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Executive Summary

"Addressing global climate change will require a sustained effort, over many generations. My approach recognizes that sustained economic growth is the solution, not the problem – because a nation that grows its economy is a nation that can afford investments in efficiency, new technologies, and a cleaner environment."

President George W. Bush

The President announced a new approach to the challenge of global climate change. This approach is designed to harness the power of markets and technological innovation. It holds the promise of a new partnership with the developing world. And it recognizes that climate change is a complex, long-term challenge that will require a sustained effort over many generations. As the President has said, "The policy challenge is to act in a serious and sensible way, given the limits of our knowledge. While scientific uncertainties remain, we can begin now to address the factors that contribute to climate change."

While investments today in science will increase our understanding of this challenge, our investments in advanced energy and sequestration technologies will provide the breakthroughs we need to dramatically reduce our emissions in the longer term. In the near term, we will vigorously pursue emissions reductions even in the absence of complete knowledge. Our approach recognizes that sustained economic growth is an essential part of the solution, not the problem. Economic growth will make possible the needed investment in research, development, and deployment of advanced technologies. This strategy is one that should offer developing countries the incentive and means to join with us in tackling this challenge together. Significantly, the President's plan will:

- Reduce the Greenhouse Gas Intensity of the U.S. Economy by 18 Percent in the Next Ten Years. Greenhouse gas intensity measures the ratio of greenhouse gas (GHG) emissions to economic output. This new approach focuses on reducing the growth of GHG emissions, while sustaining the economic growth needed to finance investment in new, clean energy technologies. It sets America on a path to slow the growth of greenhouse gas emissions, and – as the science justifies – to stop and then reverse that growth:
 - In efficiency terms, the 183 metric tons of emissions per million dollars GDP that we emit today will be lowered to 151 metric tons per million dollars GDP in 2012.



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- Existing trends and efforts in technology improvement will play a significant role. Beyond that, the President's commitment will achieve 100 million metric tons of reduced emissions in 2012 alone, with more than 500 million metric tons in cumulative savings over the entire decade.
- This goal is comparable to the average progress that nations participating in the Kyoto Protocol are required to achieve.
- Substantially Improve the Emission Reduction Registry. The President directed the Secretary of Energy, in consultation with the Secretary of Commerce, the Secretary of Agriculture, and the Administrator of the Environmental Protection Agency, to propose improvements to the current voluntary emission reduction registration program under section 1605(b) of the 1992 Energy Policy Act within 120 days. These improvements will enhance measurement accuracy, reliability and verifiability, working with and taking into account emerging domestic and international approaches.
- Protect and Provide Transferable Credits for Emissions Reduction. The President directed the Secretary of Energy to recommend reforms to ensure that businesses and individuals that register reductions are not penalized under a future climate policy, and to give transferable credits to companies that can show real emissions reductions.
- Review Progress Toward Goal and Take Additional Action if Necessary. If, in 2012, we find that we are not on track toward meeting our goal, and sound science justifies further policy action, the United States will respond with additional measures that may include a broad, market-based program as well as additional incentives and voluntary measures designed to accelerate technology development and deployment.
- Increase Funding for America's Commitment to Climate Change. The President's FY '03 budget seeks \$4.5 billion in total climate spending – an increase of \$700 million. This commitment is unmatched in the world, and is particularly notable given America's focus on international and homeland security and domestic economic issues in the President's FY '03 budget proposal.
- Take Action on the Science and Technology Review. The Secretary of Commerce and Secretary of Energy have completed their review of the federal government's science and technology research portfolios and recommended a path forward. As a result of their review, the President has established a new management structure to advance and coordinate climate change science and technology research.
 - The President has established a Cabinet-level Committee on Climate Change Science and Technology Integration to oversee this effort. The Secretary of Commerce and Secretary of Energy will lead the effort, in close coordination with the President's Science Advisor. The research effort will continue to be coordinated through the National Science and Technology Council in accordance with the Global Change Research Act of 1990.
 - The President's FY '03 budget proposal dedicates \$1.7 billion to fund basic scientific research on climate change and \$1.3 billion to fund research on advanced energy and sequestration technologies.
 - This includes \$80 million in new funding dedicated to implementation of the Climate Change Research Initiative (CCRI) and the National Climate Change Technology Initiative (NCCTI) announced last June. This funding will be used to address major gaps in our current understanding of the natural carbon cycle and the role of black soot emissions in climate change. It will also be used to promote the development of the most promising "breakthrough" technologies for clean energy generation and carbon sequestration.
- Implement a Comprehensive Range of New and Expanded Domestic Policies, Including:
 - Tax Incentives for Renewable Energy, Cogeneration, and New Technology. The President's FY '03 budget seeks \$555 million in clean energy tax incentives, as the first part of a \$4.6 billion commitment over the next five years (\$7.1 billion over the next 10 years). These tax credits will spur investments in renewable energy (solar, wind, and biomass), hybrid and fuel cell vehicles, cogeneration, and landfill gas conversion. Consistent with the National Energy Policy, the President has directed the Secretary of the Treasury to work with Congress to extend and expand the production tax credit for electricity generation from wind and biomass, to develop a new residential solar energy tax credit, and to encourage cogeneration projects through investment tax credits.

- **Business Challenges.** The President has challenged American businesses to make specific commitments to improving the greenhouse gas intensity of their operations and to reduce emissions. Recent agreements with the semi-conductor and aluminum industries and industries that emit methane already have significantly reduced emissions of some of the most potent greenhouse gases. We will build upon these successes with new agreements, producing greater reductions.
- **Transportation Programs.** The Administration is promoting the development of fuel-efficient motor vehicles and trucks, researching options for producing cleaner fuels, and implementing programs to improve energy efficiency. The President is committed to expanding federal research partnerships with industry, providing market-based incentives and updating current regulatory programs that advance our progress in this important area. This commitment includes expanding fuel cell research, in particular through the "FreedomCAR" initiative. The President's FY '03 budget seeks more than \$3 billion in tax credits over 11 years for consumers to purchase fuel cell and hybrid vehicles. The Secretary of Transportation has asked the Congressional leadership to work with him on legislation that would authorize the Department of Transportation to reform the Corporate Average Fuel Economy (CAFE) program, fully considering the recent National Academy Sciences report, so that we can safely improve fuel economy for cars and trucks.
- **Carbon Sequestration.** The President's FY '03 budget requests over \$3 billion - a \$1 billion increase above the baseline - as the first part of a ten year (2002-2011) commitment to implement and improve the conservation title of the Farm Bill, which will significantly enhance the natural storage of carbon. The President also directed the Secretary of Agriculture to provide recommendations for further, targeted incentives aimed at forest and agricultural sequestration of greenhouse gases. The President further directed the Secretary of Agriculture, in consultation with the Environmental Protection Agency and the Department of Energy, to develop accounting rules and guidelines for crediting sequestration projects, taking into account emerging domestic and international approaches.
- **Promote New and Expanded International Policies to Complement Our Domestic Program.** The President's approach seeks to expand cooperation internationally to meet the challenge of climate change, including:
 - **Investing \$25 Million in Climate Observation Systems in Developing Countries.** In response to the National Academy of Sciences' recommendation for better observation systems, the President has allocated \$25 million and challenged other developed nations to match the U.S. commitment.
 - **Tripling Funding for "Debt-for-Nature" Forest Conservation Programs.** Building upon recent Tropical Forest Conservation Act (TFCA) agreements with Belize, El Salvador, and Bangladesh, the President's FY '03 budget request of \$40 million to fund "debt for nature" agreements with developing countries nearly triples funding for this successful program. Under TFCA, developing countries agree to protect their tropical forests from logging, avoiding emissions and preserving the substantial carbon sequestration services they provide. The President also announced a new agreement with the Government of Thailand, which will preserve important mangrove forest in Northeastern Thailand in exchange for debt relief worth \$11.4 million.
 - **Fully Funding the Global Environmental Facility.** The Administration's FY '03 budget request of \$178 million for the GEF is more than \$77 million above this year's funding and includes a substantial \$70 million payment for arrears incurred during the prior administration. The GEF is the primary international institution for transferring energy and sequestration technologies to the developing world under the United Nations Framework Convention on Climate Change (UNFCCC).
 - **Dedicating Significant Funds to the United States Agency for International Development (USAID).** The President's FY'03 budget requests \$155 million in funding for USAID climate change programs. USAID serves as a critical vehicle for transferring American energy and sequestration technologies to developing countries to promote sustainable development and minimize their GHG emissions growth.
 - **Pursue Joint Research with Japan.** The U.S. and Japan continue their High-Level Consultations on climate change issues. Later this month, a

team of U.S. experts will meet with their Japanese counterparts to discuss specific projects within the various areas of climate science and technology, to identify the highest priorities for collaborative research.

- **Pursue Joint Research with Italy.** Following up on a pledge of President Bush and Prime Minister Berlusconi to undertake joint research on climate change, the U.S. and Italy convened a Joint Climate Change Research Meeting in January 2002. The delegations for the two countries identified more than 20 joint climate change research activities for immediate implementation, including global and regional modeling.
- **Pursue Joint Research with Central America.** The United States and Central American Heads of Government signed the Central American-United States of America Joint Accord (CONCAUSA) on December 10, 1994. The original agreement covered cooperation under action plans in four major areas: conservation of biodiversity, sound use of energy, environmental legislation, and sustainable economic development. On June 7, 2001, the United States and its Central American partners signed an expanded and renewed CONCAUSA Declaration, adding disaster relief and climate change as new areas for cooperation. The new CONCAUSA Declaration calls for intensified cooperative efforts to address climate change through scientific research, estimating and monitoring greenhouse gases, investing in forestry conservation, enhancing energy efficiency, and utilizing new environmental technologies.

National Goal

The President set a national goal to reduce the greenhouse gas intensity of the U.S. economy by 18 percent over the next ten years. Rather than pitting economic growth against the environment, the President has established an approach that promises real progress on climate change by tapping the power of sustained economic growth.

- The President's Yardstick – Greenhouse Gas Intensity – is a Better Way to Measure Progress Without Hurting Growth. A goal expressed in terms of declining greenhouse gas intensity, measuring greenhouse gas emissions relative to economic activity, quantifies our effort to reduce emissions through conservation, adoption of cleaner, more efficient, and emission-reducing technologies, and sequestration. At the same time, an intensity goal accommodates economic growth.
- Reducing Greenhouse Gas Intensity by 18 Percent Over the Next Ten Years is Ambitious but Achievable. The United States will reduce the 183 metric tons of emissions per million dollars GDP that we emit today to 151 metric tons per million dollars GDP in 2012. We expect existing trends and efforts in technology improvement to play a significant role. Beyond that, our commitment will achieve 100 million metric tons of reduced emissions in 2012 alone, with more than 500 million metric tons in cumulative savings over the entire decade.
- Focusing on Greenhouse Gas Intensity Sets America on a Path to Slow the Growth of Greenhouse Gas Emissions, and – as the Science Justifies – to Stop and Then Reverse That Growth. As we learn more about the science of climate change and develop new technologies to mitigate emissions, this annual decline can be accelerated. When the annual decline in intensity equals the economic growth rate (currently, about 3% per year), emission growth will have stopped. When the annual decline in intensity exceeds the economic growth rate, emission growth will reverse. Reversing emission growth will eventually stabilize atmospheric concentrations as emissions decline.
- As We Advance Science and Develop Technology to Substantially Reduce Greenhouse Gas Emissions in the Long Term, We Do Not Want to Risk Harming the Economy in the Short Term. Over the past 20 years, greenhouse gas emissions have risen with economic growth, as our economy benefited from inexpensive, fossil-fuel based – and greenhouse gas emitting – energy. While new technologies promise to break this emission-economy link, a rapid reduction in emissions would be costly and threaten economic growth. Sustained economic growth is essential for any long-term solution: Prosperity is what allows us to dedicate more resources to solving environmental problems. History shows that wealthier societies demand – and can afford – more environmental protection.
- The Intensity Based Approach Promotes Near-Term Opportunities to Conserve Fossil Fuel Use, Recover Methane, and Sequester Carbon. Until we develop and adopt breakthrough technologies that provide safe and reliable energy to fuel our economy without emitting greenhouse gases, we need to

promote more rapid adoption of existing, improved energy efficiency and renewable resources that provide cost-effective opportunities to reduce emissions. Profitable methane recovery from landfills, coal mines and gas pipelines offers another opportunity — estimated by the EPA at about 30 million tons of carbon equivalent emissions. Finally, carbon sequestration in soils and forests can provide tens of millions of tons of emission reductions at very low costs.

- The Intensity Based Approach Advances a Serious, but Measured Mitigation Response. The President recognizes America's responsibility to reduce emissions. At the same time, any long-term solution — one that stabilizes atmospheric concentrations of greenhouse gases at safe levels — will require the development and deployment of new technologies that are not yet cost-effective. The President's policy balances the desire for immediate reductions with the need to protect the economy and to take advantage of developing science and technology.

The President's Goal is Ambitious and Responsible

- Reducing Greenhouse Gas Intensity by 18 Percent Over the Next Ten Years is Comparable to the Average Progress that Nations Participating in the Kyoto Protocol are Required to Achieve. Our goal translates into a 4.5 percent reduction beyond forecasts of the progress that America is expected to make based on existing programs and private activity. Forecasts of the average reductions required by nations implementing the Kyoto Protocol range from zero to 7 percent.

- While Producing Results Similar to What the Kyoto Protocol Participants Are Required to Achieve on Average, the President's Approach Protects the Economy and Develops Institutions for a Long-Term Solution. The focus on greenhouse gas intensity separates the goal of reducing emissions from the potential economic harm associated with a rigid emission cap. By measuring greenhouse gas emissions relative to economic activity, we have a solid yardstick against which we can measure progress as we pursue a range of programs to reduce emissions. As we develop technologies to produce more goods with fewer greenhouse gas emissions, this yardstick does not penalize economic growth.

- Greenhouse Gas Intensity Is a More Practical Way to Discuss Goals with Developing Countries. The close connection between economic growth, energy use and greenhouse gas emissions implies that fixed appropriate emission limits are hard to identify when economic growth is uncertain and carbon-free, breakthrough energy technologies are not yet in place. Such targets are also hard to identify for developing countries where the future rate of emissions is even more uncertain. Given its neutrality with regard to economic growth, greenhouse gas intensity solves or substantially reduces many of these problems.

Enhanced National Registry for Voluntary Emissions Reductions

The Administration will improve the current federal GHG Reduction and Sequestration Registry that recognizes greenhouse gas reductions by non-governmental organizations, businesses, farmers, and the federal, state and local governments. Registry participants and the public will have a high level of confidence in the reductions recognized by this Registry, through capture and sequestration projects, mitigation projects that increase energy efficiency and/or switch fuels, and process changes to reduce emissions of potent greenhouse gases, such as methane. An enhanced registry will promote the identification and expansion of innovative and effective ways to reduce greenhouse gases. The enhanced registry will encourage participation by removing the risk that these actions will be penalized — or inaction rewarded — by future climate policy.

- Improve the Quality of the Current Program. A registry is a tool for companies to publicly record their progress in reducing emissions, providing public recognition of a company's accomplishments, and a record of mitigation efforts for future policy design. This tool goes hand-in-hand with voluntary business challenges, described below, by providing a standardized, credible vehicle for reporting and recognizing progress.
 - Although businesses can already register emission reductions under section 1605(b) of the 1995 Energy Policy Act, participation has been limited.
 - The President directed the Secretary of Energy, in consultation with the Secretary of Commerce, Secretary of Agriculture, and the Administrator of the Environmental Protection Agency, to propose improvements to the

current voluntary emissions reduction registration program within 120 days.

- These improvements will enhance measurement accuracy, reliability and verifiability, working with and taking into account emerging domestic and international approaches.
- Protect and Provide Transferable Credits for Emissions Reduction. The President directed the Secretary of Energy to recommend reforms to ensure that businesses and individuals that register reductions are not penalized under a future climate policy, and to give transferable credits to companies that can show real emissions reductions. These protections will encourage businesses and individuals to pursue innovative strategies to reduce or sequester greenhouse gas emissions, without the risk that future climate policy will disadvantage them.
- Background on Current Registry Program. The Energy Policy Act of 1992 directed the Department of Energy (with EIA as the implementing agency) to develop a program to document voluntary actions that reduce emissions of greenhouse gases or remove greenhouse gases from the atmosphere.
 - Under the Energy Policy Act, EIA was directed to issue "procedures for the accurate reporting of information on annual reductions of greenhouse gas emissions and carbon fixation achieved through any measures, including fuel switching, forest management practices, tree planting, use of renewable energy, manufacture or use of vehicles with reduced greenhouse gas emissions, appliance efficiency, methane recovery, cogeneration, chlorofluorocarbon capture and replacement, and power plant heat rate improvement."
 - In 1999, 207 companies and other organizations, representing 24 different industries or services, reported on 1,722 projects that achieved 226 million metric tons of carbon dioxide equivalent reductions - equal to 3.4 percent of national emissions. Participating companies included Clairol, AT&T, Dow Chemical, Johnson & Johnson, IBM, Motorola, Pharmacia, Upjohn, Sunoco, Southern, General Motors and DuPont.
 - EIA released a February 2002 report demonstrating that this program continues to expand. In 2000, 222 companies had undertaken 1,882 projects to reduce or sequester greenhouse gases. These achieved 269 million metric tons of carbon dioxide equivalent reductions - equal to 3.9 percent of national emissions.
 - A number of proposals to reform the existing registry - or create a new registry - have appeared in energy and/or climate policy bills introduced in the past year. The Administration will fully explore the extent to which the existing authority under the Energy Policy Act is adequate to achieve these reforms.

Progress Check in 2012

The domestic programs proposed by the President allow consumers and businesses to make flexible decisions about emission reductions rather than mandating particular control options or rigid targets. If, however, by 2012, our progress is not sufficient, and sound science justifies further action, the United States will respond with additional measures that may include a broad, market-based program, as well as additional incentives and voluntary measures designed to accelerate technology development and deployment.

Domestic Initiatives

SUMMARY

Key domestic initiatives to contribute to achieving our goal:

- Tax Incentives for Renewables and Cogeneration. The Administration's FY'03 budget proposal seeks \$4.6 billion in clean energy tax incentives over the next five years. These tax credits will spur investments in renewable energy (solar, wind, and biomass), hybrid and fuel cell vehicles, cogeneration, and landfill gas. As directed in the National Energy Policy, the Secretary of the Treasury will work with Congress to extend and expand the production tax credit for electricity generation from wind and biomass, to develop a new residential solar energy tax credit, and to encourage cogeneration projects through investment tax credits.
- Business Challenges. The President challenges American businesses and industries to reduce emissions. Already, agreements with the semi-conductor

and aluminum industries, and industries that emit methane, have dramatically reduced emissions of some of the most potent greenhouse gases. We will build on these successes, with broader agreements and greater reductions.

- **Transportation Programs.** The Administration is promoting the development of fuel-efficient motor vehicles and trucks, researching options for producing cleaner fuels, and implementing programs to improve energy efficiency. The President is committed to expanding federal research partnerships with industry, market-based incentives and updating current regulatory programs that advance our progress in this important area. The Administration has expanded fuel cell research, such as the "FreedomCAR" initiative, and the President's '03 budget seeks more than \$3 billion in tax credits over 11 years for consumers to purchase fuel cells and hybrid vehicles. The Secretary of Transportation has asked the Congressional leadership to work with him on legislation that would authorize the Department of Transportation to reform the Corporate Average Fuel Economy (CAFE) program, fully considering the recent National Academy Sciences report, so that we can safely improve fuel economy for cars and trucks.
- **Carbon Sequestration.** The President's FY '03 budget requests over \$3 billion - a \$1 billion increase above the baseline - as the first part of a ten year (2002-2011) commitment to implement and improve the conservation title of the Farm Bill, which will significantly enhance the natural storage of carbon. The President also directed the Secretary of Agriculture to provide recommendations on further, targeted incentives for forest and agricultural sequestration of greenhouse gases. The President further directed the Secretary of Agriculture, in consultation with the Environmental Protection Agency and the Department of Energy, to develop accounting rules and guidelines for crediting sequestration projects, taking into account emerging domestic and international approaches.

Incentives and Programs for Renewables and Industrial Cogeneration

The President's FY '03 budget proposes providing \$4.6 billion in clean energy tax incentives over the next five years (\$7.1 billion over ten years) for investments in renewable energy (solar, wind, and biomass), hybrid and fuel cell vehicles, co-generation, landfill gas conversion, and ethanol. These incentives are important to meeting the nation's long-term energy supply and security needs, and reducing pollution and projected greenhouse gas emissions. These clean energy tax incentives include:

- **New 10 Percent Tax Credit for Co-Generation (Combined Heat and Power Systems).** The President has proposed a new 10 percent tax credit for investments in combined heat and power systems between 2002 and 2006. The credit will encourage investments in highly efficient CHP projects and spur innovation in improved CHP technologies. No income tax credits are currently available for investment in CHP property.
 - **Cogeneration.** Combined heat and power (CHP), also known as "co-generation", is a highly efficient form of electric generation that recycles heat which is normally lost under traditional power combustion methods. CHP captures the heat left over from industrial use, providing a source of residential and industrial heating and air conditioning in the local area around the power plant. CHP systems achieve a greater level of overall energy efficiency, thereby reducing energy consumption, costs, and carbon emissions.
 - **EPA Combined Heat and Power Partnership.** The new tax credit would enhance efforts underway by the Environmental Protection Agency to streamline the permitting process for cogeneration plants, promote their location in brownfields and other industrial sites, and clarify how companies can use cogeneration to stay in compliance with Clean Air Act pollution standards. On October 5, 2001, in partnership with 17 Fortune 500 companies, city and state governments and nonprofits, EPA announced the Combined Heat and Power Partnership. Current CHP projects of the founding partners represent more than 5,800 megawatts of power generating capacity, an amount capable of serving almost 6 million households. The projects annually reduce carbon dioxide by more than 8 million tons; the annual energy savings equal 19 million barrels of oil. A similar program by the Department of Energy challenges the heat and power industry to double usage of cogeneration in the United States by 2010.
- **First-Ever Tax Credit for Residential Solar Energy Systems.** The

President has proposed a new 15 percent tax credit for individuals who purchase photovoltaic equipment or solar water heating systems used in a residence, up to a maximum credit of \$2,000 for each type of equipment. Currently, no credit is available for non-commercial purchases of solar energy equipment. The credit would be available for photovoltaic equipment purchased between 2002 and 2007, and for solar water heating equipment purchased between 2002 and 2005. This credit will encourage businesses and homeowners to invest in solar power systems.

- **Expanded Tax Credit for Electricity Produced from Wind or Biomass.** The President has proposed extending and modifying the tax credit for electricity produced from wind or biomass. Currently, wind energy accounts for 6 percent of renewable electricity generation and 0.1 percent of total electricity supply. Advances have helped cut costs by more than 80 percent during the last 20 years. This proposal would help make electricity produced from wind and biomass competitive with other sources of electricity supply. The proposal would:

- Extend for three years (2002-2004) the present 1.7 cent-per-kilowatt hour credit for electricity produced from wind and closed-loop biomass (plants grown exclusively to produce electricity); and
- Expand eligible biomass sources to include certain biomass from forest-related resources, agricultural and other sources. For existing biomass facilities, the credit for electricity produced from new sources is 1.0 cent-per-kilowatt hour for three years (2002-2004) of production. For coal fired facilities, electricity produced from co-firing biomass from new sources is 0.5 cent-per-kilowatt hour for three years of production (2002-2004).

- **Tax Credit for New Methane Landfill Projects.** The President has proposed encouraging the development of a new alternative source of energy by providing tax credits for energy produced from landfill gas. The credit would be approximately 1.0 cent-per-kilowatt hour (or the equivalent in dollars per million metric BTU) for energy produced from methane from landfills regulated by the EPA to collect and flare methane, and 1.5 cents-per-kilowatt hour for unregulated landfills. The credit would be available for energy produced from new facilities through 2010.

- **New Tax Credit for New Hybrid or Fuel-Cell Vehicles.** The President has proposed a new temporary tax credit of up to \$4,000 for the purchase of new hybrid vehicles and up to \$8,000 for the purchase of fuel cell vehicles between 2002 and 2007. These credits would be available for all qualifying light vehicles, including cars, minivans, sport utility vehicles, and light trucks. The tax credits will encourage the purchase of highly fuel-efficient vehicles that incorporate advanced automotive technologies and will help to move hybrid and fuel cell vehicles from the laboratory to the highway.

- **Increased Funding for Geothermal Energy.** The President's 2003 budget proposal for the US Geological Survey (USGS) supports alternative, non-fossil fuel energy development. The budget includes an increase for USGS to investigate the nature and extent of geothermal systems and produce updated assessments of available geothermal energy resources in selected regions of the United States. The near-term focus of this effort will be in the Great Basin region, where most of the public land available for geothermal leasing lies. This region encompasses most of Nevada and large portions of California, Oregon, Idaho, and Utah. Available data indicate the presence of a substantial undeveloped geothermal energy resource that could be tapped to help provide for the growing energy requirements of the western United States.

- **Increased Funding for Renewable Energy Resources on Public Lands.** The President's '03 budget proposal calls for a major effort by the Bureau of Land Management (BLM) to increase its renewable energy activities in support of the President's National Energy Policy. In 2003, BLM will encourage the study, exploration, and development of renewable energy resources from public lands. Emphasis will be directed to advancing the use of geothermal, hydropower, wind, solar, and biomass resources.

Business Challenges

The President challenged American businesses and industries to reduce greenhouse gas emissions. Already, agreements with the semi-conductor and aluminum industries, and with industries that emit methane, are dramatically reducing emissions of the most potent greenhouse gases. The President's plan will build on these successes, with broader agreements and greater reductions.

Company Challenges

- EPA's "Climate Leaders" Initiative: EPA will launch a new, voluntary Climate Leaders program with a group of major companies including: Florida Power and Light, GM, Lockheed Martin, Miller Brewing Company, Bethlehem Steel, Interface Inc., SC Johnson and Holcim Inc. These companies have agreed to test new greenhouse gas reporting guidelines as the basis for agreeing to targets in the future. Each participant will establish an individual goal for reducing greenhouse gas emissions, and will voluntarily report those emissions. The Climate Leaders program provides a significant opportunity to achieve the greenhouse gas intensity reductions set forth in this policy through a voluntary approach. In the coming months, the Administration will aggressively pursue additional corporate partners representing a wider spectrum of the U.S. economy.

Sector Challenges

- Semiconductors: On March 13, 2001, EPA and the Semiconductor Industry Association signed a new voluntary agreement, the PFC Reduction Climate Partnership. Under this partnership, the industry agreed to reduce emissions of perfluorocarbons (PFCs) by 10 percent from 1995 levels by the end of 2010. The expected reduction of 13.7 million metric tons of carbon dioxide equivalent in 2010 alone is comparable to taking 12 million cars off the road. PFCs have, on average, 10,000 times the potency of carbon dioxide over 100 years, and persist in the atmosphere 2,000 to 50,000 years.
- Aluminum: Twelve of the thirteen U.S. primary aluminum producers, representing 96 percent of the U.S. primary aluminum production capacity, have joined EPA's Voluntary Aluminum Industrial Partnership. Companies participating in this program have committed to make reductions in two potent PFCs, tetrafluoromethane (CF₄) and hexafluoroethane (C₂F₆). The program met its 2000 goal to reduce PFC emissions from U.S. primary aluminum smelting by 45% – equivalent to 1.8 million metric tons of carbon – using cost-effective approaches that make economic and environmental sense for the partners.
- Methane: Because of the potency of methane relative to carbon dioxide, a "methane-first" strategy for greenhouse gas mitigation is cost-effective. A variety of U.S. industry and government partnerships have reduced methane emissions, and they are expected to hold emissions at or below 1990 levels through and beyond 2010. Partners in EPA's methane programs are projected to maintain emissions below 1990 levels through 2010.
 - EPA's Natural Gas STAR program includes companies representing 40 percent of the U.S. natural gas production, 72 percent of transmission company pipeline miles, 49 percent of distribution company service connections, and 23 percent of processing throughput. This partnership has achieved significant reductions. In 2000, EPA estimates a reduction in methane emissions of 4 million metric tons of carbon equivalent, and projects for 2010 a reduction of 6 million metric tons of carbon equivalent.
 - EPA's Coalbed Methane Outreach Program (CMOP) encourages industry to reduce methane emissions from underground coal mines. The program provides technical assistance to mining companies on technologies for recovered methane. EPA estimates that CMOP reduced 2 million metric tons carbon equivalent in 2000.
 - In the agriculture sector, USDA and EPA have partnered on the Ag-STAR program and the Ruminant Livestock Efficiency Program (RLEP), which focus on reducing methane emissions. The overall impact of these two programs on greenhouse gas emissions has been small on a national scale, but program stakeholders in the agricultural community have demonstrated that the practices can reduce greenhouse gas emissions and increase productivity.

Improving Fuel Economy

Developing new technologies to improve the energy efficiency of transportation in the United States will be a key element in achieving future reductions in greenhouse gas emissions. Cars, trucks, aircraft and other parts of the nation's transportation system are responsible for about one-third of the carbon dioxide emissions in the United States. The Administration is currently promoting the development of fuel-efficient motor vehicles and trucks, researching options for producing cleaner fuels, and implementing programs to improve energy efficiency. The President is committed to the expansion and improvement of federal research partnerships with industry, market-based incentives, and reforming current regulatory programs that advance our progress in this

important area.

- The "FreedomCAR" – Advancing Hydrogen-Based Fuel Cells. On January 9, 2002, Energy Secretary Abraham, with the heads of General Motors, Ford Motor Co. and the Chrysler arm of DaimlerChrysler, announced a new partnership, FreedomCAR (Cooperative Automotive Research), to promote the development of hydrogen as the primary fuel for cars and trucks. The "FreedomCAR" program embraces the long-term strategic goal of developing a new breakthrough technology - the hydrogen-powered fuel cell – with a vision of ultimately eliminating our reliance on foreign oil.
- The Department Of Energy's Public-Private Projects for Low-Cost, Breakthrough Fuel Cell Technology. In August 2002, Energy Secretary Abraham announced new partnerships, totaling \$500 million, with Honeywell, Siemens, Westinghouse Power Corporation, Delphi Automotive Systems, Battelle, Cummins Power Generation, and McDermott Technologies. The partnerships build upon President Bush's commitment to fuel cell research and cutting edge technologies. The goal of this initiative is to cut the costs of fuel cells to as low as one-tenth the cost of currently marketed systems and to one-third the cost of the more advanced concepts now beginning to reach commercial readiness.
- Tax Credits for New Hybrid or Fuel Cell Vehicles. The President has proposed a new temporary tax credit of up to \$4,000 for the purchase of new hybrid vehicles and up to \$8,000 for the purchase of fuel-cell vehicles between 2002 and 2007. These credits would be available for all qualifying light vehicles, including cars, minivans, sport utility vehicles, and light trucks. The tax credits will encourage the purchase of highly fuel-efficient vehicles that incorporate advanced automotive technologies and will help to move hybrid and fuel cell vehicles from the laboratory to the highway.
- Corporate Average Fuel Economy Standards (CAFE). A key recommendation of the President's National Energy Policy directed the Secretary of Transportation to review and provide recommendations on establishing updated CAFE standards, with due consideration of the July 2001 National Academy of Sciences (NAS) report. The NAS report included several recommendations pertaining to options for structuring the CAFE system, including permitting manufacturers to trade fuel economy credits.
 - The Administration supports increasing automobile fuel economy and encouraging new technologies that reduce our dependence on imported oil, while protecting passenger safety and jobs.
 - On February 1, 2002, Transportation Secretary Mineta asked the Congressional leadership to "work...on legislation that would authorize the Department of Transportation to reform the CAFE program, fully considering the NAS report. Possible reforms include: (1) adopting fuel economy targets that are dependent on vehicles attributes, such as vehicles weight, that inherently influence fuel use and have minimal adverse safety consequences; (2) utilizing market-based incentives, such as trading of fuel economy credits, to obtain fuel savings at the lowest possible cost to consumer while providing continuous incentives for additional fuel economy enhancement; (3) encouraging development and implement of new technologies; and (4) establishing realistic, long-term targets and deadlines to increase economy safely while providing greater long-term product planning for vehicles manufacturers."
 - On July 10, 2001, Transportation Secretary Mineta urged Congress to lift the appropriations ban on new rulemaking of CAFÉ standards by the National Highway Transportation Safety Administration (NHTSA) "to improve vehicle fuel efficiency standards." In December 2001, Congress responded by lifting the ban, and last week NHTSA initiated a public review process for safely improving the fuel economy of new light truck standards for model year 2005 through 2010, and for reforming the CAFÉ program.
- Tire Pressure Monitoring Systems (TPMS). The Department of Transportation's National Highway Transportation Safety Administration (NHTSA) will finalize this year a rule requiring the installation of tire pressure monitoring systems (TPMSs) in all new cars and light trucks. Properly inflated tires improve fuel efficiency and reduce maintenance costs. NHTSA estimates that the annualized benefits range from \$120-480 million in fuel savings and \$75-165 million in reduced tread wear. NHTSA predicts TPMS will save between .31 and 1.27 million metric tons of carbon equivalent per year when applied to the entire on-road fleet. That reflects between 128 and 528 million gallons of gasoline per year.

- **First-Ever EPA Agreement with Ford to Develop High-Efficiency Auto Technology.** In September 2001, EPA agreed to license to the Ford Motor Company a unique, high-efficiency "hydraulic hybrid" technology that has the long-term potential to reduce energy consumption and greenhouse gas emissions. The first application of this technology, planned for model year 2005, will result in a minimum 30 percent improvement in vehicle fuel economy; the second phase, planned for as early as year 2009, should double the fuel economy of selected new vehicles. This is the first-ever licensing agreement between EPA and an automobile company involving vehicle powertrain technology.

Promoting Domestic Carbon Sequestration

In the agriculture sector, activities including fertilizer use, animal waste management and on-farm fuel use account for 148 million metric tons of carbon equivalent emissions, about 8 percent of total U.S. greenhouse gas emissions. The President's FY'03 budget requests \$3 billion above the base-line over 10 years (2002-2011) for a new, conservation-focused Farm Bill that will enhance the natural storage of carbon dioxide.

Increased Funding for USDA's Conservation Programs:

- **The Conservation Reserve Program (CRP)** assists farm owners and operators to conserve and improve soil, water, air and wildlife resources by removing environmentally sensitive land from agricultural production and keeping it under long-term resource-conserving cover. Currently, USDA estimates that the CRP removes nearly 34 million acres of environmentally sensitive cropland from production, which generates long-term environmental benefits, including the annual savings of about 15 million metric tons of carbon emissions per year. The CRP would expand to 40 million acres, saving roughly 19 million metric tons of carbon per year. The Administration's FY '03 budget proposes an increase of \$89 million over the FY '02 enacted level.
- **The Environmental Quality Incentives Program (EQIP)** helps producers make beneficial and cost-effective changes to cropping and grazing systems; improve manure, nutrient and pest management, and implement conservation measures to improve soil, water, and related natural resources. USDA estimates that the EQIP program (in combination with conservation technical assistance) provides assistance to farmers for planning and implementing soil and water conservation practices and removes roughly 12 million metric tons of carbon per year. The Administration's FY'03 proposes an increase of \$800 million over the FY '02 enacted level.
- **The Wetland Reserve Program (WRP)** has enrolled just over 1 million acres to date. Under current authority, the program is capped at 1,075,000 acres, and has already reached that level this year. Estimated soil carbon sequestration resulting from conversion of cropland on wetland soils to grassland or forest by 1997 (1.4 million acres) has resulted in carbon sequestration rates of over 2 million metric tons of carbon per year. The Administration has supported a version of the Farm Bill that would expand the WRP to 2.225 million acres, saving roughly 4 million metric tons of carbon per year. The Administration's FY '03 proposes an increase of \$176 million over the FY '02 enacted level.
- **The Forest Stewardship Program** provides technical and financial assistance to nonindustrial, private forest owners. About 147 million hectares of U.S. forests are nonindustrial, private forestlands and provide many ecological and economic benefits and values. These forests provide about 60 percent of our nation's timber supply, with increases expected in the future. The acceleration of tree planting on nonindustrial, private forestlands and marginal agricultural lands can help meet resource needs and provide important ancillary benefits that improve environmental quality, such as wildlife habitat, soil conservation, water quality protection and improvement, and recreation. Additionally, tree planting and forest management increases uptake of carbon dioxide and the storage of carbon in living biomass, soils, litter, and long-life wood products. The Forest Service, in cooperation with state forestry agencies, manages both programs, and estimates that these programs provide 700,000 metric tons of carbon reductions per year. The Administration's FY '03 budget proposes an increase of \$16 million over the FY '02 enacted level.

Promote New and Expanded International Policies

SUMMARY

The President's approach will actively pursue the integration of our domestic goals and policies with those of other nations. The President has submitted provisions in the FY '03 budget includes:

- **Tripling Funding for "Debt-For-Nature" Programs.** Building upon recent Tropical Forest Conservation Act (TFCA) agreements with Belize, El Salvador, and Bangladesh, the President's FY '03 budget request of \$40 million to fund "debt for nature" agreements with developing countries nearly triples funding for this highly successful program. The President also announced a new deal with the Government of Thailand, which will preserve important mangrove forest in Northeastern Thailand in exchange for debt relief worth \$11.4 million.
- **Investing \$25 Million in Climate Observation Systems in Developing Countries.** In response to the National Academy of Sciences' recommendation for better observation systems, the President has allocated \$25 million and challenged other developed nations to match the U.S. commitment.
- **Expanding Technology Transfer and Capacity Building in the Developing World:**
 - **Fully Funding the Global Environment Facility (GEF).** The President's FY '03 budget requests \$178 million for the GEF, a \$77 million increase, which includes a substantial \$70 million payment for arrears incurred during the prior Administration. These funds will support transfer of advanced energy and sequestration technologies to the developing world.
 - **Dedicating Significant Funds to the United States Administration on International Development.** The President's '03 budget requests \$155 million in funding for USAID climate change programs. USAID serves as a primary vehicle for transferring American energy and sequestration technologies to developing countries to promote sustainable development and minimize their GHG emissions growth.
- **Building on International Cooperative Agreements:**
 - **Joint Research with Japan.** The U.S. and Japan continue their High-Level Consultations on climate change issues. Later this month, a team of U.S. experts will meet with their Japanese counterparts to discuss specific projects within the various areas of climate science and technology, to identify the highest priorities for collaborative research.
 - **Joint Research with Italy.** The U.S. and Italy have identified more than 20 joint climate change research activities for immediate implementation and more topics for further development in critical areas of global and regional climate modeling, atmospheric studies related to climate, carbon cycle research, low-carbon technologies and other related areas.

Increased Funding for Tropical Forest Conservation

The Tropical Forest Conservation Act (TFCA) reflects America's commitment to preserving tropical forests worldwide. Created in 1998 and reauthorized in 2001 with broad bipartisan support, the program offers eligible countries the opportunity to reduce their debt to the United States while preserving their tropical forests. TFCA encourages and empowers local communities and nongovernmental organizations to develop and implement grassroots solutions to conservation problems. Grants from the local fund can be used to support a wide range of activities, such as training programs to increase the capacity of individuals and organizations involved in forest conservation areas; restoration of forested areas; and the protection of parks and other protected areas. The President's 2003 budget proposal seeks \$50 million in funding for tropical forestry conservation, of which \$40 million may be used for TFCA.

Estimates of the carbon sequestration value of tropical forests suggest a wide range of values. The World Resources Institute estimates that carbon sequestration value ranges from 6 to 72 tons per acre of rainforest. The 1995 IPCC report further analyzed the global potential for carbon storage. Slowing tropical deforestation on 700 million hectares (nearly the size of the US, but only 17 percent of the global forest area) could store 60 to 87 million gigatons of carbon in 55 years. Annual carbon storage could be over two gigatons by 2050, about 14% of projected emissions.

- **Agreements During the Bush Administration.** TFCA agreements have been negotiated with Belize, El Salvador, and Thailand during this administration.
- **Leverage.** The four TFCA agreements to date - Bangladesh, Belize, El Salvador, and Thailand - generate approximately \$40 million in forest conservation funding at a cost of \$19.2 million.
 - **Bangladesh.** Debt reduction agreement signed September 12, 2000; saves Bangladesh \$10 million in hard currency payments and will generate \$8.5 million in local currency interest payments for tropical forest conservation of Sundarban mangrove forests, which shields the coastline from typhoons and provides habitat for the last genetically viable population of Royal Bengal tigers.
 - **Belize.** In August, 2001, the U.S. and Belize concluded a "debt-for-nature" agreement to protect 23,000 acres of tropical forests. The agreement leveraged \$1.3 million in private funds raised by The Nature Conservancy.
 - **El Salvador.** Debt reduction agreement signed July 12, 2001; Tropical Forestry Agreement signed September 14, 2001. Reduced country's official debt to the U.S. by \$3 million, generating \$14.3 million for tropical forest conservation in local currency interest payments. Initial target of TFCA funds will be reforestation of hillsides.
 - **Thailand.** Debt reduction agreement signed September 19, 2001; agreement was approved by the Thai Cabinet on February 12, 2002. Debt agreement saves Thailand's \$11.4 million in hard currency payments and will generate \$9.5 million for conservation activities. Initial targets for TFCA funds include reforestation projects in northeastern Thailand, protection of mangrove forests.

Expanding Technology Transfer and Capacity Building in Developing Countries

The President's FY '03 budget significantly expands funding for current programs that transfer advanced energy and sequestration technologies to developing countries, and provide technical assistance and training to their citizens. Eighty-one percent of the growth in global carbon emissions from fossil fuel use in 1990–2010 is expected to come from developing countries, according to projections by the Energy Information Administration. Reducing this projected, exponential growth of emissions in developing countries therefore must be a critical element of any rational policy to address global climate change. First, the "breakthrough" technological advances achieved under the President's National Climate Change Technology Initiative will benefit all nations, and will not be confined to applications in the United States. Second, America will increase its commitment to helping the developing world gain access to advanced energy efficiency and sequestration technologies, by reinvigorating and expanding support for existing technology transfer programs.

- **Investing \$25 Million in Climate Observation Systems in Developing Countries.** In response to the National Academy of Sciences' recommendation for better observation systems, the President has allocated \$25 million and challenged other developed nations to match the U.S. commitment.
- **Fully Funding the Global Environment Facility (GEF).** The U.S. contribution to the GEF and leading a robust, multinational 5-year replenishment commitment.
 - The Administration's Fiscal Year '03 budget requested \$178 million in funding for the GEF, a 77 percent increase over the FY '02 enacted level of \$100.5 million. It includes \$107.5 million to fully fund the first installment of the U.S. pledge of \$430 million to the GEF's "Third Replenishment" (GEF-3) for 2003-2006. The FY '03 budget also includes \$70 million to clear one-third of the \$211 million arrears balances incurred by the United States during the last Administration.
 - The GEF fulfills a critical role in improving the environment globally, particularly in financing developing countries' ability to address environmental issues relating to climate change, biodiversity conservation, and land degradation. The GEF, operating as the United Nation's Framework Convention on Climate Change's primary "financial mechanism," funds the extra costs (over normal development costs) of reducing greenhouse gas emissions in energy and other projects. The GEF's project portfolio has demonstrated a wide range of approaches to promoting energy efficiency and renewable energy, often through initiatives in partnership with the private sector. GEF grant projects are

implemented at the country level through the World Bank, UN Development Program, UN Environment Program and regional development banks.

- Since beginning regular operations in 1994, the GEF has designed and implemented over 800 projects in 160 countries. The GEF has committed \$3.2 billion to date, leveraging well over \$8 billion from other sources. Co-financiers include the developing countries themselves, bilateral aid agencies and other multilateral financial institutions, NGOs and the private sector. Leveraging for clean energy projects is often as high as \$5 from other sources for every GEF dollar. U.S. companies are the largest beneficiaries of contracts extended for GEF projects, securing 30 percent of all contracts.
- Recent examples of highly successful GEF projects include:
 - Mexico. The Mexico High Efficiency Lighting Project under which Mexican consumers and businesses have installed almost 40 percent more efficient lights than originally projected;
 - India. The India Alternate Energy Project promoting investment in 41 megawatts of wind power through the provision of low-market loans, stimulating massive follow-up investment with wind power now supplying 850 megawatts of energy in India;
 - Brazil. The Brazil Biomass Power Commercial Demonstration Project promotes the use of high-efficiency agricultural byproducts as fuel for electric power and agro-industry process heat;
 - China. The Chinese Coalbed Methane Project demonstrates technologies in Chinese coal mines for capturing clean-burning methane as fuel;
 - Latvia. The Latvia Solid Waste Management and Landfill Gas Recovery project (\$25 million total, with \$5 million from GEF) will harness landfill gas for electricity production and facilitate separation of recyclable materials;
 - Philippines. The project supports the connection of a grid-connected power plant on Mindanao which combines solar and hydroelectric power;
 - Bangladesh. The Rural Electrification and Renewable Energy Development project promotes solar energy in rural areas implemented by established Bangladeshi institutions and is expected to provide solar power to as many as 130,000 additional rural households;
 - Ecuador. The Renewable Energy for Electricity Generation, Renewable Electrification of the Galapagos Islands project is aimed at reducing Ecuador's energy-related carbon dioxide emissions by introducing solar and wind energy to the Galapagos Archipelago, and is expected to provide wind and solar re-powering of village mini-grids on three islands serving more than 5,000 people; and
 - Kenya. The Ormat Olkaria III Geothermal Power Development project will provide GEF financing for the first private sector financed and managed geothermal electric project in Africa and among the first private power projects in Kenya and East Africa.
- Dedicating Significant Funds to United States Agency for International Development (USAID). The President has maintained a strong commitment to technology transfer and capacity building in developing countries by requesting \$155 million dedicated to climate change in the USAID FY '03 budget.
- Following up on the recently concluded Technology Cooperation Agreement Pilot Project (TCAPP), USAID is working with partners in Brazil, Egypt, Mexico, the Philippines, and Southern Africa to implement projects and activities designed to encourage the accelerated adoption of energy efficiency and renewable energy technologies and practices in several key sectors.
 - Brazil. Technology cooperation efforts are focused on the development of new sustainable, energy efficient and renewable energy technologies to meet the development needs in the Northeast region. This effort provided start-up financing for rural energy entrepreneurs through a combination of enterprise development services and start-up financing.
 - Philippines. Technology cooperation efforts are supporting national goals to expand rural electrification by using renewable energy sources such as, wind power.

- Southern Africa. USAID is supporting activities designed to promote the widespread use of solar water heaters in selected areas. Program-wide efforts also include a focus on the development and dissemination of outreach and communication tools in an effort to encourage information sharing.
- The Cairo Air Improvement Project (CAIP) is a \$60 million USAID program that is designed to reduce vehicular emissions, such as particulates and lead. The CAIP is reducing air pollution by:
 - operating a vehicle emission testing, tune-up, and certification program and promoting the conversion of diesel-fueled, public sector, municipal bus fleets to compressed natural gas; and
 - reducing the concentration of air pollution from smelters.
- Building on International Cooperative Agreements:
 - Joint Research with Japan. The U.S. and Japan continue their High-Level Consultations on climate change issues. Later this month a team of U.S. experts will meet with their Japanese counterparts to discuss specific projects within the various areas of climate science and technology to identify which of the highest priority opportunities to pursue.
 - Joint Research with Italy. The United States and Italy convened a "Joint Climate Change Research Meeting" in Rome on January 22-23, 2002, following upon a pledge of President Bush and Prime Minister Berlusconi to undertake joint research on climate change. This pledge recognized the need to draw on sound science and the power of technology to reduce the uncertainty associated with future global climate and environmental challenges. The two sides identified more than 20 joint climate change research activities for immediate implementation and more topics for further development in critical areas of global and regional climate modeling, atmospheric studies related to climate, carbon cycle research, low-carbon technologies and other related areas. The climate science research activities for immediate implementation will improve the capability to understand, monitor and predict climatic variations and their impacts. In addition, the technology research activities for immediate implementation will contribute to the development of advanced low carbon technologies to limit net emissions of greenhouse gases.
 - Pursue Joint Research with Central America. The United States and Central American Heads of Government signed the Central American-United States of America Joint Accord (CONCAUSA) on December 10, 1994. The original agreement covered cooperation under action plans in four major areas: conservation of biodiversity, sound use of energy, environmental legislation, and sustainable economic development. On June 7, 2001, the United States and its Central American partners signed an expanded and renewed CONCAUSA Declaration, adding disaster relief and climate change as new areas for cooperation. The new CONCAUSA Declaration calls for intensified cooperative efforts to address climate change through scientific research, estimating and monitoring greenhouse gases, investing in forestry conservation, enhancing energy efficiency, and utilizing new environmental technologies.

Enhanced Science and Technology

SUMMARY

The President's policy builds on his June 11 commitments to global climate science and technology: 1) fully fund high-priority areas for climate change science over the next five years; and 2) strengthen technology research at universities and national labs, to enhance partnerships in applied research, develop improved technology for measuring and monitoring gross and net greenhouse gas emissions, and fund demonstration projects for cutting-edge technologies, such as bioreactors and fuel cells.

- Increase Support for America's Commitment to Climate Science and Technology Initiatives. The Administrations FY'03 budget seeks an additional \$700 million for climate change programs, bringing total climate spending up to \$4.5 billion per year. This commitment to climate change research and development is unmatched in the world, and is particularly notable given America's focus on domestic and international security issues in the FY '03 budget. A key element of this effort is dedicated to funding for the Climate Change Research Initiative and the National Climate Change Technology Initiative. These initiatives are core components of the President's '03 budget. They are designed to fund high-priority research to address major gaps in our current understanding of climate science and to promote the development of the most promising "breakthrough" technologies for clean

energy generation and carbon sequestration.

- The Climate Change Research Initiative. The U.S. will spend \$1.7 billion in FY'03 for basic research on climate change, \$40 million of which is dedicated to leverage other funding to address major gaps in understanding the carbon cycle and the role of black soot.
- The National Climate Change Technology Initiative. The U.S. will spend \$1.3 billion on climate change technologies, of which \$40 million will be spent on development and deployment of advanced energy and sequestration technologies critical to long-term emission reduction.
- The President Has Established a New High-Level Committee on Climate Change Science and Technology Integration (CCCSTI). This Committee consists of the Secretaries of Commerce, Energy, State, Agriculture, Interior, Health and Human Services, Defense, and Transportation, EPA Administrator, OMB Director, NEC Director, NASA Administrator, NSF Director and CEQ Chairman. The Executive Director of the committee will be the Director of the Office of Science and Technology Policy. The functions of the CCCSTI include but are not limited to: 1) providing recommendations concerning climate science and technology to the President; 2) recommending the movement of funding and programs across agency boundaries; and 3) coordination with the Office of Management and Budget on the Committee's recommendations. The Chair of CCCSTI is responsible for the final review of recommendations to the Climate Change Panel. Research will continue to be coordinated through the National Science and Technology Council in accordance with the Global Change Research Act of 1990.

Climate Change Research Initiative

On June 11, 2001, the President announced a new commitment to developing a science-based climate change policy, and a new commitment to funding research on "breakthrough technologies" that will help meet the long-run climate change challenge. To study areas of scientific uncertainty and identify priority areas where investments can make a difference, the President created the Climate Change Research Initiative (CCRI). The CCRI promotes a vision focused on the effective use of scientific knowledge in policy and management decisions, and continued evaluation of management strategies and choices.

The President's FY '03 budget requested \$40 million for CCRI to be shared among five agencies (NOAA, NSF, NASA, DOE, and USDA). This investment will focus on answering key questions recently identified by the National Academy of Sciences in its 2001 report, "Climate Change Science: An Analysis of Some Key Questions." The CCRI will improve the integration of scientific knowledge, including measures of uncertainty, into effective decision support systems and will adopt performance metrics and deliverable products useful to policymakers in a short time frame (2-5 years).

Specific priorities identified for FY 2003 include:

- Understanding the North American Carbon Cycle. An intensive research effort will be focused on understanding North American terrestrial and oceanic carbon sources and sinks, to improve monitoring techniques, reconcile approaches for quantifying carbon storage, and elucidate key controlling processes and land management practices regulating carbon fluxes between the atmosphere, land, and the ocean. This effort will develop automated carbon dioxide and methane sensors, and improve ground-based measurements and inventories of forest and agricultural lands.
- Developing Reliable Representation of the Global and Regional Climatic Forcing by Atmospheric Aerosols. Aerosols and tropospheric ozone play unique but poorly quantified roles in the atmospheric radiation budget. CCRI investments will implement plans developed by the interagency National Aerosol-Climate Interactions Program to define and evaluate the role of aerosols that absorb solar radiation, such as black carbon and mineral dust. Proposed activities include field campaigns (including aircraft fly-overs), in situ monitoring stations, and improved modeling and satellite data algorithm development.
- Investing in Computer Modeling. The continued development and refinement of computer models that can simulate the past and future conditions of the Earth's climate system is important for providing more accurate projections of future climate change. NOAA will establish a Climate Modeling Center within the Geophysical Fluid Dynamics Laboratory (GFDL) at Princeton, New Jersey, to focus on model product generation research, assessment, and

policy applications.

- Ensuring High-Quality, Long-Term Climate Data Records. This is a long-term effort to develop high fidelity climate data records from satellite observing systems. Initial work will target calibration and validation of instruments planned for the National Polar-orbiting Operational Environment Satellite System (NPOESS) to ensure a smooth transition and guarantee climate-quality data.

National Climate Change Technology Initiative

On June 11, 2001, the President announced a new commitment to developing a science-based climate change policy, and a new commitment to funding research on "breakthrough technologies" that will help meet the long-run climate change challenge. To advance and bring focus to technologies that offer great promise to significantly reduce greenhouse gas emissions, the President created the National Climate Change Technology Initiative (NCCTI). The President charged the Secretaries of Commerce and Energy, working with other agencies, to:

- Evaluate the State of U.S. Climate Change Technology Research and Development and Make Recommendations for Improvement. The U.S. government funds many different technologies that can help mitigate greenhouse gas emissions. Some are designed to improve energy efficiency or create opportunities to switch to fuels, products, and processes that emit lower amounts of greenhouse gases. Others enhance carbon removal or storage in terrestrial, ocean, and geological sinks, or explore innovative concepts and breakthrough technologies.
- Provide Guidance on Strengthening Basic Research at Universities and National Laboratories, Including the Development of Advanced Mitigation Technologies that Offer the Greatest Promise for Low-Cost Reductions of Greenhouse Gas Emissions. There are many scientific and technological challenges regarding costs, environmental impacts, and public acceptability that must be resolved before climate change mitigation technologies can reach their full potential. Federal research efforts can help meet these challenges.
- Develop Opportunities to Enhance Private-Public Partnerships in Applied Research and Development to Expedite Innovative and Cost-Effective Approaches to Reducing Greenhouse Gas Emissions. The U.S. government has established partnerships with the private sector to advance technologies that mitigate greenhouse gas emissions. It is critical to enhance this role and ensure that partnerships with industry are directed toward the most mutually beneficial outcomes.
- Make Recommendations for Funding Demonstration Projects for Cutting-Edge Technologies. Cutting-edge technologies hold the promise of significantly reducing greenhouse gas emissions.
- Evaluate Improved Technologies for Measuring and Monitoring Gross and Net Terrestrial Greenhouse Gas Emissions. Private sector investors are reluctant to participate in projects without reliable and credible quantification of the uncertainties associated with different land management practices. Cost-effective measurement systems will not only increase the attractiveness of agricultural greenhouse gas projects to investors, but can also provide valuable information to individual farmers and ranchers optimizing the use of fuel, fertilizers, and other substances.

The President's FY '03 Budget requests \$40 million within the Department of Energy to begin work on NCCTI. Specific research areas are being identified through an interagency review process. The NCCTI will build on an existing base of research and development in climate change technologies, primarily at the Department of Energy, the Environmental Protection Agency, and the Department of Agriculture. A complete report on the findings and recommendations of the NCCTI will be issued soon.

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