

THE POWER PARTNERSSM Annual Report



Proven Progress



Continued Commitment



Environmental Leadership



JANUARY 2007





Climate Actions

The electric power industry understands the importance of addressing greenhouse gas (GHG) emissions. Utilities and power generators are working to reduce their carbon footprint and GHG emissions, generating electricity in a cleaner manner while also meeting our country's ever-growing demand for electric power.

As a result, the U.S. electric sector is a world leader in taking voluntary actions to address GHG emissions. Since 1980, the carbon intensity of electric power production—or the amount of carbon dioxide (CO₂) emissions per kilowatt-hour of electricity—has decreased by 10 percent. This decrease in carbon intensity was accomplished by increased generation efficiency and capacity improvements at coal and nuclear power plants, energy-efficiency and other demand-side management programs, transmission and distribution system upgrades, natural gas plant expansion projects, landfill gas recovery projects, carbon sequestration activities, and other projects.

In 1994, the electric power industry teamed with the U.S. Department of Energy (DOE) to create the “Climate Challenge,” a joint government-industry partnership that eliminated 237 million metric tons of CO₂-equivalent GHG emissions in the year 2000 alone. Power sector actions comprised about 70 percent of the total reductions and offsets reported to the government that year.

Building on the success of the Climate Challenge partnership, the electric power sector took another major step and made a new voluntary commitment to reduce GHG emissions intensity in the United States. In January 2003, through a new initiative named Power PartnersSM, our organizations collectively pledged to reduce the power sector's GHG emissions intensity during the 2010-2012 period by the equivalent of three to five percent (measured as GHG emissions per unit of electricity produced in our sector) below the 2000-2002 base-period average. In December 2004, the leaders of the seven electric power organizations comprising Power PartnersSM signed an agreement with DOE that established a framework to reach this goal.

The seven organizations comprising Power PartnersSM are the American Public Power Association, Edison Electric Institute, Electric Power Supply Association, Large Public Power Council, National Rural Electric Cooperative Association, Nuclear Energy Institute, and the Tennessee Valley Authority. Our groups represent all of the electric power generation in the United States.

The Power PartnersSM are making significant progress toward reaching our goal. In 2004, the latest year for which data are available, the power sector undertook voluntary programs or projects that reduced, avoided, or sequestered more than 282 million metric tons of carbon-equivalent GHG emissions. This represents nearly two-thirds of all reductions reported to the federal government in that year. Our industry is currently on track to meet our reduction targets, with adjusted power sector carbon intensity approaching a three-percent reduction compared to the baseline level—only three years into the 10-year program.

We believe that Power PartnersSM, like Climate Challenge before it, demonstrates the benefits of voluntary climate change approaches that rely on flexible programs and a robust use of available technology to reduce GHG emissions. And, we are pleased to present this inaugural Power PartnersSM annual report, which highlights both industry-wide and company-specific actions to address GHG emissions.

While the activities undertaken to date represent a significant step in the U.S. power sector's efforts to address GHG emissions, there is strong agreement within the power sector that development and global deployments of new technologies in all economic sectors—industrial, commercial, agricultural, residential, and transportation—are essential to addressing GHG emissions over the long term. Going forward, we recognize that a critical component to the success of Power PartnersSM—and any future climate programs—will be continued government support for sensible policies that help our sector economically address GHG emissions. To that end, the Power PartnersSM look forward to working with state and federal government agencies, international partners, and other stakeholders to develop the next generation of policy initiatives and technologies necessary for ongoing climate action.

SIGNED,

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Environmental Leadership

Prepared by: Edison Electric Institute

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EXECUTIVE SUMMARY

Electricity drives the U.S. economy. It powers our homes, offices, and industries; provides communications, entertainment, and medical services; powers computers, technology, and the Internet; and runs various forms of transportation. Electricity and the many technologies that it powers enhance the quality of life for our customers and contribute to the progress and success of our nation.

Even as electric utilities and power suppliers work hard to meet the increasing demands of consumers, they are strongly committed to reducing the environmental impact of electric generation. As an industry, the electric power sector has implemented flexible and cost-effective voluntary programs to mitigate greenhouse gas (GHG) emissions for several years.

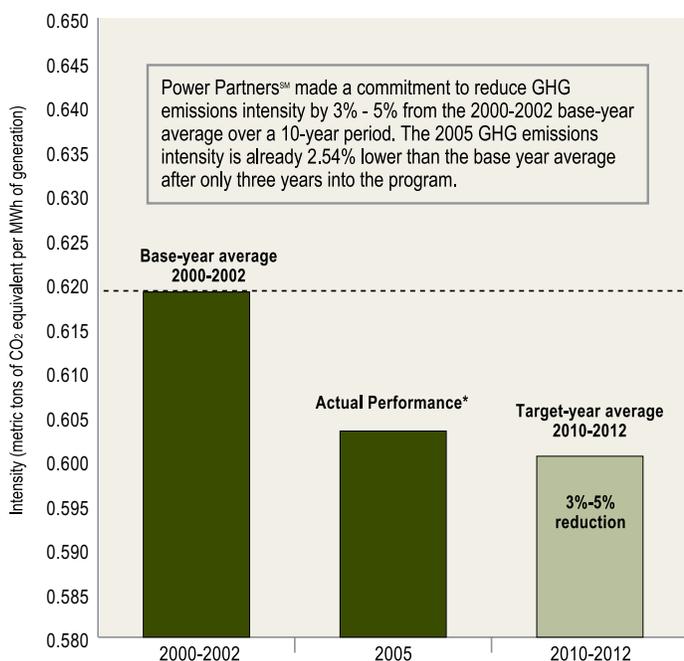
Power PartnersSM is the latest voluntary partnership between the electric power industry and the U.S. Department of Energy (DOE) to reduce GHG emissions. In fact, Power PartnersSM is a sector initiative within a broader program called Climate VISION. This program was created in response to the national goal of substantially reducing GHG emissions intensity in the economy over 10 years. In February 2003, the federal government and industry organizations representing thousands of companies from 12 energy-intensive economic sectors joined the voluntary Climate VISION partnership.

In December 2004, DOE and Power PartnersSM signed a Memorandum of Understanding (MOU) establishing a voluntary framework for reducing the GHG emissions intensity of the power generation sector. Power PartnersSM climate actions are guided by the principles of improved energy efficiency, increased investments in research and development, technological innovation, market-based initiatives, and cost-effective GHG emissions reductions. The Power PartnersSM have pledged to reduce collectively the power sector's GHG emissions intensity during the 2010-2012 period by the equivalent of three to five percent (measured as GHG emissions per unit of electricity produced in our sector) below the 2000-2002 base-period average. The U.S. Department of Agriculture (USDA) and the National Rural Electric Cooperative Association (NRECA) also signed an MOU to identify and advance technologies that will help achieve the national GHG emissions-intensity goal.

As shown in Figure E.S. 1, our industry is currently on track to meet its reduction targets, with adjusted power sector carbon intensity approaching a three-percent reduction compared to the baseline level after only three years into the 10-year program.

FIGURE E.S. 1

Trends in Power PartnersSM GHG Emissions Intensity (Annual Average)



* Includes effect of off-system and non-generation actions offsetting and affecting GHG emissions from generation.

Sources: U.S. Department of Energy, Energy Information Administration, and 2006 Power PartnersSM Survey.

While individual company actions are the cornerstone of Power PartnersSM voluntary programs, the electric power industry also is participating in several industry-wide initiatives to reduce, avoid, and sequester GHG emissions. In addition, many of the Power PartnersSM organizations are working on additional climate projects with the Electric Power Research Institute (EPRI)—a non-profit energy research consortium that provides science and technology expertise to global energy customers worldwide. EPRI's members are engaged in specific programs focused on carbon sequestration research and climate technology development.

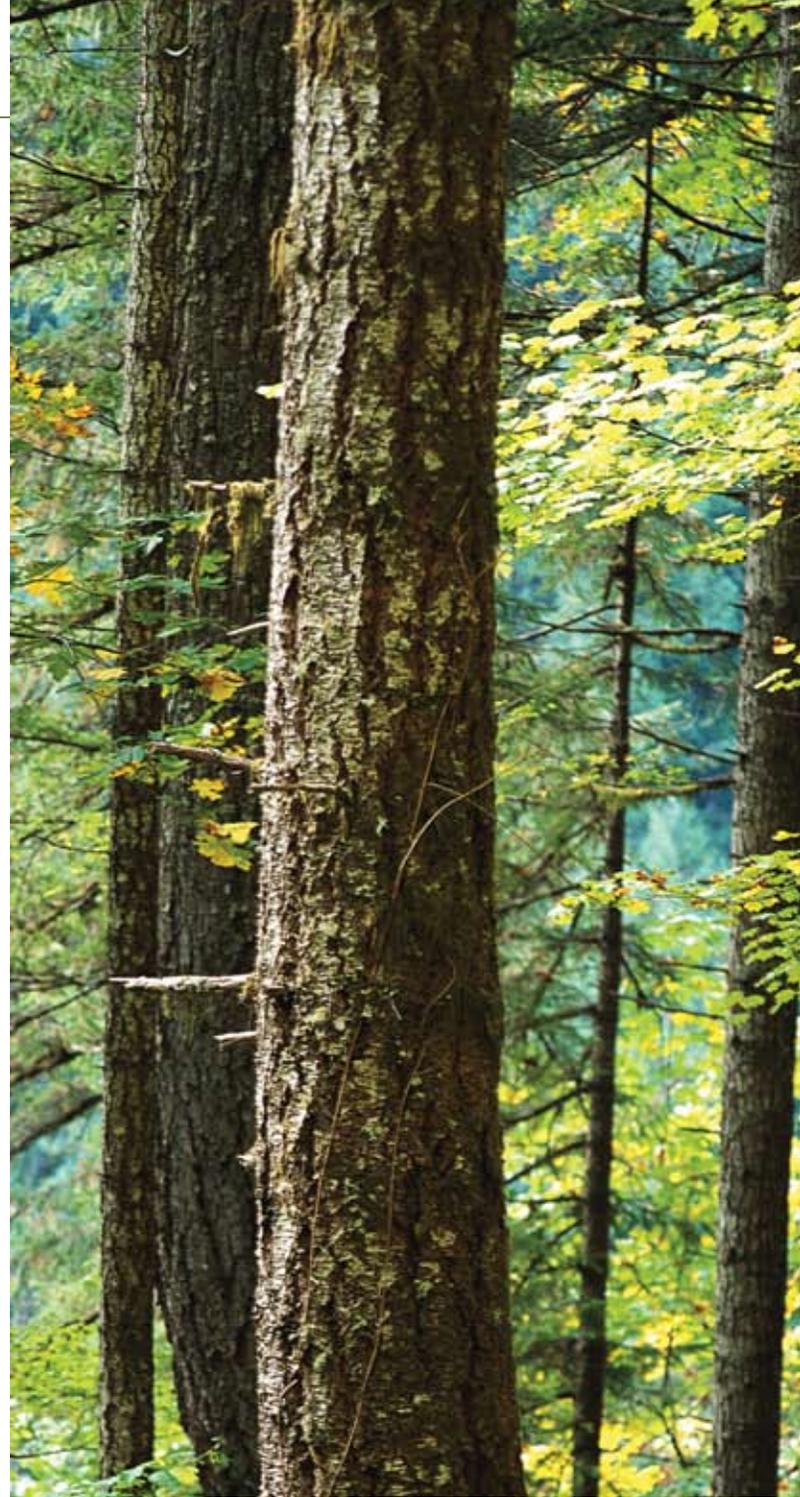
Two years after signing the MOU with DOE, the Power PartnersSM present this report to examine the progress of our efforts to date and to identify the areas where additional actions may be needed. The report highlights the many ways that the electric power sector is reducing its GHG emissions intensity, including:

- ◆ Industry-wide initiatives
- ◆ Individual company actions
- ◆ Public power actions
- ◆ Electric cooperative actions
- ◆ Tennessee Valley Authority actions
- ◆ Cross-sector projects
- ◆ Technology research and development

Achieving the goal set forth in the MOU will be a significant accomplishment when considering the difficult challenges the electric power sector faces. According to DOE's Energy Information Administration (EIA), electricity consumption is projected to increase 45 percent by 2030.¹ The electric power industry is working hard to meet the country's growing demand for electricity, while balancing additional priorities—such as reducing emissions, utilizing a diverse fuel mix, and increasing the efficiencies of its operations. To meet growing demand and provide reliable service, the industry must make significant investments in the nation's transmission and distribution systems. Additionally, the industry will be required to invest billions of dollars in new emission control equipment to meet the requirements of new environmental mandates. On the generation side, the significant increase in natural gas and oil prices in recent years can affect the mix of fuels used in generation. The electric power sector also must contend with weather-related effects on electricity generation. For example, snow and rainfall patterns affect the availability of hydropower.

However, as this report demonstrates, the Power PartnersSM have made important progress to date and we are on track to reach our goal. The Power PartnersSM look forward to continuing to work together with DOE and other government agencies to find innovative ways to reduce the GHG emissions intensity in the power sector—and ultimately to help meet the national emissions-intensity goal.

¹ U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2006*, February 2006.



Power PartnersSM climate actions are guided by the principles of improved energy efficiency, increased investments in research and development, technological innovation, market-based initiatives, and cost-effective GHG emissions reductions.

OVERVIEW

Emissions Measurement and Reporting Protocols

The members of the trade associations that comprise Power PartnersSM, along with the Tennessee Valley Authority (TVA), currently report the vast majority of their emissions (greater than 99 percent) through the use of continuous emissions monitors and fuel-use estimated data that are transmitted to the U.S. Environmental Protection Agency (EPA) and then subsequently published annually at the sector level by both EPA and EIA.

Moreover, utilities, power generators, and TVA currently plan to continue reporting their GHG emissions reduction activities under the voluntary program established under section 1605(b) of the Energy Policy Act of 1992 and administered by EIA. This program provides a means for companies, organizations, and individuals

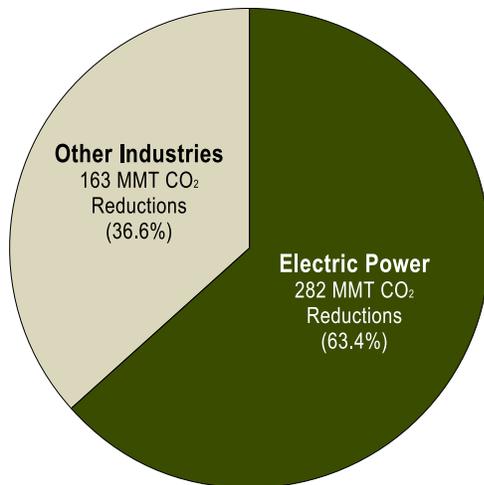
who have reduced their emissions to record their accomplishments and share their ideas for future action. GHG emissions reductions through the program include actual reductions, avoidances, and sequestrations. Reporting under these regimes is the functional equivalent of a monitoring and reporting protocol for the power sector.

While the long-term success of Power PartnersSM will be measured by meeting the goal set forth in the MOU signed with DOE, its short-term achievements can be measured today. In 2004, based on an analysis of 1605(b) data, approximately 445 million metric tons of carbon dioxide (CO₂)-equivalent reductions were reported on EIA Form 1605(b). This represents a 6.3-percent improvement in reductions compared to 2003.

The electric power sector reported the most CO₂ reductions of any reporting sector in 2004 (the latest year for which data are available) at more than 282 million metric tons—accounting for approximately 63 percent of

FIGURE 1

Electric Power Sector's Contribution to Voluntary Greenhouse Gases Program

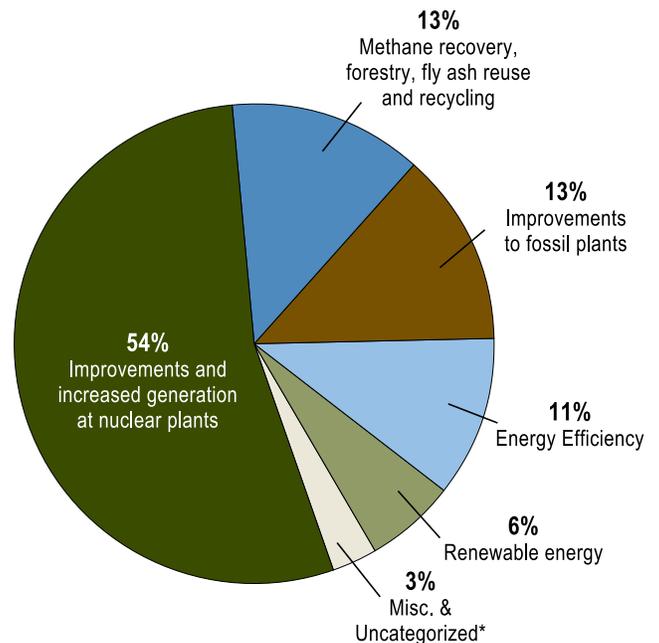


Note: Million metric tons (MMT) represent the greater of project or entity amount, on reporter-by-reporter basis.

Source: EIA Voluntary Reporting of Greenhouse Gases Program, 2004 Annual Report. Analysis by Edison Electric Institute.

FIGURE 2

Electric Power Greenhouse Gas Reductions by Project Type



*Includes improvements to transmission and distribution systems, transportation and off-road vehicles, and halogenated substances.

Source: EIA Voluntary Reporting of Greenhouse Gases Program, 2004 Annual Report. Analysis by Edison Electric Institute.

total program reductions, as shown in Figure 1. This represents a 7.7-percent increase over 2003 reported CO₂ reductions. This increase primarily can be attributed to increased nuclear power generation, which grew by 3.2 percent in 2004, according to EIA.

On a project-by-project basis, the electric power sector reported nearly 1,500 individual projects that directly or indirectly reduced CO₂ emissions by approximately 264 million metric tons.* As shown in Figure 2, nuclear power-related projects, including increased generation and capacity improvements (power uprates), accounted for about 142 million metric tons of CO₂ reductions or about 54 percent of the electric power sector's total reductions. Other major CO₂-reducing activities reported by the electric power sector include demand-side management (DSM) programs, transmission and distribution system upgrades, natural gas plant expansion projects, landfill gas recovery projects, and carbon sequestration activities.

Additional Reporting Mechanisms

To measure improvements in GHG emissions intensity, Power PartnersSM selected the level of GHG emissions per unit of electricity generation (tons of CO₂-equivalent emissions per kilowatt-hour [kWh] of generation) as our initial metric. This was chosen because it is easily understandable both within and outside the industry and because detailed data on electricity generation and CO₂ emissions are publicly available through EIA, as described in the preceding section. Due to the limitations of this metric, however, Power PartnersSM adopted an adjusted metric, incorporating several significant modifications in order to reflect actual voluntary activities more fully.

First, Power PartnersSM decided to use a three-year average for the base year and the target year. Therefore, Power PartnersSM will be measuring the performance of its voluntary initiative as the change between the 2000-2002 base-period average and the 2010-2012 target-year average. By using a three-year average, large year-to-year fluctuations in weather-related volatility, as well as nuclear plant refueling cycles, are smoothed out. Annual volatility in average weather conditions affects the electric generation intensity in two ways: (1) periods of abnormally high summer temperatures or abnormally low winter temperatures require additional peak load generation, which varies in carbon intensity from baseload generation; and (2) variations in rainfall and snowfall

patterns affect levels of emissions-free hydropower generation. Averaging over a three-year period compensates for the volatility caused by these factors. All analyses in this report of improvements in GHG emissions intensity and changes in emissions have been calculated relative to a 2000-2002 base-period average.

Second, the use of the initial intensity metric fails to capture the impact of several categories of voluntary actions that are not directly reflected in the data on electricity generation and GHG emissions from generation. These actions include: (1) initiatives taken by Power PartnersSM member utilities and power generators jointly with their customers to improve end-use energy efficiency and to reduce demand for electricity; (2) actions taken to improve the energy efficiency of the electricity transmission and distribution systems; and (3) "off-system" actions, *i.e.*, GHG emissions reductions, such as tree-planting programs, that would not otherwise be reflected in any database on electricity generation, transmission, distribution, or consumption.

Neither government agencies nor Power PartnersSM currently collect comprehensive data on these activities. However, EIA collects some data on DSM programs, as well as the voluntary reporting of GHG emissions reductions in the 1605(b) reporting program. EPA collects data on sulfur hexafluoride (SF₆) emissions as part of its voluntary partnership program. EEI collects data on the industry-wide UtiliTree Carbon Company tree-planting initiative and will be collecting data on the PowerTree Carbon Company. Some of these data were utilized in the analysis of Power PartnersSM actions.

To help fill these data gaps, Power PartnersSM conducted a survey of member utilities, power generators, and TVA in the summer of 2006 to obtain additional information on their actions to reduce, avoid, and sequester GHG emissions. The primary areas identified were company-specific carbon sequestration activities (not part of the industry-wide utility program), reductions in energy losses in transmission and distribution systems, recovery of methane emissions from landfills, utilization of coal combustion products (CCPs), energy-efficiency and DSM programs, and reductions of SF₆ emissions. The survey sought to capture data on these activities, on a consistent trend basis, from 2000 to 2005. In addition, the survey offered the opportunity for companies to provide supplemental information describing improvements in generation emissions intensity that reflected data submitted to EIA. The survey results supplemented the data on electricity generation and GHG emissions available from other data sources. Each data source was carefully reviewed to avoid instances of overlap.

Based on the additional data collected for voluntary actions (other than generation improvements), Power

* For clarification purposes, this text was updated on January 16, 2007. The original printed version does not include "by approximately 264 million metric tons."

PartnersSM constructed an adjusted carbon intensity metric. The electricity savings (in kWh) due to reductions in transmission and distribution losses, plus reductions in electricity consumption due to DSM programs, were added to the generation data as an additional source of emissions-free generation. The reductions in GHG emissions due to off-system actions were deducted as an offset to the GHG emissions from generation.

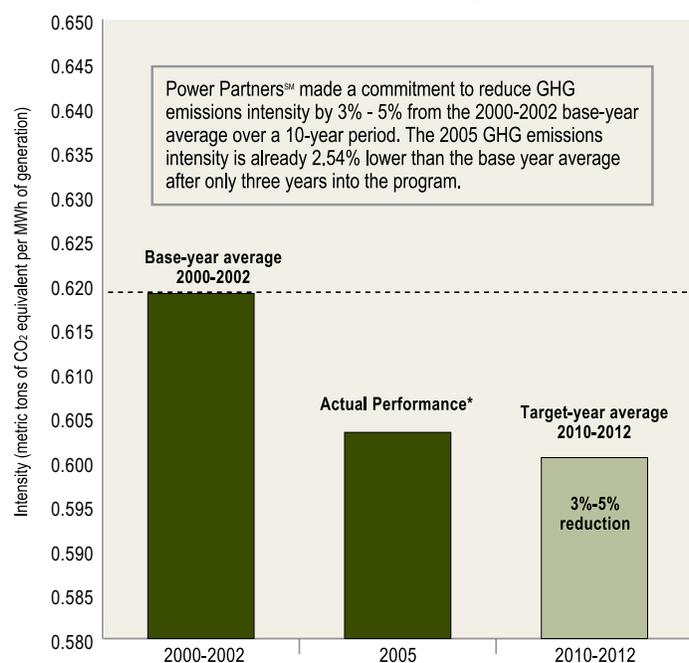
GHG Emissions Intensity Trends

The analysis of the survey data indicates an overall favorable trend in the reduction of GHG emissions intensity, and confirms that Power PartnersSM are capable of reaching our goal of a three- to five-percent reduction in GHG emissions intensity by 2012.

As illustrated in Figure 3, the analysis shows that

FIGURE 3

Trends in Power PartnersSM GHG Emissions Intensity (Annual Average)



* Includes effect of off-system and non-generation actions offsetting and affecting GHG emissions from generation.

Source: U.S. Department of Energy, Energy Information Administration, and 2006 Power PartnersSM Survey.

adjusted GHG emissions intensity was approaching a three-percent reduction in 2005, as compared with the 2000-2002 base-period average. The general direction of the GHG emissions intensity is downward, and is consistent with a path that will result in a three- to five-percent reduction in GHG emissions intensity by 2012. The data also reflect significant year-to-year variability due to weather-related effects on electricity generation. Some of the variability also may be due to changes in the mix of fuels used in generation resulting from the significant increase in natural gas and oil prices in recent years.

The survey analysis also shows that non-generation actions play a significant role in reducing the Power PartnersSM GHG emissions intensity. For example:

- ◆ DSM projects have made a significant contribution to the success of Power PartnersSM thus far. These projects, which involve collaborative efforts between Power PartnersSM member utilities and power generators and their customers, reduce electricity consumption and provide an equivalent form of emissions-free electricity that will serve areas of increasing customer load.
- ◆ Efforts by the Power PartnersSM to recycle CCPs and therefore reduce the demand for cement also create large avoided GHG emissions. According to the utilities and power generators responding to the Power PartnersSM survey, cumulative CO₂ emissions avoided through 2005 totaled almost three million metric tons of CO₂ relative to the 2000-2002 base-period average.
- ◆ Data reported by utilities participating in EPA's SF₆ Emissions Reduction Partnership show a cumulative reduction of 3.4 million tons of CO₂-equivalent GHG emissions between the 2000-2002 base period and 2005.
- ◆ GHG emissions offsets from off-system actions—such as carbon sequestration—currently comprise nearly one million tons of CO₂ and will increase significantly in the future.

The analysis also indicates certain issues that will continue to challenge the Power PartnersSM as we work toward achieving our goal: the unpredictability of weather; hydro-power availability; and natural gas, fuel oil, and coal price volatility and availability.

While the activities undertaken to date by Power PartnersSM represent a significant step in the U.S. power sector's efforts to address GHG emissions, there is strong agreement within the power sector that development and global deployments of new technologies in all economic sectors—industrial, commercial, agricultural, residential, and transportation—are essential to addressing GHG emissions over the long term. Going forward, we recognize that a critical component to the success of Power PartnersSM—and any future climate programs—will be continued government support for sensible policies that help our sector to address GHG emissions. To that end, the Power PartnersSM look forward to working with state and federal government agencies, international partners, and other stakeholders to develop the next generation of policy initiatives and technologies necessary for ongoing climate action.



The analysis of the survey data indicates an overall favorable trend in the reduction of GHG emissions intensity, and confirms that Power PartnersSM are capable of reaching our goal of a three- to five-percent reduction in GHG emissions intensity by 2012.



INDUSTRY-WIDE INITIATIVES

Since 2002, the Power PartnersSM have been assessing and developing a series of industry-wide initiatives that support the national GHG emissions-intensity goal and help the power sector reduce its carbon intensity. The following activities are being pursued to assist in achieving the sector-wide carbon intensity goal:

Coal Combustion Products Partnership (C2P2)

The C2P2 initiative is designed to increase the use of CCPs, in lieu of limited natural resources, to avoid the generation of 20 million tons of CO₂ annually by 2011, and to increase the CCP utilization rate from 32 percent to 50 percent by 2011. To date, 43 utilities have become C2P2 partners, and 19 have pledged additional funding to help meet these goals.

Utilization of CCPs provides numerous environmental and economic benefits, including a reduced volume of solid waste going to landfills, reduced use of natural resources, and reduced energy consumption and CO₂ emissions from the decreased use of natural resources and the production of cement and other materials. The use of fly ash to replace Portland cement in concrete has the potential to reduce CO₂ emissions by 10 to 14 million tons annually, thus supporting sustainable growth. Other beneficial uses of CCPs hold the potential for additional CO₂ emission reductions. For example, utilizing CCPs in industrial sand mining and road base applications have been shown to reduce CO₂ emissions.

According to data compiled from the Power PartnersSM survey, cumulative CO₂ emissions avoided from the 2000-2002 base period through 2005 from utilizing CCPs total almost three million metric tons of CO₂.

Examples of Power PartnersSM CCP projects:

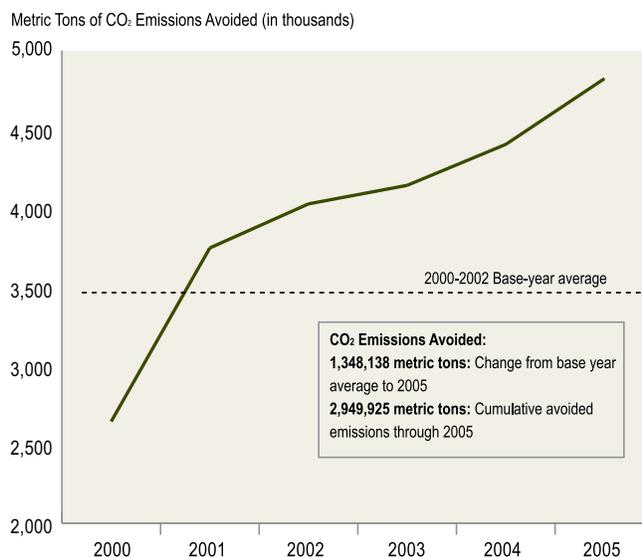
- ◆ **Entergy** utilized 86.2 percent—more than 466,000 tons—of the fly ash generated in its fossil plants in 2005. Entergy is developing a method for creating and registering emissions reduction credits that will monetize the GHG-emissions savings realized from this practice.
- ◆ Exelon Power, **Exelon's** business unit responsible for fossil operations, achieved an almost 100-percent reuse of CCPs from its fossil-generation stations in 2005. This included 100-percent reuse of nearly

156,000 tons of ash products. These products were used to stabilize other waste streams and to reclaim retired anthracite coal mine sites. In 2005, virtually all of the approximately 24,500 tons of scrubber by-products produced were used to stabilize other waste streams and to produce fertilizing agents. Since 2000, Exelon Power's reuse of CCPs has avoided more than 500,000 tons of CO₂.

- ◆ **Jacksonville Electric Authority** avoided nearly 35,000 tons of CO₂ emissions through the C2P2 program, with CCPs sold for use in cement production and road base applications.
- ◆ **Nebraska Public Power District** avoided more than 120,000 tons of CO₂ in 2005 through the use of fly ash to replace cement in concrete and for soil stabilization.

FIGURE 4

Avoided CO₂ Emissions From Utilization of Coal Combustion Products



Source: Company responses to Power PartnersSM survey (19 respondents).

- ◆ **PNM Resources** avoided more than 200,000 tons of CO₂ emissions in 2005 by utilizing its fly ash in cement production and highway construction.
- ◆ **Tampa Electric Company** has avoided more than 356,000 tons of CO₂ emissions through its fly ash utilization efforts with the concrete manufacturing industry.
- ◆ **We Energies**, a subsidiary of Wisconsin Energy Corporation, utilizes approximately 100 percent of its fly ash emissions as a cement replacement in concrete products and for sludge stabilization. We Energies has avoided more than 336,000 tons of CO₂ cement emissions through its fly ash utilization program.

PowerTree Carbon Company

This initiative, formally announced in 2004, is a reforestation effort in the lower Mississippi River Valley (Louisiana, Arkansas, and Mississippi). Twenty-five power generators have committed more than \$3 million for seven tree-planting projects that will restore habitats and will remove and store more than 1.5 million tons of CO₂ over their 100-year lifetimes.

International Power Partnerships

This program works to identify GHG emissions-reduction opportunities overseas. From 2003 to 2006, 32 projects that will reduce, avoid, or sequester more than 66 million metric tons of CO₂ emissions over project lifetimes were selected for funding. These projects include landfill gas recovery, hydropower, wind power, and fossil fuel substitution.

EPRI Technology Initiatives

Further reductions in GHG emissions intensity in the medium- to long-term will depend upon the development and availability of cost-effective technologies that allow for a stable, reliable, and affordable supply of electricity. Working with EPRI, Power PartnersSM are pursuing several initiatives focusing on near-term results and long-term actions.

- ◆ **CoalFleet for Tomorrow:** Launched in November 2004, this initiative seeks to accelerate the deployment and commercialization of clean and efficient advanced coal power systems, thereby preserving coal as a vital component in the electric generation mix. More than 50 organizations—including

various types of power generators, suppliers, engineering firms, DOE, and other U.S. and international organizations—are participating in this program. CoalFleet is tackling the technical, economic, and institutional challenges of making advanced coal power plants a prudent investment option in both the short- and long-term, while taking into account the potential for future CO₂ emissions regulations.

- ◆ **CO₂ Capture and Storage Test Centers 5-Megawatt Chilled Ammonia Process Capture Pilot:** An integrated test center that captures actual power plant flue gas CO₂ and stores it safely deep underground is a crucial step to commercializing technologies that curb CO₂ emissions. This project focuses on the first step leading to a test center. Initially, EPRI proposes to build and operate a CO₂ capture pilot plant, treating approximately a five-megawatt (MW) equivalent of flue gas and focusing on a variation of solvent scrubbing using chilled ammonia. This process appears to show great promise for significantly lower energy penalties, and therefore costs, than solvent processes being investigated by others. The pilot will be a co-funded effort with ALSTOM, an international manufacturer of rail transport and power generation equipment, which will fund approximately half of the costs. Later, EPRI plans to pursue additional CO₂ capture pilots using other technologies, and eventually will launch a test center that will capture, store, and monitor the capture and injection of half a million tons of CO₂ emissions over a 10-year period (or a 10-MW equivalent).
- ◆ **Developing GHG Emissions Offsets by Reducing N₂O Emissions in Agricultural Crop Production:** Nitrous oxide (N₂O) is a significant GHG emission. Each ton of N₂O emitted into the atmosphere is equivalent to emitting 296 tons of CO₂. This project will investigate the approach of developing large-scale GHG-emissions offsets by reducing N₂O emissions in agricultural crop production. The tools and information developed in this project will broaden the GHG emissions-offset options available to electric utilities and power generators and can serve as a mechanism to develop and strengthen partnerships with the agricultural communities that they serve.
- ◆ **Driving Environmental and Strategic Benefits to Electric Utilities and Power Generators with Electric Transportation:** EPRI, working collaboratively with the Natural Resources Defense Council, has begun groundbreaking research to better understand CO₂ emissions offsets and air quality impacts of plug-in hybrid electric vehicles (PHEVs). As part of this project, EPRI will analyze the impact of PHEV technology on CO₂ emissions by overlapping



expected technology roadmaps for both new electricity generation and electric-drive vehicle technologies.

- ◆ Long-term actions include the jointly established DOE-EPRI Center for Nuclear Fuels and Materials Research at the Idaho National Laboratory.

Power PartnersSM Resource Guide

The Power PartnersSM Resource Guide is a Web-based resource tool to help utilities and power generators undertake individual actions to reduce GHG emissions or emissions intensity. The Resource Guide directs utilities to best practices and efficiency/reduction opportunities by helping users find state-of-the-art information on a variety of topics through the use of links to credible Web sites. The guide also creates a forum for dialog between utilities that have successfully implemented projects and utilities interested in pursuing similar efforts.

DOE and the Power PartnersSM posted the Resource Guide on the Climate VISION Web site in November 2005. The Power PartnersSM update information in the Resource Guide on a quarterly basis (<http://uspowerpartners.org/ResourceGuide-Home.htm>).

National Action Plan for Energy Efficiency

Launched in July 2006, the National Action Plan for Energy Efficiency (NAPEE) is designed to help invigorate efforts to conserve and use energy more wisely. The National Action Plan is facilitated by DOE and EPA, with the participation of utilities, public utility commissions, energy consumers, and non-governmental groups. Member companies of the Edison Electric Institute (EEI) are emphasizing the following actions to help implement NAPEE:

- ◆ Helping foster more energy-efficient buildings;
- ◆ Promoting the development and deployment of more energy-efficient electric appliances, consumer electronics, and other electric technologies;
- ◆ Accelerating the development and use of “smart” or advanced electric meters;
- ◆ Supporting development of innovative electric rate-making and rate design that promote efficiency and provide customers more control over their electricity bills; and
- ◆ Helping commercialize PHEVs to improve transportation efficiency, reduce fuel costs, improve the environment, and help reduce dependence on foreign oil.

Adoption of these and other untapped energy-efficiency practices could yield significant savings in total electricity demand nationwide by 2025, which in turn could help cut load growth compared to current forecasts.

To help promote adoption of these types of practices, several tools and resources are being developed, including: a NAPEE report that details key barriers to energy efficiency, and policy and program solutions that have been used to overcome those barriers; an energy-efficiency benefits calculator to help make the business case for energy efficiency; and a number of outreach and resource materials on energy efficiency.

Cumulative CO₂ emissions avoided from the 2000-2002 base period through 2005 from utilizing CCPs total almost three million metric tons of CO₂.



INDIVIDUAL COMPANY ACTIONS

Nuclear Energy

The performance of U.S. nuclear power plants improved dramatically during the 1990s. The average capacity factor of U.S. nuclear plants was more than 90 percent in 2005. The increase in output from U.S. nuclear plants in the last 10 years—from 673 billion kWh in 1995 to 782 billion kWh in 2005—is roughly equivalent to bringing 14 new 1,000-MW power plants (operating at a 90-percent capacity factor) into service.

This improved performance has made a substantial contribution to reducing the electric sector’s GHG emissions. In fact, according to EIA’s 1605(b) data, nuclear power-related projects accounted for nearly 142 million metric tons of CO₂ reductions, or about 54 percent of the electric power sector’s total reductions in 2004. Clearly, high levels of performance from U.S. nuclear plants must be sustained in order to meet the challenge of reducing the GHG emissions intensity of the U.S. economy.

Individual utilities have undertaken numerous activities to improve performance and increase electricity generation from nuclear power plants. During the last two years, nearly 630 MW of power uprates have been approved by the Nuclear Regulatory Commission (NRC), while more than 2,900 MW have been approved since 2000. As shown in Figure 5, an additional 2,400 MW of uprates are either under review or expected between now and 2011. The planned restart of TVA’s Brown’s Ferry Unit 1 in 2007 will add an additional 1,200 MW to the grid.

In addition to uprates, nuclear plant owners continue to pursue 20-year license renewals. Since 2000, the NRC has approved license renewals for 47 nuclear reactors. To date, the owners of 81 nuclear units have decided to pursue license renewals, and more are expected to follow suit.

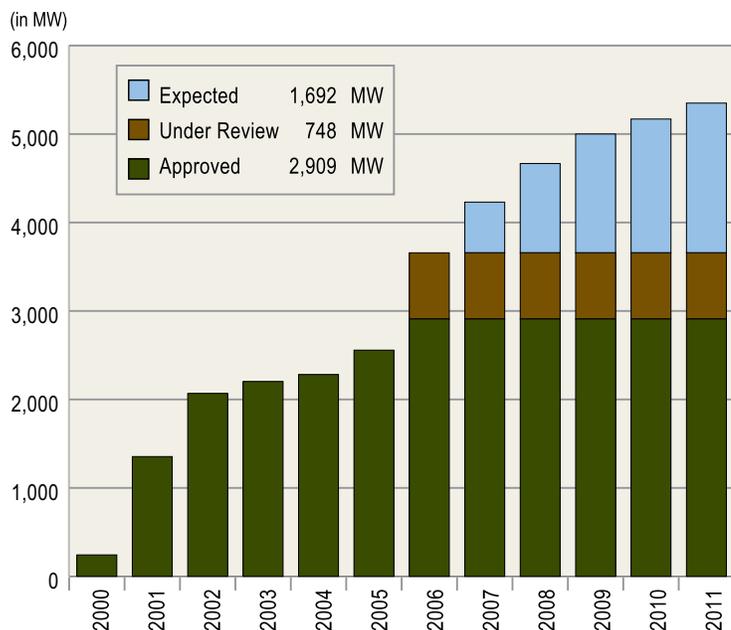
In recent months, many utilities and power generators have begun to explore the possibility of licensing and building new nuclear plants. Fourteen companies or consortia are developing applications for joint construction/operating licenses (COLs) and intend to file those applications with the NRC in the next few years. Those applications could encompass as many as 31 new nucle-

ar reactors, and represent approximately 40,000 MW of new non-emitting capacity.

In addition, the electric power industry is working together through NuStart, a nuclear development company created in 2004, which is owned by nine power companies. The nine owners—Constellation Energy Group, Duke Energy, EDF International North America, Inc., Entergy Nuclear, Exelon Corporation, FPL Group, Progress Energy, SCANA Corporation, and Southern Company—along with TVA and two nuclear reactor vendors created the NuStart Consortium. The primary goals of

FIGURE 5

U.S. Nuclear Capacity Additions at Existing Facilities (2000-2011)



Source: Nuclear Regulatory Commission.

the NuStart Consortium are to obtain a COL from NRC and to complete the design engineering for select reactor technologies.

Industry also is actively participating in domestic and international partnerships to further the development of next-generation nuclear technologies. Examples include:

- ◆ **Nuclear Power 2010 (NP2010):** A joint government-industry cost-sharing effort to identify new sites for

nuclear reactors, to develop and bring to market new nuclear plant technologies, and to demonstrate untested regulatory processes.

- ◆ **Global Nuclear Energy Partnership:** Partners the United States with other advanced nuclear nations to develop a transparent fuel market and spent nuclear fuel recycling technology while reducing nuclear proliferation risks.
- ◆ **Generation IV:** An international initiative to develop six next-generation reactors designed to be safer, more reliable, more cost effective, and more proliferation resistant than today's current technologies.
- ◆ **ITER:** An international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power.

In addition to the company examples listed below, please also see page 33 for more information about TVA activities in nuclear energy.

Examples of Power PartnersSM nuclear actions:

- ◆ **Constellation Energy Group's** initiatives, led by improved and expanded nuclear generation, have resulted in a 27-percent reduction in its GHG emissions intensity from the 2000-2002 base-period average.
- ◆ **Dominion** is one of the top three investor-owned producers of nuclear power in the nation, with more than 5,700 MW of generating capacity. In 2005, Dominion acquired a 556-MW nuclear facility in Wisconsin. Dominion's North Anna and Surry nuclear power stations in Virginia have been ranked among the most efficient nuclear facilities in the nation.
- ◆ **Duke Energy's** three nuclear generating stations increased their annual electricity output due to an increase in each generating station's availability. The increased electrical output from these generating facilities resulted in less electricity—and fewer CO₂ emissions—being produced from coal, oil, and natural gas-based generating facilities.
- ◆ **Entergy** added 355 MW of nuclear capacity through 2005 from uprates, and plans an additional 95 MW in 2006. In 2005, 52 percent of the company's electric energy was produced by nuclear power plants, compared to 40 percent in 1998.
- ◆ **Exelon** operates the largest nuclear fleet in the nation and the third largest fleet in the world. In 2005, this fleet produced 130.2 million net megawatt-hours (MWh) of electricity. The fleet also achieved an average capacity factor of 93.5 percent—the fifth year in a row the capacity factor was above 92 percent.

Since 1999, Exelon has added more than 1,000 MW of nuclear capacity through uprates and efficiency projects—enough to serve more than one million average residential customers. This added capacity avoids more than nine million tons of CO₂ emissions annually compared to adding the same amount of coal-based generation. By the end of 2006, Exelon plans to add an additional 44 MW through uprates at its nuclear reactors.

- ◆ **NRG Energy, Inc.** has announced plans to construct 2,700 MW of new nuclear capacity.
- ◆ **Progress Energy's** nuclear plant uprates helped to avoid more than nine million tons of CO₂ emissions in 2005.
- ◆ **Wisconsin Energy Corporation** implemented low-pressure turbine retrofit projects to enhance generating capacity at its Point Beach Nuclear Plant, increasing nuclear production and resulting in an average gain of 14 MW per unit. The generating capacity of Units 1 and 2 also has been increased through improved feedwater flow measurement accuracy.

Biologic Sequestration

Domestic and international activities undertaken by individual utilities in this area include reforestation and forest preservation. In addition to sequestering CO₂ emissions, these activities have the added benefits of: restoring bottomland hardwoods on marginal agricultural lands; preserving, creating and improving habitats for a variety of wildlife, including migratory birds and waterfowl, and even threatened and endangered species; improving water and soil quality; reducing flooding; conserving biological diversity in ecosystems; and providing recreational benefits.

Public power systems are sequestering substantial GHG emissions through the use and expansion of APPA's TREE POWERTM program. Currently, more than 250 utilities, serving 50 percent of public power's 19.1 million customers, participate in the TREE POWERTM program. Additional information about the program can be found on page 25.

Combining the data from the UtiliTree Carbon Company initiative with the results of the Power PartnersSM survey, the total cumulative increase in carbon sequestration from the 2000-2002 base-period average through 2005 was more than 900,000 metric tons of CO₂ emissions. A total of 14 utilities reported data on company-specific carbon sequestration activities (in addition to their contributions to industry-wide initiatives).

Examples of Power PartnersSM carbon sequestration activities:

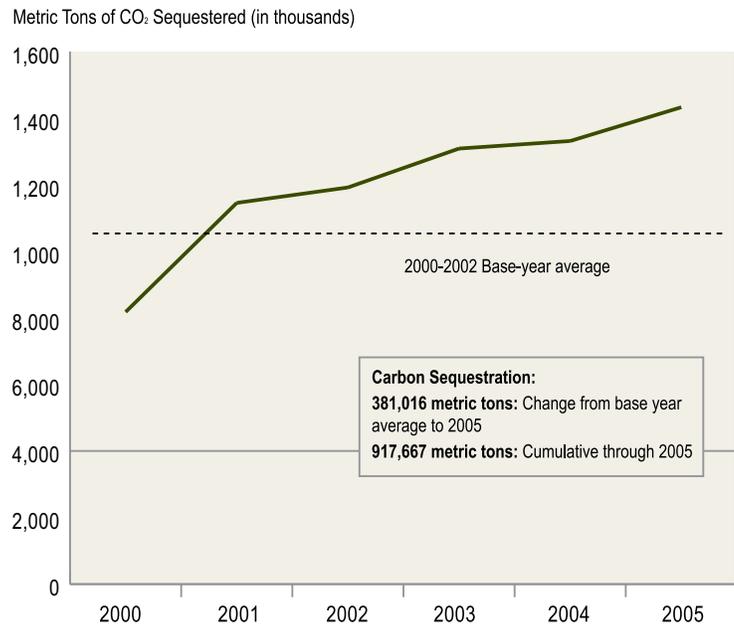
- ◆ **American Electric Power (AEP)** has pursued a number of reforestation and forest preservation activities in the United States, Bolivia, and Brazil. In the United States, AEP has partnered with the Conservation Fund and the U.S. Department of the Interior's Fish and Wildlife Service (USFWS) to acquire, protect, and restore a bottomland hardwood forest on more than 18,000 acres near Catahoula Lake in east central Louisiana, a major haven for migratory birds in the Mississippi delta. AEP restored the bottomland hardwood habitat by planting native trees on its portion of the property and a portion of the property owned by USFWS.

In Bolivia, AEP is working to protect the Noel Kempff Mercado Park, which has nearly four million acres of threatened tropical forests and is one of the most biologically diverse areas in the world. The project preserves forest that otherwise would have been logged—helping to mitigate GHG emissions by capturing carbon in the trees—and fosters sustainable development in local communities. In Brazil, AEP helped create the Guaraquecaba Climate Action Project in the Atlantic Forest to restore and protect 17,000 acres of threatened or degraded tropical forests.

- ◆ **Aquila** sponsors several carbon sequestration programs, such as “Trees Forever,” in Iowa, and similar programs in Missouri. Since 1992, the company has planted more than 230,000 trees, which has resulted in the sequestration of 13,000 tons of CO₂ emissions and more than 319 tons of combustion pollutants.
- ◆ **Cleco Corporation's** carbon sequestration activities from two projects, the Bayou Jean de Jean and Maknockanut, sequestered more than 1,600 tons of CO₂ emissions annually, from 2003 to 2005.
- ◆ In 1995, **DTE Energy** committed to plant 10 million trees by the year 2000. The company achieved that landmark in only three-and-a-half years. An additional 10 million trees have been planted to date, for a total of 20 million trees. These trees will absorb approximately 6.6 million tons of CO₂ emissions and produce 4.6 million tons of oxygen over a 50-year lifetime. Since 1998, the company also has funded an annual Urban Forestry Grant program and awarded 77 grants to 58 Michigan communities.

FIGURE 6

CO₂ Emissions Offsets From Carbon Sequestration



Source: Company responses to Power PartnersSM survey (14 respondents) combined with data collected on UtiliTree by Edison Electric Institute.

- ◆ DTE subsidiary **Detroit Edison** was one of the original sponsors of the Rio Bravo Conservation Area project to protect rainforests in Belize. Detroit Edison also was a major sponsor of the UtiliTree Carbon Company, which funded forest restoration projects in the United States and abroad.
- ◆ **Duke Energy** has initiated a number of reforestation and afforestation carbon sequestration projects in which the company provided funding for the purchase and planting of trees. Organizations that Duke Energy has partnered with include USDA, The Nature Conservancy (TNC), Ducks Unlimited, and the National Wild Turkey Federation. More than 1.5 million trees have been planted through these partnerships.

Duke Energy also has partnered with TNC, a local conservation group in Belize, and several U.S. electric utilities to undertake the Rio Bravo Carbon Sequestration Pilot Project in Belize. The project both preserves existing tropical forest by protecting it from conversion to agricultural uses and implements sustainable logging practices.

- ◆ **Entergy** established the Sustainable Forestry Plan in 2002 to identify property within its 23,000-plus acres

of company-owned land that are deemed to have high potential for achieving carbon sequestration, restoring wildlife habitats, or beautification. Through 2005, 3,200 acres of company-owned land have been reforested and more than 1.25 million metric tons of CO₂-emissions sequestration are expected.

In 2005, Entergy funded the acquisition and reforestation of native bottomland hardwoods on an additional 300 acres of marginal cropland adjacent to the Tensas River National Wildlife Refuge in Louisiana. Along with the plantings done in 2004, a total of 1,600 acres have been restored. This property has been donated to USFWS for inclusion in the Tensas River National Wildlife Refuge. Over the next 70 years, the bottomland hardwoods are expected to sequester 760,000 metric tons of CO₂ emissions. In addition, the reforested land helps restore habitat that is critical to the threatened Louisiana black bear.

- ◆ **Exelon's** ComEd subsidiary has restored more than 120 acres of natural prairie habitat on buffer lands and rights-of-way in Illinois since 1994. Exelon and its subsidiary PECO, along with other organizations, are funding TreeVitalize, an aggressive four-year, \$8 million partnership led by the Pennsylvania Department of Conservation and Natural Resources. TreeVitalize has three goals: to plant more than 20,000 shade trees, to restore 1,000 acres of forested riparian buffers, and to train 2,000 citizen volunteers in proper tree care techniques in southeastern Pennsylvania.
- ◆ **PacifiCorp** is funding the reforestation of many acres of fir and ponderosa pine to absorb or sequester CO₂ emissions in Oregon and Washington. Larger-scale company projects include aiding the preservation of more than 1.5 million acres of rainforest in Belize and Bolivia. These two projects, developed in partnership with local partners and TNC, are expected to reduce CO₂ in the atmosphere by 40 million metric tons over the life of the projects.

Wind power has become the fastest-growing renewable energy source in the United States. Wind farms currently operate in 32 states and produce a total generating capacity of more than 10,000 MW.

- ◆ **Southern Company** has planted more than 35 million trees across the Southeast. In addition, the company initiated a five-year program to restore the longleaf pine in the southeastern United States. In partnership with the National Fish and Wildlife Foundation, the program will plant longleaf pine trees, restore critical habitat, sequester carbon, and improve biodiversity throughout the Southern Company service

territory. In the first two years of this project, more than 1.5 million trees have been planted and approximately 3,000 acres of critical habitat have been restored.

Renewable Energy

The electric power industry, in cooperation with industrial and governmental stakeholders, has significantly expanded the use of renewable energy sources for generating electricity during the past 12 years. In addition to the company examples listed below, please also see the Public Power section on page 25 and the TVA section on page 33 for more information about their initiatives in this area.

Hydropower

Hydropower is the most prevalent renewable resource, providing about seven percent of total U.S. electricity supply and 80 percent of all renewable energy resources. Total hydropower capacity, including pumped storage facilities, is currently about 95,000 MW.

An example of industry support of hydropower:

- ◆ Exelon Generation, a subsidiary of **Exelon**, operates both the 536-MW Conowingo Hydroelectric Generation Station and the 1,071-MW Muddy Run Pumped Storage Facility. Each of these facilities produces, on average, more than 1.6 billion kWh of electricity annually. Through uprate and efficiency projects at these facilities, more than 800,000 tons of CO₂ emissions have been avoided since 2000. Exelon continues work on a \$39-million project to replace four of the 11 turbines at Conowingo. The last of these turbines will be operational in 2008.



Wind Power

Wind power has become the fastest-growing renewable energy source in the United States. Wind farms currently operate in 32 states and produce a total generating capacity of more than 10,000 MW. According to the American Wind Energy Association, our nation's current wind capacity avoids 16 million tons of CO₂ emissions each year.

Examples of industry support of wind power:

- ◆ **AES Corporation** currently operates 600 MW of wind facilities and is pursuing another 2,000 MW of wind projects in development, primarily in the United States. The company plans to triple its investment in wind generation over the next three years, and is exploring wind projects in North America, Europe, China, India, and Central and South America.
- ◆ Through strategic alliances and company acquisitions, **BP Alternative Energy** has acquired options to develop approximately 8,500 MW of wind power in the United States. BP aims to grow its wind business from its current base of 30 MW to more than 450 MW in 2008.
- ◆ The **Edison Mission Group** and its affiliates currently have nearly 650 MW of wind power projects in service or under construction. That number will increase to 1,000 MW by the end of 2007.
- ◆ Exelon Generation, a subsidiary of **Exelon**, is the largest wholesale wind marketer east of the Mississippi. It has long-term power purchase agreements with four wind generation projects in Pennsylvania and West Virginia, providing a total wind capacity of 153 MW. In addition, ComEd, Exelon's Illinois-based subsidiary, purchases the output from two wind

energy projects in northern Illinois, totaling 105 MW. In 2005, Exelon's subsidiary PECO contracted to purchase 2,582 MWh per year of wind power for three years, which ensures that wind power supplies 10 percent of the energy needs for the company's Philadelphia headquarters.

- ◆ **FPL Energy** is the largest developer of wind energy projects in the United States. Approximately 35 percent of wind-generated electricity in the country is generated at an FPL Energy facility. The company's wind portfolio includes more than 3,200 MW of wind generation located at 45 sites in 16 states. In 2006, parent company FPL Group estimates that it will offset nearly five million tons of CO₂ emissions as a result of wind-generated electricity.
- ◆ **Green Mountain Power** and an environmental nonprofit, Clean Air–Cool Planet, joined forces to enable Green Mountain Power's 87,000 customers to help build new renewable energy resources and reduce GHG emissions. For a \$6 monthly contribution to Clean Air–Cool Planet, customers of the Colchester, Vermont-based energy services company can help to offset the CO₂ emissions associated with their electricity use and home heating—an estimated six tons per residential household, based on Vermont average electricity consumption and New England average heating fuel use. Green Mountain Power took the lead by offsetting a year's worth of CO₂ emissions—290 tons—from both powering and heating its corporate and operations facilities.

The customer donations will help to finance the construction of new Midwest wind farms and to support efforts to build Vermont-based methane projects. Since the program began, hundreds of Green Mountain Power customers helped to fund the construction of the Rosebud Sioux Tribe Wind Turbine Project in South Dakota and the Knoxland Farm Methane Project in Bradford, Vermont. The wind turbine project is the first Native American-owned and operated large-scale wind turbine. The farm methane project will eliminate lagoon storage of manure, and capture and use methane gas. This will avoid direct emissions of methane gas and will displace fossil fuel use.

- ◆ **MidAmerican Energy Holdings Company** has developed 360 MW of wind energy and is recognized as a world leader in developing renewable energy projects. MidAmerican received the 2005 Global Energy Award for the Renewables Project of the Year and the American Wind Energy Association's 2005 Utility Leadership Award. In March 2003, Iowa Governor Tom Vilsack challenged the state's



regulators, business leaders, and utilities to work toward achieving 1,000 MW of renewable energy generation in Iowa by 2010. Following Governor Vilsack's appeal, MidAmerican announced plans to build a 310-MW wind facility. In September 2005, MidAmerican completed the project and added an additional 50 MW of electric generating capacity in mid-December. The 360.5-MW wind energy project is one of the largest land-based wind projects in the world. The project consists of 257 turbines located in northwest and north central Iowa, which provide enough capacity to serve approximately 100,000 homes.

The Iowa wind project is just one of MidAmerican Energy Holdings Company's 14 renewable energy facilities worldwide that produce a total of approximately 1,500 MW of green power, representing about 17 percent of the generation portfolio.

- ◆ **PPM Energy** now owns or operates 1,405 MW of wind projects throughout the United States. The company already has another 857 MW currently approved or under construction and has set a goal of having 3,500 MW of wind assets by 2010.
- ◆ **Xcel Energy** is the nation's leading purchaser of wind power, with 1,048 MW of wind-generated electricity. Xcel has wind operations in Minnesota, Colorado, New Mexico, North Dakota, and Texas. Xcel also built Colorado's first commercial wind farm, the Ponnequin Wind Farm in northern Colorado, and purchased the entire output of the state's second wind farm.

Solar

- ◆ **APS**, Arizona's largest and longest-serving electric utility, has created a number of solar-based programs for its more than 874,000 customers throughout the state. Through its Solar Partners program, APS gives residents, businesses, and communities the opportunity to purchase solar energy and to help develop the technology. APS now has more than five MW of installed solar capacity statewide. In addition to solar energy, the company is an active partner in the development and testing of other renewables such as biomass, hydrogen, and wind technologies.
- ◆ **BP Solar** designs, manufactures, and markets solar electric systems for a wide range of applications in the residential, commercial, and industrial sectors. BP will have a 200-MW global production capacity by the end of 2006, and plans to increase solar sales threefold in three years. In California, New Jersey, and New York, BP Solar Homes Solution® enables customers to purchase a complete home system through Home Depot stores. In July 2006, BP announced Mono2, a new silicon growth process that significantly increases cell efficiency over traditional multi-crystalline-based solar cells.
- ◆ **Exelon's** ComEd subsidiary funded the installation of photovoltaic systems throughout its service area. In 2004, Chicago passed the one-MW milestone for installed photovoltaic systems with the completion of the Exelon Pavilions in Millennium Park, which integrates photovoltaics into the building's exterior walls—a first-of-its-kind system. Other photovoltaic installations include systems on ComEd's Chicago North and South facilities, several universities, affordable single-family housing units, and the Cook County Domestic Violence Court House—which, at 110 kW, is the largest single system in the city to date.

- ◆ **FPL Group's** Sunshine Energy program enables customers to support renewable generation sources such as bio-energy, wind, and solar. For every 10,000 customers who sign up for the program, FPL will build 150 kW of solar capacity in Florida. Sunshine Energy costs an additional \$9.75 per month. In just one year as a Sunshine Energy customer, an average Florida household avoids more than five tons of CO₂ emissions—as much as a car, getting 22 miles per gallon of gasoline, would produce in more than 11,000 miles of driving. Regardless of a participating customer's actual electricity usage each month, buying Sunshine Energy ensures that 1,000 kWh of electricity are produced by cleaner generators serving Florida and other states. The program also provides environmental benefits to the regions where these generators are located.

Biomass

The use of biomass has achieved widespread acceptance as a power source, with a current combined capacity of approximately 10,300 MW. That translates into 1.4 percent of total U.S. generating capacity.

- ◆ **AES Corporation** is a leading company in biomass conversion internationally. At AES Kilroot in Northern Ireland, the team recently completed a successful trial to convert the plant to burn a mixture of coal and biomass. With further investment in the technology, nearly half of Northern Ireland's 2012 renewable target could be met from AES Kilroot alone.
- ◆ **Southern Company** subsidiary Alabama Power began utilizing switchgrass in the co-firing program at its Plant Gadsen coal-based power plant in 2003. Since then, Alabama Power's biomass power production has increased from an average of 3,700 kWh per month to more than 11,000 kWh per month in 2006.

Related to efforts to promote the development and use of renewable energy, a number of utilities offer green power or green pricing programs.

Landfill Gas

- ◆ **DTE Biomass Energy** helps reduce GHG emissions by developing, owning, and operating landfill gas recovery systems throughout the United States. DTE Biomass Energy collects landfill gas—primarily methane—and turns it into other forms of energy. Begun in 1989, DTE Biomass today operates more than 30 landfill methane recovery facilities nationwide. In 2001 alone, DTE Biomass recovered more than 20 billion cubic feet of landfill gas—the equivalent of nearly four million tons of CO₂ emissions.
- ◆ In 2006, Exelon Power, an **Exelon** business unit, completed a two-year project to convert an oil-based plant designed in 1950 into a modern, clean-operating, reliable, and efficient generating station through the use of improved technology and production methods. As a result, the two-unit, 60-MW Fairless Hills Generating Station will be the second-largest landfill gas generating station in the United States. This substantial renewable energy project is able to consume 100 percent of the landfill gas that Waste Management produces at its nearby GROWS and Tulleytown landfills. Exelon Power also operates the six-MW Pennsbury landfill gas generating station in southeastern Pennsylvania.
- ◆ **FPL Group** currently has firm capacity contracts with seven small power production and cogeneration facilities, providing 877 MW of firm capacity. Three of the facilities use solid waste as their fuel, one uses landfill gas and biomass, and another uses waste heat as its energy source.

Other renewable power sources being used or developed include geothermal and tidal power.

Green Power and Green Pricing Programs

Related to efforts to promote the development and use of renewable energy, a number of utilities offer green power or green pricing programs. Several utilities also have issued requests for proposals for renewable energy to help expand their offerings to customers. In addition to the company examples listed below, please also see the Public Power section on page 26 for more information about public power initiatives in this area.

Examples of Power PartnersSM green power programs:

- ◆ In 2005, **APS** requested permission from the Arizona Corporation Commission to offer an expanded green

energy program. This program will allow customers to purchase a mixture of renewable energy, including solar, biogas, biomass, wind, and geothermal energy. APS anticipates offering this program in 2007.

- ◆ **Duke Energy Carolinas'** franchised electric business unit collaborated to develop a first-of-its-kind voluntary GreenPower Program in North Carolina. The program gives customers the opportunity to support the development of alternative sources of electricity—specifically solar, wind, small hydroelectric, landfill gas, and biomass—by paying an additional monthly charge on their electric bill. Duke Energy Indiana has entered into a purchase power agreement for 100 MW of wind energy.
- ◆ **Exelon's** PECO subsidiary partnered with leading wind energy marketer Community Energy, Inc., of Wayne, Pennsylvania, to offer PECO WIND. This product, launched in May 2004, was the first wind energy product offered by a utility in Pennsylvania. Customers may elect to purchase wind energy either for their entire electric load or in increments of 100-kWh blocks up to 100 percent of their total load. At the end of 2005, more than 22,000 customers purchased 43 million kWh of wind-generated electricity.

Exelon also is seeking Leadership in Energy and Environmental Design platinum certification for its company's renovated Chicago headquarters, which opened in December 2006. The integrated design and project management efforts to date have resulted in energy procurement of 100-percent Green e-power to serve the needs of the new space; specifications for office layouts that leverage natural light; and material selection that includes use of recycled or regionally manufactured materials.

- ◆ **IPL**, AES's utility in Indianapolis, has implemented a metering program that allows homeowners and schools to reduce their electric bills by generating their own power using small-scale solar, wind, or hydroelectric energy systems.
- ◆ **Xcel Energy's** wind-based green pricing program, "Windsource," has 50,000 customers in Colorado, New Mexico, and Minnesota—making it the largest program of its kind in the country. Xcel plans to offer the program to its North Dakota customers in January 2007.

Energy-Efficiency and DSM Programs

A vital part of industry's short- and long-term efforts to reduce its carbon intensity is the implementation of energy-efficiency programs. From 1989 to 2005, electric utility DSM programs saved more than 796 billion kWh of electricity—enough to power nearly 74 million average U.S. homes for one year, according to EIA.² This savings is equal to the annual electricity output of slightly more than 338 baseload power plants (rated at 300 MW). During the same time period, the electric utility sector spent more than \$30 billion on DSM programs. In 2005 alone, electric utilities spent more than \$1.9 billion on DSM programs—an increase of more than 23 percent from 2004.

As part of their DSM portfolios, electric utilities have invested in energy-efficiency programs and incentives. In 2005, the industry spent \$1.169 billion on these efforts—a 28.5 percent increase from 2004. To help promote energy efficiency and better end use by customers, many utilities: participate in, and have won awards from, EPA's Waste-Wise and ENERGY STAR® programs; offer energy-efficiency and other DSM programs; and provide Web-based resources to help customers calculate energy savings or estimate costs for energy-efficient practices (installing insulation, buying new appliances, installing energy-efficient windows, etc.). See the National Action Plan for Energy Efficiency on page 9 for additional actions in this area.

Examples of individual Power PartnersSM energy-efficiency programs:

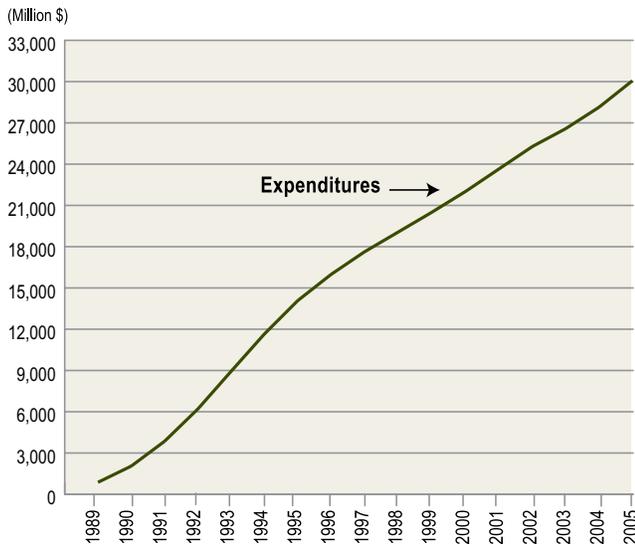
- ◆ **AEP** is implementing "Energy Efficiency Plans" to offset 10 percent of the annual energy demand growth in its Texas service territory. In 2003 alone, AEP achieved more than 47 million kWh of reductions from installation of energy-efficiency measures in customers' homes and businesses. The program is expected to achieve more than 247 million kWh of energy-efficiency gains.
- ◆ Energy-efficiency efforts in **Exelon's** own Energy Delivery business resulted in decreased energy usage across 74 facilities by three percent annually in both 2003 and 2004. In 2005, Exelon Power saved 4.7 percent in energy costs compared to 2004—exceeding its goal of three percent—due in part to energy-reduction initiatives like valve-open starts, which reduce the plants' start-up time, associated fuel burn, and emissions by approximately 50 percent. At Exelon Nuclear, the most cost-effective initiatives identified in energy assessments are in the process of being implemented.

In July 2006, ComEd launched Customers' Affordable Reliable Energy (CARE), a multi-year initiative

² U.S. Department of Energy, Energy Information Administration, *Electric Power Annual*, October 2006.

FIGURE 7

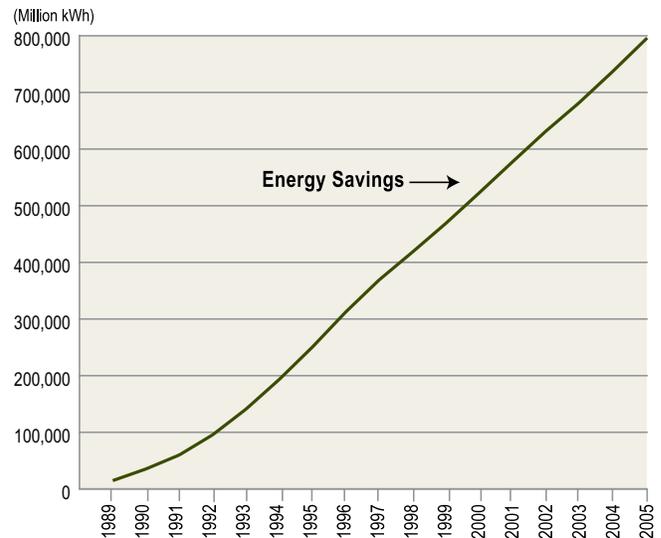
Cumulative Electric Utility Expenditures on Demand-Side Management and Energy-Efficiency Programs (1989-2005)



Source: U.S. Department of Energy, Energy Information Administration. Some utilities were spending money on DSM as early as 1976. National data are not available for expenditures from 1976-1988.

FIGURE 8

Cumulative Energy Saved by Electric Utility Demand-Side Management and Energy-Efficiency Programs (1989-2005)



Source: U.S. Department of Energy, Energy Information Administration. Some utilities were spending money on DSM as early as 1976. National data are not available for expenditures from 1976-1988.

to help residential customers with their electricity bills in preparation for rate increases coming in January 2007, after the end of a nine-year rate freeze. A key component is the CARE Web site, www.ComEdCARE.com, dedicated to helping customers better manage their energy usage. As part of the program, ComEd customers purchased more than 1.2 million discounted ENERGY STAR® compact fluorescent light bulbs to help them reduce their energy usage and save money.

- ◆ By 2008, all of **FPL Group's** DSM and energy conservation programs are expected to reduce peak demand by 2,800 MW. Through these programs, FPL is able to reduce energy costs for its customers, defer the construction of new power plants, and make more efficient use of its existing generating units.
- ◆ **Progress Energy's** DSM programs saved 6,000 MWh of electricity in 2005.
- ◆ **TVA** and the distributors of TVA power offer residential energy-efficiency programs marketed under the

brand name *energy right*®. The program promotes the construction of energy-efficient new homes and the installation of energy-saving heat pumps in existing homes and small businesses. The program also offers energy-management tools to help consumers analyze their power consumption and find ways to use energy wisely. The *energy right*® program also promotes sustainable development. The program certified 954 ENERGY STAR® homes in the Tennessee Valley through the end of the 2006 fiscal year. TVA also addresses the commercial and industrial sectors through more customized energy-efficiency efforts. These combined initiatives across all sectors accounted for estimated reductions in power demand of 45 MW in 2005, and an additional 50 MW in 2006. In total, these efforts have contributed to a cumulative demand reduction of 496 MW since 1996.

- ◆ **Xcel Energy's** DSM activities saved more than one million MWh of electricity in 2005. Examples of programs include energy-efficient equipment and process rebates, and load management programs for residential and business customers.

EEI's Wise Use Web Site

EEI maintains a Wise Use section on its Web site, which offers a variety of resources for consumers to make their homes and businesses more energy efficient. The Web site offers energy-efficient tips and information about energy-saving products that can be utilized throughout the home. Visitors to the Web site also can download "More Than 100 Ways to Improve Your Electric Bill," a booklet that gives quick and easy changes to make in your home that can result in significant energy savings.

In addition, the Web site offers detailed information about individual electric utility programs designed to help consumers and businesses save energy. For more information about electric utility energy-efficiency programs, visit EEI's Wise Use Web site, <http://www.eei.org/wiseuse>.

SF₆ Programs

SF₆, a highly potent GHG emission, is primarily used as an electrical insulator in high-voltage equipment that transmits and distributes electricity. In 1999, EPA created the "SF₆ Emissions Reduction Partnership for Electric Power Systems" to help the electric power industry reduce its emissions of SF₆. More than 70 electric utilities currently participate in EPA's program.

Each year, the program's participants have exceeded their goals for reducing SF₆ emissions. According to the report:

For 2005, SF₆ Partners have collectively achieved a 32-percent decrease in emissions from the 1999 baseline year. Approximately 190,644 pounds of SF₆, or the equivalent of 2.07 MMTCO₂ [million metric tons of carbon dioxide] emissions have been avoided. Cumulatively (1999-2005), emissions avoided total 635,182 pounds or 6.88 MMTCO₂e [million metric tons of carbon dioxide equivalent].³

EPA estimates the cumulative savings of avoided gas purchases from these emissions reductions totals \$3.8 million to \$5.7 million.

The SF₆ emissions data reported to EPA were further analyzed to identify the trend in SF₆ emissions reductions from the 2000-2002 base period used by Power PartnersSM and to update the estimated equivalent amount of CO₂ emissions using the latest global warming potential equivalence factors. The results

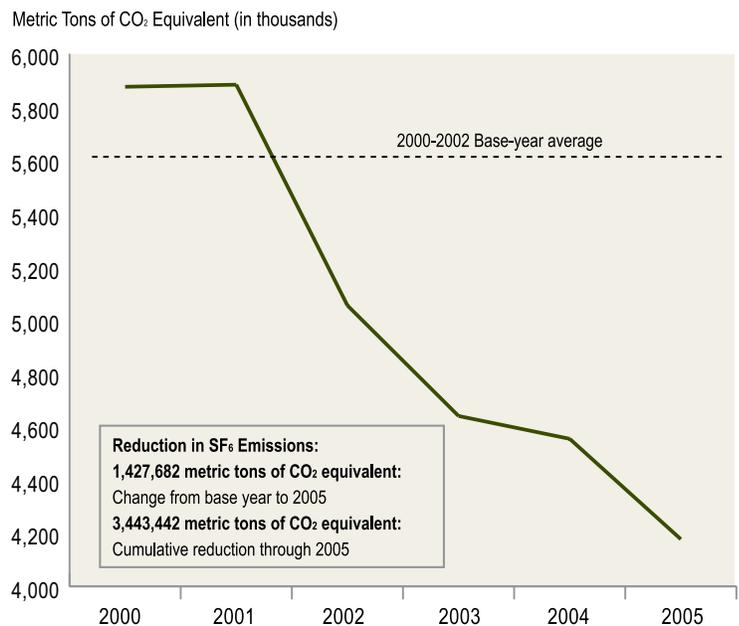
show that the power sector avoided a cumulative total of 3.4 million tons of CO₂ emissions from the 2000-2002 base-period average through 2005.

Examples of Power PartnersSM SF₆-reduction activities:

- ◆ When **Duquesne Light Company** decommissioned its Carson Substation in Pennsylvania, the company paid careful attention to ensure the project was completed in an environmentally responsible manner. As part of the decommissioning process, the company worked with a vendor to recover and safely remove the SF₆ gas. As a result, nearly 7,300 pounds of SF₆ were removed, instead of being released in the atmosphere. This is equivalent to the CO₂ emissions reductions realized from removing 17,000 cars from the road for one year.
- ◆ As part of **Exelon's** ComEd and PECO subsidiaries' participation in the EPA Partnership, the companies set a joint SF₆ goal in March 2006, committing to achieve a leak rate for SF₆ of no more than 10 percent for 2006. To help achieve this goal, the companies provided additional training to substation

FIGURE 9

Trends in SF₆ Emissions (2000-2005)



Source: EPA's SF₆ Emission Reduction Partnership for Electric Power Systems, 2005 Annual Report.

³ U.S. Environmental Protection Agency, *SF₆ Emissions Reduction Partnership for Electric Power Systems 2005 Annual Report*, August 2006, p. 3.

personnel on the proper handling of SF₆ gas to minimize leaks and revised SF₆ handling procedures.

- ◆ **Lower Colorado River Authority's** participation in EPA's SF₆ Emissions Reduction Partnership resulted in the reduction of 1,800 pounds of SF₆ emissions in 2005 through circuit breaker replacements.
- ◆ As part of **MidAmerican Energy's** participation in EPA's Partnership, the utility replaces at least three circuit breakers that leak SF₆ each year. To date, 13 345-kV circuit breakers have been replaced, and SF₆ emission rates have decreased from 23.9 percent in 2000 to 9.5 percent in 2005.
- ◆ "Since 1999, **Northeast Utilities** has reduced its SF₆ emission rate by over 90 percent, a great achievement given that the utility has experienced significant transmission system growth during this period. These emission reductions were achieved in part through a dedicated equipment replacement program." — *EPA's SF₆ Emissions Reduction Partnership for Electric Power Systems 2005 Annual Report*
- ◆ **Public Utility District No. 1 of Douglas County, Washington:** "Douglas PUD has reduced emissions [of SF₆] through proper handling techniques, identification and elimination of leaks, and the replacement of equipment that do not meet specific leak rate thresholds. Douglas PUD successfully reduced [its] emission rate to zero in 2004 and continues to maintain zero emissions as of 2005." — *EPA's SF₆ Emissions Reduction Partnership for Electric Power Systems 2005 Annual Report*
- ◆ **Southern California Edison (SCE)** received an EPA award for preventing nearly 110,000 pounds of SF₆ emissions from entering the atmosphere from 1999 to 2005. This reduction is equivalent to removing 250,000 cars from the road for one year. Since joining the EPA partnership in 2001, SCE has reduced its SF₆ emissions by 32 percent.

Clean Coal Technology

Developing coal-based power plants with zero or near-zero emissions will be one of the keys to addressing GHG emissions. Utilities and power generators are investing their own money and resources in the development of these and other clean coal technologies. For example, integrated gasification combined-cycle (IGCC) technology shows promise in producing electricity with ultra-low pollution levels. Two electric utilities—Tampa Electric and Duke Energy—currently operate small IGCC plants. AEP, Duke Energy Indiana, and Southern Company have announced plans to build additional IGCC plants.

In addition, the U.S. coal and electric utility industries are working with DOE to develop clean coal power plants through initiatives discussed in the Cross-Sector Projects section on page 35.

Examples of company-specific clean coal activities:

- ◆ **AES Corporation** has started the construction of a \$46-million emissions-reduction project at its AES Greenridge coal-based plant in New York, which will extend the life of the plant by more than 20 years. AES's IPL subsidiary will soon complete a 10-year, \$600-million multi-pollutant reduction initiative to lessen the impact of the utility's coal-based plants on the environment while maintaining competitive rates.
- ◆ **AES Eastern Energy**, a subsidiary of AES Corporation, and Praxair, Inc. plan to research and demonstrate improved CO₂ capture technologies for new and existing electric generation facilities in New York. They will focus on opportunities to create capture-ready technology designs for new generation plants and low-cost retrofit options for existing generation facilities, including oxyfuel combustion of coal.
- ◆ **NRG Energy, Inc.** is undertaking a joint initiative with GreenFuel Technologies Corporation (GreenFuel) and the New York State Energy Research and Development Authority to study CO₂ recycling. The technology takes the flue gas of a power plant and



utilizes algae-bioreactor technology to recycle CO₂ effectively into commercially viable byproducts. The process harnesses the photosynthetic processes of algae to consume waste gases and heat from a power plant's air emissions stream, ultimately producing a high-energy biomass. This means that in the presence of light, the single-celled algae take up CO₂ to produce the energy that fuels plant life—with a general rule of thumb being that two tons of algae remove one ton of CO₂. Once the algae are harvested, they can be converted to generate commercially viable by-products such as ethanol or biodiesel.

Natural Gas Generation

Many Power PartnersSM member utilities and power generators have aggressively pursued the development of natural gas generation as a means of decreasing CO₂ emissions intensity. These facilities operate at emissions rates less than 50 percent of the U.S. fossil fuel average. Power PartnersSM members will continue their efforts to increase the utilization of these units. In addition to the company examples listed below, please also see the Public Power section on page 25 for more information about public power initiatives in this area.

- ◆ **Ameren Corporation** added 3,290 MW of natural gas-based capacity and repowered a 190-MW coal unit into a 520-MW combined-cycle natural gas unit.
- ◆ **BP** has built a significant natural gas-based power portfolio with 12 gigawatts (GW) of total generation. By 2008, BP plans to build two cogeneration plants in the United States, generating nearly 700 MW.
- ◆ In 2004, **Duke Energy Indiana** repowered its coal-based Noblesville electricity generating station with natural gas combined-cycle technology. This action reduced the rate at which CO₂ is emitted from this facility by more than 50 percent.
- ◆ **Entergy** recently acquired 1,198 MW of combined-cycle gas turbine capacity to help meet projected demand while improving generation efficiency and improving overall emissions.
- ◆ In the early 1990s, **Exelon** converted Cromby Generating Station Unit 2 and Eddystone Generating Station Units 3 and 4 to burn natural gas in addition to residual fuel oil. The summer of 2006 was the first time in nearly five years that it was economic to run the units on natural gas rather than residual fuel oil. On May 31, 2006, Eddystone Unit 4 and Cromby Unit 2 came online firing natural gas. Natural-gas firing of the Cromby and Eddystone units continued over the balance of the summer generation period.



Many Power PartnersSM member utilities and power generators have aggressively pursued the development of natural gas generation as a means of decreasing CO₂ emissions intensity.

Company-Specific Reduction Commitments

A number of Power PartnersSM utilities and power generators have announced their own company-specific reduction commitments, whether as part of the EPA Climate Leaders program, the Chicago Climate Exchange, or in conjunction with environmental groups. The commitments, which are both short- and medium-term in nature, will contribute to the achievement of the national and the sector's reduction goals. Some examples of company-specific reduction and other commitments are highlighted below.

- ◆ **AEP** is a founding member of the Chicago Climate Exchange, the first voluntary, legally binding GHG emissions reduction and trading program in North America. Through this affiliation, AEP committed, beginning in 2003, to reduce or offset its GHG emissions from an established baseline each year through 2010. With this commitment, AEP expects to reduce or offset approximately 46 million metric tons of CO₂-equivalent emissions between 2003 and 2010, and has already achieved 21 million metric tons in reductions.
- ◆ **AES Corporation** plans to invest approximately \$1 billion over the next three years to expand its alternative energy business and bring to market new projects and technologies to reduce or offset GHG emissions. AES has committed to approximately \$100 million in increments, which will generate more than 17 million metric tons of carbon reduction credits through 2012. The company's strategy includes developing projects in the agricultural, reforestation, landfill gas, and coal mine methane emissions reduction sectors. AES also has entered into strategic partnerships with Los Alamos National Laboratory and XL TechGroup to identify, evaluate, and bring to market new technologies in alternative energy.
- ◆ **BP Alternative Energy** estimates that, by 2015, it will eliminate 24 million metric tons annually of CO₂ emissions. That is the equivalent of making a city the size of Chicago virtually emissions-free. BP plans to invest \$8 billion in its low- and zero-carbon energy business over the next 10 years, including solar, wind, and hydrogen power plants with associated carbon capture and storage, and natural gas-based power generation.

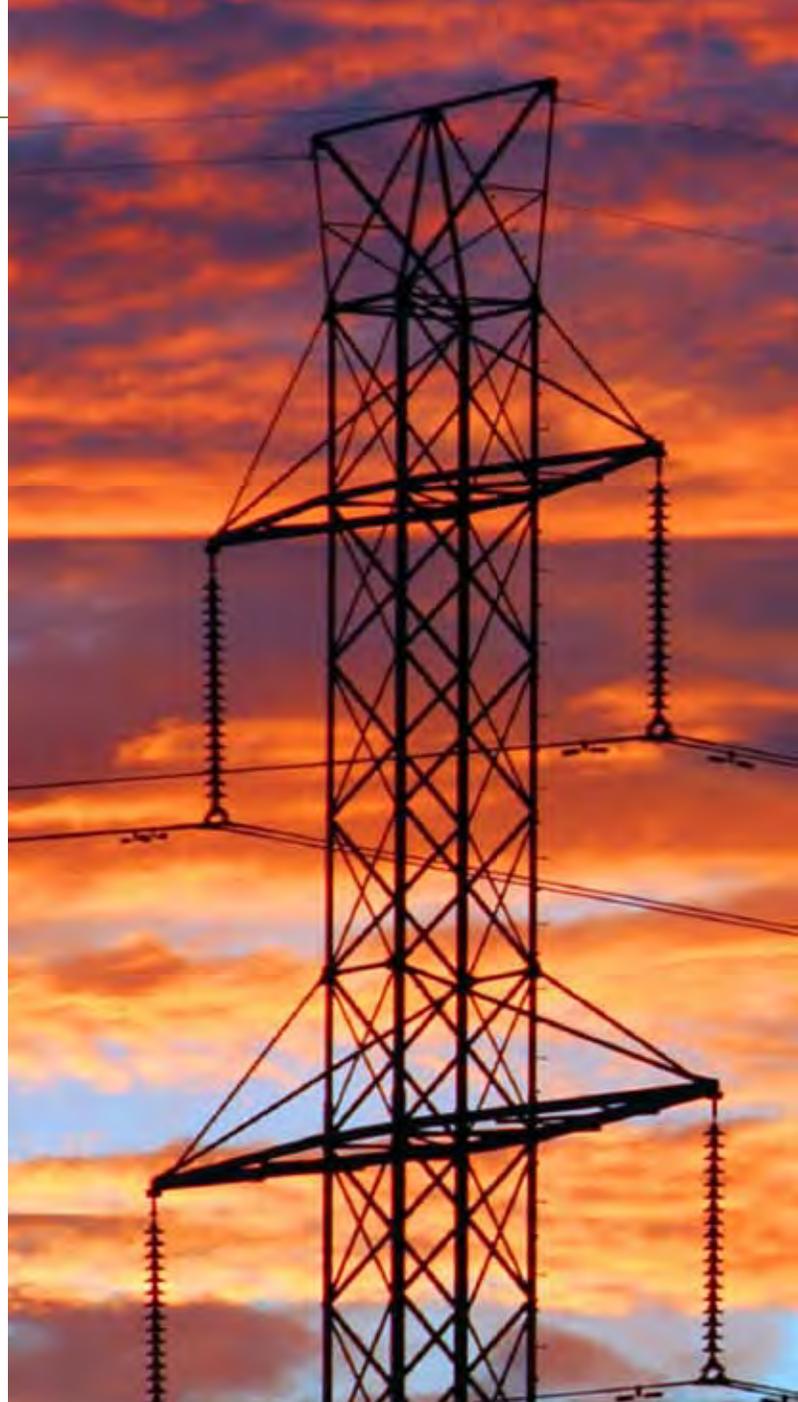
- ◆ **Calpine Corporation** set a goal to reduce its GHG efficiency-based emissions rate (pounds of GHG emitted/MWh of electricity generated) by four percent from 2003 levels by 2008. Compared to the average fossil fuel power plant in the United States, Calpine's combined-cycle, natural gas-based units release nearly 54 percent less CO₂ on average. In addition, Calpine voluntarily agreed to certification of its inventory, which it reports to the EPA, by an independent, qualified third party.



- ◆ **Duke Energy Indiana, Duke Energy Ohio, and Duke Energy Kentucky** invested approximately \$5.7 million implementing heat rate improvement projects at their electric generating stations between 2004 and 2006. These projects are estimated to reduce generating plant CO₂ emissions by approximately 818,000 tons annually.
- ◆ **Entergy** committed to stabilize CO₂ emissions at 20 percent below 2000 levels from 2006 to 2010, as part of its 2006–2010 Environmental Strategy announced in May 2006. Previously, in May 2001, Entergy pledged that it would stabilize CO₂ emissions from its U.S. power plants at year-2000 levels through 2005. In 2005, Entergy completed its first five-year GHG emissions-stabilization commitment with cumulative emissions 23 percent (61.7 million tons) below the goal, while its electric sales increased 21 percent over the same time period.
- ◆ In May 2005, **Exelon** established a voluntary goal under EPA's Climate Leaders program to reduce its GHG emissions by eight percent below its 2001 levels by year-end 2008. The company also committed to work with and encourage its suppliers to reduce their GHG emissions. Furthermore, Exelon is incorporating recognition of GHG emissions and their

potential cost into its business analyses as a means to promote internal investment in initiatives to reduce CO₂ emissions.

- ◆ **FPL Group** set a goal to improve its generating efficiency 15 percent by 2020, through its WWF PowerSwitch! commitment. The company currently predicts that it may exceed this goal by achieving an estimated 25-percent efficiency improvement. If FPL meets this higher efficiency standard, it estimates that by the year 2020 the company will achieve 19 million tons per year of CO₂ emissions reductions due to generating efficiency improvements, compared to its 2000 baseline year.
- ◆ **NRG Energy, Inc.** plans to develop approximately 10,500 MW of new generation capacity over the next decade. This repowering initiative represents a total investment of \$16 billion and includes nuclear, wind, and IGCC developments. With this initiative, NRG plans to reduce the carbon intensity of NRG's baseload fleet by 20 to 25 percent.
- ◆ **PacifiCorp** committed to building additional renewable generation and to develop conservation resources with its customers. Among other projects, company efforts include collecting methane at coal mines and funding the expansion of a company that uses food waste to produce ethanol, which is used as a clean-burning fuel in automobiles.



A number of Power PartnersSM utilities and power generators have announced their own company-specific reduction commitments, whether as part of the EPA Climate Leaders program, the Chicago Climate Exchange, or in conjunction with environmental groups.



PUBLIC POWER ACTIONS

Public power systems have developed a wide-ranging set of actions and programs to reduce their GHG emissions intensity, as well as to reduce, avoid, and sequester GHG emissions off-system. The following examples illustrate some of their accomplishments, as well as future initiatives and efforts now underway. The American Public Power Association (APPA) and the Large Public Power Council (LPPC) are currently taking concrete steps to maximize the participation of not-for-profit, community-, and state-owned electric utilities in voluntary GHG emissions reductions programs. Public power is addressing how best to meet utility research and technology needs, and promote sound public policy.

Examples of public power achievements:

- ◆ **Los Angeles Department of Water and Power** (LADWP) was honored by the California Climate Action Registry (CCAR) as a “Climate Action Leader” in 2006 for proactively registering its GHG emissions with the Registry. LADWP is a charter member of CCAR, and the only organization in the registry with five years of certified inventories. “Climate change is perhaps the most important environmental issue of our time and it is essential that the LADWP take a leadership role in addressing this global problem,” Board President H. David Nahai said. “We are proud that LADWP has pioneered the way by voluntarily reporting and registering its greenhouse gas emissions with the Registry.”
- ◆ In 2005, **Seattle City Light** became the first large electric utility in the country to effectively eliminate its contribution of GHG emissions into the environment. The utility’s goal of “zero net emissions” is a key element of the mayor’s effort to make Seattle a leader in combating GHG emissions. Seattle City Light also is partnering with local businesses and institutions committed to improving energy and resource efficiency and reducing GHG emissions. Climate Wise Partners—a mix of government, non-profit, and private entities—support voluntary environmental partnerships and demonstrate local, dollar-wise solutions to climate change. Partners assess their business opportunities, invest in new, more energy-efficient equipment and practices, and share these achievements with peers and the public.

Biologic Sequestration

Public power systems are sequestering substantial GHG emissions through the use and expansion of APPA’s TREE POWER™ program. Currently, more than 250 utilities, serving more than 50 percent of public power’s 19.1 million customers, participate in the TREE POWER™

program, which was created in 1991. To help public power utilities calculate the environmental benefits of their tree planting programs, the Sacramento Municipal Utility District (SMUD) developed the Tree Benefits Estimator. The Estimator, posted on APPA’s Web site (www.appanet.org), can be used to estimate the amount of energy and capacity a utility can save (or has saved) through its tree-planting program. It also estimates how many pounds of carbon and CO₂ emissions will be sequestered.

Natural Gas Generation

- ◆ **Austin Energy** in Texas recently completed construction of the Mueller Energy Center—the most efficient and comprehensive on-site generation plant available today. CO₂ emissions from the plant will be less than half of those produced from traditional power plants and gas boilers. The lower emissions are equivalent to removing 1,800 automobiles from the road or planting 2,700 acres of trees.
- ◆ **MEAG Power** responded to new generation needs with the construction of a new combined-cycle natural gas unit at Plant Wansley in Lowell, Georgia. The 503-MW unit became operational in 2004.
- ◆ **Wisconsin Public Power** added a 54-MW natural gas combustion turbine to its generation portfolio in 2004.

Renewable Energy

- ◆ **American Municipal Power–Ohio, Inc.** works with its 108 member communities to identify, measure, and report beneficial actions that can and are being taken to reduce or offset GHG emissions throughout its own operations and those of its members. These offsets account for nearly 4.3 million tons of CO₂ emissions avoided through various activities, including the addition of renewable generation (wind,

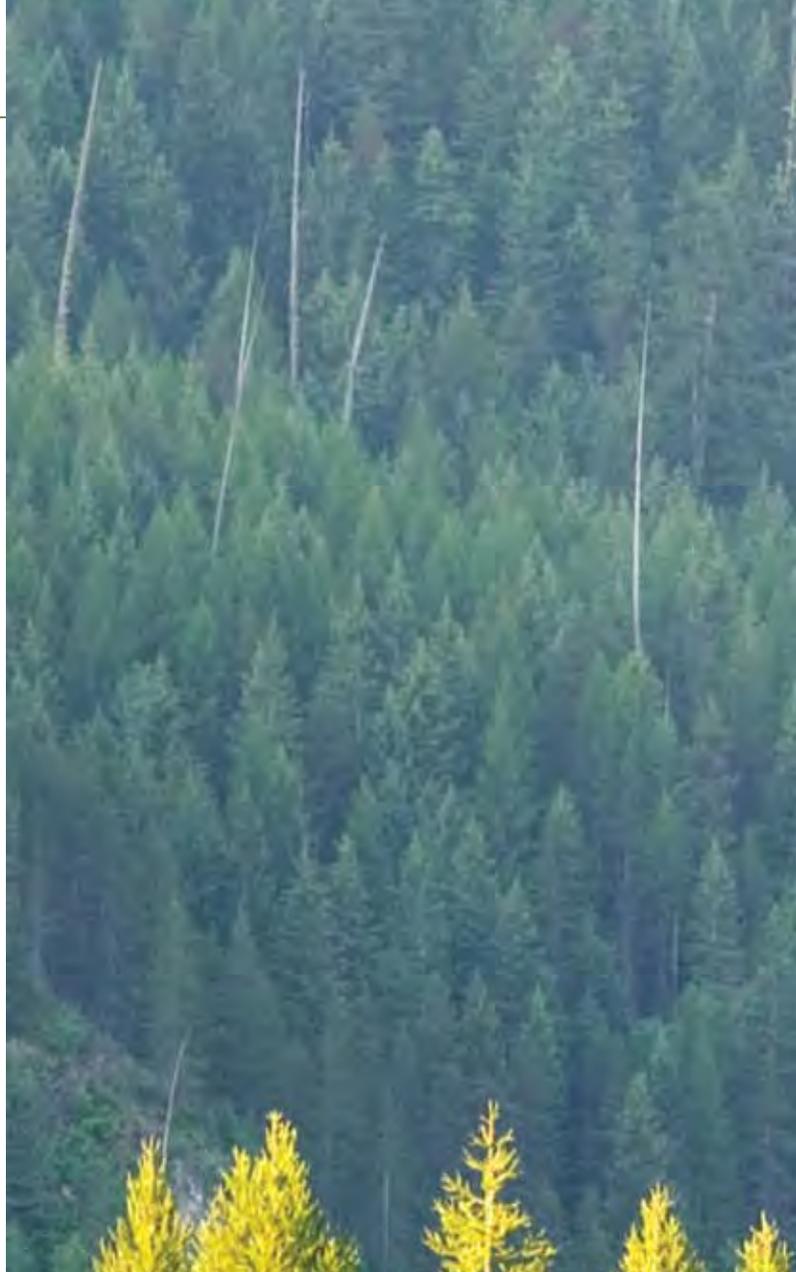
solar, landfill gas, and hydro), end-use efficiency gains (especially lighting replacements), load management, distribution system upgrades, tree-planting programs, recycling, and other activities.

- ◆ **Jacksonville Electric Authority** recovered more than 17,000 tons of methane from two municipal landfill sites from 2003 to 2005.
- ◆ **Emerald People's Utility District**, in Eugene, Oregon, operates the Short Mountain Methane Power Plant, which converts methane—a gas that is roughly 21 times as potent as CO₂—into electricity. The plant, which produces 2.5 MW annually and provides enough electricity to power approximately 1,000 homes, paid for itself in about seven years. Since the Short Mountain Landfill is an operating landfill and plans to accept refuse for many years into the future, this project will continue to produce electricity for about another 20 years.
- ◆ **Waverly Light and Power** in Iowa was the first municipal utility to own and operate wind generation in the Midwest. While it is continually searching for environmentally friendly, renewable energy resources, the utility has found wind to be an important resource leading the way in providing a clean, free, and inexhaustible energy resource. Waverly Light and Power's wind generation serves the equivalent of 761 homes annually. It also offsets nearly 6,850 tons of CO₂. Wind generation contributes more than five percent to the utility's annual generation portfolio.

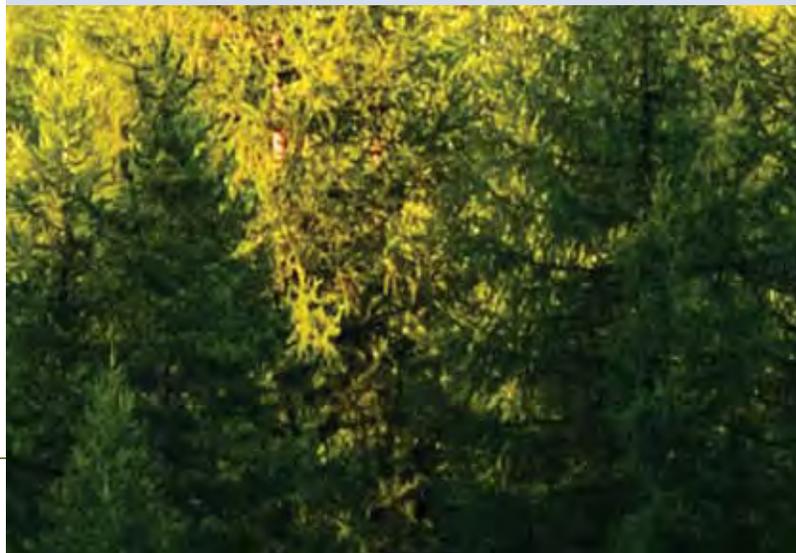
Green Power and Green Pricing Programs

Many public power systems are undertaking significant green programs. A few examples include:

- ◆ **Austin Energy** developed GreenChoice, a program that offers customers the option to choose electricity from renewable sources. The highly successful program has 665 million kWh in subscriptions and is ranked first in the nation (in renewable energy sales) by the National Renewable Energy Laboratory (NREL).
- ◆ **CPS Energy** in San Antonio, Texas, has one of the most aggressive renewable energy programs in the state, with more than four percent of peak demand drawn from renewable sources. The CPS Energy Board of Trustees has committed to meeting 10 percent of peak demand with renewable energy by 2015. Additionally, CPS designed its "GreenShade"



More than 250 public power utilities participate in the **TREE POWER™** program.



tree-planting program to conserve energy and save on consumer cooling costs during the hot summer months. Eligible customers can receive free canopy trees to plant strategically near their homes.

- ◆ In addition to its leadership role in developing the Tree Benefits Estimator, **SMUD's** Greenergy® program offers customers the choice of supporting energy created by green resources. SMUD matches up to 100 percent of a Greenergy® customer's electric needs with purchases of renewable resources for use on the SMUD power system for only pennies a day. According to NREL, Greenergy® qualifies as the nation's fifth-largest green pricing program based on the number of customers enrolled.

Energy Efficiency

APPA's Demonstration of Energy-Efficient Developments program awards utility grants and student scholarships for a variety of projects. Since 1980, it has provided more than \$6 million to about 300 projects that are of special interest to community-owned utilities. Some recent work includes research on the efficiency of photovoltaic systems, GHG emissions strategies, generating electricity from sewage sludge and digester gas, expanding renewable resources in smaller utility resource portfolios, and the impact of distributed generation on distribution systems.

- ◆ As one of the founding members of the Alliance for Climate Action—a group of local, regional, and state-level professionals committed to working to reverse the growth of GHG emissions in Burlington, Vermont—**Burlington Electric Department** (BED) operates energy-efficiency programs targeted to all customers. Through these efforts, BED has developed relationships with energy users and gained experience in how best to meet their needs. As a result of BED's energy-efficiency programs, annual electricity consumption in Burlington is only two percent higher than it was 1989. For its innovative program, BED earned the 2005 "Star of Energy Efficiency Award" from the Alliance to Save Energy.
- ◆ The **City of Shelby**, North Carolina, saved more than five tons of CO₂ emissions from 2003 to 2005 by switching from mercury vapor to sodium bulbs in its street lights.
- ◆ In Springfield, Illinois, **City Water, Light & Power's** DSM actions include both residential and commercial programs that saved nearly 3,300 MWh of electricity in 2005. This savings resulted in more than 4,000 tons of avoided CO₂ emissions.

- ◆ **Muscatine Power and Water** (MPW), in Iowa, sponsors many DSM activities, including programs for MPW and its customers to replace lighting fixtures, light bulbs, and large motors with more energy-efficient models. In 2005, MPW saved nearly 1,700 MWh of electricity through DSM actions.
- ◆ **Omaha Public Power District's** DSM projects saved more than 33,000 MWh of electricity in 2005.
- ◆ **Salt River Project**, in Phoenix, conducts a number of DSM programs, including PowerWise Homes, M-Power, and energy audits. In 2005 alone, these efforts saved more than 130,000 MWh of electricity.
- ◆ **Wisconsin Public Power's** DSM programs saved more than 125,000 MWh of electricity in 2005.

APPA's Demonstration of Energy-Efficient Developments program awards utility grants and student scholarships for a variety of projects.



ELECTRIC COOPERATIVE ACTIONS

The National Rural Electric Cooperative Association (NRECA) and U.S. Department of Agriculture (USDA) signed an MOU to identify and advance technologies that will help achieve the national 18-percent reduction goal. Initially, NRECA is working with its members and USDA to eliminate technical and market barriers to the use of low-emission renewable energy, such as agricultural waste-to-electricity, through the use of systems approaches and the development of decision-support tools.

Renewable Energy and Green Power Programs

Members of the national network of electric cooperatives currently receive 11 percent of their power from renewable resources, with more than 700 co-ops offering renewable energy from solar, wind, hydroelectric, and biomass generation. To support the growing interest in renewable energy, NRECA provides outreach to electric co-ops through grants from DOE's Wind Powering America and GeoPowering the West programs. NRECA also conducts conferences and Webinars, and provides expert advice to its members. The newly enacted Clean Renewable Energy Bond program, which helps to offset the higher cost of renewable energy, is leading to the development of 78 new cooperative-owned projects for solar, wind, landfill gas, open-loop biomass, and hydro-power facilities.

Examples of cooperative renewable energy projects:

- ◆ **Associated Electric Cooperative Inc.** (AECI) of Springfield, Missouri, is collaborating with Wind Capital Group and John Deere Wind Energy on three new Missouri-based wind projects. AECI will purchase the electricity from the wind farms and deliver it through a network of six regional generation and transmission cooperatives and 51 local rural electric cooperatives that serve more than 830,000 farms, homes, and businesses in Missouri, southeast Iowa, and northeast Oklahoma. Combined, the three wind farms will be capable of producing 157 MW—or enough power for about 45,000 homes.
- ◆ **Basin Electric Power Cooperative** (BEPC), headquartered in Bismarck, North Dakota, ranked eighth in total sales of renewable energy with nearly 114 million kWh in 2005, according to the NREL's annual ranking of leading utility green power programs. BEPC has added approximately 136 MW of wind energy to its portfolio over the past several years through joint projects and purchase agreements. In addition, BEPC developed a 22-MW, zero-emissions

waste-heat-recovery project using the hot exhaust gases from existing compressor stations, located along the Northern Border Pipeline, to generate electricity.

- ◆ **Dairyland Power Cooperative** (DPC), in La Crosse, Wisconsin, is expanding its Evergreen Renewable Energy ProgramSM and is on track to reach 10 percent renewable generation by 2015. DPC has 17 MW of wind generation and 22 MW of hydroelectric power, and owns a 10.4-MW landfill gas-to-energy plant. In addition, DPC's animal waste-to-energy program utilizes manure from dairy and swine farms within the DPC system to produce methane for conversion to electricity. Currently, 3 MW of "cow power" are online, and DPC has plans to bring as much as 25 MW of additional capacity online over five years.
- ◆ **East Kentucky Power Cooperative** (EKPC) offers the EnviroWattsSM program, which includes five landfill gas-to-electricity generating facilities that produce enough electricity to power 12,000 homes. EKPC is also exploring the use of solar photovoltaic systems, wind turbines, and biomass. EKPC estimates that signing up for only one block per month of the EnviroWattsSM for one year has the same benefit as reducing imported crude oil by more than two barrels per year, or taking one car off the road for three months.
- ◆ **Great River Energy** (GRE) of Elk River, Minnesota, has been providing electricity from wind power since 1998. In 2005, it added an additional 100 MW to its existing portfolio, bringing the provision of renewable energy to five percent of its current generation mix. Under a recent contract, the portion of GRE's electricity coming from renewables will increase to eight percent by the end of 2007. GRE also utilizes waste heat to heat and cool a new warehouse, garage, and office space adjacent to a generating station. The innovative technology provides virtually all of the heating and cooling for 57,000 square feet of building space, which results in approximately 97 tons of avoided CO₂ emissions on an annual basis.

- ◆ **Western Farmers Electric Cooperative**, in Anadarko, Oklahoma, purchases 74.3 MW from the first phase of the Blue Canyon Wind Farm. The energy produced by Blue Canyon supplies approximately five percent of the co-op's total energy needs to serve its 19 member-owned rural electric co-ops. In turn, these co-ops provide the energy to their member-owners that serve farms, rural residences, towns, and commercial/industrial customers across three-fourths of Oklahoma and small parts of Kansas and Texas.

Energy Efficiency

- ◆ **Delta-Montrose Electric Association** (DMEA), a rural electric distribution co-op serving more than 25,000 members in Colorado, received EPA's "Excellence in ENERGY STAR® Outreach 2006 Award" for its outstanding contribution to reducing GHG emissions through its "Brightening Our Communities" campaign. The campaign promotes the purchase of compact fluorescent lights (CFLs). DMEA's promotional campaign resulted in the sale of 5,000 CFLs, which are expected to save 350,000 kWh annually, with a lifetime reduction of 1,200 metric tons of GHG emissions.

DMEA also finances the installation of geothermal heat pumps for its members with a 7.5-percent interest rate for 30 years. The GeoExchange program has added more than 500 four-ton equivalent units with an estimated lifetime reduction of 20,000 tons of CO₂. DMEA was recognized by the Association of Energy Service Professionals with its "2005 Award for Best Marketing Program."

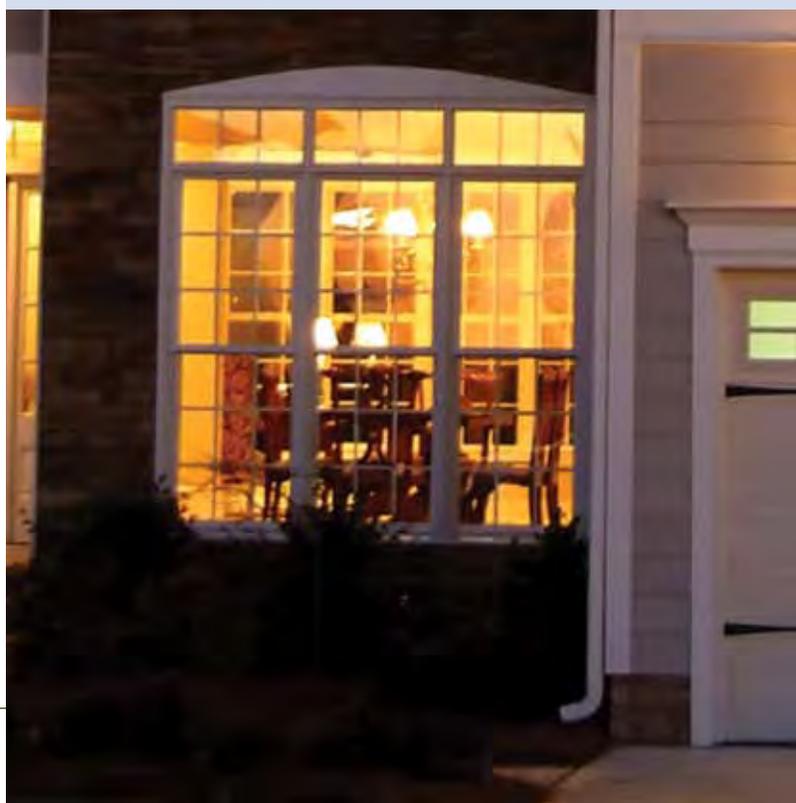
- ◆ **GRE** spent nearly \$18 million on load management and energy-efficiency efforts in 2005. GRE offers a variety of energy-efficiency programs that are promoted through rebates or special electric rates and incentives. For example, in 2005 GRE provided rebates for more than 5,600 ENERGY STAR® residential air conditioners and heat pumps. GRE's energy-efficiency efforts will yield a lifetime energy savings of nearly 400 million kWh—or enough to power nearly 29,000 residential homes for one year.

Carbon Storage

- ◆ **Basin Electric Power Cooperative**, through its subsidiary, Dakota Gasification Company, owns and operates the Great Plains Synfuels Plant in Beulah, North Dakota, which gasifies lignite coal to produce valuable gases and liquids. The Synfuels plant



GRE's energy-efficiency efforts will yield a lifetime energy savings of nearly 400 million kWh—or enough to power nearly 29,000 residential homes for one year.



began operating in 1984, and today produces more than 54 billion standard cubic feet of natural gas annually. Coal consumption exceeds six million tons each year. In addition, Dakota Gasification delivers about 8,000 metric tons of CO₂ emissions daily to two Canadian oil fields for enhanced oil recovery and storage. CO₂ emissions are expected to be permanently stored in the oil reservoir, which is monitored by the International Energy Agency's (IEA's) Weyburn CO₂ Monitoring and Storage Project.

Coal Combustion Products

- ◆ **GRE** received national recognition for promoting the use and acceptance of CCPs. GRE received EPA's "2006 Coal Combustion Products Partnership Overall Achievement Award" for its efforts to develop markets for fly ash, in which GRE partnered with more than 10 public and private organizations. GRE also received EPA's "2006 WasteWise Beneficial Use Gold Achievement Award" for its beneficial use or sale of 501,300 tons of fly ash in 2005; 417,000 tons were sold for use in concrete production and the remaining ash was used for soil stabilization. GRE's Coal Creek Station also used all 350,000 tons of generated bottom ash as structural ballast in the flue gas desulfurization (FGD) disposal unit along with fly ash.

SF₆ Emissions

- ◆ **GRE** reduced its 2005 SF₆ emissions to half of its 1998 baseline of 3,335 pounds through additional employee awareness training; monitoring SF₆ equipment for leaks; replacing old, large-volume equipment with smaller, more efficient equipment; and investigating other available technologies.

Cross-Sector Projects

- ◆ **GRE** will supply the energy to fuel a 50-million gallon ethanol plant adjacent to its Coal Creek Station in Underwood, North Dakota. Sixty percent of the energy for the Blue Flint Ethanol facility, co-owned and operated by Headwaters, Incorporated, will come from waste steam generated by GRE's Coal Creek Station, reducing energy costs and GHG emissions.

Technology Research and Development

- ◆ **Basin Electric Power Cooperative** of Bismarck, North Dakota, is leading a consortium of energy companies and research institutions in an innovative project to use electricity from local wind generators to produce hydrogen using an electrolyzer. The hydrogen can be stored and used as a transportation fuel, a fuel to provide firm (non-intermittent) power that can be scheduled from fuel cells or small generators, or other applications with zero emissions. The electrolyzer will be one of the nation's first production sources of hydrogen from a renewable resource. The hydrogen created at the production site primarily will be used to refuel hydrogen-powered vehicles. For example, General Motors 2006 Flexfuel pickups have been converted to run on hydrogen fuel to demonstrate the new link between wind power and vehicle transportation.
- ◆ **GRE** will soon begin a full-scale, advanced clean coal technology demonstration at its Coal Creek Station in North Dakota as part of the Clean Coal Power Initiative (CCPI) with industry and DOE. The thermal coal drying project will capture and reuse excess heat to dry the coal, increasing its heating value and resulting in an estimated increase in efficiency of about five percent.





TENNESSEE VALLEY AUTHORITY ACTIONS

Nuclear Power

TVA's nuclear capacity of more than 5,700 MW comprises about 30 percent of its power supply portfolio. TVA's three nuclear plants make enough electricity to power more than three million homes in the Tennessee Valley. TVA's first nuclear plant, Browns Ferry, began commercial operation in 1974. Following upgrades, the Browns Ferry Unit 1 plant is scheduled to return to service in 2007.

Renewable Energy and Green Power Programs

◆ Solar-powered hybrid lighting system

Solar-powered hybrid lighting is an exciting new technology launched in 2005 that promises to provide a better quality of indoor lighting for commercial buildings while saving energy and money. Developed at the Oak Ridge National Laboratory and funded by DOE and TVA, the system pipes sunlight into a room. A roof-mounted collector and small optical fibers transfer the sunlight to hybrid fixtures that allow both solar and electric light sources to work in tandem. The electric lights are dimmed when the sunlight is bright and are turned up again when clouds move in or the sun sets. Because the system can block ultraviolet and infrared heat more effectively than windows and skylights, it reduces the energy used for cooling as well as lighting. The cost savings can be especially dramatic in areas where sunshine is abundant.

◆ Green Power Switch®

Ninety public power distributors in the seven-state TVA region offer consumers the option to purchase renewable energy under TVA's Green Power Switch® program. Launched in 2000 with 12 distributors, the program provides energy from solar, wind, and methane gas sources. Consumers can buy Green Power Switch® in 150-kWh blocks, and each block adds \$4 to the monthly energy bill. Some recent program highlights:

- During the 2004-2005 school year, students at the University of Tennessee voted to increase their facility fees to support renewable energy, making the university the largest purchaser of Green Power Switch® in Tennessee with 3,375 blocks.

- Tennessee became the first state in the nation to buy green power for all of its state parks. Its purchase of 1,149 blocks per month is equivalent to the environmental benefits of planting 169 hectares (418 acres) of trees, recycling 8.8 million aluminum cans, or removing 270 cars from Tennessee highways.
- In 2004, TVA added a solar system at Bridges, a youth leadership training center in Memphis, and in 2005 TVA launched its 16th solar site at the Morgan County Vocational Technical School in Wartburg, Tennessee.

The program was further enhanced with the addition of 15 wind turbines to the three original turbines at TVA's Buffalo Mountain site in east Tennessee. Dedicated on Earth Day 2005, the new turbines increased the generating capacity of the site to 29 MW, making it a major source of power for the renewable program and the largest commercial wind installation in the Southeast. TVA has a 20-year power purchase agreement with Invenergy, the energy company that developed and built the new turbines. The 18 wind turbines at Buffalo Mountain can generate enough power to serve about 3,800 homes.

Coal Combustion Products

Residues from burning coal and from emission-control processes—such as fly ash, bottom ash, and gypsum—have generally been managed in ash ponds or landfills at coal-based plants. However, new methods of utilizing these materials are being developed to keep them out of landfills. In addition to being used in concrete block and wallboard, they also can be utilized as a component in road construction. In 2004, TVA utilized 2.6 million metric tons (2.9 million tons) of CCPs, and in 2005 increased the figure by nearly seven percent, to 2.8 million metric tons (3.1 million tons).

TVA also participates in C2P2, a cooperative utility effort that promotes the use of products from burning coal to reduce solid waste and CO₂ emissions. Those emissions are reduced, for example, when fly ash is used as a replacement for Portland cement, the main ingredient in concrete. Cement production creates large amounts of CO₂ emissions, and the use of fly ash in this application has the potential to reduce CO₂ emissions by about nine million to 13 million metric tons (10 to 14 million tons) annually.

CROSS-SECTOR PROJECTS

Climate VISION aims to encourage cross-sector projects that reduce GHG emissions intensity. DOE and the Power PartnersSM seek to broaden participation in, and increase the impact of, the Climate VISION program by exploring cross-sector and intergovernmental initiatives to help improve energy efficiency and reduce GHG emissions intensity.

Clean Coal Technologies

In addition to company-specific actions previously discussed in this report, there are a number of cross-sector projects with clean coal technologies. New clean coal technologies offer a number of advantages, but certain factors inhibit more widespread commercial use. The coal and utility industries are working with DOE to develop clean coal power plants through the FutureGen project, the Clean Coal Power Initiative (CCPI), and advanced research and development. All projects are designed to move promising technology along the research and development path to commercialization.

- ◆ **CCPI** is a federal cost-share program to conduct demonstrations of cutting-edge, commercial-scale, advanced clean coal technologies. To date, two rounds of demonstrations have been funded, with a third solicitation requiring additional federal funding. While several projects have made significant progress thus far, more work needs to be done to move these technologies from the demonstration phase to full-scale implementation. It should be noted that many of the projects in the CCPI program are essential to the construction of FutureGen.

The coal and utility industries are working with DOE to develop clean coal power plants through the FutureGen project, CCPI, and advanced research and development.

- ◆ **FutureGen** is an initiative under which industry and DOE plan to build and operate a 275-MW coal plant that produces both electricity and hydrogen with essentially zero emissions. The initiative is a response to President Bush's directive to draw upon the best scientific research to address the issue of GHG emissions and to help ensure America's energy security by developing technologies that utilize a plentiful domestic resource. The FutureGen Industrial Alliance involves AEP, Southern Company, PPL Corporation, CONSOL Energy, Kennecott Energy, Peabody Energy, BHP Billiton, Foundation Coal, China Huaneng Group, and U.K. Anglo American.
- ◆ **IGCC:** Coal gasified by steam and air under high pressure and temperatures produces a synthetic gas (syngas), which is used as a fuel in an IGCC power plant. This technology uses a combined-cycle process with a gas turbine driven by the combusted syngas. Since most of the electricity is generated from the gas turbine, IGCC shows promise in providing high system efficiencies with ultra-low pollution levels. Power PartnersSM member utilities and power generators are participating in a variety of efforts to advance this technology.

Carbon Capture and Storage

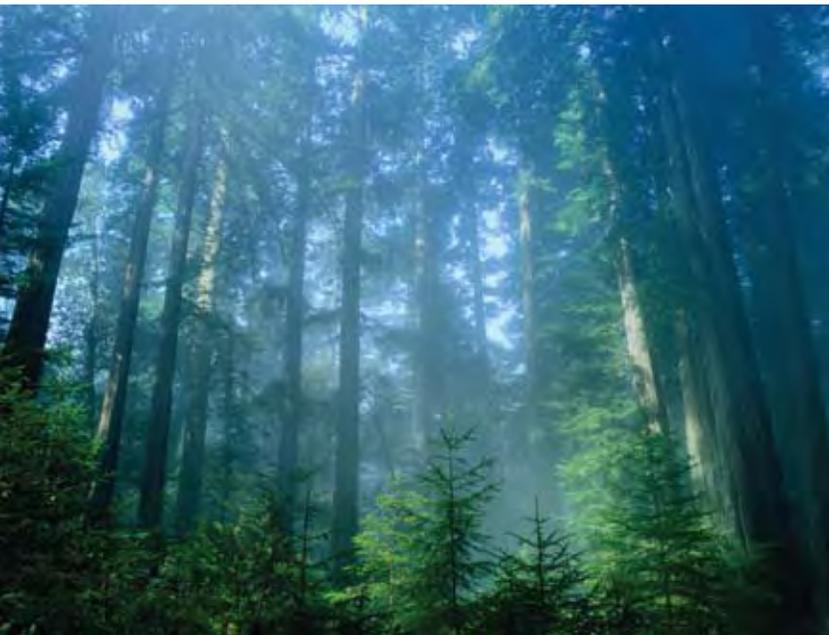
A key challenge in developing coal-based power plants with zero or near-zero emissions—whether using IGCC or advanced pulverized coal technologies—will be the ability to capture, compress, transport, and sequester CO₂ emissions (a process referred to as geologic carbon capture and storage, or CCS). In addition to projects highlighted here, a number of industries and stakeholders also are participating in the Carbon Sequestration Leadership Forum (CSLF), a multilateral initiative involving 22 countries. (See International Efforts on page 38 for additional information.)

- ◆ **Regional Carbon Sequestration Partnerships** Industry is actively participating in seven Regional Carbon Sequestration Partnerships to explore opportunities and methods for CO₂ emissions storage. Under the DOE-sponsored program, a wide variety of industry participants are working with local

universities and state and federal agencies to identify regionally appropriate opportunities for sequestering carbon either terrestrially (in trees, crops, and grasses and the soils that they grow in) or geologically (in underground formations). Phase I of the partnerships' work resulted in identification of more than 600 gigatons of storage capacity in domestic geologic formations, including deep saline formations, depleted oil and gas fields, coal seams, and shale and basalt formations. Additional characterization during Phase II is expected to identify more potential opportunities and to refine the estimates made during Phase I.

The regional partnerships are beginning Phase II activities using small-scale demonstrations of geologic storage and terrestrial opportunities to sequester carbon, in order to test methods of monitoring and verification and to identify public policies and outreach required to support a large-scale sequestration program.

- In the Midwest, efforts are underway to examine the technical feasibility and costs of storage in deep geologic formations, agricultural forests, and degraded land systems, as well as existing regulations and policies to determine if they hinder cost-effective CO₂-emissions storage and ways of overcoming these barriers.
- In the Southeast, partnership members are working together to pinpoint CO₂ sources and sinks as well as transport requirements for 11 states, enter this data into a geographical information system data base, and develop an outreach plan so that stakeholders can help identify and implement regional CO₂ storage measures.



- In the Southwest partnership, electric utilities are contributing to an effort to assess the most appropriate storage strategies and technologies, including development of a Web site network to share information, store data, and help with decision-making and future management of carbon storage in the region.
- As part of The Plains CO₂ Reduction Partnership, power providers are developing an approach that involves: 1) characterizing technical issues and the public's understanding regarding CO₂ storage; 2) identifying regional opportunities for storage; and 3) detailing an action plan to be carried out during Phase II of the partnership.
- In the Illinois Basin Initiative, electric utilities are partnering with others to look at the feasibility and ways of storing CO₂ within deep, uneconomic coal seams, numerous mature oil fields, and saline reservoirs. An action plan will be developed for possible technology validation field tests involving CO₂ injection.
- ◆ **Duke Energy** is hosting a geologic CO₂ storage field demonstration project at its East Bend generating station in Kentucky as part of the Midwest Regional Carbon Sequestration Partnership. The purpose of the demonstration is to test the potential for permanently storing CO₂ emissions in the geologic formations under the site.
- ◆ **Edison Mission Group** (EMG) and **BP** are planning a \$1-billion hydrogen-fueled power plant in California that would generate 500 MW of low-carbon generation. EMG and BP hope to bring the new power plant online by 2011. This project would eliminate four to five million tons of CO₂ per year from the atmosphere by storing it underground. Petroleum coke would first be converted to hydrogen and CO₂ gases, and about 90 percent of the CO₂ would be captured and separated. The hydrogen gas stream would be used to fuel a gas turbine to generate electricity. The captured CO₂ would be transported by pipeline to an oilfield and injected into reservoir rock formations thousands of feet underground, both stimulating additional oil production and permanently trapping the CO₂.
- ◆ **Entergy** is a member of the Gulf Coast Carbon Center and is looking to demonstrate carbon capture technologies, to conduct research into geologic storage monitoring and verification, and to develop an infrastructure in the Gulf Coast region to utilize anthropogenic CO₂ for enhanced oil recovery. Developing a cost-effective source of CO₂ from anthropogenic sources will add to the

secure domestic supply of energy and will enhance the economy within the franchise territory. It also could create a value stream for the collection and sale of CO₂ from plant stack gases that will allow the use of abundant domestic coal supplies in a way that helps the environment. Entergy has purchased 1.5 million emissions reduction credits from enhanced oil recovery projects.

Energy Efficiency

As mentioned in the Industry-Wide Initiatives section, NAPEE will serve as a blueprint for renewed efforts to conserve and use energy more wisely. The National Action Plan is facilitated by DOE and EPA, with the participation of utilities, public utility commissions, energy consumers, and non-governmental groups. Please see page 9 for additional information.

Vehicle Initiatives

◆ Hybrid Vehicles

Exelon continues to be a major voluntary user of B20 bio-diesel blended product, using it as the main source of fuel for more than 2,500 company vehicles—or 65 percent of its fleet. B20 bio-diesel consists of 80 percent diesel fuel and 20 percent soybean oil. Exelon uses in excess of two million gallons per year. For 2004, this consumption level reduced particulate emissions by more than 340 tons and displaced the need to purchase more than 400,000 gallons of petroleum-based diesel. In 2005, Exelon purchased 50 Ford Escape Hybrids, the first production hybrid sport-utility vehicle (SUV). These vehicles now comprise nearly 25 percent of the company's overall SUV fleet. The combination gasoline-and-electric Ford Escape operates in electric-only mode when the vehicle travels at low speeds or idles at a stop. As a result, the hybrid Escape provides an estimated 50-percent improvement in city/highway fuel economy when compared to the conventional Escape.

◆ PHEVs

PHEVs are the next-generation hybrid vehicles that will help our country enter a new era of clean transportation and reduce our consumption of petroleum. The development of PHEV technology is the result of extensive collaboration between EPRI, universities, automobile and battery manufacturers, national laboratories, and research institutes. PHEVs are plugged into the existing electricity system, using an electrical outlet to recharge the car batteries.

PHEVs will use significantly less gasoline than current hybrids and standard vehicles—and therefore will release fewer CO₂ emissions.

- **Austin Energy** in Texas spearheaded the influential Plug-In Partners national grassroots initiative to demonstrate to automakers that a market for flexible-fuel PHEVs exists today. About 160 other public power systems have endorsed this effort, along with hundreds of communities, businesses, and organizations across the country.

◆ Utility Hybrid Truck Initiative

Significant opportunities exist to improve fuel economy and to reduce GHG emissions through the development of an electric utility hybrid “bucket” truck, which ultimately will have significantly broader market potential. The core structure, once hybridized, is ideal not only for cable and telecommunications operations, but also for hundreds of thousands of urban work trucks, such as cargo, delivery, dump, and other truck applications. The goal is to develop a commercial hybrid work truck and meet 2010 emissions standards three years ahead of the federal goal, while improving fuel economy 50 percent (and thereby reducing emissions). To help meet this challenge, more than 25 utilities are taking part in the Utility Hybrid Truck Working Group to establish user requirements and performance specifications. By the end of 2004, several electric utilities had purchased and phased-in the first pre-production vehicles for national assessment. In 2006, those utilities and a number of others ordered additional vehicles during the second phase of this initiative.

Initiative for New Homes

The building sector is responsible for a significant portion of GHG emissions in the United States. Upgrading the energy performance of homes can help meet the national emissions-intensity goal. The Power PartnersSM and DOE are working together and with other interested parties to explore partnerships to achieve greater market penetration of energy-efficient new homes. This effort involves a wide range of stakeholders in the private and public sectors across the new homes transactional chain. Several multi-sector meetings have been held with DOE to discuss this initiative, and the power sector helped sponsor a workshop in 2004 that brought together a number of stakeholders to discuss opportunities and obstacles. In July 2005, DOE launched the Partnership for Home Energy Efficiency and held a meeting with interested stakeholders to discuss how to advance the initiative.

Individual Power PartnersSM highlights:

- ◆ **CenterPoint Energy** has been promoting the construction of new homes that meet EPA's ENERGY STAR[®] guidelines for energy efficiency since 2001. ENERGY STAR[®] homes use substantially less energy for heating, cooling, and water heating. In 2004, houses built within CenterPoint Energy's ENERGY STAR[®] program saved more than 22 MW of electricity generation. This amount far exceeded the annual goal set by CenterPoint Energy and contributed significantly to the statewide energy-efficiency goal established by the Public Utility Commission of Texas.

The electricity saved by these houses is equivalent to removing 23,000 cars from the road, or planting 37,500 acres of trees. The 13,000 participating homeowners also will collectively save an estimated \$100 million on their electric bills over the life of their homes. EPA awarded CenterPoint Energy its 2005 award for "Excellence in Energy Efficiency and Environmental Education."

- ◆ In the aftermath of the 2005 hurricane season, New Orleans-based **Entergy** is involved in the development of new, post-hurricane local zoning and building rules in communities throughout its service territory in order to create more energy-efficient housing.



International Efforts

The U.S. government has reached a number of bilateral and multilateral agreements that address climate change issues through research and technology transfer, including four important international initiatives: the Asia-Pacific Partnership on Clean Development and Climate (APP), the CSLF, the International Partnership for the Hydrogen Economy (IPHE), and Methane to Markets. The electric utility industry is actively participating in many of these activities. Such an approach is vital because the combined CO₂ emissions of China and India already exceed those of the United States, and in only eight years the combined CO₂ emissions of developing economies (e.g., China, India, Brazil, etc.) will exceed those produced by all developed countries.

◆ APP

The APP involves governments working with the private sector to expand investment and trade in cleaner energy technologies to address the challenges of reducing poverty and promoting economic development while reducing GHG emissions. Together, the partner countries—Australia, China, India, Japan, Korea, and the United States—produce half of the world's CO₂ emissions. They have agreed to work together to meet goals for climate change, energy security, and air emissions reductions in ways that promote sustainable economic growth and poverty reduction.

The APP has established eight task forces covering: (1) cleaner use of fossil energy; (2) renewable energy and distributed generation; (3) power generation and transmission; (4) steel; (5) aluminum; (6) cement; (7) coal mining; and (8) buildings and appliances. U.S. industry representatives are participating in each of these task forces, which are developing action plans that will outline how the task forces will meet their goals. For example, improving the generation efficiency of the coal-based power plants in APP member nations by just one percent would yield significant reductions in GHG emissions.

◆ CSLF

Established in June 2003, the CSLF is an international climate change initiative focused on the development of improved cost-effective technologies for the separation and capture of CO₂ for its transport and long-term safe storage. The purposes of the CSLF are to make these technologies broadly available internationally, and to identify and address wider issues relating to CCS. To date, 17 projects have been undertaken.

Together, the APP partner countries—Australia, China, India, Japan, Korea, and the United States—produce half of the world’s CO₂ emissions.

◆ **IPHE**

Established in 2003, this international consortium of 17 member countries seeks to advance the development of hydrogen and fuel cell technologies. IPHE has developed 300 hydrogen and fuel cell demonstration projects around the world. The partnership also sponsors several meetings throughout the year to provide a forum to develop policies and standards to advance technology development.

◆ **Methane to Markets**

The Methane to Markets partnership was established in November 2004 as a voluntary framework for cooperation to advance the recovery and use of methane as a valuable and clean energy source. Sixteen countries belong to the partnership, which is chaired by the United States. The partnership is organized around sources of methane: oil and gas, landfill, agriculture, and coal. One of the major goals of the partnership is to develop and transfer methods and technologies for methane capture. The coal group has completed an action work plan and has begun conducting workshops in member countries that will identify key barriers to wider capture and use of coal mine methane. An additional workshop, held in conjunction with the APP coal mining task force, convened in Australia in the fall of 2006.

Power PartnersSM highlights include:

- ◆ **The AES Corporation** formed a joint venture with AgCert International plc, called AES AgriVerde, to deploy AgCert’s GHG emissions-reduction technology in selected countries in Asia, Europe, and North Africa. By 2012, AES AgriVerde intends to create an annual production volume of 20 million metric tons of GHG emissions reductions through the reduction of methane. AES AgriVerde will capture methane from agricultural and animal waste products and either destroy it or use it to generate electricity or heat, reducing net GHG emissions from the manure management process by approximately 95 percent.





TECHNOLOGY RESEARCH AND DEVELOPMENT

The Power PartnersSM and DOE view the development and use of more advanced energy technologies as critical to the achievement of the national GHG emissions-intensity reduction goal. As described in the MOU with DOE, the Power PartnersSM and DOE agree to work collectively to develop a process, subject to available funds and applicable provisions of law, for (1) identifying high-priority areas for power sector research, development, demonstration, and deployment (RDD&D) associated with technologies that would contribute to the achievement of the national goal and ultimately would contribute to surpassing this goal; and (2) recommending steps to carry out power sector RDD&D in the identified, high-priority areas. EPRI will serve as the consultant to the Power PartnersSM in connection with the RDD&D process.

Technology research and development efforts already discussed in this report include:

- ◆ Joint EPRI technology initiatives to advance clean coal power systems, CCS, reducing N₂O in crop production, and electric-drive vehicle technologies;
- ◆ Development of the next-generation of nuclear technologies;
- ◆ Several industry-government joint projects to advance clean coal power plants, including IGCC technology, the FutureGen project, and CCPI; and
- ◆ Regional Carbon Sequestration Partnerships, a government-industry effort to determine the most suitable technologies and infrastructure needs for CCS.

In addition, TVA, in collaboration with EPRI, has conducted three DOE-funded research projects, described below, aimed at developing and evaluating new technologies for the removal and storage of CO₂.

Two of the three projects evaluated methods of capturing CO₂ emissions and storing it in forms that would prevent its re-entrance into the atmosphere. The methods tested are expected to provide benefits in addition to storing carbon, such as utilizing CCPs in a safe and beneficial manner, creating other products or sources of energy, or enhancing land use. The third project was an economic comparison that evaluated major technologies under development for CO₂ capture and storage.

Carbon Capture and Water Emissions Treatment System (CCWESTRS)

The CCWESTRS project is both a research and a demonstration effort aimed at assessing the cost

effectiveness of using CCPs to enhance the growth of trees planted on coal mine soil. The planting of 100 acres of sycamore and sweetgum trees on surface-coal-mine land adjacent to TVA's Paradise Fossil Plant in Kentucky is estimated to have the potential to sequester 70 to 90 metric tons of CO₂ per year over a 20-year period.

A unique aspect of the project is that the gypsum produced by the plant's scrubber (the emission control system for sulfur dioxide) is used as a soil additive and mulch for the trees, and water from the plant's fly ash pond is used for irrigation. Both of those substances must be managed properly to avoid unwanted environmental impacts.

Additional benefits include the production of commercial-grade lumber from the trees and the development of the site as wildlife habitat. Soil analysis and measurement of the below-ground carbon being stored by the trees' roots indicate positive results.

Chemical Fixation of CO₂ in CCPs And Recycling Through Algal Biosystems

Each year in the United States, about 22 million tons of fly ash and flue gas desulfurization (FGD) products from power plants are managed in ash ponds and landfills. This fly ash and FGD waste have the potential to be used as a growth medium for algae that, in turn, could be used to sequester CO₂ produced by gas turbine generators. In this project, TVA is using fly ash as a catalyst to create a carbon-enriched CCP liquid biosystem that will serve as an algal growth medium.

A method to transfer CO₂ to an algal growth solution has been developed. Normally, the reaction of CO₂ in an algal growth medium is slow. In addition, because

of low pH, the solution will de-gas significantly on exposure to the atmosphere. However, when CO₂ is bubbled through a column packed with fly ash, almost all of the gas goes into solution, and the pH remains higher than it ordinarily would be for the same level of bicarbonate in solution.

The CCP biosystem, because it is solar driven and makes use of potential waste products from combustion, requires minimal inputs of energy or materials. Based on optimum laboratory conditions, the area required for a 1,000-MW gas turbine plant is projected to be about 500 acres. The time required for the biosystem to attain steady-state production of liquid CO₂, hydrogen, algae, or methane has not been determined yet but likely will be a primary factor in limiting output.

Economic Evaluation of Carbon Sequestration Technologies

A wide variety of technological approaches are being evaluated, both nationally and internationally, for the removal of CO₂ from the atmosphere and for storage of carbon elsewhere on the planet. Carbon storage options being considered include active oil reservoirs, coal beds, depleted oil and gas reservoirs, deep aquifers, and even the world's oceans. As detailed elsewhere in this report, also being explored is the enhancement of natural biological sinks, such as forests and croplands.

This collaborative TVA-EPRI endeavor involved a team of international experts, including economists, scientists, and engineers from the Massachusetts Institute of Technology, Parsons Infrastructure and Technology, SFA Pacific, the IEA's Greenhouse Gas Programme, the University of Tennessee, and TVA. The team developed and refined the framework for the economic evaluation to determine which sequestration approaches are most viable. Economic parameters were identified for various technological processes. Process designs and economic models for the many approaches to CCS will soon be developed, including the evaluation of forests and cropland as carbon sinks.



The Power PartnersSM and DOE view the development and use of more advanced energy technologies as critical to the achievement of the national GHG emissions-intensity reduction goal.





The electric power sector leads all industry efforts to reduce CO₂ emissions.



CONCLUSION

Electric utilities and power generators take climate change concerns seriously. As an industry, we have implemented flexible and cost-effective voluntary programs to mitigate GHG emissions. Even as demand for electricity continues to grow, the industry has reduced carbon intensity steadily over the past 25 years.

Through Power PartnersSM, the power sector and DOE are working together to develop and implement voluntary climate actions to sustain economic growth. Power PartnersSM climate actions are guided by the principles of improved energy efficiency, increased investments in research and development, technological innovation, market-based initiatives, and cost-effective CO₂ emissions reductions.

Power PartnersSM have made significant progress in reaching our goal of reducing the power sector's GHG emissions intensity during the 2010-2012 period by the equivalent of three to five percent below the 2000-2002 base-period average. Through actions implementing the above-listed principles, the electric power sector leads all industry efforts to reduce CO₂ emissions. In fact, the adjusted power sector carbon intensity is approaching a three-percent reduction compared to the base-period average—only three years into the 10-year program.

Achieving the goal set forth in the MOU will be a significant accomplishment when considering the difficult challenges the electric power sector faces. The electric power industry is working hard to meet the country's growing demand for electricity, while balancing additional priorities—such as reducing emissions, utilizing a diverse fuel mix, and increasing the efficiencies of its operations. To meet growing demand and provide reliable service, the industry must make significant investments in the nation's transmission and distribution systems. Additionally, the industry will be required to invest billions of dollars in new emissions control equipment to meet the requirements of new environmental mandates. On the generation side, the significant increase in fuel prices in recent years can affect the mix of fuels used in generation. The electric power sector also must contend with weather-related effects on electricity generation.

While significant work remains, the Power PartnersSM are confident that success will be achieved through continued collaborative efforts with DOE and other government agencies. Together, we will continue to provide reliable electricity to ensure our nation's sustained economic growth and to help foster a cleaner environment for all.



APPENDIX A: THE POWER PARTNERSSM

The Power PartnersSM organizations listed below—with their individual members—are committed to addressing greenhouse gas (GHG) emissions and to protecting the environment. Here is a look at the organizations that have partnered with the Department of Energy, along with a snapshot of their individual climate initiatives.

- ◆ The **American Public Power Association (APPA)** represents the interests of the nation’s nearly 2,000 not-for-profit community- and state-owned electric utilities.

The **Large Public Power Council (LPPC)** is an organization of 24 of the largest publicly owned electric utilities. Publicly owned electric utilities provide electric service to more than 40 million Americans.

APPA’s and LPPC’s members are taking climate actions to:

- Forge partnerships with the federal government, local governments, and environmental groups to implement effective GHG emissions-mitigation programs, and enter into utility-specific commitments to achieve quantifiable GHG emissions-mitigation activities;
- Increase the use of wind, hydropower, and landfill gas to generate electricity;
- Improve end-use efficiency through demand-side management and conservation programs;
- Sequester GHG emissions through “TREE POWER™,” APPA’s national tree planting program that was established in 1991.

- ◆ The **Edison Electric Institute (EEI)** is the association of U.S. shareholder-owned electric companies, international affiliates, and industry associates worldwide. EEI’s U.S. members serve 97 percent of the ultimate customers in the shareholder-owned segment of the industry, and 71 percent of all electric utility ultimate customers in the nation.

EEI’s member companies are taking actions individually to reduce, avoid, and sequester GHG emissions by:

- Investing in additional clean coal technology and natural gas generation;
- Supporting additional nuclear generation;
- Promoting additional renewable energy, energy efficiency, and wise electricity use programs;
- Encouraging methane projects, international projects, and additional tree planting—through such programs as UtiliTree Carbon Company and PowerTree Carbon Company—to offset carbon dioxide (CO₂) emissions.

Companies also are jointly taking climate actions to:

- Remove CO₂ from the atmosphere through forestry projects in the lower Mississippi River Valley;
- Divert coal combustion products (CCPs) from land disposal and increase the uses of CCPs that reduce GHG emissions and provide other environmental benefits;
- Harvest wind power and biomass for electricity generation;
- Develop international power partnerships that focus on climate and sustainable development.

- ◆ **The Electric Power Supply Association (EPSA)** is the national trade association representing competitive power suppliers. Using the cleanest, most efficient generating technologies available, EPSA's members are serving the nation's growing need for power.

EPSA's member companies are taking climate actions to:

- Promote policies that encourage greater utilization of efficient power plants through increased competition within regional electricity markets. Enhanced operation of these plants will help to lower GHG emissions intensity;
- Increase the production of electricity from wind, biomass, landfill gas, geothermal, and other renewable sources;
- Promote the domestic and international development and implementation of innovative technological solutions to decrease GHG emissions;
- Develop new, efficient natural gas, clean coal, and nuclear generating facilities;
- Promote solar electrification, reforestation, carbon sequestration initiatives, and methane reduction programs;
- Participate in market-based GHG emissions reduction initiatives, such as the Chicago Climate Exchange.

- ◆ The **National Rural Electric Cooperative Association (NRECA)** is the national service organization that represents the nation's 900-plus, consumer-owned electric cooperatives, which provide electric service to more than 39 million people in 47 states.

Generation, transmission, and distribution facilities in the NRECA cooperative network are taking climate actions to:

- Reduce GHG emissions by enhancing efficiency at electricity generation, transmission, and distribution facilities;
- Plant trees to sequester carbon from the atmosphere and restore forests;
- Invest in low- and zero-emissions renewable energy sources;
- Expand long-term research and development efforts in energy efficiency and clean coal technology;
- Work with co-ops in developing nations to increase their efficiency and reduce GHG emissions globally.

- ◆ **The Nuclear Energy Institute (NEI)** is the policy organization of the nuclear energy and technologies industry and participates in both national and global policy-making processes. NEI's objective is to ensure the formation of policies that promote the beneficial uses of nuclear energy and technologies in the United States and around the world.

NEI's member companies are taking climate actions to:

- Increase the output of America's 103 nuclear power plants, which provide one-fifth of our nation's electricity, by the equivalent of about 10,000 megawatts of capacity (a 10-percent increase) by 2012. NEI analysis shows that the emissions avoided by this action would be significant—the equivalent of 81 million metric tons of CO₂. The increased output will be realized through power plant capacity uprates, improved productivity, and planned plant restarts.

- ◆ The **Tennessee Valley Authority (TVA)** is a federal corporation and the nation's largest public power company. Congress established TVA in 1933 primarily to provide flood control, navigation, and electric power in the Tennessee Valley region.

TVA is taking climate actions through:

- Participating in industry-wide forestry and CCP projects, as well as activities to reclaim abandoned mine lands;
- Co-firing wastewater treatment methane at a coal-based plant in Tennessee. This process reduces GHG emissions by utilizing a waste product that would not otherwise be used;
- Upgrading the power output of Units 2 and 3 (and restarting Unit 1) at the Browns Ferry nuclear plant in Alabama;
- Working with local distributors and the environmental community to further develop and increase participation in "Green Power Switch®"—the Southeast's largest renewable energy program, which offers consumers the opportunity to buy electricity generated from solar, wind, and methane gas resources.

APPENDIX B: POWER PARTNERSSM SURVEY

Power PartnersSM conducted a survey of member utilities, power generators, and TVA in the summer of 2006 to obtain additional information on their actions to reduce, avoid, and sequester GHG emissions. The survey also offered the opportunity for companies to provide supplemental information describing improvements in generation emissions intensity that reflected data submitted to EIA. A copy of the survey and the instructions are provided below.

Company Name: _____ Contact Person: _____ Contact Information -- Email: _____ Phone: _____

GHG Reporting Survey -- Request for Data Form

Data Type	Reporting Units	Base Period (2000-2002 Avg.)				2003	2004	2005	Description of Action Taken	Source of Data (Indicate whether reported data to EIA or other actual or estimated data)	Comments on Quality and Availability of Data, and Other Concerns
		2000	2001	2002	Avg.						
Generation and Emissions Data											
Net Generation	MWH										
Carbon Dioxide Emissions from Generation	Short Tons CO2										
Non-Generation Actions Affecting Generation Carbon Intensity											
Reductions in T&D Losses (new actions initiated in 2003 and after)	MWH										
Project # 1											
Project # 2											
Energy Savings From DSM Actions (annual effect of cumulative new actions initiated in 2003 and after)	MWH										
Off-System Actions											
Carbon Sequestration from Company Specific Projects	Short Tons CO2										
Project # 1											
Project # 2											
Methane Capture from Coal Bed Methane Projects	Short Tons CH4										
Landfill Methane Recovery Projects	Short Tons CH4										
Coal Combustion Products Projects	Short Tons CO2										
SF6 Emissions	Pounds SF6										
All Other (specify GHG reporting unit and list by project)	Short Tons CO2										
Project # 1											
Project # 2											
Project # 3											
Project # 4											

Notes:

1. Tons to be reported in short tons (except SF6).
2. Lines may be added as needed if a respondent has more projects than can be reported in the lines already provided.

Instructions for the Power Sector GHG Reporting Survey

Description of Data Categories (Columns):

Base Period:	The base years' data should be individual year's data for 2000, 2001, and 2002, and an average of all three years.
2003:	Information from 2003, in order to maintain continuity in the data series and help identify trends.
2004:	This is the first year to recognize changes from voluntary actions under the Memorandum of Understanding between the power sector and the Department of Energy. In subsequent years, the reporting year will roll forward in order to collect the most recent data available.
2005:	Information from 2005, in order to continue to monitor trends.
Description of Actions Taken:	The purpose of this column is to collect information at a general level on types of actions. For example, the description of actions affecting generation emissions activity could be new capacity additions, increased emissions-free generation, shifts in fossil fuel mix and improvements in generation performance. (For net generation, the description of actions taken also can include descriptions of any significant changes in station service or other generation for own use, such as installation of pollution control equipment, that affect changes in net generation relative to gross generation.) Examples of non-generation and off-system actions could include transformer replacement, home weatherization, tree planting, etc.
Source of Data:	Indicate whether the data is the same as reported to other government databases or from other sources. Government-reported data can include Energy Information Administration forms 906, 920, 861, or 1605b and data submitted to EPA Climate Leaders, DOE EERE programs, FERC Form 1, and others. Indicate whether data is other actual data or an estimate derived from other reported data (as might be the case in carbon dioxide emissions from generation). This would also be the place to note where state regulatory required methods have been used (e.g., calculating reductions from DSM programs). For all carbon dioxide emissions estimates, please provide conversion factors and brief description of the method used to develop the estimates. Using estimates that are cross-referenced to other databases will minimize the need for further explanation of the methodologies used in developing the estimates.
Comments on Quality and Availability of Data, and Other Concerns:	This column is intended to collect any comments, observations, or caveats on the quality of the data presented, and any issues or concerns regarding the amount of time and effort required to collect data.

Additional Instructions Regarding Data Elements (Rows):

Ownership Issues:

1. Respondents should report values based upon their equity interest in a unit, as opposed to reporting values for units they operate. For example, if a company/utility owned 75% of a unit that emitted 1,000 tons of CO₂ in 2005, the company would report 750 tons of emissions as its share. The same pro-rata division would be used for reporting MWH generated. This would hold true even if the other owner in the unit was not an EEI/NRECA/APPA etc. member.
2. In addition, for combined electric and natural gas companies/utilities, information on off-system actions should be limited to actions related to electric operations only.

Net Generation: (MWH)	Reported in megaWatt-hours. Net generation is generation produced by generating facilities that is available for sale to the grid. Net generation excludes station service (e.g., amount of generation powering pollution control equipment), and other generation for own use and not made available to the grid.
Carbon Dioxide Emissions from Generation: (short tons of CO₂)	Reported in short tons of carbon dioxide. Carbon dioxide emissions from generation are an estimate based on heat rate of plants or amount of fossil fuel consumption and the carbon content of the specific fuel burned at each plant. Carbon dioxide emission estimates from all generating facilities should be aggregated.
Reductions in T&D Losses: (MWH saved)	Reported in megaWatt-hours. Reductions in transmission and distribution losses should be reported on the basis of specific actions or projects, initiated in 2003 or later years, to improve the overall efficiency in transmitting and distributing power available to the grid.
Energy Savings from DSM Actions (annual effect of cumulative new actions initiated in 2003 and beyond): (MWH saved)	Reported in megaWatt-hours saved. This data reflects the results of demand-side management actions or projects initiated in 2003 and beyond. The point is to delineate new actions initiated after the base period, from those actions taken during or prior to the base years' period.
Carbon Sequestration from Company-specific Projects: (short tons of CO₂)	Reported in short tons of carbon dioxide. This category represents increases in carbon sequestration from projects wholly undertaken by your company alone, or your company's share of joint projects undertaken with other entities (other than PowerTree Carbon Co. and UtiliTree Carbon Co. – data from those two joint projects will be captured separately).
Methane Captured from Coal Bed Methane Projects: (short tons of CH₄)	Reported in short tons of CH ₄ . This category includes methane captured from coal bed methane projects. (If any projects are undertaken jointly with other entities, only your company's share should be reported.)
Methane Recovery from Landfill Projects: (short tons of CH₄)	Reported in short tons of CH ₄ . This category includes amount of methane recovered from landfills. (If any projects are undertaken jointly with other entities, only your company's share should be reported.)

Coal Combustion Products Projects: (short tons of CO₂)

Reported in short tons of carbon dioxide. This category includes all reuse of coal combustion products (CCPs) produced through generation and the associated emissions saved from the calcination process. Tons of carbon dioxide emission savings vary by coal rank and end-use application of ash. Please provide estimates of tons reused and appropriate CO₂ conversion factors. “Reuse” is defined as utilized CCPs, internally and sold.

SF₆ Emissions: (pounds of SF₆)

Reported in pounds of SF₆ for each reporting year. Improvements in this category includes all improvements in the leak rate of new equipment, refurbishing of older equipment, and the use of more efficient operation and maintenance techniques to reduce SF₆ discharges.

All Other:

Reported in short tons of carbon dioxide or other greenhouse gases. Specify and list efforts by project. Sample projects could include savings from reductions in vehicle fleet emissions, HFC reduction projects, or other non-generation CO₂ reductions.

Survey Respondents

The survey's 37 respondents include 18 shareholder-owned utilities, 15 publicly owned utilities, three cooperatives, and TVA. Together, they represent 47 percent of electricity generation in the United States, and are responsible for 50 percent of the power sector's CO₂ emissions.

Shareholder-Owned Utilities (18)

- ◆ Ameren Corporation
- ◆ American Electric Power
- ◆ Aquila, Inc.
- ◆ Cleco Corporation
- ◆ Constellation Energy Group, Inc.
- ◆ Dominion
- ◆ DTE Energy Company
- ◆ Duke Energy Corporation
- ◆ Entergy Corporation
- ◆ Exelon Corporation
- ◆ FPL Group, Inc.
- ◆ MidAmerican Energy Company
- ◆ PNM Resources Inc.
- ◆ Progress Energy
- ◆ Southern Company
- ◆ TECO Energy, Inc.
- ◆ We Energies
- ◆ Xcel Energy, Inc.

Public Power Systems (15)

- ◆ American Municipal Power–Ohio, Inc.
- ◆ City of Shelby (North Carolina)
- ◆ CPS Energy (San Antonio, Texas)
- ◆ City Water, Light & Power (Springfield, Illinois)
- ◆ Jacksonville Electric Authority
- ◆ Lower Colorado River Authority (Texas)
- ◆ MEAG Power (Georgia)
- ◆ Muscatine (Iowa) Power and Water
- ◆ Nebraska Public Power
- ◆ Omaha Public Power District
- ◆ Orrville Utilities (Ohio)
- ◆ Salt River Project (Arizona)
- ◆ Seattle City Light
- ◆ Waverly (Iowa) Light and Power
- ◆ Wisconsin Public Power

Cooperatives (3)

- ◆ Basin Electric Power (North Dakota)
- ◆ Great River Energy (Minnesota)
- ◆ Unidentified Co-op

Federal Utilities (1)

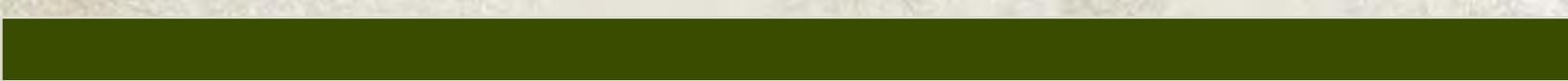
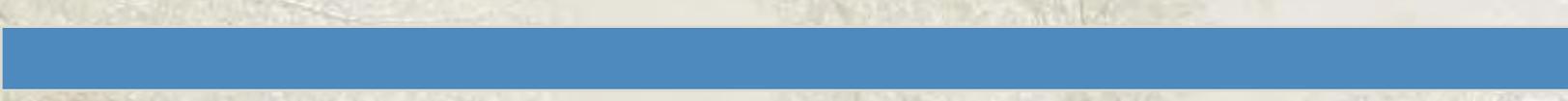
- ◆ Tennessee Valley Authority

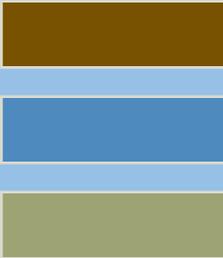
APPENDIX C: SUPPLEMENTAL INFORMATION

DOE's Climate VISION Web site (<http://www.climatevision.gov/index.html>) contains additional information about industry initiatives to reduce GHG emissions, including the electric power sector's efforts through the Electric Power Industry Climate Initiative and Power PartnersSM. Some of the documents referenced in this report can be found on the Web site, including:

- ◆ **The MOU between Power PartnersSM and DOE:**
http://www.climatevision.gov/sectors/electricpower/pdfs/powerpartners_mou.pdf
- ◆ **The MOU between NRECA and USDA:**
http://www.climatevision.gov/sectors/electricpower/pdfs/nreca-usda_mou.pdf

In addition, the Power PartnersSM Work Plan, which is updated on a regular basis, can be found at: http://www.climatevision.gov/sectors/electricpower/work_plans.html.





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