

**TESTIMONY OF  
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**BEFORE THE  
SUBCOMMITTEE ON INTERNATIONAL ECONOMIC POLICY, EXPORT AND TRADE PROMOTION  
COMMITTEE ON FOREIGN RELATIONS  
UNITED STATES SENATE**

**HEARING ON  
“U.S. INTERNATIONAL CLIMATE CHANGE APPROACH: A CLEAN TECHNOLOGY SOLUTION”**

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**INTRODUCTION**

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss ways in which the Administration is working internationally to address the challenge of climate change. My testimony today will cover what the Administration is doing in the climate change technology area both domestically and internationally, the international climate change provisions of the Energy Policy Act of 2005 (*EPAct2005*), the importance of engaging developing countries, and the Asia-Pacific Partnership for Clean Development and Climate.

As a party 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 would prevent dangerous anthropogenic interference with the climate system. In February 2002, President Bush reaffirmed his Administration’s commitment to this central goal of the Framework Convention.

Meeting the UNFCCC objective 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, 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.

**ACCELERATING DEVELOPMENT OF “TRANSFORMATIONAL” TECHNOLOGIES**

Looking to the future, it is increasingly apparent that to provide the energy necessary for continued economic growth and to reduce greenhouse gas emissions, we will have to develop new cost-effective “transformational” technologies that alter fundamentally the way we produce

and use energy. By 2100, more than half of the world's energy may have to come from low- or zero-emission technologies to attain the UNFCCC goal.<sup>1</sup>

The Bush Administration is laying a strong technological foundation to develop cost-effective and realistic mitigation options to meet clean development and climate objectives. The Administration's Climate Change Technology Program (CCTP) was created to coordinate and prioritize the Federal Government's approximately \$3 billion annual investment in climate-related technology research, development, demonstration, and deployment (RDD&D), including voluntary partnerships. We are pleased that *EPAAct2005* includes an authorization for this program, which is the technology counterpart to the Climate Change Science Program.

CCTP is assessing different technology options and their potential contributions to reducing greenhouse gas emissions over the short, mid, and long term. In August 2005, CCTP released its *Vision and Framework for Strategy and Planning*. This document provides an overall strategy to guide and strengthen our technical efforts to reduce emissions. In September, CCTP released its draft *Strategic Plan* for public comment, which builds on the guidance in the *Vision and Framework*. The *Plan* articulates a vision of the role for advanced technology in addressing climate change, defines a supporting mission for CCTP, establishes strategic direction and guiding principles for Federal R&D agencies to use in formulating research and development portfolio, outlines approaches to attain CCTP's six strategic goals, and identifies a series of next steps toward implementation.

CCTP's strategic vision has six complementary goals: (1) reducing emissions from energy use and infrastructure; (2) reducing emissions from energy supply; (3) capturing and sequestering CO<sub>2</sub>; (4) reducing emissions of other greenhouse gases; (5) measuring and monitoring emissions; and (6) bolstering the contributions of basic science.

The Administration continues strong investment in many strategic technology areas. As the President's National Energy Policy requires, efforts with respect to energy production and distribution focus on ensuring environmental performance, as well as dependability and affordability.

- **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 remains a need to reduce manufacturing, operating, and maintenance costs of many of these technologies.
- **Hydrogen:** In his 2003 State of the Union address, President Bush made a commitment to the development of a hydrogen economy, pledging \$1.2 billion over five years for his Hydrogen Fuel Initiative to develop hydrogen fuel cell-powered vehicles. The transition to hydrogen as a major energy carrier over the next few decades could transform the nation's

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<sup>1</sup> See, for example, K. Caldeira, A.K. Jain, and M.I. Hoffert, *Science*, 299, 2052-2054 (2003).

energy system and create opportunities to increase energy security by making better use of diverse domestic energy sources for hydrogen production and to reduce emissions of air pollutants and greenhouse gases.

- **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 an important source of energy. One 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. Approaches being pursued include carbon capture and geologic storage, and carbon sequestration in trees and soils.
- **"FutureGen" Coal-Fired, Zero-Emissions Power Generation:** The FutureGen project—a 10-year, \$1 billion government-industry cost-shared effort to design, build, and operate the world's first near-zero atmospheric emissions coal-fueled power plant—will employ the latest technologies to generate electricity, produce hydrogen, and sequester carbon dioxide from coal. Through this research, coal can remain part of a diverse, secure energy portfolio well into the future.
- **Nuclear Fission and Fusion:** The Administration also is pursuing next-generation nuclear energy as a zero-emissions energy supply choice, and DOE's Generation IV Nuclear Energy Systems Initiative is working on reactor designs that are safe, economical, secure, and able to offer additional capabilities such as reducing nuclear waste and producing, such as hydrogen. And though the technical hurdles are high, the Administration sees great potential in fusion as a future energy source.

These initiatives and other technologies in the CCTP portfolio could put us on a path to ensuring access to clean, affordable energy supplies while dramatically reducing greenhouse gas emissions.

### **Innovative International Partnerships**

In addition to these domestic programs, the Administration is working internationally with a broad range of partners. We believe that well-designed multilateral and bilateral 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 we face. These 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 protection.

- **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, D.C. to launch IPHE.<sup>2</sup> IPHE provides a vehicle to organize, co-ordinate, 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 standards and safety protocols to speed market penetration of hydrogen technologies.
  
- **Carbon Sequestration Leadership Forum (CSLF):** CSLF is a U.S. initiative that was established formally at a ministerial meeting held in Washington, DC in June 2003.<sup>3</sup> 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 are invited to participate in the FutureGen clean coal project. There are 22 members of the CSLF, including the United States, European Commission, China, and India.
  
- **Generation IV International Forum (GIF):** In 2002, nine countries and Euratom joined together with the United States to charter GIF, and multilateral collaboration to fulfill the objective of the Generation IV Nuclear Energy Systems Initiative.<sup>4</sup> GIF's goal is to develop a 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 U.S. was joining the negotiations for the construction and operation of the international fusion experiment ITER.<sup>5</sup> The negotiations are now advancing rapidly and we hope to have a near-final agreement for both Congress and the Administration to review in early 2006.

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<sup>2</sup> 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 17<sup>th</sup> member.

<sup>3</sup> CSLF member governments include the United States, Australia, Brazil, Canada, China, Colombia, Denmark, European Commission, France, Germany, Greece, India, Italy, Japan, Republic of Korea, Mexico, Netherlands, Norway, Russia, Saudi Arabia, South Africa, and the United Kingdom.

<sup>4</sup> GIF member countries include the United States, Argentina, Brazil, Canada, France, Japan, Republic of Korea, South Africa, Switzerland, and the United Kingdom.

<sup>5</sup> ITER member countries include the United States, China, European Union, Japan, Russia, and the Republic of Korea.

- **Methane to Markets Partnership (M2M):** In November of last year, the United States and representatives from 13 countries<sup>6</sup> launched M2M, which is led on the U.S. side by EPA. M2M 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. Since the launch, the Partnership has expanded to include 17 countries, representing over 60 percent of global methane emissions, as well as almost 200 representatives from the private sector, financiers, and non-governmental organizations. The Partnership now actively supports near-term project development in four major methane sources: landfills; underground coal mines; natural gas and oil systems; and livestock waste management.
- **Bilateral Activities:** Since 2001, the United States has established 15 climate partnerships with key countries and regional organizations that, together with the United States, account for almost 80 percent of global greenhouse gas emissions.<sup>7</sup> These partnerships encompass over 400 individual activities, and 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**

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. 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 adapt to climate change over the long term.

Therefore, an important objective of U.S. participation in many international collaborations is to mobilize private sector investment by supporting economic reforms and institutional capacity building in the energy sector to strengthen markets and strengthen the rule of law while 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.

At the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, the United States launched a Clean Energy Initiative (CEI). CEI consists 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, led by EPA; and Efficient Energy for Sustainable Development, led by DOE. The

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<sup>6</sup> M2M member governments include the United States, Argentine, Australia, Brazil, Canada, China, Colombia, Ecuador, India, Italy, Japan, Republic of Korea, Mexico, Nigeria, Russia, Ukraine, and the United Kingdom

<sup>7</sup> Partners include Australia, Brazil, Canada, China, Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), European Union, Germany, India, Italy, Japan, Mexico, New Zealand, Republic of Korea, Russian Federation, and South Africa.

mission of CEI 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 expanding access to and modernizing energy services.

The United States is also one of 17 countries that participate in the Renewable Energy and Energy Efficiency Partnership—REEEP. REEEP was initiated by the United Kingdom as a WSSD partnership to assist market development of renewable and energy efficiency systems. The United States also actively participated in the Renewables 2004 conference sponsored by the German Government in June 2004 and submitted five action items to provide specific technology plans and cost targets for renewable energy technologies using solar, biomass, wind, and geothermal resources.

### **INTERNATIONAL CLIMATE PROVISIONS OF *EPAAct2005***

The international climate provisions of *EPAAct2005* recognize the importance of developing countries in mitigating climate change. Indeed, central to achieving the objective of the UNFCCC will be the participation of developing countries.

In passing unanimously the Byrd-Hagel Resolution in 1997, the Senate then made its views quite clear that any approach to climate change must involve developing countries. However, under the terms of the Kyoto Protocol to the UNFCCC, only industrialized, mature market economies are required to reduce emissions. The emerging economies of the developing world—including large emitting countries such as China and India—can continue business as usual despite their rapidly growing emissions.

Total carbon dioxide emissions from fossil fuel consumption from the emerging economies soon will outstrip those from mature market economies. Projections in the Energy Information Administration's (EIA) *International Energy Outlook 2005* suggest that by 2010, carbon dioxide emissions from emerging economies could surpass those from the mature market economies. According to EIA, in 2002, carbon dioxide emissions from mature market economies were 49 percent of the world total while emerging economies accounted for 39 percent and the transitional economies of Eastern European/former Soviet Union (EE/FSU) countries 13 percent. EIA projects that in 2025, mature market economies will account for 39 percent of world carbon dioxide emissions, emerging economies 50 percent, and the EE/FSU countries 11 percent. *IEO2005* projections also suggest that the emerging economies and EE/FSU countries combined will account for 77 percent of the total projected increase in global emissions from 2002 to 2025.

These EIA projections are consistent with recent projections from the International Energy Agency. Its *World Energy Outlook 2004* suggests that well over two thirds of the projected increase in energy-related carbon dioxide emissions between now and 2030 will be from developing countries.

The Bush Administration believes that the most effective way to engage developing countries is to focus not solely on climate change, but rather on a broader development agenda that promotes economic growth, reduces poverty, provides access to modern sanitation, enhances agricultural

productivity, provides energy security, reduces pollution, *and* mitigates greenhouse gas emissions.

Developing countries made these needs clear at WSSD, and the international community agreed, in the Johannesburg Plan of Implementation, on the primacy of the development agenda over an agenda exclusively focusing on decarbonizing economies. Given these considerations, the reluctance of developing countries to take on Kyoto-style emissions caps—which could make achieving economic and social development goals much more difficult—is well founded.

An emissions intensity approach to limiting greenhouse gas emissions can lead to greater engagement on climate change from developing countries because it encourages reductions without threatening economic growth and development. This is a clear advantage over the Kyoto Protocol approach, which focuses on short-term reductions.

This intensity approach is working here in the United States. In 2002, President Bush set an ambitious but achievable national goal to reduce the greenhouse gas intensity of the U.S. economy by 18 percent by 2012, which represents about a 30 percent increase in the rate of improvement projected by EIA over this period. The Administration estimates that this commitment will achieve about 100 million metric tons of reduced carbon-equivalent emissions in 2012, with more than 500 million metric tons of carbon-equivalent emissions in cumulative savings over the decade.

To this end, the Administration has developed an array of policy measures, including financial incentives and voluntary programs. For example, the Department of Energy's (DOE) Climate VISION program and the Environmental Protection Agency's (EPA) Climate Leaders and SmartWay Transport Partnership programs work in voluntary partnership with industry to reduce emissions. The Department of Agriculture is using its conservation programs to provide incentives to increase carbon sequestration in soils and trees, and to reduce methane and nitrous oxide emissions from crop and animal agricultural systems. DOE, in partnership with EPA, USDA, and other federal agencies, also is pursuing many energy supply technologies with comparatively low or zero carbon dioxide emissions profiles, such as solar, wind, geothermal, bioenergy, and combined heat and power. 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.

We expect these programs will make significant contributions toward meeting the President's 18 percent ten-year goal, which represents an average annual rate of about 2.0 percent. Recent data show we are already making headway. The average annual reduction of greenhouse gas emissions intensity from 1990 to 2003 was 1.9 percent. A June 2005 EIA flash estimate of *energy-related carbon dioxide* emissions—which account for over four fifths of total greenhouse gas emissions—suggests an improvement in carbon dioxide emissions intensity of 2.6 percent in 2004. This follows on the EIA's *Emissions of Greenhouse Gases in the United States 2003* report showing that the total U.S. *greenhouse gas* emissions intensity was 2.3 percent lower in 2003 than in 2002. Overall, then, the Nation appears to be ahead of schedule in meeting the President's goal.

We believe that certain aspects of the international climate provisions authorized under Title XVI Subtitle B of *EPAAct2005* are broadly consistent with the Administration's approach. Specifically, the provisions call on DOE to lead an effort to identify technology options that could reduce greenhouse gas emissions intensity and are suitable for transfer to developing countries DOE also is authorized to carry out fellowship and exchange programs under which officials from developing countries can gain experience and knowledge of best practices to reduce greenhouse gas emissions intensity in their countries.

The Department is working with the Department of State and the U.S. Agency for International Development on a framework to execute those aspects of the international climate change provisions that it can readily accomplish. The Department is currently evaluating provisions authorizing demonstration projects for cleaner, more efficient technologies. Conducting demonstration projects in developing countries would likely raise issues and complexities involving legal, regulatory, trade, intellectual property, and other questions. Also, without complementary economic reforms in partner countries to strengthen markets for cleaner technologies, their replication and deployment will be inhibited.

#### **ASIA-PACIFIC PARTNERSHIP FOR CLEAN DEVELOPMENT AND CLIMATE**

The Administration believes the international climate change provisions of *EPAAct2005* are also consistent with the Asia-Pacific Partnership for Clean Development and Climate, which was announced in July by Deputy Secretary of State Robert Zoellick and his counterparts representing five large economies—Australia, China, India, Japan, and Korea.

Together, the six nations that make up the Partnership account for about half of the world's greenhouse gas emissions and a significant amount of total global economic output. So while the partnership initially is at a manageable size, it nonetheless can have a significant impact. Moreover, it is significant that among the partners are countries with targets under the Kyoto Protocol, countries without targets under the Kyoto Protocol, countries not party to the Kyoto Protocol, and both industrialized and emerging economies.

The one characteristic all the countries have in common is a willingness to take practical measures to address the complementary challenges of energy security, clean development, and climate change. The Partnership's focus will be activities to create new investment opportunities, build local capacity, and remove barriers to the introduction of clean, more efficient technologies. It is designed to help each country meet nationally designed strategies for improving energy security, reducing pollution, and addressing the long-term challenge of climate change. The Partnership also will cooperate on longer-term "transformational" energy technologies that can drive economic growth while enabling significant reductions in greenhouse gas intensities.

#### **CLOSING OBSERVATIONS**

The Administration remains committed to the UNFCCC and to the mutual goals of sustainable development and economic growth. The President has an ambitious near-term goal to reduce the Nation's greenhouse gas emissions intensity, and is taking many actions to help meet that goal. We are investing billions of dollars on advancing climate science and accelerating the

development of advanced technologies—such as hydrogen, carbon sequestration, advanced nuclear reactors, 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.

The Administration believes that co-operation among developed and developing countries must combine action on greenhouse gases with action to meet societal needs for increased energy resources to fuel economic growth and reduce poverty, and to do so in way that reduces pollution, improves energy security, and avoids greenhouse gas emissions.

Significant portions of the approach outlined in Title XVI Subtitle B of *EPAAct2005* are conceptually in agreement with the approach adopted by the Administration on climate change, particularly in the emphasis on technology, innovation, and improving markets to support the deployment of improved technologies. The framework set out in the legislation avoids many of the very real problems with the emissions cap approach of the Kyoto Protocol, and it complements many of the Administration's ongoing international initiatives described in this testimony.

We appreciate the careful thought that has gone into *EPAAct2005*, and we stand ready to work with the Senate and this subcommittee to explore these ideas further.