



**Testimony of
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INTRODUCTION

Mr. Chairman, thank you for inviting me to testify on the long-term challenge of global climate change. The President and his Administration are firmly committed to taking sensible action on climate change. The Administration's climate change policy is science-based, encourages research breakthroughs that lead to technological innovation, and takes advantage of the power of markets to bring those technologies into widespread use. Our growth-oriented strategy encourages meaningful global participation through actions that will help ensure the continued economic growth and prosperity for our citizens and for citizens throughout the world. Economic growth provides the resources that enable investment in the technologies and practices we need to address the rise in greenhouse gases.

Domestically, in 2002, President Bush set an ambitious national goal to reduce the greenhouse gas intensity (emissions per unit of GDP) of the U.S. economy by 18 percent by 2012. At the time, this commitment was estimated to achieve about 100 million additional 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. Our objective is to significantly slow the growth of greenhouse gas emissions and, as the science justifies, stop it and then reverse it. While measuring progress in absolute terms is important, the most useful measure for policy management purposes is relative improvement in greenhouse gas emissions intensity. The intensity measure appropriately recognizes reductions that are achieved through increased investment in efficiency, productivity and economically valuable activities that require less energy or otherwise lead to fewer emissions. The intensity measure sharply discounts reductions produced by economic decline, job loss, or policies that simply shift greenhouse gas emitting activity from the U.S. to another country – in which case the desired emission reduction did not actually happen.

With this in mind, the Administration is now implementing more than 60 federal programs – including partnerships, consumer information campaigns, incentives, and mandatory regulations – that are directed at developing and deploying cleaner, more efficient energy technologies, conservation, biological sequestration, geological sequestration and adaptation. 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 specific commitments by industry to verifiably reduce emissions. In terms of incentives, new tax rules on expensing and dividends are helping to unleash substantial new capital investment, including purchases of cleaner, more efficient equipment and facilities. The EPAct of 2005 provides for approximately \$5 billion in tax credits and incentives over 5 years.

The Department of Agriculture is using its conservation programs to provide substantial incentives to increase carbon sequestration in soils and trees, and to reduce methane and nitrous oxide emissions, two additional and potent green house gases, from crop and animal agricultural systems. DOE, in partnership 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, and a new generation of nuclear power. The Bush Administration has mandated a 15 percent improvement in fuel economy of new light trucks and sport utility vehicles, required use of 7.5 billion gallons of renewable ethanol by 2012, and is establishing 15 new mandatory efficiency standards for new appliances. These programs, and several others, are highlighted in the next section of my testimony.

From 2001 to the end of 2006, the federal government will have devoted nearly \$29 billion to climate science, technology, international assistance, and incentive programs, more than any other nation. The President’s Fiscal Year 2007 budget calls for \$6.5 billion for climate-related activities. Broad bipartisan consensus continues to sustain this high level of federal taxpayer

investment. In 2002, the President called for action at all levels of government and across all sectors. Many of our states and cities are experimenting with similar portfolios of voluntary measures, incentives, and locally relevant mandatory measures. Many of these build on or partner with related federal programs.

We expect these efforts will significantly contribute to meeting the President's 18 percent, 10-year goal, which represents an average annual rate of improvement of about 1.96 percent. A June 2006 EIA preliminary 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 3.3 percent in 2005. Although we are only a few years into the effort, the nation appears well on track to meet the President's goal.

Progress in the U.S. compares favorably with progress being made by other countries. Attachment 1 (Trends in GHG Emissions: 2000-2004) and Attachments 2 (Trends in GHG Emissions Intensity: 2000-2004) show how emission trends in the U.S. compare to other industrialized countries based on national data reported to the UN Framework Convention on Climate Change. The data in Attachment 1, which includes countries that have obligations under the Kyoto Protocol, indicate that from 2000 to 2004 the major developed economies of the world are at about the same place in terms of actual GHG emissions. In some countries, emissions are increasing slightly, in others they are decreasing slightly. Contrary to some popular misconceptions, no country is yet able to decrease its emissions massively. Note that the U.S. has seen its actual emissions increase at a slower rate than the European Union 25, 1.3 percent compared to 2.1 percent.

Attachment 2 shows progress in emissions intensity for the same countries over the same period. Major industrialized countries are all in the 10 percent range for emissions intensity improvement, showing that these economies, with very sophisticated infrastructure and systems, are

in the process of turning over capital stock to more productive and efficient technologies and practices. The ongoing focus is to take actions to help accelerate that turnover to cleaner and more advanced technologies.

Internationally, the President is working closely with key world leaders in the Asia-Pacific region and with his G-8 counterparts who agreed last year that we need a more integrated agenda of action that addresses the interlinked objectives of improved energy security, cleaner air and reduction in greenhouse gases. This integrated agenda will promote economic growth, reduce poverty, provide access to modern sanitation and clean water, enhance agricultural productivity, provide energy security, reduce pollution, and mitigate greenhouse gas emissions. 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. 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 other policy approaches to reducing greenhouse gas emissions. Among the most notable efforts with a strong, practical emphasis on expanding and accelerating both near- and long-term investment in existing and new technologies are the recently established Asia-Pacific Partnership on Clean Development and Climate, the Methane to Markets Partnership, FutureGen (zero-emission coal), the Renewable Energy and Energy Efficiency Partnership, the Carbon-Sequestration Leadership Forum, the International Partnership for a Hydrogen Economy, the emerging Global Nuclear Energy Partnership, and related bilateral initiatives promoting this vital zero-emission energy source.

Our work on practical measures at the international level is increasingly important, as total carbon dioxide emissions from fossil fuel consumption from non-Organization of Economic Cooperation and Development (OECD) countries — which includes such large developing

countries as China and India — are expected to outpace those from OECD countries, possibly as soon as 2010 according to projections in EIA's International Energy Outlook 2006 (See Attachment 3: World Carbon Dioxide Emissions by Region: 2003-2030). EIA reports that in 2003, carbon dioxide emissions from OECD countries and non-OECD countries accounted for 53 percent and 47 percent, respectively, of the world total. EIA projects that in 2030, OECD countries will account for 40 percent of world carbon dioxide emissions, and non-OECD countries will account for 60 percent. EIA also projects that non-OECD countries will account for 77 percent of the total projected increase in global emissions from 2002 to 2030. 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. Nevertheless, these countries also hold great promise for improvement in GHG intensity (See Attachment 4: Carbon Dioxide Intensity Improvement Projections by Selected Countries and Regions).

At the World Summit on Sustainable Development in Johannesburg, South Africa in 2002, the developing countries insisted, and the international community agreed to 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. That is why the 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 clean water and modern sanitation, enhances agricultural productivity, provides energy security, reduces pollution, and mitigates greenhouse gas emissions.

The Administration's international efforts received a strong boost from the passage of Title XVI of the Energy Policy Act of 2005.

DOMESTIC PROGRAMS

The President has launched and is implementing a broad portfolio of groundbreaking domestic initiatives to improve our understanding of climate science and to develop new technologies. Let me take a moment to highlight some of the most interesting and consequential:

Energy Policy Act of 2005. The Energy Policy Act of 2005, which the President signed into law last year, authorized \$5 billion over five years in tax incentives to encourage investments in energy efficiency and alternative renewable energy sources. The new energy law provides new performance-based tax credits of up to \$3,400 for the most highly fuel efficient vehicles such as hybrids and clean diesel. It also establishes 15 new appliance efficiency mandates and a 7.5 billion gallon renewable fuel requirement by 2012. These actions will help power our growing economy, improve air quality, and reduce greenhouse gas emissions (See Attachment 5: Energy Bill Tax Incentives).

Advanced Energy Initiative. In his 2006 State of the Union Address, President Bush announced the Advanced Energy Initiative and proposed a 22 percent increase in funding for clean energy technology research at the Department of Energy. The Initiative supports new transportation and power technologies that will help achieve significant reductions of oil imports, lead to substantial reductions in air pollution and greenhouse gas emissions, and increase economic and energy security. We will change how we power our homes and offices by increasing investments in zero-emission coal-fired plants, revolutionary solar and wind technologies, and clean, safe nuclear

energy. We will also change how we power our cars by improving batteries for hybrid and plug-in hybrid vehicles, making cellulosic ethanol cost-competitive with corn-based ethanol by 2012, and by accelerating the development of zero-emission cars that run on hydrogen. To reduce oil consumption, AEI focuses on transportation technologies to advance commercialization of hybrid vehicles, cellulosic ethanol, and hydrogen-powered fuel cell vehicles and infrastructure. With an increased focus on these technologies, the AEI transportation research and development plan will also:

- Develop advanced battery technologies that allow a plug-in hybrid-electric vehicle to have a 40-mile range operating solely on battery charge.
- Foster breakthrough technologies needed to make cellulosic ethanol derived from agricultural waste products, such as wood chips, stalks, or switch grass cost-competitive with gasoline.
- Accelerate progress towards the President's goal of making it practical and cost-effective for large numbers of Americans to choose hydrogen fuel cell vehicles.
- Initiating a new Global Nuclear Energy Partnership (GNEP), which I will describe in the next section.
- Develop clean coal technologies through ventures like FutureGen, a key part of the Coal Research Initiative. FutureGen is a partnership between government and the private sector to build a near-zero atmospheric emissions demonstration coal plant that captures the carbon dioxide it produces and stores it in deep geologic formations.
- Reduce the cost of solar photovoltaic technologies so that they become cost-competitive by 2015.
- Expand access to wind energy by developing wind turbines for use in low speed wind environments, which are closer to population centers.

Global Nuclear Energy Partnership (GNEP). The Global Nuclear Energy Partnership (GNEP), announced in February 2006 as part of the Advanced Energy Initiative, seeks to develop worldwide consensus on enabling expanded use of economical, zero-emission nuclear energy to meet growing electricity demand. America will work with nations that have advanced civilian nuclear energy programs, such as France, Japan, and Russia. GNEP will use new technologies that effectively and safely recycle spent nuclear fuel. Re-processing spent uranium fuel for use in advanced reactors will allow us to extract more energy. It also has the potential to significantly reduce storage requirements for nuclear waste. With re-processing, Yucca Mountain could hold America's nuclear waste through the end of the 21st century. Through our partnership, we can also help developing countries meet their growing energy needs by providing them with small-scale reactors that will be secure and cost-effective. We will also ensure that developing nations have a reliable nuclear fuel supply. In exchange, these countries would agree to use nuclear power only for civilian purposes and forego uranium enrichment and reprocessing activities that can be used to develop nuclear weapons. The President's FY'07 budget request includes \$250 million to launch this initiative. By working with other nations under the Global Nuclear Energy Partnership, we can provide the cheap, safe, and clean energy that growing economies need, while reducing the risk of nuclear proliferation.

Climate Change Technology Program (CCTP). The President's FY'07 budget seeks nearly \$3 billion for the programs coordinated through the Climate Change Technology Program (CCTP), a multi-agency program that increases the development and use of key technologies aimed at reducing GHG emissions. The intent of this program is to reduce, avoid, or sequester greenhouse gas emissions by stimulating the development and use of renewable, clean coal, fusion, nuclear and

other energy technologies and by increasing energy efficiency throughout the U.S. economy. This request includes over \$300 million for the National Climate Change Technology Initiative (NCCTI), a set of priority activities that address technological challenges, which, if solved, could advance breakthrough technologies that will dramatically reduce, avoid, or sequester greenhouse gas emissions.

Climate Change Science Program (CCSP). The President's 2007 Budget request includes \$1.715 billion for the Climate Change Science Program (CCSP), a multi-agency program led by the Department of Commerce, charged with: investigating natural and human-induced changes in the Earth's global environmental system; monitoring, understanding, and predicting global change; and providing a sound scientific basis for national and international decision-making. The CCSP combines the near-term focus of the Administration's Climate Change Research Initiative — including a focus on advancing the understanding of aerosols and carbon sources and sinks and improvements in climate modeling — with the breadth of the long-term research elements of the US Global Change Research Program. CCSP integrates research and observational approaches across disciplinary boundaries and is also working to create more seamless approaches between theory, modeling, observations, and applications required to address the multiple scientific challenges posed by changes in climate.

In July 2002, the CCSP undertook a year-long process to prepare a new 10-year strategic plan for the program. The planning process was designed to ensure a comprehensive examination of research and observation needs, transparent review by the national and international scientific and stakeholder communities, and establishment of defined goals for research on climate and global change. Approximately 1,300 scientists and other participants were involved in the development and review of the strategic plan. In addition, the National Academy of Sciences twice reviewed the

plan and gave its approval. The plan identifies both overarching goals and core approaches for achieving those goals. The CCSP is now in the process of implementing the 10-year strategic plan.

Improved Corporate Average Fuel Economy (CAFE) Standards. Since 2003, the Bush Administration has finalized two sets of Corporate Average Fuel Economy (CAFE) regulations requiring a combined 15 percent increase in the fuel economy of light trucks. For the first time, large Sport Utility Vehicles, including Hummers, are required to meet the standards. The Administration is implementing program improvements recommended by the National Academy of Sciences to ensure that we not only save fuel, but also lives and American jobs. These actions are projected to save more than 14 billion gallons of gasoline over the lifetime of these trucks, and correspondingly avoid nearly 177 million metric tons of carbon dioxide emissions. We strongly urge Congress to give us authority to establish new rules on passenger car fuel economy based on these concepts.

Surface Transportation Programs. The Department of Transportation's surface transportation programs can be used by state and local transportation agencies to help reduce fuel usage and greenhouse gas emissions. The Congestion Mitigation and Air Quality Improvement Program and innovative finance programs can help fund projects like truck stop electrification for reduced truck idling and diesel retrofit. System management projects that relieve congestion, improve traffic flow and increase transit use also help reduce fuel usage. Transit funds are available for purchase of hydrogen-powered and other clean-fueled buses. FAA is pursuing initiatives for more efficient air traffic management, which will reduce aircraft fuel use, and FAA's Partnership for Air Transportation Noise and Emission Reduction is conducting research on climate change impacts of aviation.

SmartWay Transportation Partnership. Announced in February 2004, SmartWay is a voluntary partnership between various freight industry sectors and the Environmental Protection Agency designed to increase energy efficiency while significantly reducing greenhouse gases (or gas emissions) and air pollution. There are three primary components of the program: creating partnerships, reducing all unnecessary engine idling (for example, by upgrading truck stops and enouaging trucks to plug-in overnight instead of running their engines), and increasing the efficiency and use of rail and intermodal operations. Shipping, truck and rail companies are enrolled in the program. By 2012, this initiative aims to reduce between 33 and 66 million metric tons of carbon dioxide (CO₂) emissions and up to 200,000 tons of nitrogen oxide (NO_x) emissions per year. The State of Oregon, for example, recently announced a program of tax credits and loans available to truckers who buy SmartWay retrofit kits that reduce diesel emissions. The loans are supported through the Department of Transportation's State Infrastructure Bank program.¹

Energy STAR. In 1992 the U.S. Environmental Protection Agency (EPA) introduced Energy STAR as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Computers and monitors were the first labeled products. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment. In 1996, EPA partnered with the U.S. Department of Energy for particular product categories. The Energy STAR label is now on major appliances, office equipment, lighting, home electronics, and more. EPA has also extended the label to cover new homes and commercial and industrial buildings. Through its partnerships with more than 8,000 private and public sector

¹ <http://www.deq.state.or.us/msd/taxcredits/factsheets/TruckEngineTaxCreditFactSheet.pdf>

organizations, Energy STAR delivers the technical information and tools that organizations and consumers need to choose energy-efficient solutions and best management practices. Over the past decade, Energy STAR has been a driving force behind the more widespread use of such technological innovations as LED traffic lights, efficient fluorescent lighting, power management systems for office equipment, and low standby energy use.² Smart consumer purchases informed by programs such as Energy STAR and projected to have saved consumers \$12 billion on their utility bills, and avoided 44 million metric tons carbon-equivalent (MMTCE), the equivalent to emissions from 23 million cars.

Natural Gas STAR. The Natural Gas STAR Program is a flexible, voluntary partnership between EPA and the oil and natural gas industry. Through the Program, EPA works with companies to identify and promote the use of cost-effective technologies and practices to reduce emissions of methane.³ Methane is greenhouse gas that is more than 20 times more potent than CO₂ and has a shorter atmospheric life, which means that effort to reduce it have a nearer-term benefit.

Participation in Natural Gas STAR cuts across all of the major industry sectors, including gas production, processing, transmission and distribution. As of 2005, the companies participating in Natural Gas STAR represent 56 percent of the natural gas industry in the U.S. Today, the program has over 110 partner companies and is endorsed by nearly 20 major industry trade associations. Since the Program began in 1993, Natural Gas STAR partners have eliminated over 400 billion cubic feet (Bcf) of methane emissions through the implementation of the Program's core Best Management Practices (BMPs), as well other activities identified by partner companies. At the

² http://www.energystar.gov/index.cfm?c=about.ab_history

³ <http://www.epa.gov/gasstar/>

same time, these companies have saved over \$2.8 billion by keeping more gas in their systems for sale in the market.⁴

USDA Programs. In June 2003, the Secretary of Agriculture announced that, for the first time, the Department of Agriculture (USDA) would provide targeted incentives to encourage wider use of land management practices that remove carbon from the atmosphere or reduce emissions of greenhouse gases. USDA's initiatives encourage the increased use of biomass energy, crop and grazing land conservation actions, practices to reduce emissions from agriculture, and sustainable forest management. USDA is targeting greenhouse gases and carbon sequestration through the conservation programs it administers and set a target to reduce 44 million tons of CO₂ equivalent emissions by 2012. These incentives come in part from an increase in funding for conservation programs on private lands of \$17.1 billion over 10 years as authorized by the Farm Bill of 2002.

Since 2002, The Natural Resources Conservation Service (NRCS) delivered guidance to its offices nationwide to reward and recognize actions that provide greenhouse gas benefits within the Environmental Quality Incentives Program (EQIP) application ranking systems. Between 2004 and 2006, EQIP participants addressed soil erosion concerns on 4.9 million acres; irrigation water management resource concerns on 22.4 million acres; and wildlife habitat resource concerns on 2.3 million acres.

USDA and EPA are promoting the use of anaerobic digesters on farms to reduce odors and pathogens and methane emissions. Over the past two years, the number of digesters has more than doubled. For example, from 2003-2005, USDA helped to install 84 new digesters through rural development grants and another 11 digesters were funded under EQIP.

⁴ <http://www.epa.gov/gasstar/accomplish.htm>

As part of technical assistance efforts, NRCS developed three web-based energy tools to help farmers increase energy awareness in agriculture and identify where they can reduce their energy costs. The tools address: energy and cost savings associated with different tillage systems; nitrogen use efficiency; and energy savings associated with improved irrigation systems. Since the first energy awareness tool was released in December 2005, the three tools have had over 1.5 million hits.

The Farm Service Agency (FSA) is using the Conservation Reserve Program (CRP) to promote carbon sequestration. FSA modified the Environmental Benefits Index (EBI) used to score and rank offers to enroll land in the CRP to give more points for installing vegetative covers that sequester more carbon and issued a rule that allows the private sale of carbon credits for lands enrolled in the CRP.

FSA is targeting 500,000 acres of CRP continuous signup enrollment toward bottomland hardwood tree planting. These efforts have been slowed somewhat as Mississippi and Louisiana recover from hurricane Katrina.

Under the Conservation Security Program (CSP), NRCS is providing financial and technical assistance to promote conservation on working cropland, pasture, and rangeland. Outcomes of CSP contracts for 2004 and 2005, include: 4 million tons of additional carbon have been sequestered (14.6 million tons of CO₂ equivalents); 8.5 million acres enrolled with enhancements applied to increase soil quality; 2.7 million acres enrolled with grazing management enhancements applied that exceed quality criteria; and over 5 million acres enrolled with nutrient management enhancements applied that exceed quality criteria.

Climate Leaders. Climate Leaders is an EPA partnership that encourages individual companies to develop long-term, comprehensive climate change strategies. Partner companies

develop corporation-wide GHG inventory including all emission sources of the six major gases (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆), set an aggressive corporate-wide GHG emissions reduction goal to be achieved over 5 to 10 years, and report inventory data annually and document progress toward their emissions reduction goal. Since its inception in 2002, Climate Leaders has grown to include nearly 100 corporations whose revenues add up to almost 10 percent of the United States' gross domestic product and whose emissions represent 8 percent of total U.S. greenhouse gas emissions. Five organizations have achieved their GHG reduction goals – Baxter International, General Motors Corporation, IBM Corporation, National Renewable Energy Laboratory and SC Johnson.⁵

Climate VISION. In February 2003, President Bush announced the formation of Climate VISION, a public-partnership program established to contribute to the president's emission intensity reduction goal. Fourteen major industrial sectors and the Business Roundtable have committed to work with four cabinet agencies (Departments of Energy, Transportation, and Agriculture, and the Environmental Protection Agency) to reduce greenhouse gas emissions in the next decade. Participating industries include electric utilities, petroleum refiners and natural gas producers, automobile, iron and steel, chemical and magnesium manufacturers, forest and paper producers, railroads, and the cement, mining, aluminum, lime, and semiconductor industries (See Attachments 6.1 and 6.2: Climate VISION Sectors). This initiative is modeled on highly successful partnerships such as EPA's 33/50 program from the early 1990s to reduce emissions of toxics.

⁵ <http://www.epa.gov/stateply/aboutus.html>

Hydrogen Fuel Initiative. In his 2003 State of the Union Address, President Bush launched his Hydrogen Fuel Initiative. The goal of this initiative is to work in partnership with the private sector to accelerate the research and development required for a hydrogen economy. The President's Hydrogen Fuel Initiative and the FreedomCAR Partnership are providing nearly \$1.72 billion to develop hydrogen-powered fuel cells, hydrogen infrastructure technologies, and advanced automobile technologies. The President's Initiative will enable the commercialization of fuel cell vehicles in the 2020 timeframe. Through this initiative, the cost of a fuel cell has already been cut in half, and the expected life of an automotive fuel cell has been doubled since 2003. I have driven several prototypes of such vehicles. Private sector interest and investment remains high.

Voluntary Greenhouse Gas Emissions Registry ("1605(b)"). In response to a February 2002 directive from President Bush, the Department of Energy has revised the Voluntary Greenhouse Gas Emissions Registry ("1605(b)") program guidelines to establish a more accurate and transparent national registry where businesses and institutions will be encouraged to submit comprehensive reports on their greenhouse gas emissions, sequestration and reductions. Under the revised program, utilities, industries and other large emitters of greenhouse gases can now demonstrate net, entity-wide reductions, based on emission intensity or other eligible measures, and be recognized for "registered reductions". Provisions encourage participation in the program by small emitters of greenhouse gases, such as farmers, forest owners, and small businesses. Small emitters can either report on their own or partner with a larger group to report greenhouse gas reduction benefits. The revised guidelines include new state-of-the-science guidance and tools, developed by USDA, for estimating emissions from agricultural, forestry, and conservation activities important for carbon sequestration efforts. The guidelines offer farmers and ranchers a new on-line tool called COMET-VR which provides a simple and reliable method for estimating

soil carbon sequestration. The technical guidelines for forests have recently been published as⁶ a series of detailed carbon stock default tables with guidance on applying the tables for inventory purposes, direct measurement protocols, and guidance on the use of models. Actions that farmers and landowners can consider reporting include using no-till agriculture, installing a waste digester, improving nutrient management, and managing forestland. The original program guidelines, issued in 1994 following enactment of the Energy Policy Act of 1992, provided reporters considerable flexibility to decide what they reported to DOE's Energy Information Administration (EIA). This flexibility was intended to encourage participation. Over 200 utilities and other entities, large and small, report to DOE under the original program guidelines. Since its inception, participants in the existing program have reported several billion tons of CO₂ (equivalent) emission reductions to EIA. While these previous reports clearly demonstrate the commitment of participants to reducing emissions, the original program guidelines were revised to ensure that future reports provide a more accurate and comprehensive accounting of the entity-wide reductions achieved by participants. The new guidelines will govern reports submitted in 2007 and beyond.

While we do not yet have any data reported under the new guidelines, we do have 1605(b) data reported for 2004. For the 2004 reporting year, 226 U.S. companies and other organizations reported to the Energy Information Administration (EIA) that they had undertaken 2,154 projects to reduce or sequester greenhouse gases in 2004.

Carbon Sequestration. The carbon sequestration program has grown significantly under the current Administration from about \$24 million in 2001 to almost \$70 million in FY'06. With major

⁶ USDA FS GTR-NE343, "Methods for Calculating Forest Ecosystem & Harvested Carbon with Standard Estimates for Tree Types of the United States." USDA Forest Service, 2006.

industry cost-sharing for the total program very close to \$100 million. There are approximately 40 field validation tests of geologic sequestration underway or planned world wide on carbon sequestration. Notably, the majority of these are taking place in the U.S. (See Attachment 7.1: Carbon Sequestration Program Structure; Attachment 7.2: Sequestration Program Statistics FY'06; and Attachment 7.3: Regional Carbon Sequestration Partnerships Field Validation Tests).

Federal Energy Management Program (FEMP). Chartered in 1973, the Department of Energy's Federal Energy Management Program (FEMP) works to reduce the cost and environmental impact of the Federal government by advancing energy efficiency and water conservation, promoting the use of distributed and renewable energy, and improving utility management decisions at Federal sites. With FEMP's leadership, Federal agencies have achieved nearly a 30% reduction in British Thermal Units (BTUs) per square foot energy consumption at Federal facilities since 1985. The EPAct of 2005 established even more aggressive requirements for Federal agencies to further decrease BTU per square foot energy consumption at Federal facilities by over 2% per year for 10 years.

DOE's Super Energy Saving's Performance Contracts are among the key tools that Agencies use to reduce energy consumption. These contracts were reauthorized in the EPAct of 2005, and provide a cost-effective way for agencies to improve energy efficiency of their buildings and facilities through private sector financing and without requiring up front appropriated funding normally necessary for such projects. These contracts provide funding to enable improved energy efficiency and renewable energy utilization at the thousands of Federal buildings across the country. Agencies repay private sector investments plus interest through guaranteed energy cost savings.

Federal agencies are also leading by example in the area of renewable energy use. The Federal Government is currently the largest consumer on non-hydro renewable energy in the

country. Federal facilities consume over 2500 Giga-watt hours of non-hydro renewable energy per year. The Energy Policy Act of 2005 established new a requirement that the Federal Government use at least 3 percent renewable energy in fiscal years 2007 through 2009, not less than 5 percent in fiscal years 2010 through 2012 and not less than 7.5 percent in fiscal year 2013 and each fiscal year thereafter. Federal agencies are currently exceeding the 2012 requirements of the act by purchasing more than 5% of their energy from renewable resources.

FEMP is also guiding the Government's efforts to lead by example in greenhouse gas reductions. Federal facilities are on track to meet a goal of reducing the greenhouse gas emissions associated with Federal facilities at least 30% by 2010 based on a 1990 baseline. This goal was established under Executive Order 13123, "Greening the Government through Efficient Energy Management".

THE GLOBAL EFFORT

Of course, climate change is not just a concern domestically, it is a global issue. The United States remains a strong leader in the global effort to address climate change. It is important to recognize that government funding is only small part of the success equation globally. The International Energy Agency estimates that \$17 trillion dollars will be invested by 2030⁷ in energy and infrastructure to meet projected demand growth. The questions in front of us are: What is the nature of the technology being installed? What will investing in these technologies do in terms of advancing and enhancing our energy security, clean development, air pollution control and greenhouse gas mitigation?

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

⁷ International Energy Agency. 2005 World Energy Outlook. <http://www.worldenergyoutlook.org/>

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 (See Attachments 8.1-8.2: Innovative International Technology Partnerships).

The international climate technology partnership provisions found in Title XVI of the EPAct of 2005 provide us with an important legislative foundation for sustaining and building on these partnerships. The comprehensive domestic technology provisions of EPAct are also critical to the success of the international effort. The importance of this inter-relationship has been recognized for some time. For example, Senator Byrd in the mid 1990's initiated programs to export U.S. technologies which were proposed 2002 in the Clean Energy Technology Export initiative (CETE). Many aspects of the CETE initiative are reflected in the EPAct of 2005 and are being carried out through Administration initiatives.

Developing countries such as India and China need enormous amounts of new energy to continue their economic development and to provide jobs and improved living standards for their populations. The economic, social and environmental benefits of building clean and efficient generation capacity, as well as delivering and using electricity more efficiently, are huge.

Asia-Pacific Partnership on Clean Development and Climate. Last summer, the Administration introduced one of our most consequential multilateral initiatives, the Asia-Pacific Partnership for Clean Development and Climate. The six nations in this partnership – Australia, China, India, Japan, South Korea, and the United States – account for about half of the world's economy, energy use, and greenhouse gas emissions (See Attachment 9: Asia-Pacific Partnership Significance). In announcing the Asia-Pacific Partnership on July 27, 2005, President Bush said, "This new results-oriented partnership will allow our nations to develop and accelerate deployment of cleaner, more efficient energy technologies to meet national pollution reduction, energy security, and climate

change concerns in ways that reduce poverty and promote economic development” (See Attachment 10: President’s Statement: July 27, 2005).

The Asia-Pacific Partnership and our other international engagements on climate change center on five key ideas, all of which extend from and build on our own experience here in the United States. First, a successful international response to climate change requires developing country participation, which includes both near-term efforts to slow the growth in emissions and longer-term efforts to build capacity for future cooperative actions. Absent the participation of all major emitters, including developing countries, the UN Framework Convention’s ultimate goal of stabilizing GHG concentrations will remain elusive.

Second, we will make more progress on this issue over time if we recognize that climate change goals fall within a broader development agenda – one that promotes economic growth, reduces poverty, provides access to modern sanitation and clean water, enhances agricultural productivity, provides energy security, reduces pollution, and mitigates greenhouse gas emissions. Countries do not look at individual development goals in a vacuum, and approaches that effectively integrate both near- and longer-term goals will yield more benefits over time.

Third, technology is the glue that can bind these development objectives together. By promoting not just the development but also the wide spread commercialization and use of cleaner and more efficient technologies, we can meet a range of diverse development and climate objectives simultaneously.

Fourth, we need to pursue our international efforts in a spirit of collaboration, not coercion, and with a true sense of partnership. This is especially true in our relations with developing countries, which have an imperative to grow their economies and provide for the welfare of their citizens. Experience has shown these countries to be quite skeptical of climate mitigation approaches that they think will divert them from these fundamental goals. It is also true that many

of the largest greenhouse gas emitters are also among our most significant trading partners. They have rapidly advancing – in many cases, world class – industries and considerable technical expertise. We view countries like China and India as responsible partners in our efforts.

Finally, we need to engage the private sector to be successful. While the right kind of government-to-government collaboration can pave the way for great progress, we will need to harness the ingenuity, resources and vision of the private sector in developing and deploying technology.

The Partnership's Charter, which I have attached to my testimony, identifies a broad range of near and long-term technologies and practices that are designed to improve energy security, reduce pollution, and address the long-term challenge of climate change. The Partnership focuses on voluntary practical measures to create new investment opportunities, build local capacity, and remove barriers to the introduction of cleaner, more efficient technologies. It is important to build on mutual interests and provide incentives to tackle shared global challenges such as climate change effectively (See Attachment 11: Asia-Pacific Partnership Focus).

We are united with our partners in recognizing that the ingenuity and energy of the private sector is crucial to our success in addressing these issues over time. This effort cannot succeed without strong private sector involvement. The Departments of State, Energy, Commerce, the Environmental Protection Agency, and other agencies and financing institutions, such as the Export-Import Bank and Asian Development Bank, are actively discussing ways of ensuring that the private sector is engaged in a meaningful way in the Partnership at every stage of its work.

This past January, I was privileged to join Energy Secretary Sam Bodman and Under Secretary of State Paula Dobriansky at the first Ministerial meeting of the Partnership in Sydney, Australia. The meeting was hosted by Australian Prime Minister John Howard and chaired by Australian Foreign Minister Alexander Downer. In addition to involving unusually high-ranking

government official representation, the meeting also included a substantive dialogue with leading CEOs and heads of industrial organizations from each country representing some of the most significant, energy-intensive and emitting sectors. The Ministerial established a Policy and Implementation Committee and its first set of Task Forces covering actions in eight areas: Cleaner Fossil Energy, Renewable Energy and Distributed Generation, Power Generation and Transmission, Steel, Aluminum, Cement, Coal Mining, and Buildings and Appliances.

Each Task Force has a government chair and co-chair (See Attachment 12). Initial details about the objectives and work plans for each task force are outlined in the accompanying charts (See Attachments 13.1-13.8). Each Task Force will consist of two senior government officials and two private sector leaders from each country to enable a relatively manageable planning and implementation dialogue of about 24 people per Task Force. The United States is chairing the Policy and Implementation Committee and chairing or co-chairing three of the Task Forces. The United States Task Force members include participants from government agencies, major companies, trade associations, and non-profit organizations.

The Task Forces currently vary in their level of organization and planning. The aluminum sector, for example, has already adopted a memorandum of understanding as to how they intend to proceed. This is not surprising, as this sector is already well-organized internationally and involves large multi-national companies. On the other hand, sectors such as cement and power generation are composed predominantly of domestic companies, that infrequently, if ever, have had reason to get together and share management strategies, relevant sector goals, best practices, technologies and financing arrangements. For many, the Asia-Pacific Partnership will afford the first opportunity for such hands-on, senior level exchanges.

The Power Generation and Transmission Task Force is demonstrating the "can-do" approach typical of the APP Task Forces. Already over twenty US utilities have agreed to engage the APP

and are standing ready to participate with the partnering nations. The American Electric Power Corporation (AEP) has already hosted representatives from the Indian National Thermal Power Corporation, the largest power utility in India where the high level India officials and engineers were shown opportunities for efficiency and environmental improvements. As a follow-up, this September, AEP and other US companies are planning to host meetings and plant visits to share "best-practices" on techniques and processes to operate power facilities more efficiently and to control emissions. Both government and industry in China and India have shown strong interest in the return visit and plan to send engineers to participate. Consideration is also being given to have US power engineers go to India and perhaps China to help do "walkdowns" of the facilities where they can help provide "hands-on" assistance as a follow-up activity.

In April of this year, the United States hosted the first Task Force working meetings in Berkeley, California. Approximately 300 senior representatives from the public and private sectors attended the nearly week-long event. The eight Task Forces met for two full days and identified actions covering several dozen discrete activities. All of the Task Forces indicated they will complete their initial action plans by August 31, at which time they will be submitted to the Policy and Implementation Committee for review and approval.

Let me outline a few of my own personal thoughts concerning the kinds of deliverables the Task Forces will explore. A principal, operational objective of the Partnership is to identify profitable technology investment opportunities and outcomes in each partner country. In addition to the more traditional discussion of "demonstration projects" related to emerging technologies in each sector, we are placing a strong emphasis on identifying opportunities for near-term outcomes that can be mass-produced using tried and true technologies and methods and investment strategies.

For example, methane capture from coal mining is a well-established and highly profitable practice in the United States that nets significant benefits in terms of worker safety, harmful

pollution reduction, and mitigation of a greenhouse gas. Under the auspices of the Methane to Markets Partnership, which I will discuss in the next section, Caterpillar and Shanxi Jincheng Anthracite Coal Mining Group Co., Ltd. in China have signed a \$58 million contract to provide 60 methane-gas-powered generator sets to produce power at a Chinese coal mine. Once complete, this project is expected to be the largest of its kind in the world. Methane gas is found in coal seams which is released into the mine or atmosphere during mining operations. This methane can be very hazardous and can contribute to fires and explosion if not properly vented. Methane is also a greenhouse gas more than 20 times more potent than CO₂. On the bright side, methane is also used as a very clean burning fuel. Caterpillar will be capturing this methane gas instead of venting it to the atmosphere and burning it providing 120 megawatts of electricity to Jincheng City. It is estimated that the project will reduce GHGs by 4.5 million tons of CO₂ equivalent over its 20-year lifetime. This is also an example of the type initiative that the APP is trying to stimulate. The potential number of such projects in several of the other partner countries is quite high.

Our partner countries also have a strong interest in our substantial experience and success in improving the efficiency and capacity of our power generation. For example, in March 2006, China announced a commitment to improve its energy intensity by 20 percent and cut its sulfur-dioxide emissions by 10 percent by 2010 from 2005 levels.⁸ To reach this goal, policies are being drafted that may include establishing an index to evaluate how local governments have cut energy consumption. In late 2005, the Chinese State Council, which is the equivalent of the President's Cabinet, approved a directive for the State Environmental Protection Agency (SEPA) to use an emission trading program to control SO₂ from the power sector. At the end of May 2006, SEPA and

⁸ "China Orders Coal-Fired Power Plants to Cut Emissions." People's Daily Online.

http://english.people.com.cn/200605/31/eng20060531_270104.html

the Ministry of Finance reached an agreement with over 20 provinces and the six largest power companies representing approximately 50 percent of generating capacity to institute an SO₂ cap and trade program starting in the year 2009. The agreement also included the approach to be used to allocate the tradable allowances to each power plant. These remarkably ambitious objectives create a strong market force for new investment in technologies and services. The partnership will work within the context of such nationally defined outcomes to share experiences and identify needed methods, technologies, and financial arrangements to assure success. Out of such discussions should emerge a fairly concrete list of information, policy, economic, and regulatory barriers to investment and corresponding actions to address such barriers.

Another opportunity is the prospect of a better, shared inventory of each country's capabilities and commitments in key sectors. For example, Japan has a highly-evolved, partnership program of greenhouse gas mitigation goal-setting and implementation involving each of its major emitting sectors. President Bush's Climate VISION and Climate Leaders programs share common elements with the Japanese program.⁹ Closer alignment and amplification of these approaches, while ensuring their relevance to each country's national circumstances, will be very valuable.

Another area of importance is the potential for further development of capacity to accurately monitor and measure performance across a number of metrics and sectors. While at different points on the continuum, each of the six countries is working aggressively to improve its ability to track improvements in efficiency, air quality and greenhouse gas emissions. Such capacity is essential to ensuring integrity, consistency, and cost-effectiveness of results.

Finally, we are working to ensure the focused and active engagement of public and private financing institutions. The operational success of this effort should be measured not by how much

⁹ <http://www.climatevision.gov/>

governments and their taxpayers spend on the effort, but on how much new private sector investment and financing can be unleashed and accelerated to achieve partnership security and environmental performance goals. The U.S. Department of Commerce and our Export-Import Bank are already working on business plans and trade promotion exchanges focused on Partnership priorities. The head of the Asian Development Bank participated in the Ministerial launch of the Partnership in Australia.

The President's FY07 budget calls for \$52 million to support the work of the Partnership. The request is divided among the Departments of State, Energy and Commerce, and the Environmental Protection Agency. Other agencies, such as the Departments of Transportation and Agriculture, will also be participating. The Partnership is a team effort and requires a team budget.

Methane to Markets. The Methane to Markets Partnership is another highly practical major element in the series of international technology partnerships advanced by the Bush Administration. Launched in November 2004, the Methane to Markets Partnership focuses on advancing cost-effective, near-term methane recovery and use as a clean energy source from coal beds, natural gas facilities, landfills, and agricultural waste management systems. The Partnership includes 18 countries: Argentina, Australia, Brazil, Canada, China, Colombia, Ecuador, Germany, India, Italy, Japan, Mexico, Nigeria, Republic of Korea, Russia, Ukraine, United Kingdom and United States. The European Commission has announced it is joining. The Partnership will reduce global methane emissions to enhance economic growth, promote energy security, improve the environment, and reduce greenhouse gas emissions. Other benefits include improving mine safety, reducing waste, and improving local air quality. The goals of Methane to Markets will be accomplished through collaboration between developed countries, developing countries, and countries with economies in transition — together with strong participation from the private sector. Methane to Markets has the

potential to deliver by 2015 annual reductions in methane emissions of up to 50 million metric tons of carbon equivalent (MMTCE) or recovery of 500 billion cubic feet (Bcf) of natural gas. These measurable results, if achieved, could lead to stabilized or even declining levels of global atmospheric concentrations of methane relatively soon, similar to what we already achieved in the U.S. To give a sense of scale, this would be equivalent to: removing 33 million cars from the roadways for one year, growing 49 million acres of trees for one year¹⁰, or eliminating emissions from fifty 500 megawatt coal-fired power plants; or providing enough energy to heat approximately 7.2 million households for one year. The Partnership operates in four sectors: oil and gas, coal mining, landfill, and agriculture, initially focusing on livestock waste.

Renewable Energy and Energy Efficiency Partnership. The United States is also one of several countries that participates 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.

G-8. Building on the earlier targeted efforts in the context of the G-8, the United States worked with the United Kingdom and other G-8 partners to launch the 2005 Gleneagles Plan of Action, a landmark document containing over fifty practical, results-oriented actions to address the linked

¹⁰ USDA FS GTR-NE343, “Methods for Calculating Forest Ecosystem & Harvested Carbon with Standard Estimates for Tree Types of the United States.” USDA Forest Service, 2006.

issues of development, energy security, energy access, climate change, and air pollution. G8 partners are engaged in ongoing ministerial-level dialogue with other major energy economies to see that the commitments in Gleneagles are carried through in an effective manner.¹¹ G-8 members agreed that “climate change is a serious and long-term challenge that has the potential to affect every part of the globe. We know that increased need and use of energy from fossil fuels, and other human activities, contribute in large part to increases in greenhouse gases associated with the warming of our Earth’s surface. While uncertainties remain in our understanding of climate science, we know enough to act now to put ourselves on a path to slow and, as the science justifies, stop and then reverse the growth of greenhouse gases.”¹² The Gleneagles Plan of Action helped launch of the Global Bioenergy Partnership (GBEP), an Italian initiative to support wider, cost effective, biomass and biofuels deployment, particularly in developing countries.

The U.S. has a significant leadership role in organizing a workshop at the G-8’s request on short term opportunities for Carbon Capture and Storage in the fossil fuel sector. The workshop will be held in San Francisco during August and is being organized by the International Energy Agency and Carbon Sequestration Leadership Forum (CSLF) (discussed in more detail below).

The G-8 leaders carried their dialogue forward during last week’s G-8 meetings in St. Petersburg with a particular focus on the energy security perspective including clean energy and sustainable development.

¹¹ http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_CCChangePlanofAction.pdf

¹² http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_CCChapeau.pdf

2006 U.S.-European Summit.¹³ Last month in Vienna, the President and European Union leaders they agreed to cooperate on a range of activities to promote energy security and advance cleaner and more efficient energy technologies and practices to help cut air pollution and reduce greenhouse gases. This autumn, they will initiate a U.S.-EU High Level Dialogue on Climate Change, Clean Energy and Sustainable Development to build on existing bilateral and multilateral initiatives and further advance implementation of the G-8 Gleneagles Plan of Action.

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. In November 2003, representatives from 16 governments gathered in Washington, D.C. to launch IPHE.¹⁴ 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.

¹³ <http://www.whitehouse.gov/news/releases/2006/06/20060621-2.html>

¹⁴ 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.

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 2003.¹⁵ CSLF is a multilateral initiative that provides a framework for international collaboration on sequestration technologies. The Forum's main focus is assisting the development and deployment 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. Seventeen international carbon capture and storage projects, including four co-sponsored by India and China, are currently underway under the direction of CSLF member countries.

Generation IV International Forum (GIF). In 2002, nine countries and Euratom joined together with the United States to charter the Generation IV International Forum (GIF), a multilateral collaboration to fulfill the objective of the Generation IV Nuclear Energy Systems Initiative.¹⁶ 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

¹⁵ 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.

¹⁶ GIF member countries include the United States, Argentina, Brazil, Canada, France, Japan, Republic of Korea, South Africa, Switzerland, and the United Kingdom.

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.

Future Gen. In February 2003, President Bush announced that the United States would sponsor, with international and private-sector partners, the Future Gen Initiative, a \$1 billion, 10-year project to build the world's first coal-based, zero-emissions electricity and hydrogen power plant. The Future Gen is designed to dramatically reduce air pollution and capture and store greenhouse gas emissions through carbon sequestration. India and South Korea have both recently joined Future Gen Initiative on the government side and will each be contributing \$10 million. The U.S. has also invited other countries to join in to make this a truly international effort towards a global technology solution to climate change concerns. An industry consortium has been formed, and site selection is under way. Member companies¹⁷ have global operations serving customers in Asia, Australia, Canada, Continental Europe, the People's Republic of China, South Africa, South America, and the United States. These member companies are committing \$250 million.

¹⁷ USG, South Korea, India, American Electric Power – US, Anglo Coal – UK, BHP Billiton – Australia, China Huaneng Group – PRC, Consol Energy, Inc – US, Foundation Coal Corp – US, Kennecott Energy Co. - (Parent company is Rio Tinto of Australia), Peabody Energy – US, Southern Company –US, PPL - US (Used to be Pennsylvania Power and Light)

International Thermonuclear Experimental Reactor (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, International Thermonuclear Experimental Reactor (ITER). The Bush Administration considers fusion a key element in U.S. long-term energy plans because fusion offers the potential for abundant, safe and environmentally benign energy. ITER will allow scientists to explore the physics of a burning plasma at energy densities close to that of a commercial power plant, the critical next step in producing and delivering commercially available electricity from fusion to the grid. The EU location in Cadarache, France has been selected as the ITER site, and a Director General nominee from Japan has been chosen. ITER member countries include the United States, China, European Union, India, Japan, Russia, and the Republic of Korea. Meetings held between September 2005 and February 2006 resulted in the completion of major milestones for the ITER project. Member nations are now presenting the final initialed text to their respective governments for approval.

World Summit on Sustainable Development (WSSD). 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 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.

Group on Earth Observations.¹⁸ On July 31, 2003, the United States hosted 33 nations, including many developing nations, at the inaugural Earth Observation Summit (EOS), out of which came a commitment to establish an intergovernmental, comprehensive, coordinated, and sustained Earth observation system. The climate applications of the data collected by the system include the use of the data to create better climate models, to improve our knowledge of the behavior of carbon dioxide and aerosols in the atmosphere, and to develop strategies for carbon sequestration. The United States was instrumental in drafting a ten-year implementation plan for a Global Earth Observation System of Systems, which was approved by 55 nations and the European Commission at the 3rd EOS summit in Brussels in February 2005. The United States also released its contribution through the Strategic Plan for the U.S. Integrated Earth Observing System in April 2005.¹⁹ The plan will help coordinate a wide range of environmental monitoring platforms, resources, and networks.

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.²⁰ These partnerships encompass numerous individual activities. 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

¹⁸<http://earthobservations.org/>

¹⁹ http://iwgeo.ssc.nasa.gov/docs/EOCStrategic_Plan.pdf

²⁰ 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.

sequestration, and policy approaches to reducing greenhouse gas emissions (See Attachment 14: U.S. Climate Change Bilaterals). Most recently, President Bush and Prime Minister Harper of Canada agreed to establish a high-level dialogue to discuss the environment, climate change, air quality and energy issues.

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.

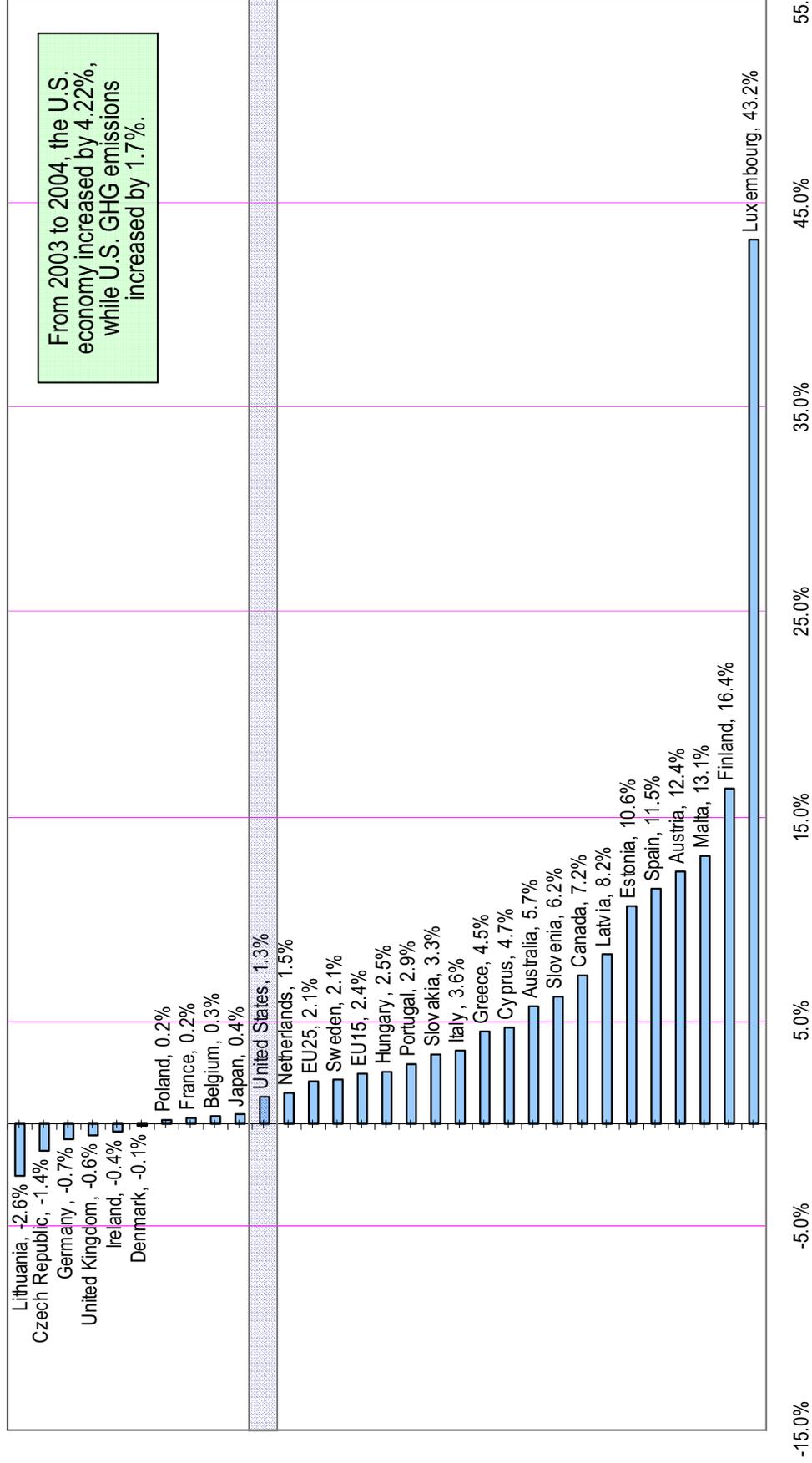
Therefore, an important objective of U.S. participation in many international collaborations is to mobilize private sector investment by supporting economic reforms; institutional capacity in the energy sector to strengthen markets; strengthen the rule of law; and promote innovative financing that reduces risks and transaction costs. These efforts are aimed at developing new policies and business models to create self-sustaining markets for financing energy efficiency, renewables, and infrastructure projects.

President Bush has demonstrated his commitment to opening markets and knocking down trade barriers to create new opportunities for U.S businesses, workers and farmers. The President's actions to advance free and fair trade have contributed to economic growth at home and increased prosperity and freedom around the world.

The Administration is committed to the completion of the Doha Round of multilateral trade talks, the negotiation of a number of new bilateral and regional free trade agreements (FTAs), and the active enforcement of our trade laws and international rights. As part of the Doha Round, the United States has been an active advocate for new market access for environmental goods and services, such as renewable energy technologies. The Doha negotiations have the potential to lower prices and increase availability of environmental technologies and services for the world's businesses and consumers, in particular those in developing countries. Likewise, the Office of the United States Trade Representative is negotiating the elimination of tariff and non-tariff barriers to environmental technologies that can reduce greenhouse gas intensity in U.S. FTAs.

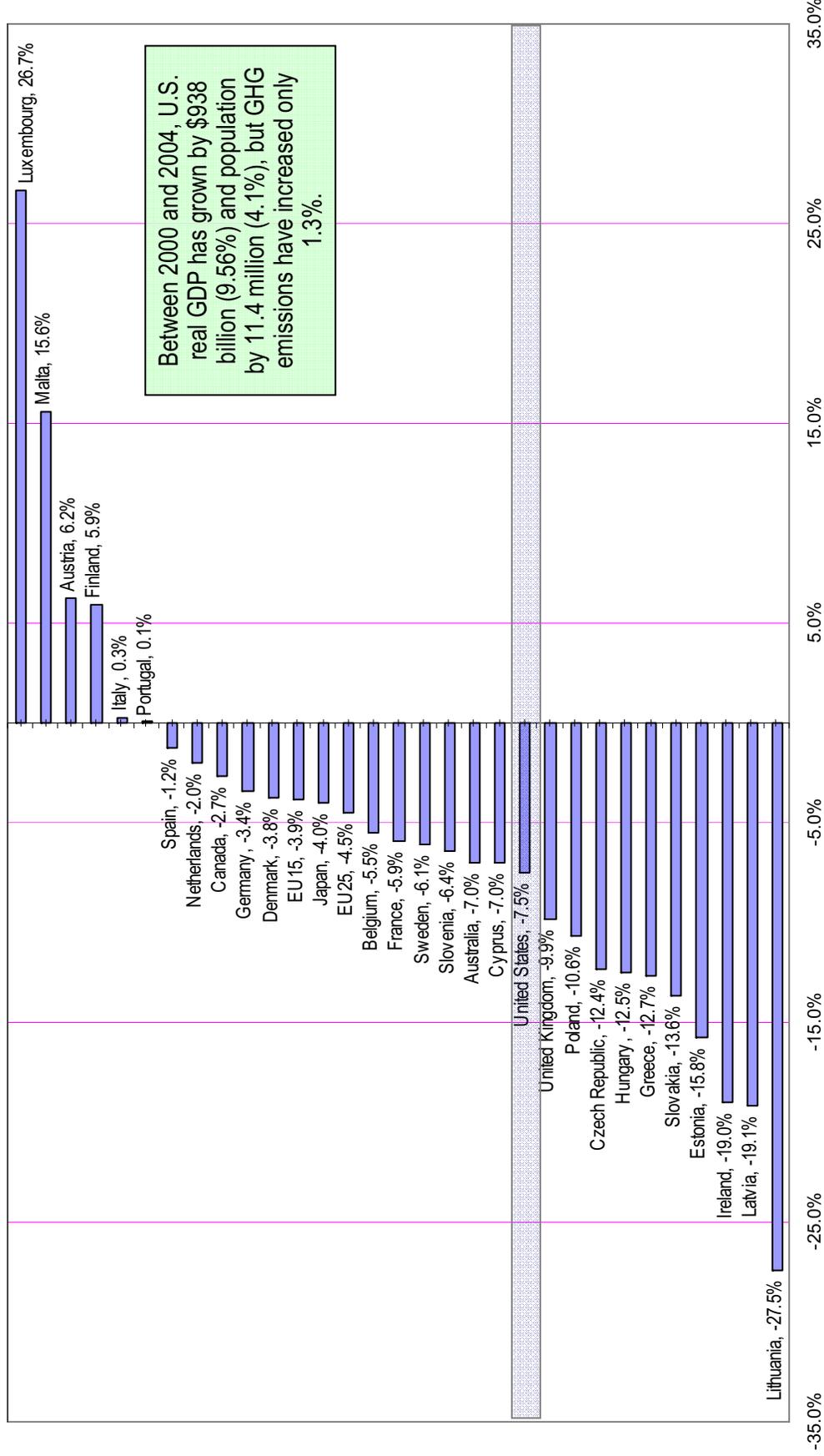
I thank you for the opportunity to testify. I look forward to responding to any questions you may have.

Trends in GHG Emissions: 2000-2004



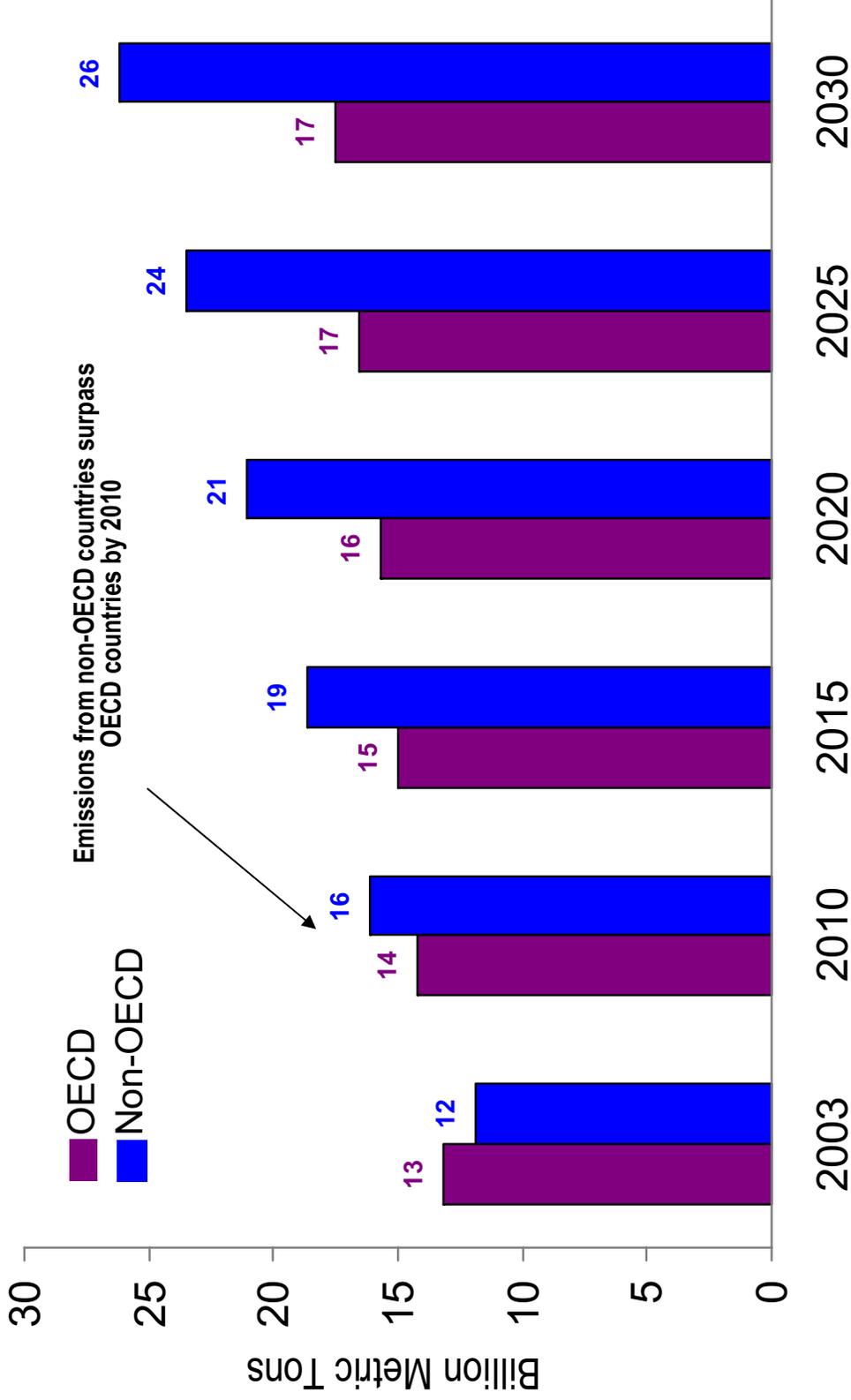
Emissions Data: 2006 National Inventory Reports and Common Reporting Formats at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/2761.php

Trends in GHG Emissions Intensity: 2000-2004



Emissions Data: 2006 National Inventory Reports and Common Reporting Formats at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/3734.php
 Economic Data: Haber; These calculations are based on changes in Chained Real GDP. Since the chart is based on percent change, there should be little substantive difference from calculations using other measures of GDP such as those based on Purchase Power Parity. Since there is less controversy in using Chained Real GDP, these are the figures presented.

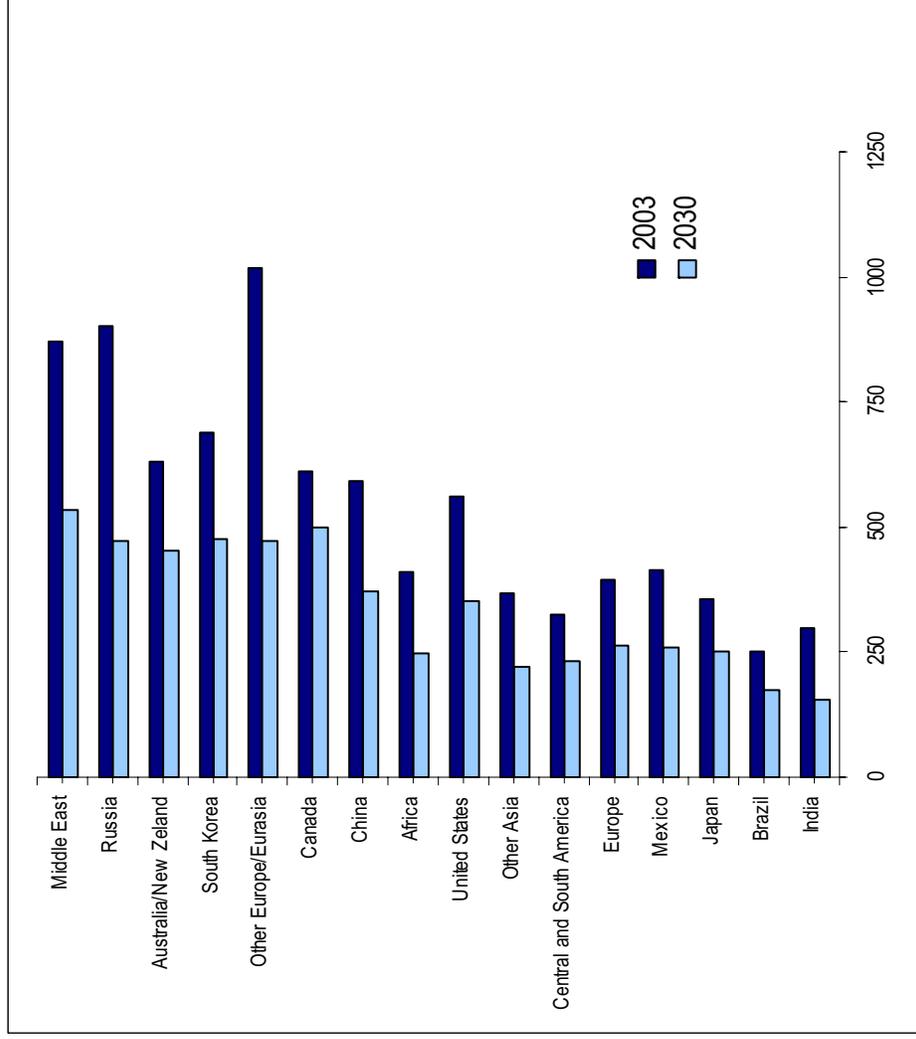
World Carbon Dioxide Emissions by Region: 2003-2030



Source: Energy Information Administration, International Energy Outlook, 2006

Carbon Dioxide Intensity Improvement Projections by Selected Countries and Regions

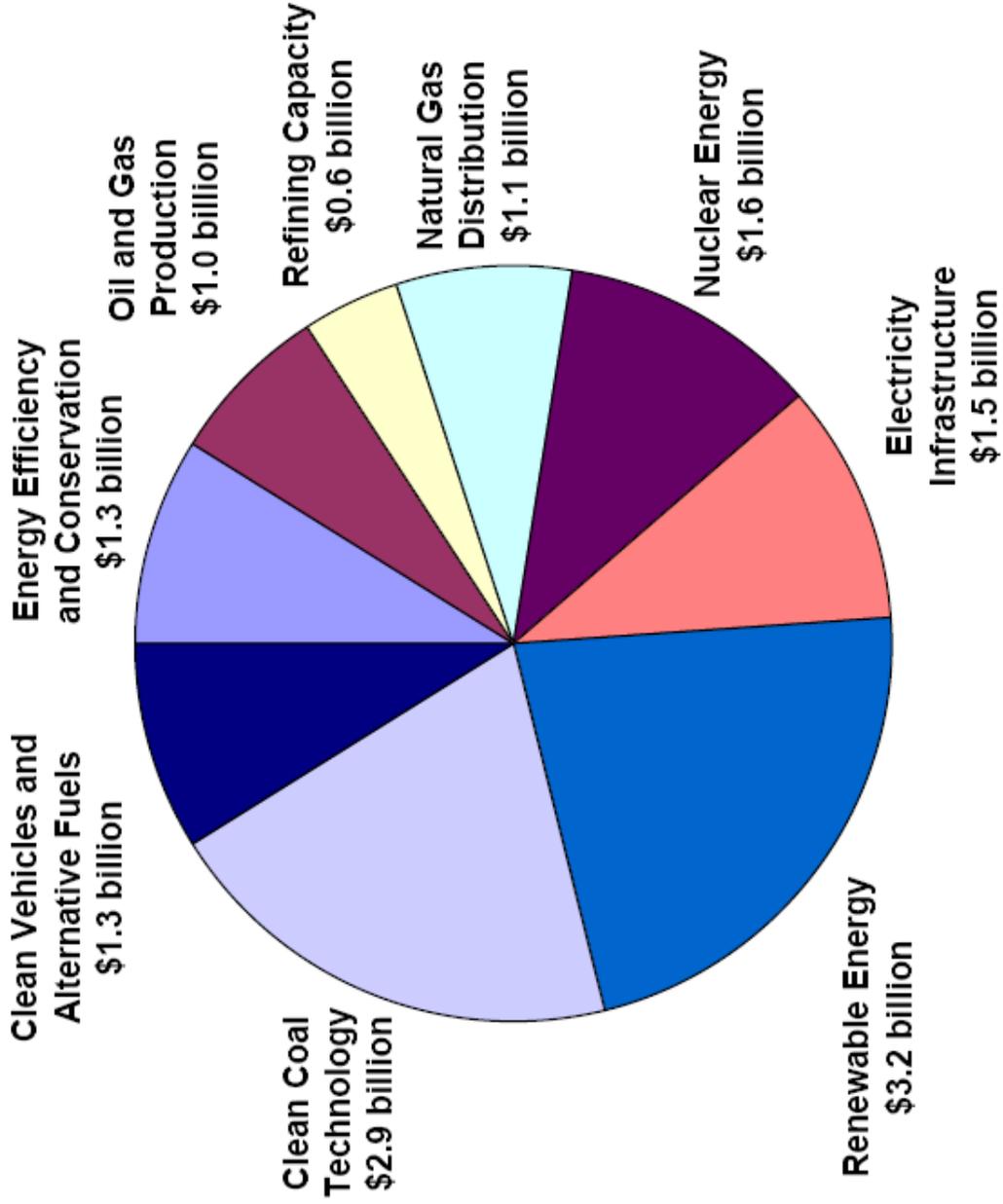
(Metric Tons per Million 2000 U.S. Dollars of Gross Domestic Product)



Source: International Energy Outlook 2006, Energy Information Administration, Department of Energy



Energy Bill Tax Incentives



Incentives: \$14.5 billion
Offsets: \$3 billion
Total: \$11.5 billion

Climate VISION Sectors



	Aluminum	Achieved goal of an additional direct carbon intensity reduction of 25% since 2000; represents 98% of primary aluminum production.
	Railroads	By 2012, reduce the GHG emissions intensity of operations by 18% relative to 2002 levels.
	Chemical Manufacturing	By 2012, reduce overall GHG intensity by 18% relative to 1990 levels; represents 90% of U.S. chemical industry production.
	Forest Products	By 2012, reduce the forest products industry's greenhouse gas intensity by 12% relative to 2000; represents over 80% of U.S. paper, wood and forest products.
	Magnesium	By 2010, eliminate sulfur hexafluoride emissions; represents 80% of the global magnesium industry.
	Oil and Gas	Improve energy efficiency of refining operations by 10% over 2002 levels.

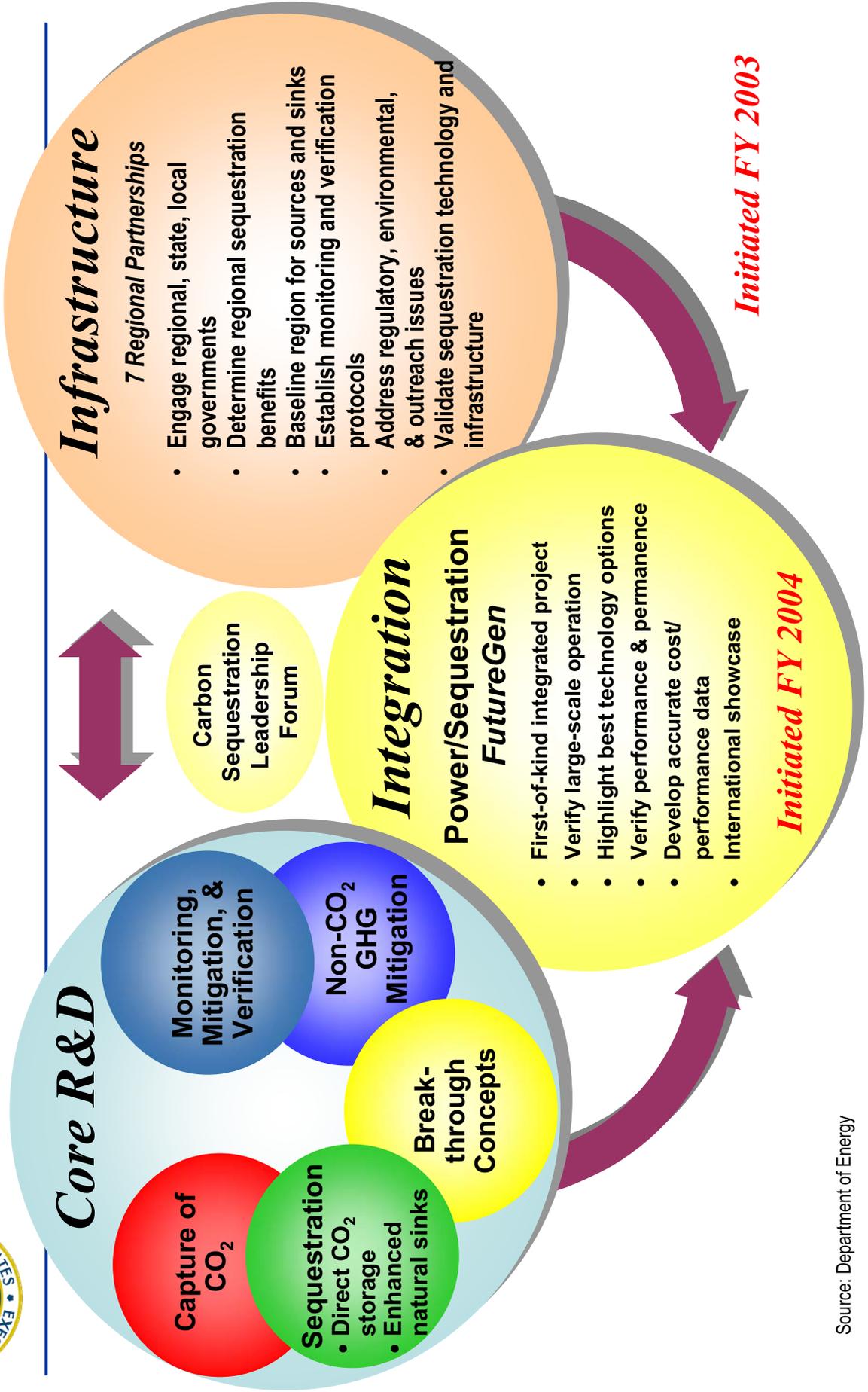


Climate VISION Sectors

	Semiconductors	By 2010, cut perfluorocompound emissions by 10% from 1995 levels; responsible for more than 85 percent of U.S. semiconductor production.
	Automobile Manufacturers	By 2012, achieve a 10% reduction in GHG emissions from manufacturing relative to 2002 levels.
	Cement	By 2020, reduce carbon dioxide (CO ₂) emissions per ton of product by 10% relative to a 1990 baseline.
	Electric Power	By 2012, reduce the power sector's carbon intensity by the equivalent of 3-5 percent by 2012; represents 100% of the power generators in the United States.
	Iron and Steel	By 2012, achieve a 10% increase in sector-wide average energy efficiency relative to 1998; represents ~ 75% of U.S. and North American steel capacity.
	Mining	Obtain sector-wide engagement in voluntary programs to reduce GHG emissions.
	Business Roundtable	Achieve 100% participation of BRT member companies in programs fostering enhanced voluntary action on GHG emissions.
Minerals	By 2012, reduce GHG emissions from fuel combustion by 4.2% relative to 2000; represents 80% of soda ash, 100% of borates, and 60% of sodium silicate manufacturing.	
Lime	By 2012, reduce greenhouse gas emissions from fuel combustion per ton of product by 8% relative to 2002; represents ~ 95% of U.S. commercial lime production.	

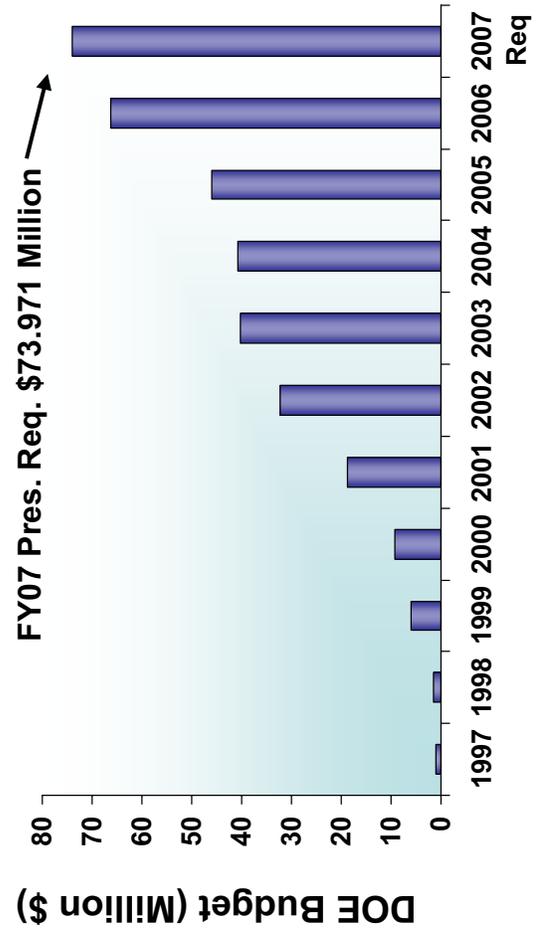


Carbon Sequestration Program Structure





Sequestration Program Statistics FY'06



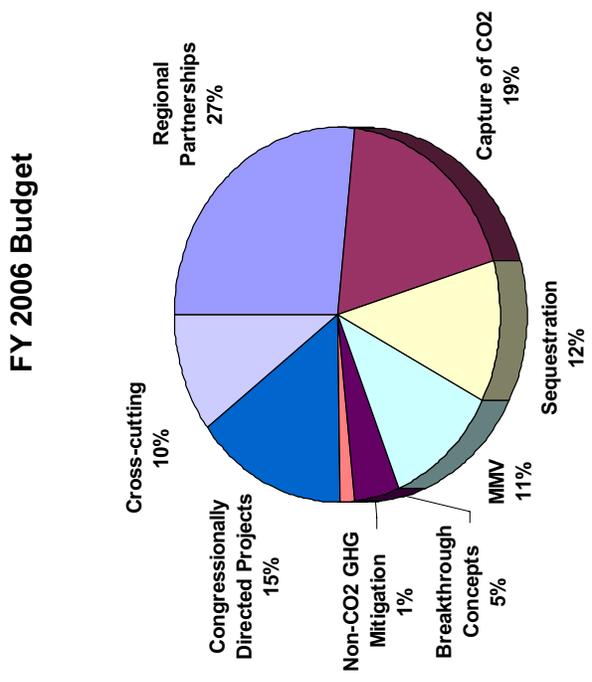
Fiscal Year

Diverse research portfolio

~ 70 R&D Projects

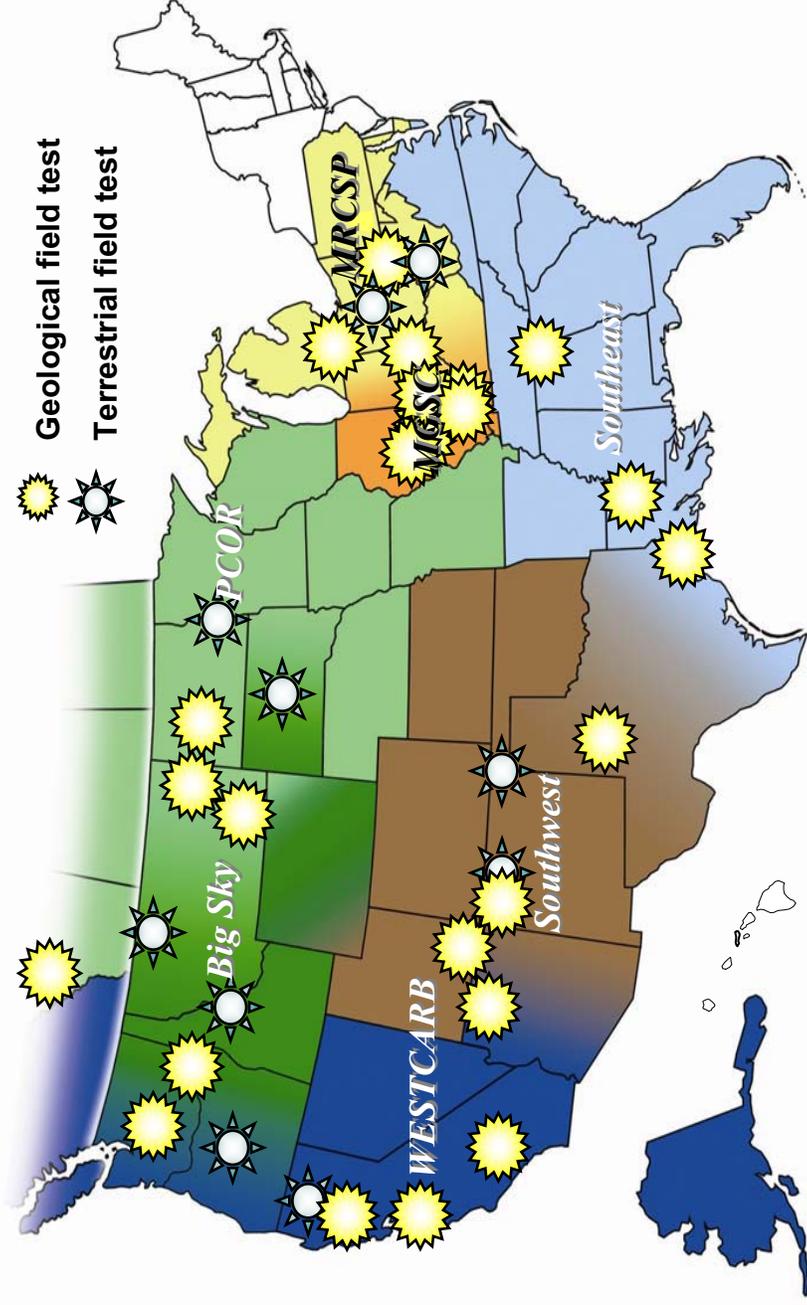
Strong industry support
~ 39% cost share on projects

Federal Investment to Date
~ \$260 Million



Source: Department of Energy

Regional Carbon Sequestration Partnerships Field Validation Tests



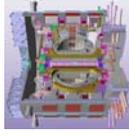


Innovative International Technology Partnerships

- **Asia-Pacific Partnership on Clean Development and Climate** – 6 member countries committed to develop and accelerate deployment of cleaner, more efficient energy technologies to meet national pollution reduction, energy security, and climate change concerns in ways that reduce poverty and promote economic development.
 
- **Methane to Markets Partnership** – 18 members: Recovery and use of methane from landfills, mines, agriculture, and natural gas production systems. Aims to capture 50 million metric tons CO₂ equivalent by 2015.
 
- **G8** – Implementing the 2005 Gleneagles Plan of Action, a landmark document containing over fifty practical, results-oriented actions to address the linked issues of development, energy security, energy access, climate change, and air pollution. G8 partners are engaged in ongoing ministerial-level dialogue with other major energy economies to see that the commitments in Gleneagles are carried through in an effective manner. The Gleneagles Plan of Action has also led to the recent launch of the
 
- **Global Bioenergy Partnership (GBEP)**, an Italian initiative to support wider, cost effective, biomass and biofuels deployment, particularly in developing countries.
 
- **Global Nuclear Energy Partnership** – Seeks to develop worldwide consensus on enabling expanded use of economical, carbon-free nuclear energy to meet growing electricity demand, using a nuclear fuel cycle that enhances energy security, while promoting non-proliferation.
 



Innovative International Technology Partnerships

- 
 ■ **International Partnership for the Hydrogen Economy (IPHE)** – 17 members: Organizes, coordinates, and leverages hydrogen RD&D programs.
- 
 ■ **Carbon Sequestration Leadership Forum (CSLF)** – 22 members: Focused on CO₂ capture & storage technologies.
- 
 ■ **Generation IV International Forum (GIF)** – 11 members: Devoted to R&D of next generation of nuclear systems.
- 
 ■ **ITER** – 7 members: Project to demonstrate the scientific and technological feasibility of fusion energy.
- 
 ■ **Group on Earth Observations** – 64 member countries, the European Commission, and more than 40 participating organizations: Design and implementation of a new Global Earth Observation System of Systems (GEOSS).
- 
 ■ **Renewable Energy and Energy Efficiency Partnership (REEEP)** – 17 countries working to enhance the delivery of clean and secure energy through the use of renewable resources and energy efficiency programs in the developed and developing world.



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 9



Significance

Six Asia-Pacific Partners in 2003 accounted for:

- 64.7% of World GDP (MER)
- 49.8% of World GDP (PPP)
- 45.2% of World Population
- 51.0% of World Total Primary Energy Consumption
- 49.4% of World CO₂ Emissions from the Fossil Fuel Consumption and Flaring
- 64.5% of World Coal Production
- 63.6% of World Coal Consumption
- 45.6% of World Petroleum Consumption
- 55.6% of World Net Conventional Thermal Electricity Generation
- 49.3% of World Total Net Electricity Generation
- 30.1% of World Dry Natural Gas Consumption

Source: Energy Information Administration, *International Energy Annual 2003*



Asia-Pacific Partnership on Clean Development and Climate

President's Statement: July 27, 2005

ATTACHMENT 10



- The United States has joined with Australia, China, India, Japan, and South Korea to create a new Asia-Pacific partnership on clean development, energy security, and climate change.
- This new results-oriented partnership will allow our nations to develop and accelerate deployment of cleaner, more efficient energy technologies to meet national pollution reduction, energy security, and climate change concerns in ways that reduce poverty and promote economic development.
- The six Asia-Pacific partners will build on our strong history of common approaches and demonstrated cooperation on clean energy technologies.
- I have directed Secretary of State Condoleezza Rice and Secretary of Energy Sam Bodman to meet with their counterparts this fall to carry forward our new partnership and provide direction for our joint work.



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 11



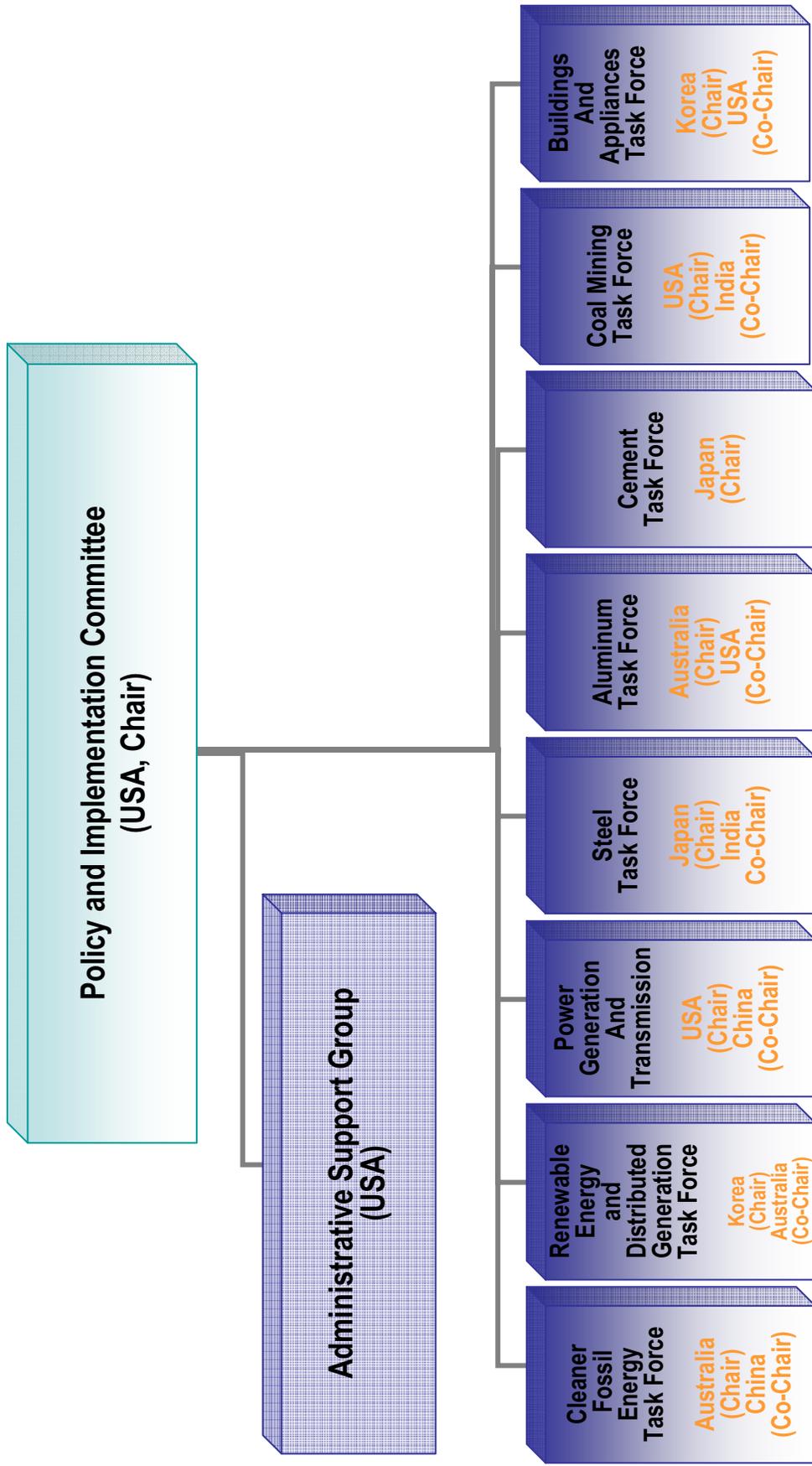
Focus

- **Voluntary practical measures taken by these six countries in the Asia-Pacific region to create new investment opportunities, build local capacity, and remove barriers to the introduction of clean, more efficient technologies.**
- **Help each country meet nationally designed strategies for improving energy security, reducing pollution, and addressing the long-term challenge of climate change.**
- **Promote the development and deployment of existing and emerging cleaner, more efficient technologies and practices that will achieve practical results in areas such as:**
 - Energy Efficiency
 - Clean Coal
 - Natural Gas
 - Bioenergy
 - Methane Capture/Use
 - Civilian Nuclear Power
 - Geothermal
 - Agriculture/Forestry
 - Rural/Village Energy Systems
 - Advanced Transportation
 - Hydro/Wind/Solar Power
 - Building/Home Construction/Operation



Asia-Pacific Partnership on Clean Development and Climate

Organizational Chart





Asia-Pacific Partnership on Clean Development and Climate

Clean Fossil Energy Task Force Objectives

ATTACHMENT 13.1



- **Build on the range of existing national (and other international) measures and initiatives to develop an Asia-Pacific Partnership cleaner fossil energy technology development program.**
- **Identify the potential for, and encourage uptake of, CO₂ geo-sequestration opportunities in Partnership countries.**
- **Further develop coal bed and waste coal mine methane gas and LNG/natural gas opportunities and markets in the Asia-Pacific region.**
- **Build the research and development base, and the market and institutional foundations of Partners through technology supporting initiatives, such as education, training and skills transfer.**



Asia-Pacific Partnership on Clean Development and Climate Renewable Energy and Distributed Generation Objectives

ATTACHMENT 13.2



- Facilitate the demonstration and deployment of renewable energy and distributed generation technologies in Partnership countries.
- Identify country development needs and the opportunities to deploy renewable energy and distributed generation technologies, systems and practices, and the enabling environments needed to support wide-spread deployment, including in rural, remote and peri-urban applications.
- Enumerate financial and engineering benefits of distributed energy systems that contribute to the Partnership's economic development and climate goals.
- Promote further collaboration between Partners on research, development and implementation of renewable energy technologies including supporting measures such as renewable resource identification, wind forecasting and energy storage technologies.
- Support cooperative projects to deploy renewable and distributed generation technologies to support rural and peri-urban economic development and poverty alleviation.
- Identify potential projects that would enable Partners to assess the applicability of renewable energy and distributed generation to their specific requirements.



Asia-Pacific Partnership on Clean Development and Climate **Power Generation and Transmission Task Force Objectives**

ATTACHMENT 13.3



- **Assess opportunities for practical actions to develop and deploy power generation, transmission and demand side management technologies that can aid development and climate concerns.**
- **Facilitate demonstration and deployment of practices, technologies and processes to improve efficiency of power production and transmission within Partnership countries.**
- **Enhance collaboration between Partners on research and development of such technologies and processes.**
- **Enhance synergy with relevant objectives of other Task Forces (i.e. Cleaner Fossil Energy, Renewable Energy and Distributed Generation and Buildings and Appliances).**
- **Identify potential projects that would enable Partner countries to assess the applicability of energy feedstocks to their specific requirements.**
- **Identify opportunities to enhance investment in efficient power supply by improving energy markets and investment climate.**



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 13.4



Steel Task Force Objectives

- **Develop sector relevant benchmark and performance indicators.**
- **Facilitate the deployment of best-practice steel technologies.**
- **Increase collaboration between relevant Partnership country government, research and industry steel-related institutions.**
- **Develop processes to reduce energy usage, air pollution and GHG emissions from steel production.**
- **Increase recycling across the Partnership.**



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 13.5



Aluminum Task Force Objectives

- Enhance current production processes of aluminum through uptake of best-practice use of existing equipment.
- Advance the development and deployment of new best practice aluminum production process and technologies across Partnership economies.
- Enhance sector-related data, including recycling and performance.
- Facilitate increased aluminum recycling rates across the Partnership.



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 13.6



Cement Task Force Objectives

- **Facilitate demonstration and deployment of energy-efficient and cleaner product formulation technologies in Partnership countries that will significantly improve the GHG emissions intensity and the air pollutant emissions intensity of cement operations.**
- **Develop sector relevant benchmark and performance indicators.**
- **Take advantage of opportunities to build infrastructure in developing countries and emerging economies that uses energy efficient cement and concrete building and paving materials.**



Asia-Pacific Partnership on Clean Development and Climate

ATTACHMENT 13.7



Coal Mining Task Force Objectives

- **Facilitate technologies and practices that can improve the economics and efficiencies of mining and processing and continue to improve safety and reduce environmental impacts.**
- **Establish, as appropriate, efficiency and emissions intensity and mine reclamation objectives based on each nation’s circumstances.**
- **Identify current reclamation activities in each country, as appropriate, and exchange best practice information in reclamation of surface mined lands with a focus on enhanced surface reclamation practices that improve the opportunities for carbon sequestration.**



Asia-Pacific Partnership on Clean Development and Climate

Building and Appliances Task Force Objectives

ATTACHMENT 13.8



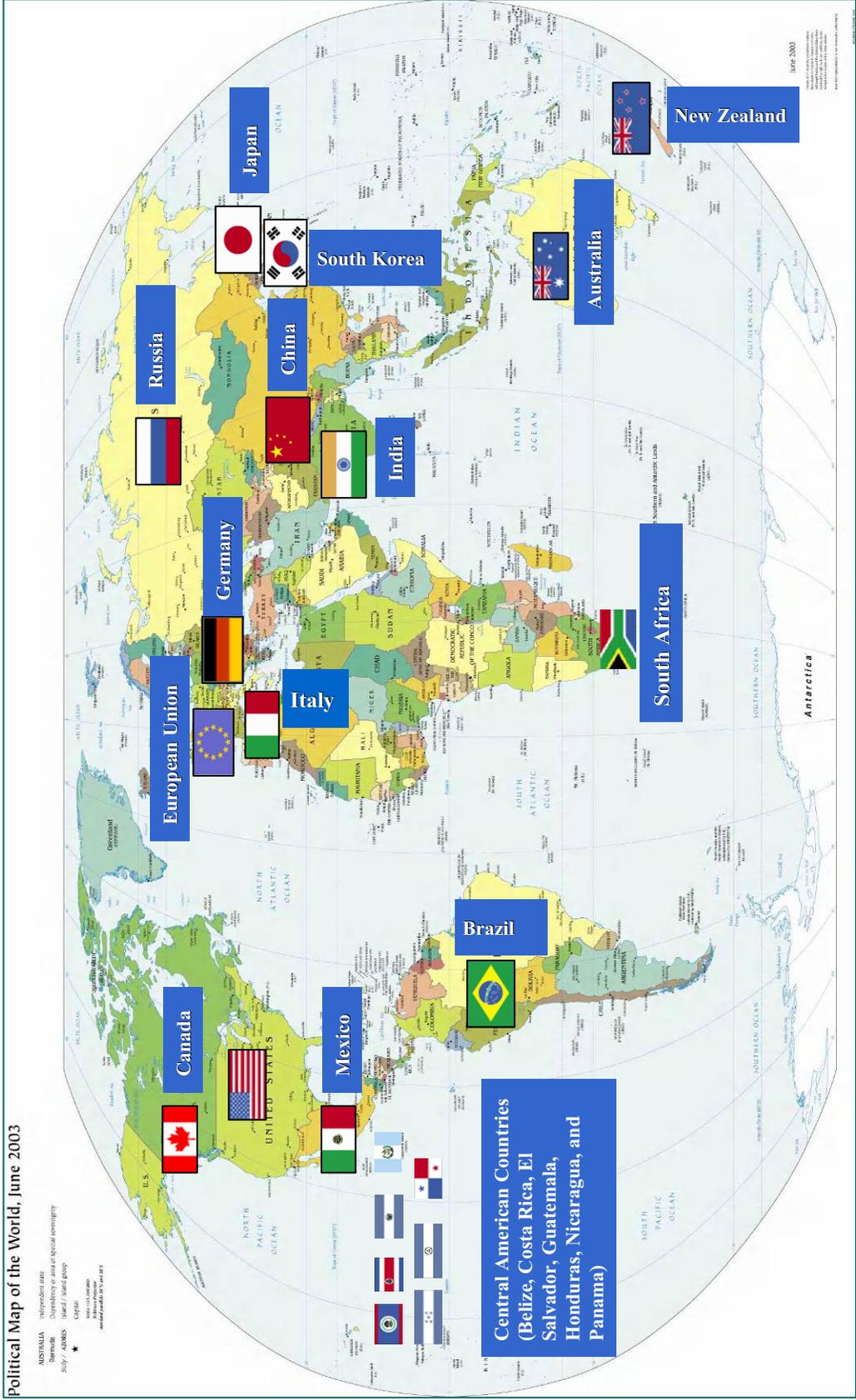
- Use cooperative mechanisms to support the further uptake of increasingly more energy efficient appliances, recognizing that extensive cooperative action is already occurring between Partner countries.
- Promote best-practice and demonstrate technologies and building design principles to increase energy efficiency in building materials and in new and existing buildings.
- Support the integration of appropriate mechanisms to increase the uptake of energy efficient buildings and appliances into broader national efforts that support sustainable development, increase energy security and reduce environmental impacts.
- Systematically identify and respond to the range of barriers that limit the implementation of end-use energy-efficiency practices and technologies.

U.S. Climate Change Bilaterals



Political Map of the World, June 2003

AUSTRIA Independent state
Denmark Dependency or area of special sovereignty
Italy / ARABES State / Island group
Capital
State of Palestine
State of Palestine (2012)



June 2003

Source: CIA World Factbook
Map data: National Geographic
Map projection: Robinson
Map scale: 1:100,000,000