2000 being even warmer, as the cold Pacific (La Nina) warms again naturally.
- New satellite data released by NASA January 19, 2000 shows that part of the Pacific Ocean may be undergoing a cooling which could influence U.S. weather patterns over the next years and even decades. This newly identified climate pattern, known as Pacific-Decadal Oscillation (PDO), is a natural oscillation of northern hemisphere Pacific Ocean temperatures that occurs over decades, similar to the international El Nino-La Nina cycle in the tropical Pacific. The research suggests that the U.S. entered the "cool" phase of the PDO (similar to the La Nina phase) about 2 years ago. The tendency of this phase is to cool some regions of the earth, and while this could serve to "mask" or "dampen" global warming signals, it is not evidence that global warming is not occurring. For example, 1998 and 1999 set records as the warmest and 5th warmest years this century during the same period that scientists believe a "cool" PDO phase may have been starting.

Industry and Technology Update

- Following the lead of Ford in December 1999, DaimlerChrysler Corp. this January withdrew from the Global Climate Coalition (GCC), the major business lobbying group opposed to the

Kyoto climate treaty. This leaves GM as the only American carmaker still in the GCC. BP/Amoco, Sunoco and Shell all left the GCC within the last two years.

- In first week of January, a coalition of 42 religious and environmental organizations in 17 states unveiled "Campaign ExxonMobil" (CEM), an effort aimed at pressuring ExxonMobil to reform corporate practices that contribute to global warming, to acknowledge that human activity is causing global warming, and to quit anti-Kyoto lobbying groups such as the Global Climate Coalition. The religious and environmental groups' primary tactic is shareholder resolutions. In addition to ExxonMobil, they are also targeting GM, Cinergy, Goodyear, Duke Power, CSX, Southern Co., Chevron, Texaco, and Allegheny Energy.
- At the Detroit Auto Show the first week of January 2000, virtually every major manufacturer unveiled prototype hybrid cars that get better than 70 mpg. Ford's entry, the Prodigy, is "a family car that gets nearly 80 mpg without sacrificing performance or functionality," according to company documents. GM's Precept has similar qualities. Both were developed under the Partnership for a New Generation of Vehicles program. Chrysler is slated to display their entry later this year.
- A new hybrid gas and electric car which gets more than 60 mpg arrived at Honda dealers in the U.S. in December, 1999, the first such vehicle priced under \$20,000 to be available to American consumers. Drivers fill it with unleaded gas and an electric motor is charged by the car's brakes so it never needs to be plugged in—one of the big drawbacks to cars that are entirely electric. Toyota will release a similar vehicle in 2000, selling for \$17,000 and getting 66 mpg.
- Cargill Inc. and Dow Chemical announced in mid-January a \$300 million program for full-scale commercial production of a new kind of plastic made from plants instead of petroleum. The new product is being called "Natural Plastic."

International Developments

- The World Bank in mid-January announced the creation of a fund to finance a market for greenhouse gas emissions. Four governments—Finland, Norway, Sweden and the Netherlands—and nine companies have committed \$85 million so far to the fund, which will begin operating in April 2000. Reports in the *Washington Post* and *Wall Street Journal* speculated that the initiative reflects the World Bank's concern about the vulnerability of poor, low lying nations to coastal flooding as a result of global warming.
- France unveiled a program to fight global warming containing 96 measures, including an energy consumption tax on industries due to take effect in 2001, proposals to encourage vehicles to economize on fuel, the development of new public transport, reduction of energy consumption in buildings, and the promotion of research into renewable energy sources. The proposal, announced the week of January 17 also includes a domestic emissions trading system, despite the European Union's strong criticism of trading systems.

Recent Editorials

- January 9, 2000—*The Washington Post*
“Warming to Reality” (complete text attached)
- January 15, 2000—*The Courier-Journal*
“Global Warming”
- Headline: January 16, 2000—*The Detroit News*
“Global Warming?”
- January 17, 2000—*The Indianapolis Star*
“Still Not a Crisis”
- January 17, 2000—*The Washington Post*
“More Hot News”
- January 18, 2000—*The Atlanta Constitution*
“Global Warming Facts Ignored at Our Peril”

Other Media Coverage

- *CBS News* aired six separate global warming stories over three nights the week of January 10-16 featuring clips from President Clinton’s January 11th statement at the Grand Canyon, two interviews with Dr. James Baker of NOAA, and an interview with White House Chief of Staff John Podesta. All the stories emphasized that global warming science is becoming conclusive, and included impacts as diverse as farming problems in the Central Valley of California and increased incidence of jellyfish blooms worldwide. On Wednesday, January 12, Dan Rather began the CBS lead story with this statement: “A CBS News Exclusive: a new study finds global warming is real and getting worse as the White House plans to unveil an ambitious new program to fight it.”
- *NBC Nightly News*, devoted an “In-Depth” segment on January 4, 2000 to the latest global warming data, indicating that since the mid-1970’s global temperatures have risen .35 degrees Fahrenheit a decade. The following week, NBC ran two additional stories emphasizing the increasing certainty in the science of global warming.

The New York Times

1 SUNDAY, DECEMBER 19, 1999

1999 Continues Warming Trend Around Globe

By WILLIAM K. STEVENS

At the New York Botanical Garden in the Bronx, fragrant white blooms with a pink blush are breaking out on specimens of a popular landscaping shrub called the Koreanspice viburnum — four to five months early. Snowdrops, among the earliest bulbs to send up shoots when winter ends, have already poked up their noses. In some New York suburbs, yellow forsythia blossoms have brought a premature touch of spring to December.

"There's a little confusion out

there," said Wayne Cahilly, an arborist at the botanical garden, and he expressed no doubt as to the reason: abnormal warmth. Or is it so unusual? "I think this warm weather is becoming normal," Mr. Cahilly said.

Certainly it seems that way of late. Last month was the warmest November in 105 years of record-keeping in the contiguous 48 states, and the fourth-warmest in the Northeast. The trend continued into December in most of the country; as of Friday, the average temperature for the month in New York, for instance, was 5.7 degrees Fahrenheit above normal.

But that is almost the least of it. Federal scientists reported last week that in the contiguous 48 states and on other global land masses, including Europe and Asia, 1999 is certain to join 1998 as one of the two warmest years on record, continuing a

Continued on Page 18



Richard L. Harbus for The New York Times

KEEPING TRACK

Warmer and Warmer

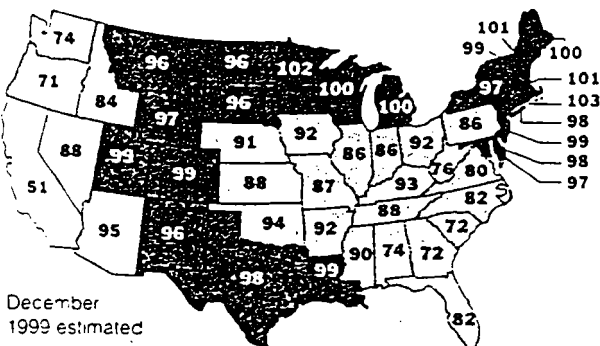
Scientists are reporting that 1999 will join 1998 as one of the two warmest years on record across the contiguous United States.

For 1999 ...

Numbers are 1999's temperature rank since 1895.

105=Warmest, 1=Coldest

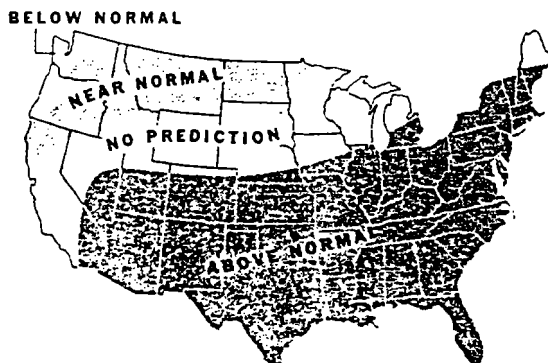
■ Much above normal (104-95) □ Above normal (85-94) □ Normal (11-84)



Source: National Oceanic and Atmospheric Administration

... and for the next three months

Predictions for January, February and March of 2000 based on statistical analysis of past climate and current trends.



The New York Times

ing climatic and agricultural zones.

The United States experienced record-breaking warmth in both of the two most recent winters, said scientists at the government's Climate Prediction Center in Camp Springs, Md. The center predicted last week that on average, most of the country would be warmer than normal over the January-through-March period just ahead.

In the winter of 1997-98, circulation patterns influenced by El Niño played a crucial role in the warmth. Last winter, different circulation patterns associated with La Niña had a similar effect. Both La Niña and El Niño modify North America's climate by changing the position of the jet stream, the high-altitude river of air that generally runs from west to east and marks the boundary between cold northern air and warm southern air.

In a La Niña winter, the jet stream typically plunges down through Montana and the northern Plains and then into the central part of the country before curving northeastward. This curve would normally take place in the East, but in a La Niña year it tends to take place farther west, leaving the Eastern Seaboard on the warm side of the warm-cold division marked by the jet stream.

Eventually this whole pattern drifts eastward, bringing cold weather to the East. An influx of cold northern air is in fact expected for the latter part of this month in the Northeast, said Fred Gadomski, a meteorologist at Pennsylvania State University. This progression hap-

pens repeatedly. Sometimes in a La Niña regime, the course of the jet stream temporarily flattens out and whisks warm Pacific air all the way across the continent. Mr. Gadomski said he would not be surprised if such a nationwide warm spell developed after the upcoming cold snap passes.

Other factors, too, are shaping the winter, scientists at the prediction center say. In addition to the general warming of the atmosphere, for instance, year-to-year flip-flops in cir-

The warmest decade in a century of record-keeping.

ulation patterns over the North Atlantic can have a major effect on weather in the Eastern part of the country.

If this so-called North Atlantic oscillation is in one mode, typified by low atmospheric pressure over the ocean, the East tends to be warm. If high pressure dominates, said Vernon Kousky, a research meteorologist at the prediction center, the jet stream tends to follow a southerly course into the ocean in the vicinity of Virginia and North Carolina. North of that, big snowstorms can develop, Mr. Kousky said, as happened in 1995-96, a La Niña winter in which a January blizzard dropped

record snows from Washington to New York, essentially shutting down the nation's capital for days.

The North Atlantic oscillation's effect "never makes itself felt till the end of December or early January," Mr. Kousky said, adding that forecasters at this point cannot predict its behavior this winter.

A similar oscillation in the North Pacific may influence next summer's American weather, he said. The sea-surface temperature there flips back and forth between warm and cool states similar to those of El Niño and La Niña, but stays in one phase for several years. Researchers believe that it may recently have flipped into its warmer state. If it has, Mr. Kousky said, it could set off atmospheric chain reactions next summer that will bring a repeat of last summer's drought in much of the country's Northeastern quadrant, as well as a more active Atlantic hurricane season.

"We're trying to alert people to that possibility," he said.

Last summer's drought established records for dryness in the Northeast, the Middle Atlantic and the Ohio Valley, Mr. Karl's group reported last week. The April-to-July period was the driest or second-driest in all states from West Virginia to Maine. The drought was followed by record rainfall as hurricanes Dennis and Floyd struck the East Coast. Intensified drought and heavier rain are both expected to result from global warming, although no particular weather event of any kind can be attributed to it.

The Washington Post

AN INDEPENDENT NEWSPAPER

Warming to Reality

BIT BY bit, industry is facing up to global warming. Last month Ford Motor Co. withdrew from the Global Climate Coalition, a lobbying group opposed to the Kyoto climate treaty. On Thursday DaimlerChrysler Corp. quit too; British Petroleum, Shell Oil and Dow Chemical left a while back. But as corporations move on, some politicians are lingering behind. On the campaign trail, Sen. Orrin Hatch routinely denounces the Kyoto accord, and Gov. George Bush has said that he opposes it. In Congress an ostrich caucus still insists that the scientific evidence for global warming is inconclusive.

For most of the world, 1997, 1998 and 1999 were the three warmest years on record. That is no mere blip: Since the mid 1970s, the world seems to have been warming at a rate of 3.5 degrees per century. Given that the world warmed by less than 10 degrees in the 20,000 previous years, the current rate is alarming. The unpleasant consequences may well include more extreme weather, a disruption to agriculture and rising sea levels that cause coastal flooding.

This warming is at least partly the consequence of human behavior: Cars, factories and coal fires produce carbon dioxide and other gases that accumulate in the atmosphere and

alter climate patterns. A serious effort to reduce such emissions is therefore needed. Last year the administration promised to cut the federal government's fossil fuel emissions by 30 percent by 2010, and to triple national production of non-greenhouse "biomass" fuels derived from farm products.

But there is a limit to what the administration can do without the cooperation of Congress. For the past four years, Republican budget riders have prevented the administration from raising fuel-efficiency levels for vehicles. Congress has killed tax credits for fuel-efficient vehicles and air conditioners. The Senate has made it clear that it will not ratify the Kyoto climate accord. It will not even pass modest versions of the Kyoto idea, which would give industry an incentive to reduce greenhouse emissions.

The oil industry claims that compliance with the Kyoto accord would cost the average American family \$1,500 to \$3,000 a year. The Clinton administration declares that the extra cost of fuel-efficient machines is largely offset by the savings from reduced fuel purchases, rendering compliance all but free. The truth may lie somewhere in between. But reckless inaction in the face of global warming is the costliest of all options.