Testimony of

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Mr. Chairman and Members of the Committee, thank you for the opportunity to appear before you today to discuss climate change activities at the Department of Energy (DOE).

As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), the United States shares with many countries its ultimate objective: stabilization of greenhouse gas concentrations in the atmosphere at a level that prevents dangerous interference with the climate system. In February 2002, President Bush reaffirmed his Administration's commitment to this central goal of the Framework Convention.

The Bush Administration believes that the most effective way to meet this challenge is to focus not solely on greenhouse gas emissions, but rather on a broader agenda that promotes economic growth, provides energy security, reduces pollution, *and* mitigates greenhouse gas emissions. Many of the DOE programs I will discuss today advance these goals.

Addressing global climate change will require a sustained, long-term commitment by all nations over many generations. To this end, the President has established a robust and flexible climate change policy that harnesses the power of markets and technological innovation, uses the best available science, maintains economic growth, and encourages global participation. Major elements of this approach include:

- implementing near-term policies and measures to slow the growth in greenhouse gas emissions;
- advancing climate change science;
- accelerating technology development; and
- promoting international collaboration.

Near-Term Policies and Measures

Although climate change is a complex and long-term challenge, the Bush administration recognizes that there are cost-effective steps we can take now. In 2002, President Bush set an ambitious national goal to reduce the greenhouse gas intensity of the U.S. economy—i.e.,

emissions per unit of economic output—by 18 percent by 2012, which represents about a 28 percent increase in the rate of improvement projected by the Energy Information Administration (EIA) over this period.

A hallmark of the intensity approach is flexibility, an especially important consideration when confronted with the many uncertainties surrounding climate change. These uncertainties suggest that a measured response is required that concentrates first on slowing emissions growth before trying to stop and eventually reverse it. Unlike the Kyoto Protocol approach, a greenhouse gas emissions intensity goal can encourage reductions without risking economic consequences that could jeopardize our ability to invest in long-run scientific and technological solutions.

In 2002, the Administration estimated that its 18 percent intensity improvement goal will reduce cumulative emissions of carbon by more than 1,833 million metric tons of carbon dioxide by 2012. Recent EIA projections suggest that achieving the 18 percent goal will reduce carbon emissions by 366 million metric tons of carbon dioxide in 2012 alone.

To this end, the Administration has developed an array of policy measures, including financial incentives and voluntary programs. Among these are DOE's Climate VISION program and the Voluntary Reporting of Greenhouse Gases Program authorized under subsection 1605(b) the Energy Policy Act of 1992 and commonly known as the "1605(b)" program.

- **Climate VISION:** In setting the 18 percent decade goal, President Bush issued a challenge to the private sector to do its part. The President's call resonated with business, and in February 2003, the Federal Government and industry organizations representing thousands of companies from 12 energy-intensive economic sectors (since expanded to 14) and The Business Roundtable joined in a voluntary partnership known as Climate VISION (Voluntary Innovative Sector Initiatives: Opportunities Now). These Climate VISION partners, which include some of the largest companies in America, represent a broad range of industry sectors—oil and gas, electricity generation, coal and mineral production and mining, manufacturing (automobiles, cement, iron and steel, magnesium, aluminum, chemicals, and semiconductors), railroads, and forestry products—accounting for about 40 to 45 percent of total U.S. greenhouse gas emissions. Four Federal agencies participate in the program: DOE (lead), Department of Agriculture, Department of Transportation, and Environmental Protection Agency.

  Climate VISION is unique in that it focuses on economic sectors, not specific companies, with each industry association making a commitment on behalf of its members to reduce greenhouse gas emissions intensity. The program works with its partners in four areas: (1) measuring and monitoring; (2) finding cost-effective solutions to reduce energy use and GHG emissions; (3) helping to direct industry's energy efficiency R&D investments; and (4) exploring cross-sector efficiency gains to reduce emissions.

  The Climate VISION program also is exploring risk-based incentives for early commercial uses of advanced energy technologies to tip private investment decisions and speed the market penetration of new technologies and systems. It is looking at several areas where this approach could be applied, including residential and commercial buildings, coal gasification,

nuclear energy, and biorefining. Climate VISION and DOE's Building America program, for example, have been working with three states—California, Texas, and New York—on pilot projects aimed at using a transaction chain approach to transform housing markets to increase the penetration of energy efficient homes. The lessons learned in these pilots could help inform policies to move the housing market towards greater energy efficiency.

The Climate VISION website—www.climatevision.gov—is an excellent source of information about the program and the voluntary activities undertaken by industry to reduce emissions intensity.

- **"1605(b)" Voluntary Greenhouse Gas Registry:** The 1605(b) program is a voluntary system administered by EIA (http://www.eia.doe.gov/oiaf/1605/frntvrgg.html) that provides a vehicle for companies to record progress in reducing greenhouse gas emissions. Currently, about 220 companies file annual reports. In February 2002, President Bush directed that the 1605(b) program be revised to enhance the "accuracy, reliability, and verifiability" of the data reported to the system.

  Based on this guidance, DOE's Policy Office has been working with an interagency group to improve the system. We issued draft revised General Guidelines in November 2003, and subsequently held a public workshop to discuss the proposed guidelines and to receive comments.

  Interim Final General Guidelines and a Notice of Availability for the Draft Technical Guidelines were published in the Federal Register of March 24, 2005, for public comment. The Department of Energy hosted a public workshop April 26-27, 2005, to discuss the guidelines and to receive public comment. The agenda for this workshop, the presentation slides used during the workshop, a list of participants, and a full transcript of the plenary sessions are now available on DOE's website. On May 5, 2005, the Departments of Agriculture and Energy held a workshop on the agricultural and forestry elements of the guidelines. On June 30, 2005, EIA issued a Federal Register notice soliciting public comment on draft reporting forms and instructions based on the Interim Final General Guidelines and Draft Technical Guidelines. It is DOE's intention that final guidelines be issued this fall.

Other key Administration programs, like the Environmental Protection Agency's Climate Leaders and SmartWay Transport Partnership, also work in voluntary partnership with industry to reduce emissions. Further, the Department of Agriculture is using its conservation programs to provide an incentive for actions that increase carbon sequestration. DOE is pursuing many energy supply technologies with comparatively low or zero carbon dioxide emissions profiles, such as solar, wind, bioenergy, and combined heat and power. And the Bush Administration also has increased fuel economy standards for new light trucks and sport utility vehicles by 1.5 miles per gallon over the next three model years. A new round of standards is being prepared for proposal later this summer.

These and other initiatives may be contributing to greenhouse gas emission intensity reductions that we have seen already. The President's 18 percent ten-year goal represents an average annual rate of about 2.0 percent (compounded). According to Energy Information Administration's

(EIA) *Emissions of Greenhouse Gases in the United States 2003* report, the energy-related greenhouse gas intensity was 2.3 percent lower in 2003 than in 2002, and a recent EIA estimate suggests a further improvement in carbon dioxide emissions intensity of 2.6 percent in 2004. Overall, then, the Nation appears to be ahead of schedule in meeting the President's goal.

Accelerating Climate Change Technology Development

While acting to slow the pace of greenhouse gas emissions intensity in the near term, the Administration is laying a strong technological foundation to develop realistic mitigation options to meet energy security and climate change objectives.

The Bush Administration is moving ahead on advanced technology options that have the potential to substantially reduce, avoid, or sequester future greenhouse gas emissions. Over 80 percent of current anthropogenic greenhouse gas emissions are energy related, and although projections vary considerably, a tripling of global energy demand by 2100 is not unimaginable. Therefore, to provide the energy necessary for continued economic growth while we reduce greenhouse gas emissions, we may have to develop and deploy cost-effective technologies that alter the way we produce and use energy.

The Climate Change Technology Program (CCTP), which I direct, was created to coordinate and prioritize the fFederal Government's nearly $3 billion annual investment in climate-related technology research, development, demonstration, and deployment (RDD&D). Using various analytical tools, CCTP is assessing different technology options and their potential contributions to reducing greenhouse gas emissions. Given the tremendous capital investment in existing energy systems, the desired transformation of our global energy system may take decades or more to implement fully. A robust RDD&D effort can make advanced technologies available sooner rather than later and can accelerate modernization of capital stock at lower cost and with greater flexibility.

Later this week, Energy Secretary Bodman, who chairs the President's Cabinet Committee on Climate Change Science and Technology Integration, will release the CCTP Vision and Framework for our forthcoming draft Strategic Plan. CCTP's strategic vision has six complementary goals: (i) reducing emissions from energy use and infrastructure; (ii) reducing emissions from energy supply; (iii) capturing and sequestering CO2; (iv) reducing emissions of other greenhouse gases; (v) measuring and monitoring emissions; and (vi) bolstering the contributions of basic science. The larger Strategic Plan will be published for public comment later this summer.

The Administration continues strong investment in many strategic technology areas.

- **Energy Efficiency and Renewable Energy:** Energy efficiency is the single largest investment area under CCTP and it provides tremendous short-term potential to reduce energy use and greenhouse gas emissions. Renewable energy includes a range of different technologies that can play an important role in reducing greenhouse gas emissions. The United States invests considerable resources in wind, solar photovoltaics, geothermal, and biomass technologies. Many of these technologies have made considerable progress in price

competitiveness, but there remain opportunities to reduce manufacturing, operating, and maintenance costs of many of these technologies. Annually the Administration invests about $1.2 billion for these activities.

- **Hydrogen:** President Bush launched his Hydrogen Fuel Initiative in his 2003 State of the Union Address. The goal is to work closely with the private sector to accelerate our transition to a hydrogen economy, on both the technology of hydrogen fuel cells and a fueling infrastructure. The President's Hydrogen Fuel Initiative and the FreedomCAR Partnership launched in 2002 will provide $1.7 billion through 2008 to develop hydrogen-powered fuel cells, hydrogen production and infrastructure technologies, and advanced automotive technologies, with the goal of commercializing fuel-cell vehicles by 2020.

- **Carbon Sequestration:** Carbon capture and sequestration is a central element of CCTP's strategy because for the foreseeable future, fossil fuels will continue to be the world's most reliable and lowest-cost form of energy. A realistic approach is to find ways to capture and store the carbon dioxide produced when these fuels are used. DOE's core Carbon Sequestration Program emphasizes technologies that capture carbon dioxide from large point sources and store it in geologic formations. In 2003, DOE launched a nationwide network of seven Regional Carbon Sequestration Partnerships, involving State agencies, universities, and the private sector, to determine the best approaches for sequestration in each geographic region represented and to examine regulatory and infrastructure needs. On June 9th of this year, Secretary Bodman announced a major expansion of the Regional Partnerships program

- **Coal-Fired, Near-Zero-Emissions Power Generation:** The United States has vast reserves of coal, and about half of its electricity is generated from this fuel. Advanced coal-based power and fuels, therefore, is an area of special interest from both an energy security and climate change perspective. The Coal Research Initiative (CRI) consists of research, development, and demonstration of coal-related technologies that will improve coal's competitiveness in future energy supply markets. The Clean Coal Power Initiative (CCPI), within the CRI, is a cost-shared program between the government and industry to demonstrate emerging technologies in coal-based power generation and to accelerate their commercialization. A major initiative under CCPI is the FutureGen project, a 10-year, $1 billion government-industry effort to design, build, and operate the world's first near-zero atmospheric emissions coal-fired power plant. This project, which cuts across many CCTP strategic areas, will incorporate the latest technologies in carbon sequestration, oxygen and hydrogen separation membranes, turbines, fuel cells, and coal-to-hydrogen gasification. Through the CRI, clean coal can remain part of a diverse, secure energy portfolio well into the future.

- **Nuclear Fission:** Concerns over resource availability, energy security, and air quality as well as climate change suggest a larger role for nuclear power as an energy supply choice. While current generations of nuclear energy systems are adequate in many markets today, new construction of advanced light-water reactors in the near term and of even more advanced systems in the longer term can broaden opportunities for nuclear energy, both in industrialized and developing countries. The Nuclear Power 2010 program is working with industry to demonstrate the Nuclear Regulatory Commission's new licensing process, while

the Generation IV Nuclear Energy Systems Initiative is investigating the more advanced reactor and fuel cycle systems that represent a significant leap in economic performance, safety, and proliferation-resistance. One promising system being developed under the Nuclear Hydrogen Initiative would pair very-high-temperature reactor technology with advanced hydrogen production capabilities that could produce both electricity and hydrogen on a scale to meet transportation needs. Complementing these programs is the Advanced Fuel Cycle Initiative, which is developing advanced, proliferation resistant nuclear fuel technologies that can improve the fuel cycle, reduce costs, and increase the safety of handling nuclear wastes.

- **Fusion:** Fusion energy is a potential major new source of energy that, if successfully developed, could be used to produce electricity and possibly hydrogen. Fusion has features that make it is an attractive option from both an environmental and safety perspective. However, the technical hurdles of fusion energy are very high, and with a commercialization objective of 2050, its impact would not be felt until the second half of the century, if at all. Nevertheless, the promise of fusion energy is simply too great to ignore.

Advances in these and other technology areas in the CCTP portfolio could put us on a path to ensuring access to clean, affordable energy supplies while dramatically reducing the greenhouse gas profile of our economy over the long term. Moreover, the deployment of cleaner energy technologies in developing economies like China and India can make a huge difference in altering the future global energy picture.

Innovative International Partnerships

The Administration believes that well-designed multilateral collaborations focused on achieving practical results can accelerate development and commercialization of new technologies. Under President Bush's leadership, the United States has brought together key nations to tackle jointly some tough energy challenges. These multilateral collaborations mirror the main strategic thrusts of our domestic technology research programs, and they address a number of complementary energy concerns, such as energy security, climate change, and environmental stewardship. Another characteristic of each is that they include as partners Kyoto countries, non-Kyoto countries, industrialized countries, developing countries, and countries with economies in transition.

- **International Partnership for the Hydrogen Economy (IPHE):** Recognizing the common interest in hydrogen research that many countries share, the United States called for an international hydrogen partnership in April 2003, and in November 2003, representatives from 16 governments gathered in Washington to launch IPHE.[1] IPHE provides a vehicle to organize, coordinate, and leverage multinational hydrogen research programs that advance the transition to a global hydrogen economy. It reviews the progress of collaborative projects, identifies promising directions for research, and provides technical assessments for policy decisions. IPHE also will develop common recommendations for internationally-recognized

[1] Founding IPHE member governments include the United States, Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Norway, Republic of Korea, Russia, and the United Kingdom. In January 2005, New Zealand became the 17th member.

standards and safety protocols to speed market penetration of hydrogen technologies. Through IPHE, the U.S. has assisted Brazil and China in developing hydrogen roadmaps.

- **Carbon Sequestration Leadership Forum (CSLF):** CSLF is a U.S.-launched initiative that was established formally at a ministerial meeting held in Washington, DC, in June 2003.[2] CSLF is a multilateral initiative that provides a framework for international collaboration on sequestration technologies. The Forum's main focus is assisting the development of technologies to separate, capture, transport, and store carbon dioxide safely over the long term, making carbon sequestration technologies broadly available internationally, and addressing wider issues, such as regulation and policy, relating to carbon capture and storage. In addition to these activities, CSLF members and other interested nations are invited to participate in the FutureGen clean coal project.

- **Generation IV International Forum (GIF):** In 2002, nine countries and Euratom joined together with the United States to charter GIF, a multilateral collaboration to fulfill the objective of the Generation IV Nuclear Energy Systems Initiative.[3] GIF's goal is to develop the fourth generation of advanced, economical, safe, and proliferation-resistant nuclear systems that can be adopted commercially no later than 2030. A technology roadmap developed by the GIF and the Department of Energy's Nuclear Energy Research Advisory Committee in 2003 identified six technologies as candidates for future designs. Based on the *Roadmap*, GIF countries are jointly preparing a collaborative research program to develop and demonstrate the projects.

- **ITER:** In January 2003, President Bush announced that the United States was joining the negotiations for the construction and operation of the international fusion experiment known as ITER.[4] If successful, this multi-billion-dollar research project will advance progress toward producing clean, renewable, commercially-available fusion energy by the middle of the century. It was recently agreed that the experimental reactor will be sited in Cadarache, France.

- **Methane to Markets Partnership:** In November of last year, the United States and representatives from 13 countries[5] launched the Methane to Markets Partnership, which is led on the U.S. side by EPA. This Partnership is an international initiative that focuses on advancing cost-effective, near-term methane recovery and use as a clean energy source to enhance economic growth, promote energy security, improve the environment, and reduce greenhouse gases. Initially, the Partnership will target three major methane sources: landfills, underground coal mines, and natural gas and oil systems.

- **Regional and Bilateral Activities:** Since 2001, the United States has established 15 climate partnerships with key countries and regional organizations that, together with the United

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[2] CSLF member governments indude the United States, Australia, Brazil, Canada, China, Colombia, Demark, European Commission, France, Germany, India, Italy, Japan, Mexico, Norway, Russia, South Africa, and the United Kingdom.
[3] GIF member countries include the United States, Argentina, Brazil, Canada, France, Japan, Korea, South Africa, Switzerland, and the United Kingdom.
[4] ITER member countries include the United States, China, European Union, Japan, Russia, and the Republic of Korea.
[5] Founding Methane to Markets member governments include the United States, Argentina, Australia, Brazil, China, Colombia, India, Italy, Japan, Mexico, Nigeria, Russian Federation, Ukraine, and the United Kingdom

States, account for almost 80 percent of global greenhouse gas emissions.[6] These partnerships encompass over 400 individual activities, and successful joint projects have been initiated in areas such as climate change research and science, climate observation systems, clean and advanced energy technologies, carbon capture, storage and sequestration, and policy approaches to reducing greenhouse gas emissions.

Market Development for Commercialization of New Technologies

Adoption and transfer of modern energy technologies is capital and information intensive, and can only be accomplished as part of a broader effort to improve governance, regulation, and management of service providers in developing countries. Nations that develop strong, market-based institutions and the rule of law will be in the best position to make the sustained investments necessary to provide clean energy and address climate change over the long term. One of the biggest barriers to economic progress in developing countries is lack of access to affordable, modern energy services, such as electricity. Such services are instrumental to economic growth, social development, and alleviation of poverty, and their availability can amplify the impact of investments in public health, education, sanitation, clean water, agriculture, and others.

Therefore, an important objective of U.S. participation in many of its international collaborations is to mobilize private sector investment by promoting innovative financing that reduces risks and transaction costs. These efforts are aimed at developing new policies and business models to create self-sustaining markets for financing energy efficiency, renewable, and infrastructure projects.

- **Clean Energy Initiative:** At the World Summit on Sustainable Development (WSSD), the United States launched a "Clean Energy Initiative" consisting of four market-oriented, performance-based partnerships: Global Village Energy Partnership, led by the U.S. Agency for International Development; Partnership for Clean Indoor Air and Partnership for Clean Fuels and Vehicles, both led by EPA; and Efficient Energy for Sustainable Development (EESD), led by DOE. The mission of this initiative is to bring together governments, international organizations, industry and civil society in partnerships to alleviate poverty and spur economic growth in the developing world by modernizing energy services.

  DOE's EESD aims to improve the productivity and efficiency of energy systems, while reducing pollution and waste, saving money and improving reliability through less energy intensive products, more energy efficient processes and production modernization. In furtherance of the U.S. Clean Energy Initiative, DOE submitted and obtained approval from Asia-Pacific Economic Cooperation forum Energy Ministers a plan to implement an agenda for financing energy efficiency and renewable energy projects within the region.

- **Renewable Energy and Energy Efficiency Partnership:** Formed at the World Summit on Sustainable Development in Johannesburg, South Africa, in August 2002, the Renewable

[6] Partners include Australia, Brazil, Canada, China, Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), European Union, India, Italy, Japan, Mexico, New Zealand, Republic of Korea, Russian Federation, and South Africa.

Energy and Energy Efficiency Partnership (REEEP) seeks to accelerate and expand the global market for renewable energy and energy-efficiency technologies. As the world's largest producer and consumer of renewable energy, and with more renewable energy generation capacity than Germany, Denmark, Sweden, France, Italy, and the United Kingdom combined, the United States is one of 17 countries who are partners in REEEP. The United States also actively participated in the Renewables 2004 conference sponsored by the German Government in June 2004, and submitted five action items intended to provide specific technology plans and cost targets for renewable energy technologies using solar, biomass, wind, and geothermal resources.

Closing Remarks

The Bush administration has developed a comprehensive strategy on climate change that is informed by science, emphasizes innovation and technological solutions, and promotes international collaboration to support the UNFCCC objective.

Further, the Administration remains committed to the UNFCCC and to the mutual goals of economic growth and energy security. The President has an ambitious near-term goal to reduce the greenhouse gas emission intensity of the U.S. economy, and is taking many actions to help meet that goal. We are also investing billions of dollars on advancing climate science and accelerating the development of advanced technologies—such as hydrogen, carbon sequestration, advanced nuclear power, and fusion energy—that have the potential to transform energy systems. And we are fully engaged internationally and lead major multilateral and bilateral climate change science and technology initiatives, and will continue to co-operate with all nations.

Although the scientific and technology challenges are considerable, the President remains committed to leading the way on climate change at home and around the world.