ENERGY STAR

PROTECTING THE ENVIRONMENT—TOGETHER

ENERGY STAR® and Other Voluntary Programs
2003 Annual Report

EPA
United States
Environmental Protection
Agency

PROTECTING THE ENVIRONMENT—TOGETHER

ENERGY STAR® AND OTHER VOLUNTARY PROGRAMS
CLIMATE PROTECTION PARTNERSHIPS DIVISION (CPPD)
2003 ANNUAL REPORT

CONTENTS

For additional information, please visit our Web sites at www.epa.gov/cppd and www.energystar.gov or call the toll-free ENERGY STAR Hotline at 1-888-STAR-YES (1-888-782-7937).

LETTER FROM THE ASSISTANT ADMINISTRATOR

September 2004

EPA applauds its partners for their leadership and exemplary efforts to save energy and ensure a cleaner, healthier environment for all Americans. We congratulate the dedicated partners working with EPA on climate protection. Together, we are on track to meet President Bush's goal of an 18-percent reduction in greenhouse gas intensity from the U.S. economy by 2012.

Americans benefit from EPA's voluntary partnerships in the form of economic savings and emissions reductions. In 2003, with the help of ENERGY STAR, Americans saved over $8 billion on their energy bills while preventing greenhouse gas emissions equivalent to the emissions from 18 million vehicles. These same partnerships helped develop a national market for energy-efficient products, with more than one billion ENERGY STAR products sold and billions of square feet of building space improved. In addition, EPA's national outreach campaign has delivered the energy efficiency message to millions of households and has helped them make informed choices as consumers.

Great progress has been achieved by partners in other EPA programs as well. The Climate Leaders Program has added 16 new partners, bringing the total to 52 companies. The successful Methane Programs have reduced emissions of methane, a potent greenhouse gas, to 5 percent below 1990 levels, and we expect the reductions to remain below 1990 levels through 2020, even with future economic growth. In addition, Environmental Stewardship Programs that engage specific industries, such as aluminum, electric power, and semiconductors, are cost-effectively reducing U.S. emissions of the most harmful greenhouse gases and encouraging similar voluntary initiatives abroad.

EPA appreciates the commitment of its partners, and we look forward to continued collaboration as we work to find solutions to the pressing environmental challenges of our time.

Jeffrey R. Holmstead
Assistant Administrator
U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

"EPA appreciates the commitment of its partners, and we look forward to continued collaboration as we work to find solutions to the pressing environmental challenges of our time."

—Jeffrey R. Holmstead, Assistant Administrator, U.S. Environmental Protection Agency

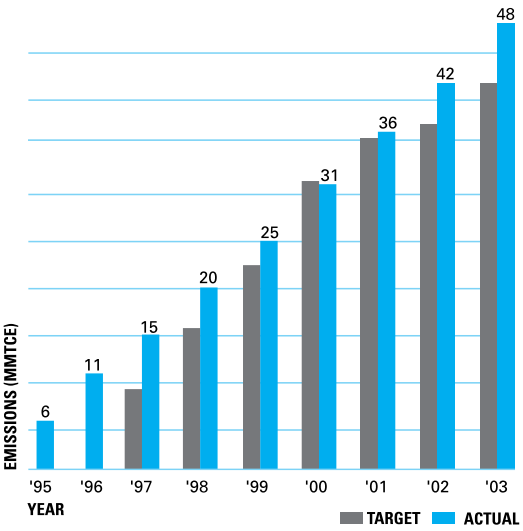
Global climate change is a complex, long-term challenge that will require a sustained effort over many generations. As President Bush has said, "The policy challenge is to act in a serious and sensible way, given the limits of our knowledge. While scientific uncertainties remain, we can begin now to address the factors that contribute to climate change." Wise action now is an insurance policy against future risks of global climate change. This includes the adoption of leading technologies and practices that reduce greenhouse gas emissions, as well as enhance the comfort and quality of our homes, increase the productivity of business, reduce emissions of criteria air pollutants, and improve the reliability of the nation's power sector.

For more than a decade, businesses and organizations have partnered with EPA through voluntary climate protection programs to pursue common sense approaches. Each year the environmental and economic benefits grow, and 2003 was another excellent year.

Highlights of 2003:

- Americans, with the help of ENERGY STAR, avoided greenhouse gas emissions equivalent to those from 18 million automobiles—up from 15 million in 2002—while saving $8 billion on their energy bills.
- U.S. methane emissions remained below 1990 levels, as did emissions of the most potent greenhouse gases—perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6)—for the sectors with which EPA partners.
- EPA's new Clean Energy and Climate Leaders programs attracted many new partners and made great progress in promoting clean energy and comprehensive climate change strategies.
- EPA's climate protection programs remain on track to provide 40 percent of the greenhouse gas reductions required to meet the President's 18 percent greenhouse gas intensity improvement goal by 2012. EPA's programs again exceeded their goals[1] for reductions in greenhouse gas emissions in 2003.

Figure ES-1.
Division greenhouse gas emissions avoided compared to program goals



NOTE: Historical totals updated based on most recent data available.

Source: EPA Climate Protection Partnerships Division

Additional major environmental and economic achievements of EPA's climate partnerships[2] as of 2003 are summarized below.

ENVIRONMENTAL BENEFITS

- The partnerships prevented 48 million metric tons of greenhouse gas emissions (in MMTCE[3]) in 2003 alone, equivalent to the annual emissions from 32 million automobiles (see Figure ES-1).
- 165,000 tons of nitrogen oxides (NO_x) were prevented in 2003.[4]
- More than 41 MMTCE per year in greenhouse gas emissions will be avoided during the next decade due to actions already taken by partners in these voluntary programs.

[1] *Each of EPA's climate protection partnerships is designed to achieve long-term greenhouse gas emissions reduction goals, which were set through an interagency process in 2001 and communicated to the Secretariat of the Framework Convention on Climate Change in the U.S. Climate Action Report 2002.*

EXECUTIVE SUMMARY

ECONOMIC BENEFITS

- Consumers and business have locked in investments in energy-efficient technologies exceeding $16 billion.
- Net of their investment in energy-efficient technologies, consumers and businesses are saving about $89 billion cumulatively over the next 10 years; they saved in excess of $8 billion in 2003 alone.

PROGRAM EFFECTIVENESS

Every federal dollar spent on these partnership programs through 2003 means:

- Reductions in greenhouse gas emissions of 1.0 metric ton of carbon equivalent (3.7 tons of carbon dioxide (CO_2)).
- Savings for partners and consumers of more than $75 on their energy bills.
- The creation of more than $15 in private sector investment.
- The addition of more than $60 into the economy.

The environmental and economic benefits for the key EPA partnership program areas—ENERGY STAR, Clean Energy Programs, Methane Programs, and the Environmental Stewardship Programs for the high global warming potential (GWP) gases—are summarized in Table ES-1.

Table ES-1.
Summary of the benefits for 2003 and cumulative benefits through 2013 from the actions taken by partners through 2003 (in billions of 2003 dollars)

	BENEFITS FOR 2003		CUMULATIVE BENEFITS 1993–2013			
Program	Net Savings	MMTCE	NPV of Bill Savings	NPV of Technology Expenditures	NPV of Net Savings	MMTCE
ENERGY STAR						
Qualified Products	$4.5	11.7	$47.6	$3.1	$44.5	122
Buildings	$3.5	11.3	$51.6	$9.6	$42.0	209
Industry	___	4.0	___	___	___	na
Clean Energy Programs	___	0.5	___	na	___	5
Methane Programs	$0.2	11.5	$6.3	$3.4	$3.0	171
Environmental Stewardship Programs	___	9.2	___	na	___	144
TOTAL	$8.2	48.2	$105.5	$16.1	$89.4	651

NPV: Net Present Value

NOTES: Technology Expenditures include O&M expenses for Methane Programs.
Bill Savings and Net Savings include revenue from sales of methane and electricity.
ENERGY STAR qualified homes are included in the Qualified Products totals.
Totals may not equal sum of components due to independent rounding.
For details on cumulative benefits, see pages 43-44.

___ : Not applicable

na: Not available

2 *This report provides results for the climate protection partnership programs operated by the Office of Atmospheric Programs at EPA (with the exception of the State and Local Outreach Program). It does not include emissions reductions attributable to WasteWise, transportation programs, the Significant New Alternatives Program, or the landfill rule, which are the remaining actions in EPA's comprehensive climate program. EPA estimates the reduction in greenhouse gas emissions across the entire set of climate programs to be more than 80 MMTCE in 2003.*

3 *Reductions in annual greenhouse gas emissions for EPA's climate programs, including non-CO_2 gases, are based on "carbon equivalents," which are determined by weighting the reductions in emissions of a gas by its global warming potential for a 100-year time period.*

4 *Based on data from The Emissions & Generation Resource Integrated Database (eGRID2002) Version 2.01, released May 2003.*

EXECUTIVE SUMMARY

"Food Lion is an example of how a company can protect the environment and meet its business objectives. As an ENERGY STAR partner, Food Lion is demonstrating a long-term commitment to the environment and to its bottom line."

—Glenn Dixon,
Senior Vice President of
Corporate Development,
Food Lion

KEY ACCOMPLISHMENTS FOR 2003

Climate Leaders

- Since Climate Leaders was launched in early 2002, 52 companies have become partners. Ten of the partners have already completed corporate-wide greenhouse gas emissions inventories and 20 announced aggressive greenhouse gas reduction goals.

ENERGY STAR

- Americans with the help of ENERGY STAR saved a significant amount of energy in 2003, about 110 billion kilowatt hours (kWh) and 20,000 megawatts (MW) of peak power, the amount of energy required to power about 20 million homes (See Figure ES-2). They also prevented greenhouse gas emissions equivalent to those from 18 million automobiles.
- The ENERGY STAR label has become the national symbol for energy efficiency, recognized by 56 percent of the American public.

- To earn the label on products, manufacturers must meet strict energy efficiency guidelines set by the federal government. More than 1,400 manufacturers use the ENERGY STAR across a total of 28,000 individual product models in over 40 product categories. To date, Americans have bought more than one billion ENERGY STAR qualified products.
- More than 2,000 builders have constructed over 200,000 ENERGY STAR qualified new homes, locking in financial savings for homeowners that exceed $60 million annually.
- Close to 5,000 homes have been improved through Home Performance with ENERGY STAR, which continues to grow with the addition of U.S. Department of Energy (DOE) sponsored pilot programs in Atlanta, Atlantic City, Austin, Boise, and Kansas City. This is a whole-house retrofit program in which certified contractors recommend, through diagnostic testing, the most cost-effective, energy-efficient home improvements for homeowners.
- EPA's national energy performance rating system has been used to evaluate almost 19,000 buildings; 17 percent of office buildings, 11 percent of schools, 17 percent of supermarkets, 28 percent of hospitals, and 6 percent of hotels have been benchmarked. Nearly 1,400 buildings have earned the ENERGY STAR.
- ENERGY STAR for the industrial sector helped improve energy efficiency in four major U.S. manufacturing industries by publishing final energy guidelines for the corn refining, cement, auto assembly, and brewing industries. Energy guides provide a review of opportunities for improving energy efficiency in focus industries.

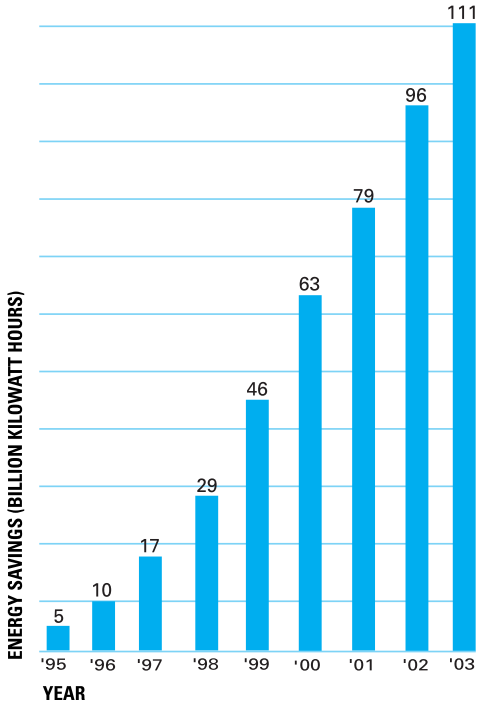
Clean Energy

- An additional 143 partners joined EPA's Green Power Partnership for a total of more than 230 partners committed to purchasing more than 1 billion kWh of green power (roughly the annual output of a 425 MW wind farm). EPA recognized the environmental achievements of Green Power partners at events in California, Georgia, Illinois, Oregon, Washington, DC, and Wisconsin.
- The number of partners in the Combined Heat and Power (CHP) Partnership more than doubled to a total of 116. EPA facilitated 40 projects in the Midwest and the Northeast, bringing the capacity of projects assisted to over 850 MWe.[5]

Methane and High Global Warming Potential (GWP) Environmental Stewardship

- Partnership programs achieved reductions of non-carbon dioxide (CO_2) gases—methane, PFCs, HFCs, and SF_6—totaling an estimated 20.7 MMTCE in 2003 alone. Through the continuation of these efforts, U.S. methane emissions are expected to stay below 1990 levels through 2012. In addition, industry commitments, such as the recently announced magnesium partnership commitment to eliminate SF_6 emissions by 2010, are significantly reducing emissions of the most potent and persistent gases.

Figure ES-2.
Annual savings in energy use as a result of CPPD's partnership programs



NOTE: Historical totals updated based on most recent data available.

Source: EPA Climate Protection Partnerships Division

EXPECTATIONS FOR 2004 AND BEYOND

The future for EPA's voluntary partnerships is promising, and EPA has ambitious plans to expand program activities. Proven strategies and thriving partnerships will promote greater benefits for businesses, organizations, consumers, and the environment. In the coming years, EPA plans to:

Climate Leaders

- Welcome 25 additional businesses into Climate Leaders and have an additional 20 organizations announce corporate greenhouse gas emissions reduction goals.

ENERGY STAR

- Enhance the value of the ENERGY STAR label for consumers by adding product specifications for new product categories such as refrigerated beverage vending machines, air cleaners, and external power supplies.
- Maintain the integrity of the ENERGY STAR label by revising specifications where appropriate for products such as water coolers, telephony, dehumidifiers, and furnaces. Continue to identify additional product categories for new specification development or specification review.
- As in the past, continue to build public awareness of ENERGY STAR and strengthen the ENERGY STAR brand nationwide.
- Continue to educate consumers and homeowners to be aware that ENERGY STAR can reduce their home energy bills by about 30 percent or about $400 annually through a variety of means, while making a difference for the environment.
- Increase the market penetration of ENERGY STAR qualified homes and expand the partner base. Support new and existing sponsors of the existing home improvement programs, which include Home Performance with ENERGY STAR. In addition, build the contractor infrastructure and explore financing options among national lenders.
- Offer energy performance ratings and label eligibility for more building types, including medical office buildings, bank branches, financial centers, courthouses, warehouse/storage areas, and residence halls. Continue to promote superior energy management by providing focused energy performance rating tools to offices, K-12 schools, hospitals, hotels, and supermarkets.
- Continue the ENERGY STAR Industrial Sector Focuses in the automobile manufacturing, brewery, cement manufacturing, corn refining, glass manufacturing, and petroleum refining sectors. Add new sector focuses for the petrochemical, pulp and paper, fruit and vegetable canning, and sugar processing industries.

[5] *Measured at the generator terminals.*

EXECUTIVE SUMMARY

To date, U.S. consumers have purchased more than one billion ENERGY STAR qualified products.

Clean Energy

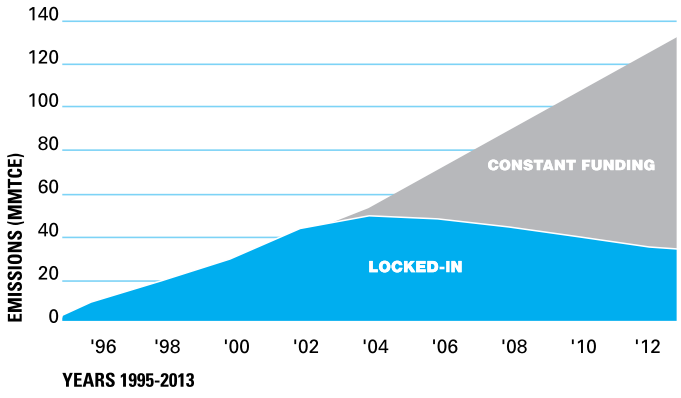
- Welcome 50 new CHP partners and assist 30 new CHP projects representing at least 800 MWe of CHP capacity.
- Add 170 new Green Power partners, raising total green power purchasing commitments to 1.5 billion kWh of electricity.

Non-CO_2 Programs

- Maintain methane, PFC, HFC, and SF_6 emissions below 1990 levels through effective partnerships and outreach to the aluminum, magnesium, semiconductor, electric power, landfill, coal mining, and natural gas industries.
- Assist the aluminum, magnesium, and semiconductor industries with new sector-wide greenhouse gas emissions reduction goals as part of the President's Climate VISION (Voluntary Innovative Sector Initiatives: Opportunities Now) initiative.

In implementing these plans, EPA expects to more than double the greenhouse gas emissions reductions resulting from these voluntary programs to about 120 MMTCE in 2012 (see Figure ES-3). These programs represent 64 percent of the estimated 185 MMTCE to be avoided by all EPA climate change programs in 2012.

Figure ES-3.
Annual greenhouse gas emissions avoided can be more than doubled by 2012



NOTE: Historical totals updated based on most recent data available.
Source: EPA Climate Protection Partnerships Division

EPA CLIMATE PROGRAMS EXPECTED TO ACHIEVE 40% OF ADMINISTRATION'S CLIMATE GOAL

In February 2002, President Bush announced an aggressive strategy to reduce greenhouse gas intensity by 18 percent by 2012.[6] By significantly slowing the growth in greenhouse gas emissions, this policy will put America on a path toward stabilizing concentrations of greenhouse gases for the long term, while sustaining the economic growth needed to finance investments in a new, cleaner energy structure.

The Bush Administration is strengthening and expanding EPA's voluntary programs as a key strategy for achieving the intensity reduction goal. Many industries have already responded to the new challenge to reduce their greenhouse gas emissions voluntarily wherever possible.

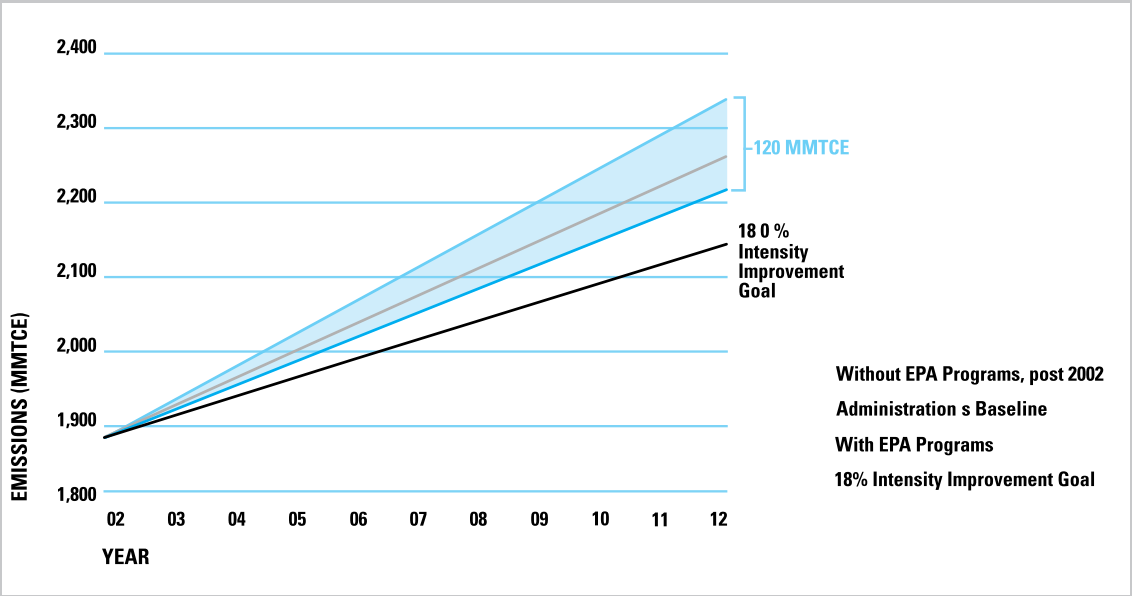
EPA's voluntary climate protection programs will contribute a reduction of 45 million metric tons of carbon equivalent (MMTCE) annually to the President's 18 percent intensity reduction goal by 2012, in addition to contributing 75 MMTCE to the Administration's baseline projection. In total, EPA's programs will contribute 120 MMTCE by 2012, as illustrated in Figure 4. These avoided emissions are in addition to the 65 MMTCE avoided annually as of 2003 (not shown in Figure 4).

This annual report provides a summary, update, and outlook for many of the EPA programs that are expected to deliver these results. The other EPA programs that contribute to these results primarily address transportation issues, such as Smart Way, and can be found at www.epa.gov/air/transport.

"To achieve this goal, our nation must move forward on many fronts, looking at every sector of our economy. We will challenge American businesses to further reduce emissions .... We will build on these successes with new agreements and greater reductions."

—President George W. Bush, February 14, 2002

Figure 4.
Projected reductions in greenhouse gas emissions due to Administration Climate Policy



Source: EPA Climate Protection Partnerships Division

[6] *Greenhouse gas intensity is the ratio of greenhouse gas emissions to economic output (measured by the gross domestic product). For more information on the Administration's goal, see http://www.whitehouse.gov/news/releases/2002/02/climatechange.html.*

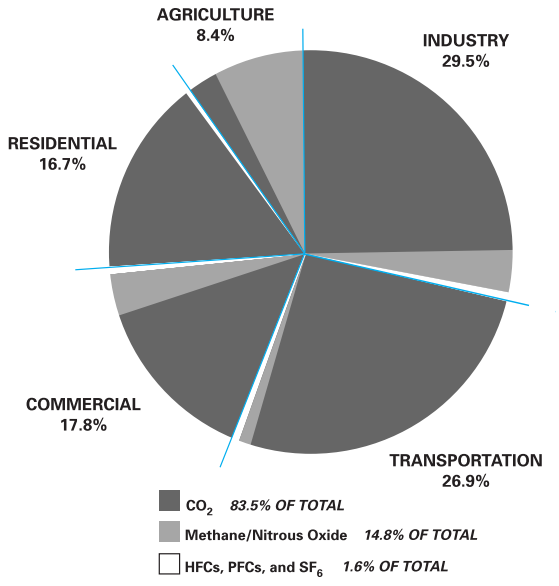
INTRODUCTION

Global climate change is a complex, long-term challenge that will require a sustained effort over many generations. As President Bush has said, "The policy challenge is to act in a serious and sensible way, given the limits of our knowledge. While scientific uncertainties remain, we can begin now to address the factors that contribute to climate change." Wise action now is an insurance policy against future risks.

A common sense approach for addressing the risks of global climate change is to promote the more rapid adoption of existing, improved energy efficiency and renewable resources that provide cost-effective opportunities to reduce greenhouse gas emissions. In addition to reducing emissions, such efforts enhance the comfort and quality of our homes, increase the productivity of business, reduce emissions of criteria air pollutants, and improve the reliability of the nation's power sector.

EPA's climate protection programs employ this common sense approach. They promote a broad set of technologies and practices that significantly reduce emissions of the major greenhouse gases—carbon dioxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—from key sources. The programs provide information, technical assistance, and recognition for environmental leadership to large and small organizations as they develop strategies and take advantage of proven opportunities to reduce their greenhouse gas emissions. The programs also identify opportunities and technologies appropriate for each of the economic sectors to address the 30 percent of U.S. greenhouse gas emissions from industry, 27 percent from transportation, 18 percent from commercial buildings, 17 percent from residential buildings, and 8 percent from agriculture (see Figure 5).

Figure 5.
U.S. greenhouse gas emissions by sector and by gas



NOTE: Totals may not add to 100% due to independent rounding.

Source: EPA GHG Inventory 2004

For more than a decade, businesses and organizations have partnered with EPA to pursue these approaches. Each year the environmental and economic results grow, and 2003 was another excellent year. In addition, EPA's climate programs are on target to provide 40 percent of the greenhouse gas reductions required to meet the President's 18 percent greenhouse gas intensity improvement goal by 2012 (see Figure 4).

INTRODUCTION

EPA's public-private partnerships focus on the following opportunities to take action:

Corporate Commitments. With the introduction of Climate Leaders two years ago, businesses can now partner with EPA to reduce their impact on the environment. The Climate Leaders partners are conducting inventories of their greenhouse gas emissions and then setting aggressive long-term reduction goals. They report their progress to EPA and are recognized for their achievements. The voluntary greenhouse gas reductions by Climate Leaders partners play an important part in helping the country reach its greenhouse gas intensity reduction goal of 18 percent by 2012.

Energy Efficiency. Energy efficiency is an important strategy for addressing the growing emissions of carbon dioxide (CO_2) from energy generation and use. More than 85 percent of the energy consumed in the United States is from the combustion of fossil fuels, which produces CO_2, the dominant greenhouse gas, as well as criteria air pollutants (see Figure 5).

Energy efficiency—obtaining the identical services or output such as heating, cooling and lighting for less energy input—offers significant cost savings to businesses and consumers. Commercialized technologies and practices are available in the residential, commercial, and industrial sectors to improve efficiency and reduce costs by 20 to 30 percent. The ENERGY STAR program enables businesses, homeowners, and others to realize the economic and environmental benefits of these technologies. Energy efficiency also improves the reliability of the U.S. power generation system while enhancing the comfort and affordability of housing and increasing the profitability of business.

Table 2.
Global warming potentials (GWPs) and atmospheric lifetimes of greenhouse gases

Greenhouse Gas	Global Warming Potential for 100 Years	Atmospheric Lifetime (years)
Carbon Dioxide	1	50 – 200
Methane	21	12 ± 3
Nitrous Oxide	310	120
Hydrofluorocarbons	140 – 11,700	1.5 – 264
Perfluorocarbons	6,500 – 9,200	3,200 – 50,000
Sulfur Hexafluoride	23,900	3,200

Source: IPCC 1996

Clean Energy. In addition to using energy more efficiently, there are ways to make the energy we use cleaner—effectively breaking the link between increased energy use and harmful air emissions. Combined heat and power as well as renewable sources of energy can play larger roles in the U.S. energy mix. EPA is collaborating with its partners to expand the use of these technologies.

Methane Programs. Although it is a potent greenhouse gas, methane is also the major component of natural gas—a much sought-after clean fuel. When methane emissions are reduced in a cost-effective manner, the recovered methane represents a valuable energy source that can be used or sold. The natural gas, coal, and landfill gas development industries are working with EPA through partnership and outreach programs to capture and use methane wherever cost effective.

High GWP Environmental Stewardship. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) are potent greenhouse gases, and some persist in the environment for thousands of years. While emitted in smaller quantities than CO_2, these gases are important to address due to the greater ability of each molecule to trap heat in the Earth's atmosphere and, in the case of PFCs and SF_6, their long atmospheric lifetimes (see Table 2). Various U.S. industries are working aggressively with EPA to avoid significant accumulation of these long-lived chemicals in the atmosphere. These voluntary programs accelerate the development and implementation of low-emitting technologies and help companies use alternative chemicals where technically feasible and cost effective.

The following sections of this 2003 Annual Report contain more detailed information about the Climate Protection Partnerships Division's programs and achievements. Included are program descriptions, environmental and economic benefits, and goals for the future. 2003 was another strong year for the division, and this report reflects the power of voluntary partnerships to make a difference.

ENERGY STAR PROGRAM

"Lowe's is proud to offer products that have earned the ENERGY STAR. These are products that denote the highest quality and value, helping our customers save money and protect the environment. Lowe's shares the responsibility in conserving our valuable natural resources. We're proud to promote the ENERGY STAR message to our customers and employees."

—Bruce Ballard, Merchandising Vice President, Appliances, Lowe's

ENERGY EFFICIENCY IS A SMART INVESTMENT

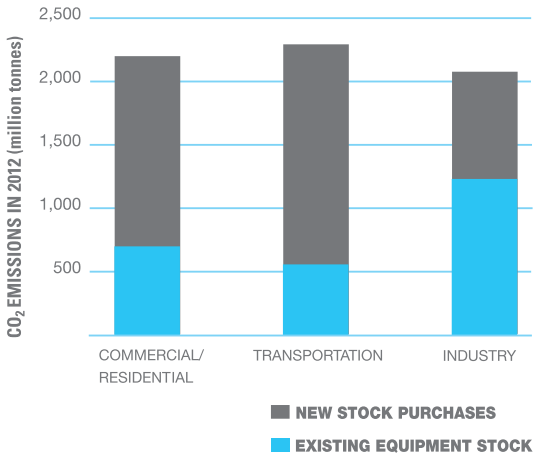
Energy efficiency is well recognized for providing many benefits. These include:

Cost savings. American families and businesses spend $700 billion each year on energy bills—about the same as is spent on education. Energy efficiency offers great potential for reducing these energy costs. Many homeowners and businesses could use 20 to 30 percent less energy, without sacrificing features or comfort, through attractive investments in products and services.

Greenhouse gas reductions. More than 50 percent of the projected national energy use and CO_2 emissions 10 years from now will come from the use of equipment purchased between now and then (see Figure 6). Promoting more efficient options could reduce greenhouse gas emissions substantially as equipment is naturally retired or replaced.

Energy reliability. By reducing demand, energy efficiency is a low-cost (2–4 cents/kWh) contributor to system adequacy—the ability of the electric system to supply the aggregate energy demand at all times—because it reduces the base load as well as the peak power demand. This reduction in peak power demand can also contribute to system security—the ability of the system to withstand sudden disturbances—by reducing the load and stress at various points in the power distribution system, thereby decreasing the likelihood of failures.

Figure 6.
More than 50% of projected energy use 10 years from now will come from equipment purchased between now and then



Source: EPA Climate Protection Partnerships Division

Lower natural gas prices. While overall demand for natural gas in the United States is rising, the demand for natural gas is growing the fastest in the electric power sector, and natural gas prices continue to increase. Energy efficiency can be an effective instrument for slowing electricity consumption and restraining today's increasing natural gas prices. It can promote greater stability and reduce economic risks in the short and long term (see sidebar on page 11).

Energy security. Between 1973 and 2002, U.S. dependence on foreign oil rose from about 35 percent to nearly 53 percent of U.S. consumption. During the same period, the import share of natural gas rose from less than 5 percent to more than 15 percent and continues to rise. Energy efficiency and the use of renewable energy are environmentally sound ways to reduce foreign oil and gas imports and to moderate the effects of energy price spikes.

ENERGY EFFICIENCY CAN ALLEVIATE THE PRESSURE ON NATURAL GAS MARKETS

Rapidly growing natural gas demand in the United States and historically high natural gas prices are affecting all economic sectors and causing electric utilities, regulators, and consumers to examine the consequences of these trends on themselves and on the economy as a whole. They are posing critical questions about natural gas markets, policies, and potential risks. There is interest in minimizing volatility, keeping costs from rising even higher, and avoiding a regional or national gas crisis in the near future. Many organizations and policymakers have already analyzed the current natural gas market and developed recommendations for a more secure, balanced energy future. According to a recent report by the National Petroleum Council, a balanced energy future requires greater energy efficiency, among other things.

The National Petroleum Council reported on the subject of natural gas markets in the United States in 1992, 1999, and again in 2003 in response to a request from the Secretary of Energy to update the previous reports. The latest multi-volume report, *Balancing Natural Gas Policy—Fueling the Demands of a Growing Economy*[7] provides analysis of market dynamics and makes recommendations for actions that industry and government can take to ensure adequate, reliable energy supplies for customers in all sectors. The report identifies conservation and energy efficiency as important tools for addressing natural gas demand concerns. Key findings related to energy efficiency are summarized below.

- **Between now and 2025, natural gas demand in the United States is expected to rise. Much of the increase will be in the U.S. power sector, reflecting future use of recent additions to gas-fired generation.**
- **Increased energy efficiency and energy conservation are essential short- and long-term mechanisms for stabilizing prices and reducing volatility. Without efficiency gains, demand in the future will be significantly higher.**
- **Promoting a balanced future that includes energy efficiency, development of new sources, and fuel choice flexibility could save $1 trillion in natural gas costs over the next two decades. Public policy should be made with the goal of a balanced energy future in mind.**
- **Efficiency and flexibility should be promoted through the use of market-oriented initiatives and through consumer education. In addition, the capability to generate power from alternate fuels should be increased.**
- **Specific measures to encourage energy efficiency include using market price signals, reviewing and upgrading efficiency standards, identifying best practices and promoting their adoption nationwide, and removing market inefficiencies in wholesale markets and in regulatory structures.**

[7] *Balancing Natural Gas Policy – Fueling the Demands of a Growing Economy (2003). http://npc.org/*

ENERGY STAR PROGRAM

The potential of energy efficiency is not being fully realized nationwide for a variety of reasons. With relatively low energy prices in the United States, many organizations have focused much less on energy efficiency improvements and much more on improvements in labor or capital productivity. While many businesses and homeowners express interest in making energy efficiency investments for their own buildings and homes, they do not know which products or services to ask for, who supplies them in their areas, and whether the real energy savings will live up to the claims.

ENERGY STAR

The lack of answers to important questions about energy efficiency shows a large information gap. The ENERGY STAR program seeks to fill this gap and enable businesses, organizations, and consumers to realize the cost savings and environmental benefits of energy efficiency investments through a straightforward, market-based approach:

- Use the ENERGY STAR label to clearly identify which products, practices, new homes, and buildings are energy efficient—offering lower energy bills and environmental benefits.

- Empower decisionmakers by making them aware of the benefits of products, homes, and buildings that qualify as ENERGY STAR and by providing energy performance assessment tools and project guidelines for efficiency improvements.
- Work with retail and service companies in the delivery chain so they can easily offer energy-efficient products and services.
- Partner with regional, state, and local organizations running energy efficiency programs to leverage the national energy efficiency specifications and public awareness of ENERGY STAR and achieve more with combined resources.

Introduced by EPA in 1992 for energy-efficient computers, the ENERGY STAR label has been expanded to more than 40 product categories. Since the mid-1990s, EPA has collaborated with DOE, which now has responsibility for certain product categories. Efficient new homes became eligible for the label in 1995. Efficient buildings became eligible for the label in 1999, when EPA unveiled a new standardized approach for measuring the efficiency (or energy performance) of an entire building.

The economic and environmental benefits of ENERGY STAR through the year 2003 are already substantial. More than one billion ENERGY STAR qualified products have been purchased and billions of square feet of building space improved. The results across the ENERGY STAR program in terms of energy saved and greenhouse gas emissions avoided in 2003 are provided in Table 3. Additional program achievements within the residential, commercial, and industrial sectors are presented in the sections beginning on page 14.

ENERGY STAR PROGRAM

Table 3.
ENERGY STAR Program: Annual Goals and Achievements

	2003				2004	
	Energy Saved (Billion kWh)		Emissions Prevented (MMTCE)		Energy Saved (Billion kWh)	Emissions Prevented (MMTCE)
	Goal	Achieved	Goal	Achieved	Goal	Goal
PROGRAM TOTAL FOR ENERGY STAR	95.0	111.2	22.5	27.0	99.5	24.8
Commercial/Residential Buildings Total	—	111.2	19.2	23.0	—	21.4
Qualified Products Subtotal[1]	—	55.5[2]	10.6	11.7	—	11.9
Computers	—	1.6	—	0.3	—	—
Monitors	—	22.1	—	4.5	—	—
Printers	—	10.4	—	2.1	—	—
Copiers	—	1.1	—	0.2	—	—
Other Office Equipment	—	5.2	—	1.0	—	—
Lighting	—	6.1	—	1.2	—	—
Home Electronics	—	6.0	—	1.2	—	—
Other	—	3.0	—	1.1	—	—
Building Improvements Subtotal[3]	—	55.7	8.5	11.3	—	9.5
Industrial Improvements Total[4]	—	—	3.3	4.0	—	3.4

[1] *Results for qualified products from Webber et al., 2004.*

[2] *The kWh savings imply peak demand savings of more than 20 gigawatts (GW), based on conservation load factors developed by LBNL (Koomey et al., 1990).*

[3] *Results for building improvements from Horowitz, 2001.*

[4] *Results for industrial improvements from ICF Consulting, 2004.*

NOTE: ENERGY STAR qualified homes are included in the Other category.
Totals may not equal sum of components due to independent rounding.
___ : Not applicable

PARTNER OF THE YEAR 2003

LOWE'S COMPANIES, INC.

Mooresville, North Carolina

For the second year in a row, Lowe's Companies, Inc., won Retail Partner of the Year. Lowe's determination to integrate ENERGY STAR into all marketing practices paid off in a 31-percent increase in sales of ENERGY STAR qualified products in 2003. These sales will save Lowe's customers nearly $500 million in energy costs over the life of the products, while eliminating one million tons of air emissions from the environment. Lowe's spread the ENERGY STAR message far and wide through national broadcast TV ads that achieved nearly 156 million impressions in over 90 markets; an in-store signage initiative across all 925 home improvement stores and 45 states that reached more than 9 million customers per week; and a variety of other marketing efforts such as circulars, direct mail, and Internet—including a newsletter dedicated to ENERGY STAR sent to 1.2 million registered Lowe's.com users. Together, these activities have contributed to an unparalleled level of ENERGY STAR outreach, awareness, and national benefits. ***(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)***

ENERGY STAR PROGRAM

"When Pardee Homes embraced energy-efficient building, we wholeheartedly embraced the ENERGY STAR program. Not only does it deliver a solid, energy-smart house, but ENERGY STAR has a name and reputation that we're extremely proud to be associated with."

—Joyce Mason, Vice President of Marketing, Pardee Homes

ENERGY STAR IN THE RESIDENTIAL SECTOR

ENERGY STAR continues to flourish as a powerful platform for delivering energy efficiency to homeowners across the country. Major highlights of 2003 include:

Building and expanding partnerships with manufacturers to add new products that can earn the ENERGY STAR label. EPA is committed to updating performance specifications for products in cases where technology has advanced and updates are necessary to maintain the value of ENERGY STAR. In 2003, EPA updated the specifications for ceiling fans, roof products, and ventilating fans. By the end of 2003, more than 1,400 manufacturers were ENERGY STAR partners, using the label on more than 28,000 product models.

Building consumer awareness of the ENERGY STAR label as the national government-backed symbol for energy efficiency. Recent surveys, including a 2003 household survey fielded by the Consortium for Energy Efficiency, show that 56 percent of consumers nationwide recognize the ENERGY STAR, a jump from 40 percent in previous years. In addition, a majority of consumers report that the label influenced their purchasing decisions, and more than 60 percent would recommend ENERGY STAR to a friend. Some of the growth in awareness is the result of EPA's recent national public awareness campaign. The "Change" campaign, which ended in 2003, garnered more than $17 million in equivalent ad value through print, radio, and television placements that reached more than one billion consumers.

Expanding the number of ENERGY STAR qualified homes nationwide. Homes that earn the ENERGY STAR label provide comfort, value, and savings to homeowners and increased profits for homebuilders, while protecting the environment. By the end of 2003, more than 200,000 homes had earned the ENERGY STAR, saving Americans more than $60 million in energy costs annually.

CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2003

SEA GULL LIGHTING PRODUCTS, INC.

Riverside, New Jersey

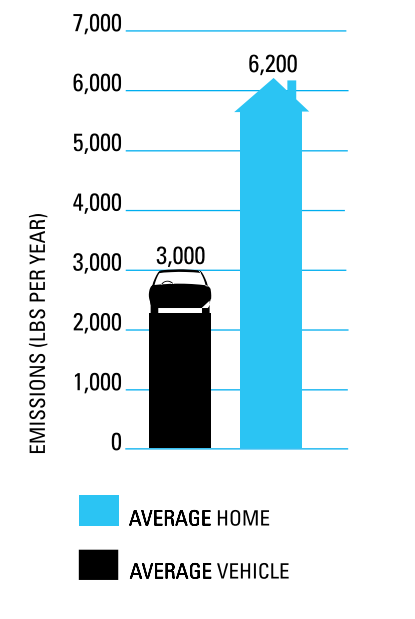
In 1919, Sea Gull Lighting Products, Inc., started as a small Philadelphia lighting specialty store with a single workbench. In 2003, Sea Gull Lighting embraced technology that will light the homes of future generations. In 2003, Sea Gull Lighting distinguished itself through product design, innovation, and the number of qualified products, as well as through its participation in national promotions, new construction marketing, and retail showroom promotions. The company's dedication to ENERGY STAR was clear when it launched a full line of products—from chandeliers to wall sconces to ceiling fans—thus allowing builders and homeowners to choose fixtures from a single source for the entire home. Sea Gull's 2003 marketing efforts included producing a dedicated 600-square-foot display of ENERGY STAR qualified products for the industry's largest trade show and distributing a dedicated ENERGY STAR qualified products catalog. The company also marketed to consumers using point-of-sale materials, direct mail, and an ENERGY STAR training session at its national sales meeting. Sea Gull Lighting Products has been a true industry leader.

(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)

GREENHOUSE GAS EMISSIONS FROM A HOME CAN EXCEED THOSE FROM A PASSENGER VEHICLE

Most people know that their vehicle—whether it is a car, truck, SUV, or minivan—emits gases into the air. They can see the exhaust from tailpipes when they drive, and in many states, owners are required to have vehicles tested periodically to ensure they meet emissions standards. In contrast, most people do not realize that their home also causes air pollution and greenhouse gas emissions. They do not see these emissions because the majority arise from fossil fuel combustion at the power generation source, not at the home itself. The fact is that the average single-family house in the United States can cause twice as many greenhouse gas emissions as the average passenger vehicle.

Figure 7.
Greenhouse gas emissions



A recent analysis[8] showed that while the average vehicle emits around 3,000 lbs. of carbon[9] per year, the typical single-family house can cause 6,200 lbs. or more of carbon per year to be released into the air.

EPA believes that if Americans become more aware of the magnitude of the emissions caused by their homes and the impact on the environment, they will take a more active role in managing their household energy use. Because power generation for homes is a large source of carbon emissions, every energy-saving measure at home helps prevent greenhouse gas emissions and air pollution. EPA seeks ways to improve the efficiency of homes, as well as the efficiency of vehicle use.

FIVE STEPS THAT EVERYONE CAN TAKE AT HOME TO REDUCE AIR EMISSIONS:

1. **CHANGE FIVE LIGHTS.** Replace the five most frequently used lights, or the bulbs in them, with ones that have earned the ENERGY STAR to save energy and lower emissions.
2. **LOOK FOR PRODUCTS THAT HAVE EARNED THE ENERGY STAR.** When shopping for lighting, home electronics, heating and cooling equipment, and appliances, ask about ENERGY STAR qualified products.
3. **HEAT AND COOL SMARTLY.** Improve your home's performance by servicing equipment annually, using programmable thermostats, and replacing old equipment with ENERGY STAR qualified models.
4. **SEAL UP THE HOUSE.** Seal air leaks around drafty windows and doors, add insulation to attics, and buy ENERGY STAR qualified windows when replacing older ones to improve comfort in your home and save energy.
5. **TELL FAMILY AND FRIENDS.** Help spread the word that energy efficiency is important—it benefits your home, lowers your utility bills, and makes a difference in your environment.

Together, these energy-saving measures at home can add up to sizeable benefits for everyone in the form of lower energy bills and fewer air emissions. Consider this: If one room in every U.S. household were brightened by ENERGY STAR qualified lighting, the annual greenhouse gas savings would be equivalent to preventing the emissions from more than 8 million cars. For more information, visit www.energystar.gov

[8] *Memo from Lawrence Berkeley National Laboratory to U.S. EPA, April 2004.*
[9] *CO_2 is the predominant greenhouse gas, accounting for 83.5 percent of total emissions (see Figure 5).*

ENERGY STAR PROGRAM

Program growth has been exceptional with over 100-percent growth during each of the past 3 years and more than 20 percent market penetration in key markets such as Phoenix, Las Vegas, Southern California, and parts of Texas. New Jersey, New England, and the Midwest also have large concentrations of ENERGY STAR qualified homes. Some 2,000 builder partners have joined ENERGY STAR, recognizing its market value. The nation's 10 largest homebuilders are now ENERGY STAR partners, and 23 of the top 25 builders offer ENERGY STAR qualified homes.

Reaching more consumers with ENERGY STAR Home Improvement. EPA continued to expand its work in residential energy efficiency improvements, promoting its whole-house retrofit program called Home Performance with ENERGY STAR. This whole-house improvement program emphasizes home diagnostics and evaluation, improvements made by a trained technician, and a strong quality assurance program. This year DOE provided more than $500,000 in seed money to establish Home Performance with ENERGY STAR in five pilot areas: Atlantic City (New Jersey), Kansas City (Missouri), Austin (Texas), Atlanta (Georgia), and Boise (Idaho).

In addition, existing Home Performance with ENERGY STAR projects continued to flourish in 2003. Under the leadership of the New York State Energy Research and Development Authority (NYSERDA), more than 4,000 Home Performance with ENERGY STAR jobs were completed in 2003, achieving an average savings of 350 therms and 600 kWh per job per year. The state of Wisconsin, under its Focus on Energy Program, has completed work in more than 800 homes. Similar programs in California and Kansas City continue to grow. Working with the Building

CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2003

NEVADA ENERGY STAR PARTNERS

Las Vegas, Nevada

The Nevada ENERGY STAR Partners—a unique group of more than 35 home builders, home energy raters, utilities, and other organizations—were recognized for their outstanding commitment to promoting ENERGY STAR in the fast-growing Las Vegas housing market. The Nevada ENERGY STAR Partners' 2003 effort was designed to promote consumer awareness of ENERGY STAR and increase the number of ENERGY STAR qualified homes sold in Las Vegas. The 13-week multimedia campaign, including an ENERGY STAR month for the State of Nevada, resulted in a 16-percent increase in consumer awareness and a 16-percent increase in sales of ENERGY STAR qualified homes in the Las Vegas Valley. Consumer awareness of ENERGY STAR qualified homes reached 76 percent, and the number of ENERGY STAR qualified homes jumped to 46 percent of the estimated 24,000 new homes built in Las Vegas. More than one-third of all new home communities in the Las Vegas Valley now feature ENERGY STAR qualified homes; and Summerlin, the largest master-planned community in the United States, is now committed to building only ENERGY STAR qualified homes. ***(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)***

ENERGY STAR PROGRAM

Performance Institute (BPI) as well as the National Association for Technician Excellence (NATE), EPA supported the growing number of professionals trained to understand how parts of the home work together to maintain comfort while reducing energy use and energy bills.

Through ENERGY STAR Home Sealing, contractors and homeowners are learning about the need to seal air openings to the outside while properly insulating walls and attics. When combined with ENERGY STAR qualified windows, this sealed "home envelope" keeps conditioned air within the living space. EPA's seasonal ENERGY STAR Cool Change Campaign promotes this "systems" approach for heating and cooling systems.

In 2004, EPA will:

- Update performance specifications for programmable thermostats. EPA will also add residential air cleaners and external power supplies (cordless phone or cell phone charger, for example) to the ENERGY STAR suite of qualifying residential products.
- Continue to build consumer awareness of ENERGY STAR, particularly through focused national campaigns for lighting products, home electronics, and cooling equipment, with the goal of raising awareness of the label to more than 70 percent over the next several years.
- Launch a new public service campaign directing consumers to five simple steps they can take to help reduce energy use at home and prevent greenhouse gas emissions.
- Work with retail partners, utilities, and states in broad consumer promotions of ENERGY STAR qualified products and new homes.
- Collaborate with homebuilders and champions to build, test, and label 165,000 additional new homes as ENERGY STAR. To help achieve this goal, EPA will expand its new homes-related outreach to 18 markets and distribute its new CD-based sales tool kit for builders to help sell ENERGY STAR qualified homes.
- Promote ENERGY STAR lighting fixtures to ENERGY STAR builder partners. Examine whether an indoor air quality label on an ENERGY STAR qualified home will help builders further differentiate themselves in the market.
- Support Home Performance with ENERGY STAR in Atlanta, Atlantic City, Austin, Boise, Kansas City, and St. Louis by developing a national sales training course and marketing strategies tailored to these metropolitan areas. In collaboration with DOE and the U.S. Department of Housing and Urban Development (HUD), EPA will establish a $1 million grant with a technician certification and contractor accreditation organization to help develop the national technician infrastructure for Home Performance with ENERGY STAR. EPA will target five more metropolitan areas in which to establish and develop Home Performance with ENERGY STAR.
- Expand home improvement programs to promote in-home services such as ENERGY STAR home sealing, duct sealing, and proper installation and maintenance of heating and cooling equipment. One key component involves increasing the number of trained contractors to perform these services. ENERGY STAR will continue to work closely with NATE to expand the number of qualified HVAC technicians who understand energy efficiency and the advantages of proper installation and maintenance of ENERGY STAR qualified HVAC equipment.

CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2003

THE CALIFORNIA INVESTOR-OWNED UTILITIES

Pacific Gas and Electric Company - San Francisco
San Diego Gas and Electric - San Diego
Southern California Edison - Rosemead
Southern California Gas Company - Los Angeles

The California ENERGY STAR New Homes Program is a statewide initiative, jointly implemented by California's Investor-Owned Utilities (IOUs), that committed an impressive 17 percent market share for ENERGY STAR qualified homes across the state, or 32,000 qualified homes in 2003. The program offers technical training and incentives to encourage builders to construct both single-family and low-rise multifamily homes that earn the ENERGY STAR. Its effectiveness can be attributed to a smart marketing and implementation strategy tailored to a large, highly diverse state. For consistency, the IOUs use one builder brochure and application and advertise jointly statewide. In 2003, they reached 50,000 building professionals. To connect with consumers individually, each utility creates specialized point-of-sale materials (brochures, direct mail pieces, etc.) for customers in their respective service territories. The California IOUs are also helping to increase demand for ENERGY STAR qualified major appliances. Through the second quarter of 2003, California achieved 55 percent market share for ENERGY STAR qualified dishwashers, 34 percent market share for qualified residential air conditioners, 28 percent for qualified refrigerators, and 27 percent for qualified clothes washers. ***(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)***

ENERGY STAR PROGRAM

ENERGY STAR IN THE COMMERCIAL SECTOR

To promote improved energy performance in 2003, EPA continued to offer businesses and other organizations a strategy for superior energy management, as well as standardized measurement tools to assist in this effort. According to research conducted by Innovest, organizations that improve energy performance outperform their competitors by as much as 10 percent on net operating income. Regardless of age and technology, top-performing buildings use four times less energy than those that are at the bottom of the performance scale.

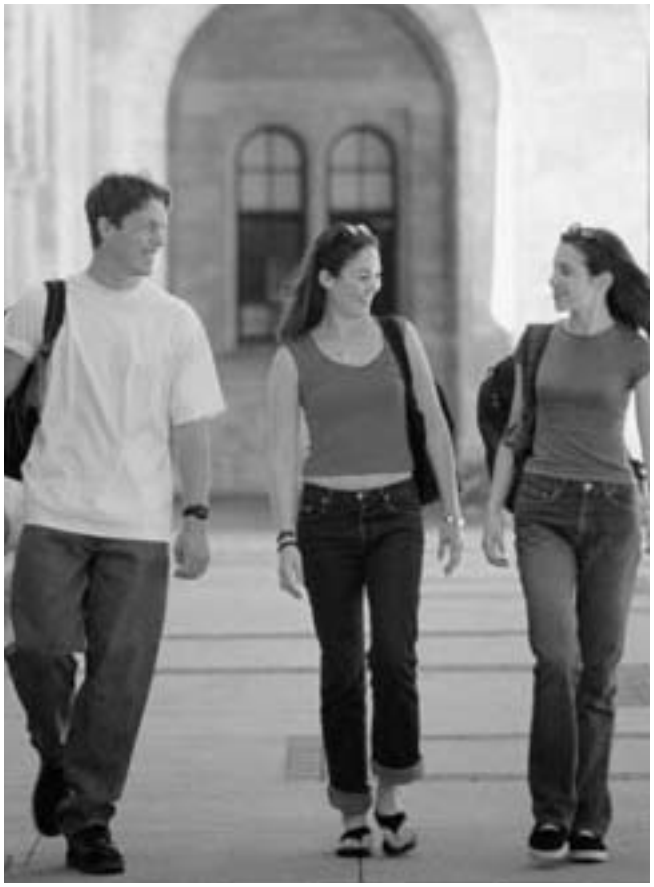
"The University of Michigan is committed to a policy of environmental stewardship. ENERGY STAR is a key example of how the University accomplishes its goal of excellent stewardship of the environment through energy efficiency."

—Richard W. Robben, P.E.
Director of Plant Operations,
University of Michigan

In 2003, ENERGY STAR in the Commercial Sector continued:

Expanding commitments to successful energy management. In 2003, many new businesses and organizations committed to implementing a strategy for superior energy management. For example, the number of new partners in the education and health care sectors doubled and tripled, respectively.

- About 13,000 organizations, including small businesses, now work with EPA to improve their energy management practices.
- ENERGY STAR partners represent more than 12 billion square feet, which accounts for approximately 18 percent of the commercial building market.



Encouraging continuous improvement. EPA has developed a proven energy management strategy for its ENERGY STAR partners. Based on building science, this strategy assists organizations in achieving twice the savings for a given level of investment as traditional methods would achieve. It includes a 5-stage approach to building upgrades, which encompasses recommendations for building tune-up, product procurement, and capital-intensive projects.

- These efforts have saved 55.7 billion kWh to date, according to EPA estimates.

Promoting the use of standardized measurement tools. EPA's national energy performance rating system has been used to evaluate almost 19,000 buildings; 17 percent of office buildings, 11 percent of schools, 17 percent of supermarkets, 28 percent of hospitals, and 6 percent of hotels have been benchmarked. This performance rating for buildings, launched in 1999, measures how well the systems of a building are integrated and how well the building is operated and maintained. By comparing the energy use of an individual building against the national stock of similar buildings using an objective 1 to 100 point rating system, the rating fills an important measurement gap. No consistent or comparable metric existed prior to EPA's system.

ENERGY STAR PROGRAM

- Almost 19,000 buildings representing more than 3.2 billion square feet (or 15 percent of the total eligible market) have had their energy performance rated.
- EPA now provides the commercial market with the capability to rate buildings representing more than 40 percent of the sector's carbon emissions.
- In 2003, the number of K-12 schools using the energy performance rating continued to grow; this sector now has the highest number of buildings with ratings.
- Also in 2003, EPA expanded ENERGY STAR to include commercial new construction. Encouraging the design of energy-efficient buildings will further reduce the air pollution and greenhouse gas emissions caused by commercial building energy use. Using EPA's performance rating tool and other guidance, architecture firms can now set an energy use target for whole-building performance and design buildings to be among the most efficient in the country.

Providing recognition for top performing buildings. EPA offers the ENERGY STAR label as a way to distinguish buildings that are top energy performers—those that score in the top 25 percent on the rating system while meeting industry standards for indoor air quality.

- Almost 1,400 buildings, representing about 325 million square feet, have been labeled to date.
- More buildings earned the ENERGY STAR in 2003—almost 500—than any previous year. The percentage of repeat labeled buildings increased as well.
- The supermarket/grocery store sector doubled the number of labeled buildings in 2003.

Building partnerships with interested third-party organizations. In 2003, EPA continued to reach out to interested organizations to provide clear, accurate information to energy end-users about opportunities for improved energy performance. These organizations include energy service providers, utilities, state energy groups, and public benefits funds administrators. By the end of 2003, almost 30 energy efficiency program sponsors across the United States were partnering with EPA to offer resources to end-user customers, enabling them to be more energy efficient.

Some highlights from third-party collaborations include:

- NSTAR, a major New England utility, launched an initiative to its large commercial customers that integrates EPA's energy performance rating system with the utility's ongoing energy efficiency programs.
- The State of New York began using ENERGY STAR to market energy efficiency in K-12 schools and the commercial real estate market.
- The Northwest Energy Efficiency Alliance (NEEA) began using EPA's energy performance rating in the screening process for its new Building Performance Services pilot program.
- The Consortium for Energy Efficiency (CEE), a national member organization composed of public energy efficiency program administrators, launched a new working group devoted to linking ENERGY STAR with commercial energy efficiency programs throughout the country.
- Service and Product Providers (SPPs) increased their activities. In 2003, SPPs helped benchmark more than 1,100 buildings. They also assisted in labeling 250 buildings, slightly more than half of the buildings labeled for the year.

CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2003

GIANT EAGLE, INC.

Pittsburgh, Pennsylvania

Giant Eagle, Inc., has grown to be the number one supermarket retailer in the region, with 131 corporate and 84 independently owned and operated stores in western Pennsylvania and parts of Ohio, West Virginia, and Maryland. The company has demonstrated its commitment to energy management throughout the organization, up to the highest levels. Its Conservation Department, responsible for addressing all energy and environmental concerns for the company, reports directly to the President of Giant Eagle. Approved by senior management, its strategic energy management program is comprehensive and quantifiable. It focuses on energy-saving technologies, benchmarking energy performance, and monitoring facility energy use. Giant Eagle has set an energy goal to achieve and maintain the ENERGY STAR status for 80 percent of its corporate stores by FY 2005. The company is well on the way to achieving this goal, having benchmarked close to 100 stores and earned the ENERGY STAR on 17 of them. Giant Eagle also demonstrates its commitment to improving energy performance company wide by purchasing wind power, designing stores that incorporate skylights for daylighting, installing remote-communicating energy management system controls in nearly every store, and proactively upgrading stores with white roofing, occupancy sensors, and variable frequency drives on HVAC units. ***(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)***

ENERGY STAR PROGRAM

"3M is committed to achieving business success within the framework of our environmental, social, and economic values. ENERGY STAR's strategic approach to energy management helps us address our values, meet customer expectations, and achieve our energy and environmental goals."

—James T. Mahan, Senior Vice President of Engineering, Manufacturing and Logistics Operations, 3M

Reaching out to strategic businesses/organizations.

- Educated more than 5,000 leading institutional investors focusing on socially responsible investing to establish the link between good environmental performance and long-term financial success.
- Relationships with 12 major Wall Street financial institutions, including Dreyfus, Neuberger Berman, The Calvert Group, and many others resulted in more than $4 billion in assets-under-management that include ENERGY STAR performance in the evaluation criteria used to determine institutional investment options.
- In collaboration with The Conference Board, hosted the first-ever senior-level strategic energy management conference in New York City, drawing over 150 senior managers.

Adding new products for the commercial sector that can earn the ENERGY STAR label.

In 2003, EPA added commercial fryers, steam cookers, and hot food holding cabinets to the growing list of qualifying commercial products.

In 2004, EPA will:

- Promote continuous improvement and recognition opportunities tied to that improvement by launching a new initiative, ENERGY STAR Leaders, to honor partners that set a baseline for their organization-wide energy use and achieve 10-, 20-, and 30-point reductions in energy use (compared to the baseline) across their portfolios.
- Offer energy performance ratings and label eligibility for more building types, including medical office buildings, bank branches, financial centers, courthouses, warehouse/storage areas, and residence halls. With this expansion, the rating system will apply to more than 50 percent of the building space across the country.
- Facilitate hosting of EPA's energy performance rating system by third parties, with the goal of making it easier for companies to benchmark their customers' facilities using their own energy tracking software.
- Distinguish new construction projects whose estimated energy performance for their design meets EPA criteria as "Designed to Earn the ENERGY STAR." Once constructed, these buildings would be eligible for ENERGY STAR after maintaining superior performance for one year.
- Collaborate with developers of international corporate sustainability indices to include improvement against a facility's energy performance baseline as a major energy performance criterion. Among these indices are the Dow Jones Sustainability Index (DJSI) and the FTSE4Good Index series developed by the Financial Times/London Stock Exchange (FTSE).
- Update performance specifications for exit signs. EPA will also add vending machines and external power supplies to the ENERGY STAR suite of qualifying commercial products.

CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2003

PROVIDENCE HEALTH SYSTEM

Seattle, Washington

Providence Health System, sponsored by the Sisters of Providence religious community and the Little Company of Mary Sisters, provides a comprehensive array of non-profit healthcare services across Alaska, Washington, Oregon, and Southern California. Upon joining the partnership in 1999, the President and CEO challenged energy managers to uphold Providence's core value of environmental stewardship by using ENERGY STAR to save energy and reduce air emissions. Providence hospitals began using the ENERGY STAR *Buildings Manual* and EPA's energy performance rating system as the backbone of its energy management efforts. Providence engineers regularly track and manage facility energy performance, set goals, and rank facilities by their energy intensity to prioritize improvement plans. Senior executives highlight energy savings and provide incentives for achievements. Providence's combined savings in energy is equivalent to more than $28 million in new business. ***(For a complete list of ENERGY STAR Award Winners for 2003, see page 22.)***

ENERGY STAR IN THE INDUSTRIAL SECTOR

Through ENERGY STAR, EPA is helping manufacturers identify the best in energy performance for their organizations and is assisting them in developing strategic approaches to energy management. These strategies are built on the principles of organizational commitment and continuous improvement. A strong corporate energy management program with sustained progress and decisionmaking leads to a better environment and improved financial health for a company.

Integral to this support, EPA convenes Industry Focuses. An Industry Focus is a targeted effort to improve energy efficiency within a specific manufacturing sector. Industry Focuses create momentum for continuous improvement in energy performance, provide the tools needed to achieve greater success in corporate energy management, and create a supportive environment where ideas and opportunities are shared. In 2003, EPA initiated several Industry Focuses, enhanced the networking opportunities for partners from all sectors, and supported all industries in their efforts to manage energy strategically.

In 2003, ENERGY STAR in the Industrial Sector:

- Strengthened existing Industry Focuses in the automobile, corn refining, brewing, and cement industries.
- At the request of the auto manufacturers, held the second annual Energy Efficiency Focus to exchange energy-efficient practices for auto plants, discuss new methods for reducing energy use in paint booths, and review use of the Energy Performance Indicator (EPI) for automotive assembly plants. Representatives from more than 75 percent of U.S. assembly production participated.
- Published final energy guides for the auto assembly, brewing, cement, and corn refining industries. Energy guides describe opportunities for improving energy efficiency in Focus industries.
- Collaborated with the corn refining industry to create an initial EPI—a tool that enables company managers to measure and assess the energy performance of corn refineries, compare results against those of their peers, track improvement over time, and prioritize efforts and resources.
- Conducted an energy efficiency Focus with the wet corn milling industry. Participating companies represented more than 90 percent of the production capacity in this sector.
- Introduced the Industry Focus concept to the pharmaceutical and petroleum industries and obtained agreement to proceed.
- Initiated an energy management guide for the new petroleum refining Industry Focus. Worked with technology specialists, industry experts, and partners to gather resource material.
- Created opportunities for partners from all industry sectors to share effective energy management strategies and to improve energy efficiency by hosting one in-person and 10 Web conferences.
- Finalized and published *Guidelines for Energy Management* and disseminated the document to partners from all sectors to enable them to build world-class, strategic, corporate energy management programs that sustain energy reductions and produce positive results for the environment.
- Coordinated with the Portland Cement Association and the Alliance of Automobile Manufacturers to identify pathways for achieving these industries' Climate VISION commitments.

In 2004, EPA will:

- Convene energy efficiency Industry Focuses with the pharmaceutical and petroleum industries.
- Conduct the third annual ENERGY STAR Energy Efficiency in Automobile Manufacturing Industry Focus meeting in Georgetown, Kentucky. Organize a half-day meeting with the paint suppliers to develop a plan for reducing energy use in auto painting.
- Hold the second annual ENERGY STAR Energy Efficiency in Corn Refining Industry Focus in Indiana.
- Develop an initial EPI tool for the pharmaceutical industry to test.
- Increase partner networking opportunities and participation by raising the frequency of Web conferences and expanding the discussion topics.
- Plan a senior executive corporate energy management leadership summit in spring 2005.

ENERGY STAR AWARD WINNERS FOR 2003

PARTNER OF THE YEAR—RETAILER

Lowe's Companies, Inc.
Mooresville, North Carolina

PARTNER OF THE YEAR—PRODUCT MANUFACTURERS

GE Consumer Products
Fairfield, Connecticut

Good Earth Lighting, Inc.
Wheeling, Illinois

Gorell Enterprises, Inc.
Indiana, Pennsylvania

Lennox Industries Inc.
Richardson, Texas

Sea Gull Lighting Products, Inc.
Riverside, New Jersey

SYLVANIA
Danvers, Massachusetts

Whirlpool Corporation
Benton Harbor, Michigan

EXCELLENCE IN APPLIANCE RETAILING

Sears, Roebuck and Co.
Hoffman Estates, Illinois

NATIONAL PRODUCT CAMPAIGN AWARD

Ace Hardware Corporation
Oak Brook, Illinois

Efficiency Vermont and Partners Green Mountain College, the Village of Poultney, Vermont, and Williams Hardware
Burlington, Vermont

The Home Depot
Atlanta, Georgia

Maytag Corporation
Newton, Iowa

Panasonic
Secaucus, New Jersey

Southern Minnesota Municipal Power Agency
Rochester, Minnesota

SUSTAINED EXCELLENCE IN ENERGY MANAGEMENT

Food Lion, LLC
Salisbury, North Carolina

General Motors Corporation
Detroit, Michigan

Hines
Houston, Texas

Servidyne Systems, LLC
Atlanta, Georgia

LEADERSHIP IN ENERGY MANAGEMENT

3M
St. Paul, Minnesota

Eastman Kodak Company
Rochester, New York

Fremont Unified School District
Fremont, California

Giant Eagle, Inc.
Pittsburgh, Pennsylvania

Providence Health System
Seattle, Washington

Transwestern Commercial Services
Houston, Texas

University of Michigan
Ann Arbor, Michigan

USAA Real Estate Company
San Antonio, Texas

EXCELLENCE IN SERVICE PROVIDER PERFORMANCE

ei3 Corporation
Montvale, New Jersey

EXCELLENCE IN BUSINESS OUTREACH

American Hotel & Lodging Association
Washington, DC

EXCELLENCE IN EFFICIENT HOMES

David Powers Homes
Houston, Texas

D.R. Wastchak, LLC
Tempe, Arizona

Ence Homes
St. George, Utah

Energy Services Group
Wilmington, Delaware

Engle Homes Colorado, a division of TOUSA Homes, Inc.
Englewood, Colorado

MaGrann Associates
Moorestown, New Jersey

Nevada ENERGY STAR Partners
Las Vegas, Nevada

Pardee Homes
Los Angeles, California

Pulte Homes Nevada Operations
Las Vegas, Nevada

Veridian Homes
Madison, Wisconsin

EXCELLENCE IN ENERGY EFFICIENCY AND ENVIRONMENTAL EDUCATION

The California Investor-Owned Utilities

Pacific Gas and Electric Company
San Francisco, California

San Diego Gas and Electric
San Diego, California

Southern California Edison
Rosemead, California

Southern California Gas Company
Los Angeles, California

CenterPoint Energy
Houston, Texas

The Institute for Sustainable Energy at Eastern Connecticut State University
Willimantic, Connecticut

Minnesota Power, an ALLETE Company
Duluth, Minnesota

Nevada Power Company & Sierra Pacific Power Company
Las Vegas and Reno, Nevada

New England Joint Management Committee

New York State Energy Research and Development Authority (NYSERDA)
Albany, New York

Northeast Energy Efficiency Partnerships, Inc. (NEEP)
Lexington, Massachusetts

Northwest Energy Efficiency Alliance
Portland, Oregon

Oncor Electric Delivery Company
Dallas, Texas

Sacramento Municipal Utility District
Sacramento, California

Vermont ENERGY STAR Homes Service, Vermont Energy Investment Corporation
Burlington, Vermont

Vermont Gas Systems
South Burlington, Vermont

Wisconsin's Focus on Energy Program
Madison, Wisconsin

SPECIAL RECOGNITION—TECHNICAL EXCELLENCE

Architectural Energy Corporation
Boulder, Colorado

SPECIAL RECOGNITION—ADVANCEMENT OF PC ENERGY EFFICIENCY

Dell, Inc.
Round Rock, Texas

Intel Corporation
Santa Clara, California

SPECIAL RECOGNITION—ENERGY STAR MILLION MONITOR DRIVE

Fairfax County Public Schools
Fairfax, Virginia

Indoor Environmental Services
Sacramento, California

The Procter and Gamble Company
Cincinnati, Ohio

University of Pittsburgh
Pittsburgh, Pennsylvania

VP Buildings, Inc.
Memphis, Tennessee

Wal-Mart Stores, Inc.
Bentonville, Arkansas

CLIMATE LEADERS

EPA launched the Climate Leaders program in February 2002 as part of the President's Climate Change Strategy to challenge individual companies to demonstrate leadership by setting aggressive greenhouse gas reduction goals for their sector. Companies that join the partnership enjoy a number of benefits from understanding and managing their greenhouse gas emissions, including increased identification of cost-effective reduction opportunities and strategic preparation for the future as the climate change policy debate evolves. Last year, the program continued to grow, expanding from the original 12 Charter Partners to include a number of leading companies across industrial sectors. Climate Leaders partners set corporate-wide greenhouse gas reduction goals and conduct annual inventories of their emissions to measure progress.

In 2003, Climate Leaders:

- Welcomed 16 new companies as partners for a total of 52 partners.
- Had 13 companies announce greenhouse gas reduction goals, joining the seven companies that announced goals in 2002 for a total of 20 Climate Leaders partners with publicly stated goals.

In 2004, EPA will:

- Recruit 25 additional businesses.
- Announce 20 additional corporate greenhouse gas emissions reduction goals.

"Staples has a long-standing commitment to environmental excellence, and we're pleased to participate in EPA's Climate Leaders Program. Climate Leaders will afford us the opportunity to assess all of our current operations with respect to greenhouse gas emissions—both the emissions we release directly into the environment and the secondary emissions associated with our power procurement. We will then develop short- and long-range goals to reduce these emissions."

—Mark F. Buckley, Vice President
Environmental Affairs, Staples

GREENHOUSE GAS REDUCTION GOALS

The targets announced to date will prevent a total of 7.5 MMTCE per year. These reductions are equivalent to the annual emissions from 5 million cars.

Partner Goals Announced in 2003:

- 3M pledged to reduce total U.S. greenhouse gas emissions by 30 percent from 2002 to 2007.
- Advanced Micro Devices, Inc., pledged to reduce global greenhouse gas emissions by 40 percent per Manufacturing Index from 2002 to 2007.
- American Electric Power pledged to reduce total U.S. greenhouse gas emissions by 4 percent below an average 1998-2001 base year by 2006.
- Cinergy Corp. pledged to reduce total U.S. greenhouse gas emissions by 5 percent from 2000 to 2010.
- Eastman Kodak Company pledged to reduce total global greenhouse gas emissions by 10 percent from 2002 to 2008.
- FPL Group pledged to reduce U.S. greenhouse gas emissions by 18 percent per kWh from 2001 to 2008.
- Interface, Inc., pledged to reduce U.S. greenhouse gas emissions by 15 percent per unit of production from 2001 to 2010.
- International Paper pledged to reduce total U.S. greenhouse gas emissions by 15 percent from 2000 to 2010.
- Johnson & Johnson pledged to reduce total U.S. greenhouse gas emissions by 14 percent from 2001 to 2010.
- Pfizer, Inc., pledged to reduce global greenhouse gas emissions by 35 percent per dollar of revenue from 2000 to 2007.
- PSEG pledged to reduce U.S. greenhouse gas emissions by 18 percent per kWh from 2000 to 2008.
- St. Lawrence Cement pledged to reduce global greenhouse gas emissions by 15 percent per ton of cementitious product from 2000 to 2010.
- United Technologies Corporation pledged to reduce global greenhouse gas emissions by 16 percent per dollar of revenue from 2001 to 2006.

CLEAN ENERGY PROGRAMS

2003 ENERGY STAR CHP AWARD AND CHP PARTNERSHIP CERTIFICATES OF RECOGNITION

ENERGY STAR CHP AWARD WINNERS

Russell Energy Center
Russell, Kansas

Kinder Morgan Power Company Thermo Greeley CHP facility
Greeley, Colorado

University of Michigan
Ann Arbor, Michigan

CHP PARTNERSHIP CERTIFICATES OF RECOGNITION

Grand Wailea Resort
Maui, Hawaii

University of Missouri – Columbia
Columbia, Missouri

"EPA's recognition has highlighted our company and the work we do to a variety of key stakeholders, including the general public. This in turn allows us to continue to market the environmental benefits of CHP to our customers and the communities we do business in, leading to additional environmental benefits in the future from new project development."

—Chris Shugart, Director-Industrial Services, Calpine Corporation

COMBINED HEAT AND POWER PARTNERSHIP

In October 2001, EPA introduced the Combined Heat and Power (CHP) Partnership as part of the President's National Energy Policy. CHP projects offer tremendous potential for pollution prevention by recycling the waste heat that is produced in many industrial processes and as a by-product of electricity generation. CHP systems also offer many benefits, including cost savings, enhanced reliability of the electric system, and local economic development. Compared with conventional separate heat and power, CHP projects are highly efficient—often times reaching 75 percent efficiencies and higher—and can be installed in a variety of settings, including large industrial plants, college campuses, hospitals, hotels, and commercial buildings. EPA recognizes the most efficient CHP projects each year through the ENERGY STAR CHP Award.

To maximize the use of cost-effective, efficient CHP, the CHP Partnership works with industry, state and local governments, universities, and other organizations to facilitate the development of CHP projects. EPA provides technical assistance, networking, and public recognition. EPA also partners with regional CHP initiatives, state agencies, and key industry sectors to organize CHP workshops and outreach events.

In 2003, the CHP Partnership:

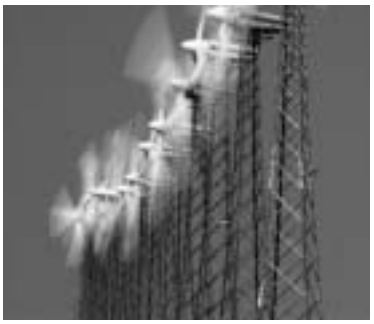
- Grew to 116 partners and facilitated 40 new CHP projects that are currently operational or under development, totaling 400 MW of new CHP capacity.
- Co-sponsored CHP workshops in Washington, DC, California, Pennsylvania, Texas, and Massachusetts.
- Provided public recognition to projects that won the ENERGY STAR CHP Award or CHP Partnership Certificates.
- Offered new services to partners, including the calculation of environmental benefits for specific CHP projects, an expanded Web site, and project feasibility analyses.
- Initiated niche market development efforts in the ethanol industry, and continued project development efforts in the college and university sector.

In 2004, EPA will:

- Add 50 new partners and assist partners with more than 30 new projects, facilitating the development of over 800 MWe of new CHP capacity.
- Release a *Best Practices Guide to Output-Based Air Emissions Regulations* and educate air regulators on innovative ways to recognize the efficiency of CHP.
- Co-sponsor CHP outreach events in multiple states.
- Continue niche market development activities with the ethanol and college and university sectors, and explore new niche markets such as wastewater treatment plants.
- Expand project facilitation services for CHP partners to cover each step in the CHP project development cycle.
- Continue to recognize superior projects through the ENERGY STAR CHP Awards and CHP Partnership Certificates.

CLEAN ENERGY PROGRAMS

GREEN POWER PARTNERSHIP



EPA launched the Green Power Partnership in 2001 in response to a recommendation in the President's National Energy Policy. The partnership's goal is to lower the cost of renewable energy by enlisting large electricity purchasers to purchase a percentage of their power as green power. EPA also works to increase green power's value by offering public recognition to leading green power purchasers. As increasing numbers of large electricity customers demand green power, electricity providers will respond by investing in new renewable energy capacity to meet this growing demand. EPA supports the development of green power markets in several ways, including providing emissions benefits information, recognizing leading purchasers through annual green power awards, and supporting the development of third-party certification so consumers can be confident that they are getting what they pay for.

In 2003, renewable energy purchasing became increasingly common among major companies, universities, government agencies, and other organizations as a strategy for demonstrating environmental leadership. The Green Power Partnership welcomed 143 new partners in 2003, and provided technical assistance, including comparison of various green power products and information on strategies for maximizing the benefit of a green power purchase. EPA also publicly recognized exceptional partners through its participation in local events, press releases, speaking engagements, the Green Power Leadership Club, and national Green Power Awards.

In 2003, the Green Power Partnership:

- Recruited an additional 143 partners for a total of 236 organizations that have made a combined commitment to purchase more than 1.2 million megawatt-hours (MWh) of green power annually, including 700,000 MWh from new renewable energy resources.
- Created more technical resources, including a comprehensive "Communications Guide for Green Power Partners" and the Green Power Locator, a Web-based tool that helps consumers locate green power providers in their area.
- Released the Power Profiler, a Web-based tool that allows electricity users to understand the air emissions impacts associated with their purchases of conventional electricity.
- Provided recognition to leading green power purchasers through local press events and the national Green Power Leadership Awards.

2003 GREEN POWER LEADERSHIP AWARDS

PARTNER OF THE YEAR

City of Portland
Portland, OR

Dyess Air Force Base
Dyess AFB, TX

Johnson & Johnson
New Brunswick, NJ

University of Pennsylvania
Philadelphia, PA

GREEN POWER PURCHASING

Austin Grill
Bethesda, MD

City of Moab
Moab, UT

Clif Bar
Berkeley, CA

Kinko's, Inc.
Ventura, CA

State of New Jersey–NJCESP
Trenton, NJ

The Tower Companies
Bethesda, MD

White Wave
Boulder, CO

ON-SITE GENERATION

BMW
Spartanburg, SC

City of San Diego
San Diego, CA

Domaine Carneros Winery
Napa, CA

Fala Direct Marketing Group
Melville, NY

Hayward Lumber
Monterey, CA

Loyola Marymount University
Los Angeles, CA

Solano County
Fairfield, CA

Toyota Motor Sales, USA, Inc.
Torrance, CA

In 2004, EPA will:

- Recruit 400 additional partners to make commitments to purchase green power, bringing the total to more than 600.
- Create new resources for partner recognition and technical assistance, including a Web-based listing of the top 25 green power purchasers.
- Expand public recognition of outstanding partners by working with power providers on joint recognition events for their largest green power purchasers.
- Continue to provide recognition through the national Green Power Leadership Awards.

METHANE PROGRAMS

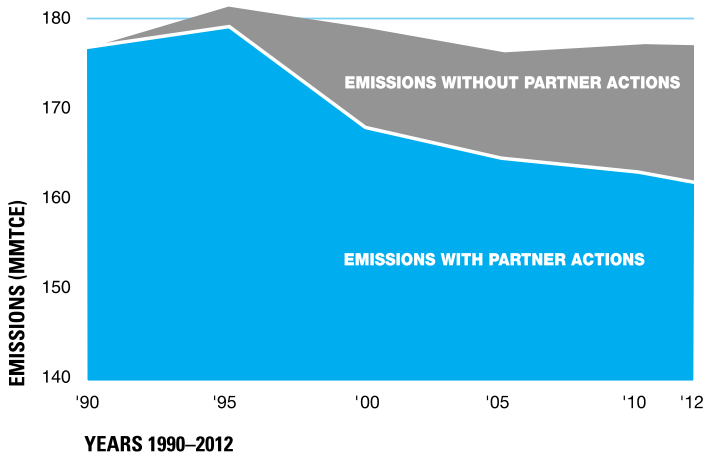
METHANE PROGRAMS

Methane's contribution to total U.S. greenhouse gas emissions is second only to that of carbon dioxide. Each ton of methane emitted is, however, more than 20 times more effective at trapping heat in the atmosphere than one ton of CO_2. At the same time, methane is also a valuable source of energy, being the major component of natural gas.

U.S. industries along with state and local governments collaborate with EPA in several voluntary partnerships to encourage the profitable collection and use of methane that would otherwise be released to the atmosphere. These methane partnerships include the Landfill Methane Outreach Program, Natural Gas STAR Program, and Coalbed Methane Outreach Program. All follow a common approach, which is to provide sound technical, economic, and regulatory information on emissions reduction technologies and practices, as well as tools to facilitate implementation of methane reduction opportunities. Partners profit from their involvement in these programs by making their operations more efficient and their businesses more competitive. EPA also provides information and tools to the agricultural community to encourage methane reductions.

In 2003, these voluntary partnerships, in conjunction with a regulatory program to limit air emissions from the nation's largest landfills, reduced national methane emissions to well below 1990 levels, and they are projected to maintain emissions below 1990 levels through 2012 (see Figure 8).

Figure 8.
Partner actions are projected to maintain methane emissions below 1990 levels through 2012



Source: EPA Climate Protection Partnerships Division

METHANE PROGRAMS

LANDFILL METHANE OUTREACH PROGRAM

Landfills are the largest source of U.S. human-related (anthropogenic) methane emissions. Capture and use of landfill gas not only reduces methane emissions directly, but also reduces CO_2 emissions indirectly by displacing the use of fossil fuels. The Landfill Methane Outreach Program (LMOP) encourages landfills across the nation and internationally to capture and use their landfill gas emissions as a renewable energy source. Working with landfill owners, state energy and environmental agencies, energy suppliers, industry, communities, and other stakeholders, LMOP lowers the barriers to landfill gas energy (LFGE) project development.

Since the program's launch in December 1994, LMOP has reduced methane emissions from landfills by approximately 19 MMTCE. In addition, the number of landfill gas energy projects has grown to nearly 370. In 2003 alone, LMOP assisted all 33 LFGE projects that became operational, resulting in a reduction of 4.1 MMTCE.

LMOP focuses its outreach efforts on the smaller landfills not regulated by EPA's New Source Performance Standards and Emission Guidelines. The program's varied tools help landfill owners and operators overcome barriers to project development. These tools include feasibility analyses, software for evaluating project economics, profiles of hundreds of candidate landfills across the country, a project development handbook, and energy end-user analyses.

In 2003, LMOP:

- Assisted in the development of 33 new landfill gas energy projects, with more than 25 additional projects under construction and expected online soon.
- Welcomed 32 new partners, increasing participation by 9 percent and bringing the total number of LMOP partners to 379.
- Released two new LFGE project development tools, LFGcost and the LMOP Locator, designed to provide project developers and other parties with comprehensive financial and end-user data. Both tools have led to the identification of dozens of new project opportunities.
- Collaborated with DOE's Federal Energy Management Program (FEMP) to implement the first landfill gas to energy project at a federal facility under the Biomass and Alternative Methane Fuels Program.

In 2004, EPA will:

- Implement a corporate and federal end-user market strategy to provide energy and financial tools and services to spur LFGE project development.
- Host the 8th Annual LMOP Conference and Project Expo and seven state and regional workshops to present the benefits of landfill gas energy, discuss project development activity and opportunities, and address issues affecting landfill gas projects.
- Conduct three international training workshops to provide government officials and technical experts with the information and tools necessary to evaluate the potential for LFGE project development; tools include a newly adapted country-specific EPA model to evaluate LFG potential.
- Assist in the development of 25 new landfill gas energy projects.

"Landfill gas is a clean-burning fuel and makes a perfect power source for the plant's boilers."

—Dave Shenefield, Site Utilities Manager,
General Motors Assembly Plant, Fort Wayne, IN

LMOP 2003 AWARD WINNERS

PROJECT OF THE YEAR (TIE): ANTIOCH COMMUNITY HIGH SCHOOL LFG-TO-ENERGY PROJECT

Antioch, Illinois

Antioch Community High School is the first school in the United States to get electricity and heat from landfill gas. Through the combined efforts of the Antioch Community High School, Waste Management, the State of Illinois, and RMT (an environmental and engineering firm), a liability has become an asset. Not only has this project turned a former Superfund landfill into a source of renewable energy, it also serves as a great learning tool for students and the community. In 2001, RMT approached the school district about using LFG, and in 2002 signed an agreement to make it happen. Waste Management then agreed to make the gas available to the school at no charge, and the Illinois Department of Commerce and Economic Opportunity provided a needed boost with a $550,000 grant to the project. After years of planning and construction, the school district now captures gas from the HOD Landfill to produce electricity and heat from 12 Capstone microturbines. The microturbines produce 360 kW of electricity, enough to power the school, with excess sold to Commonwealth Edison. Waste heat from the microturbines will be used to heat the school. Along with the environmental benefits of the project, Antioch Community High School estimates that the energy savings will be in excess of $100,000 per year. The project is part of the 2004 science curriculum, and is a great example of collaboration between industry, a utility, and local, state, and federal agencies.

"We're going to be able to recycle, save money for the taxpayers, and help with the environment."

—Bill Ahlers, Business Manager, Antioch Community High School District 117, Antioch, IL

"We are very excited to support BMW in meeting its energy and environmental goals through this renewable energy project. This project means cleaner air, a healthier environment and a better community for all."

—George Sakellaris, President and CEO, Ameresco, Framingham, MA

PROJECT OF THE YEAR (TIE): BMW MANUFACTURING LFG-TO-ENERGY PROJECT

Greer, South Carolina

BMW and its partners have created a project that will have positive environmental and economic benefits for at least the next 25 years. In January 2003, BMW's Greer, South Carolina plant began purchasing LFG from Waste Management's Palmetto Landfill, located 9.5 miles away. The gas now fires four 1.25 megawatt turbines that typically sat idle at BMW's plant. The electricity from the turbines provides about 25 percent of the Greer plant's electricity needs, while the waste heat from the turbines provides almost 100 percent of the plant's cooling/thermal and hot water needs. BMW will reduce methane emissions equivalent to driving 105 million miles per year or more than 4,000 times around the earth. To achieve this success, BMW worked closely with project partners Ameresco, Waste Management, and the South Carolina Energy Office to resolve the many project permitting, educational, and technology obstacles. Pleased with the results, BMW is investigating other uses for the additional gas from the landfill.

LMOP 2003 AWARD WINNERS

ENERGY PARTNER OF THE YEAR: GENERAL MOTORS

Detroit, Michigan

General Motors (GM), as the single largest direct user of landfill gas in the United States, has demonstrated that environmental protection and economic benefits can go hand in hand. With four landfill gas energy projects online in Ohio, Michigan, Indiana, and Louisiana, and a fifth under construction, General Motors is truly a leader in advancing landfill gas as a renewable energy source. The four projects use a total of 6,200 cubic feet/minute (cfm) of LFG, and GM purchases 8 million kWh of electricity from a LFG electricity project in Michigan. When the fifth direct-use project comes online in Oklahoma, it will bring GM's gas usage to 7,500 cfm. In addition to its own LFG projects, General Motors has been instrumental in reaching out to other potential corporate LFG users and has helped the World Resources Institute develop a guidance document on LFG usage for corporate members. All of GM's projects save money while reducing emissions, with average savings of more than $500,000 per project per year. GM estimates that cumulatively more than 170,000 tons of carbon dioxide emissions have been prevented due to its operating projects.

INDUSTRY PARTNER OF THE YEAR: AMERESCO

Framingham, Massachusetts

Ameresco, a relative newcomer to the landfill gas energy field, has shown that innovation and creativity in project structure and technology can create viable projects. Ameresco got involved in LFG energy project development in January 2001, when tax credits and other incentives were non-existent or declining. Since that time, Ameresco has proven that projects can be financially successful in the absence of tax credits. The company currently has three operational LFG energy projects, including the well-known, highly successful BMW project in South Carolina. It also has three diverse projects under construction—one with an electric cooperative, one with a large electric utility, and a direct-use project with Gold Kist, the nation's second largest chicken processing cooperative. Recently, Ameresco was awarded four more projects, all with expected online dates in 2004. The environmental benefits of the operational projects under Ameresco's care, which generate 17.5 MWs of power, equate to removing the emissions from more than 150,000 cars per year. Ameresco estimates that in the next two to three years it will have the equivalent of 54 MWs of power online.

COMMUNITY PARTNER OF THE YEAR: PRINCE GEORGE'S COUNTY, MARYLAND

Largo, Maryland

Prince George's County (PG County) had one of the first LFG electricity projects on the East Coast in the late 1980s and remains a leader in the field. PG County, which owns the Brown Station Road Landfill, began plans for a LFG energy project in 1985 to supply the electric power needs of the county's Correctional Center, 2.5 miles away. Commissioned in 1987, the project sends gas to three LFG-fired Waukesha engines at the Correctional Center and supplies hot water to the facility. Due to increasing gas supply, the County began to look at expanding its LFG energy project in 1999. The Gas Expansion Project was completed on April 4, 2003, adding four Waukesha engines on site. During construction, the County worked with PJM Interconnection and PEPCO on Interconnection Service Agreements (ISA). The ISA was filed with the Federal Energy Regulatory Commission (FERC) and is one of the first such filings under FERC's newly adopted standard ISA. The project's output also meets the criteria for Green Power; it is estimated that at least $750,000 will result from power sales. Prince George's County sets a good example for other communities wishing to pursue LFG energy projects.

METHANE PROGRAMS

NATURAL GAS STAR PROGRAM

Natural Gas STAR is a voluntary partnership between EPA and the U.S. natural gas industry designed to overcome barriers to the adoption of cost-effective technologies and practices that reduce emissions of methane. Natural Gas STAR was launched in 1993 with the transmission and distribution sectors, and has since expanded twice—to the production sector in 1995 and the processing sector in 2000. The program has achieved significant reductions through 2003, reducing methane emissions from natural gas systems by 5.7 MMTCE in 2003 alone.

Natural Gas STAR has developed a range of tools and resources designed to help corporate partners implement best management practices to reduce gas loss. These include an implementation guide, a series of "Lessons Learned" studies, technology transfer workshops, partner-to-partner information exchanges, and more. Extensive partner support for and continued expansion of the program, combined with ongoing positive feedback from partners, demonstrates the effectiveness of these tools in promoting methane reduction activities.

In 2003, Natural Gas STAR:

- Achieved 64 percent industry participation across all major sectors (production, processing, transmission, and distribution).
- Partnered with 13 new companies, bringing the total number of partners to 111.
- For the first time, conducted technology transfer workshops for all industry sectors.
- Continued a 2-year study to identify additional cost-effective methane emissions reduction opportunities from the gas production and processing sectors.

In 2004, EPA will:

- Expand Natural Gas STAR in all sectors to attain 65 percent industry participation.
- Conduct six technology transfer workshops, including the first workshop for offshore producers.
- Continue to work with the American Petroleum Institute to implement its voluntary commitment of 100 percent participation in the Natural Gas STAR Program under the President's Climate VISION initiative.

"Our participation in Natural Gas STAR has heightened environmental awareness throughout the company. Emissions reductions and operational efficiency go together and are not only good for business but also for the environment."

—Don Anderson, Compliance Manager, Western Gas Resources

NATURAL GAS STAR AWARD WINNERS

PRODUCTION PARTNER OF THE YEAR: BP

BP joined the Natural Gas STAR Program in 1998 and has been a leader in reducing methane emissions, first earning the Production Partner of the Year Award in 2001 and the Continuing Excellence Award a year later. BP reported 1.9 billion cubic feet (Bcf) in methane emissions reductions, the most among natural gas production companies for 2002. The company maintains a high profile in the program and provides leadership not only in reducing emissions but also in supporting outreach and technology transfer goals. BP managers deliver presentations at the Natural Gas STAR Annual Implementation Workshops, contribute to journal articles and technical documents, and participate in an EPA-sponsored study of emissions reduction opportunities at gas processing plants. BP's Implementation Manager, Reid Smith, was honored with the Implementation Manager of the Year Award in 2003.

TRANSMISSION PARTNER OF THE YEAR: EL PASO PIPELINE GROUP

El Paso Pipeline Group joined the Natural Gas STAR Program in 1993 and has been one of Natural Gas STAR's most active participants. For 2002, El Paso reported the largest volume of new emissions reductions—more than 2.4 Bcf. To date, the company has achieved the highest cumulative reductions of all transmission partners, totaling 32 Bcf. El Paso Pipeline Group takes advantage of dramatic emissions reduction opportunities by comparing and learning from the experiences of its five subsidiary pipelines. El Paso Pipeline Group has also helped the Natural Gas STAR Program by recently hosting a pair of technology transfer workshops.

DISTRIBUTION PARTNER OF THE YEAR: COLUMBIA GAS OF OHIO (A NISOURCE COMPANY)

Columbia Gas of Ohio, one of the 10 energy distribution companies within NiSource Inc., joined the Natural Gas STAR Program in 1993. For 2002, the company reported reductions of 2.3 Bcf—more than any other distribution company. Columbia Gas of Ohio achieved this by performing meticulous leak detection surveys of more than 4,000 gate stations and surface facilities.

PROCESSING PARTNER OF THE YEAR: WESTERN GAS RESOURCES

Western Gas Resources (WGR) joined the Natural Gas STAR Program in late 2001 and achieved the largest emissions reductions of any processing partner in 2002. To date, WGR has reported cumulative methane emissions reductions of more than 2 Bcf. WGR has also demonstrated commitment to communicating the importance of Natural Gas STAR, both internally and externally, by conducting Natural Gas STAR briefings and training sessions for operations supervisors and managers, and by sharing their experiences with other companies through presentations at Natural Gas STAR workshops.

NATURAL GAS STAR AWARD WINNERS

CONTINUING EXCELLENCE: KERR-MCGEE OIL & GAS CORPORATION

Kerr-McGee joined the Natural Gas STAR Program in 1996 and was awarded Production Partner of the Year in 2000. The company has continued to be one of the program's most active partners. In 2002, Kerr-McGee reported emissions reductions totaling 750 million cubic feet (MMcf)—the second highest volume reported by a gas producer. The company continued to extend its participation by providing data on many new gas production sites and emissions reduction activities—almost doubling the number of facilities reporting emissions reductions. Kerr McGee also contributes to program technology transfer and outreach efforts by developing implementation case studies and presentations for workshops.

CONTINUING EXCELLENCE: CHEVRONTEXACO

ChevronTexaco joined the Natural Gas STAR Program separately in 1995 as Chevron and in 1996 as Texaco. Chevron was recognized as the Production Partner of the Year in 1999. As ChevronTexaco, the company has strengthened its commitment to the Natural Gas STAR Program. For 2002, it reported reductions of 700 MMcf, the third highest among production partners. Cumulatively, ChevronTexaco has reduced methane emissions by 18 Bcf since 1990. ChevronTexaco continues to demonstrate leadership by actively contributing to program technology transfer efforts, including the development of case studies and workshop presentations.

CONTINUING EXCELLENCE: COLUMBIA GAS TRANSMISSION AND COLUMBIA GULF TRANSMISSION (NISOURCE COMPANIES)

Columbia Gas and Columbia Gulf Transmission have been leaders since joining the Natural Gas STAR Program. In 2000 and 2001, they were recognized as the Transmission Partners of the Year. For 2002, Columbia Gas Transmission reported the largest emissions reductions (almost 4 Bcf), while Columbia Gulf Transmission reported the 3rd highest (more than 1 Bcf). These two NiSource companies continue to identify and implement a large number of new emissions reduction opportunities, directly contributing to technology transfer efforts. Working with other business units, they are also helping educate all NiSource companies on the value of greenhouse gas emissions reductions.

ROOKIE OF THE YEAR: NORTHERN NATURAL GAS

Northern Natural Gas operates an interstate natural gas pipeline extending from the Permian Basin in Texas to the upper Midwest. Although the company is new to the Program, Northern Natural Gas has already successfully reduced methane emissions by 200 MMcf. This was accomplished through the aggressive implementation of several emissions reduction technologies and management practices, such as a survey and leak repair program at its compressor stations and remote facilities, altering emergency shut down procedures, and replacing high-emission controllers.

COALBED METHANE OUTREACH PROGRAM

The Coalbed Methane Outreach Program (CMOP) reduces methane emissions from underground coal mines by collaborating with large coal companies and small businesses—primarily independent natural gas project developers and equipment supply companies—to develop environmentally beneficial and economically successful coal mine methane (CMM) projects. Outreach efforts focus on providing high-quality, project-specific information. CMOP has achieved significant results through 2003.

EPA began working with the coal mining industry in 1990, when coal mines captured and used only 25 percent of the methane produced from their mine degasification systems. As a result of this collaboration, the percentage of methane recovery grew to about 85 percent by 2003. To eliminate the remaining methane emitted from degasification systems, CMOP is working with industry to use CMM in small- and large-scale power generation, for mine heating and coal drying, and for upgrading low-quality gas to pipeline specifications. Favorable economics also increase the viability of other end-use options for CMM such as vehicle fuel (liquified natural gas (LNG) and compressed natural gas (CNG)), manufacturing feedstocks, and use in fuel cells.

In addition, CMOP supports efforts to demonstrate the use of flare technology, which has yet to be employed at an active U.S. mine. Following the program's success in reducing methane emissions from degasification systems, CMOP has expanded its focus to the methane emitted from coal mine ventilation systems. Ventilation air from coal mines typically contains methane at concentrations below one percent, yet accounts for 90 percent of the remaining methane emissions from underground coal mines—about 80 Bcf of methane annually. CMOP is collaborating with industry and other federal agencies to demonstrate and deploy newly developed technologies that can reduce these emissions substantially over the next few years.

Abandoned mines are also a source of methane emissions, accounting for about 5 to 10 percent of U.S. CMM emissions from underground mines. CMOP is now actively engaged in promoting reductions from this source. In the United States alone, 20 projects in 2003 captured and used methane from 30 abandoned mines.

CMOP has developed a range of tools designed to overcome the barriers to recovery and combustion of coal mine methane. These include numerous technical and economic analyses of technologies and potential projects, mine-specific project feasibility assessments, state-specific analyses of project potential, market evaluations, and guides to state, local, and federal assistance programs. CMOP has collaborated with operators of virtually every major U.S. underground coal mine that has gassy conditions or that emits gases to apply these tools and facilitate projects, which in 2003 alone achieved a reduction of 1.7 MMTCE.

In 2003, CMOP:

- Reduced methane emissions at 14 of the gassiest mines in the country, including the first recovery projects in the western United States, by providing high-quality, project-specific information to mine operators, project developers, and other stakeholders.
- Published an analysis of domestic and international emerging markets for ventilation air methane projects, identifying new technologies and assessing project costs and benefits.
- Calculated and included methane emissions from abandoned mines in the *U.S. Inventory of Greenhouse Gas Emissions and Sinks*, marking the first time this source of emissions was included in any country's national inventory.

METHANE PROGRAMS

PROGRAM EVALUATION: MEASURING RESULTS IN THE METHANE PROGRAMS

Tracking and recording the methane reductions achieved by EPA's partnership programs is a straightforward process. EPA gathers project-specific data on all the methane reduction activities implemented in coordination with the partnerships.

NATURAL GAS STAR

Industry partners report their reduction activities to EPA on a detailed online reporting form, and EPA works with partners to verify these data.

LANDFILL METHANE OUTREACH

EPA works with all stakeholders to compile up-to-date annual project information. The program reports reductions from only those projects that EPA directly assisted.

COALBED METHANE OUTREACH

EPA gathers state gas sales data for each mine to determine the total amount of coal mine methane used from degasification systems. Although EPA works with every project, the program reports only 40 percent of the total reductions achieved, attributing 60 percent to the impact of the Energy Policy Act of 1992. In the future, the program will also report emissions reductions from ventilation air methane reduction projects.

In 2004, EPA will:

- Finalize and publish the report *Methane Emissions from Abandoned Coal Mines in the United States, Emissions Inventory Methodology*, and initiate additional efforts to support development of projects at abandoned mines.
- Work with CONSOL Energy and DOE to install and operate the first commercial-scale demonstration of ventilation air oxidation technology in the United States.
- Encourage greater CMM reductions in the western United States by working with DOE and the National Mining Association to implement their voluntary commitments to reduce CMM emissions under the President's Climate VISION initiative.

Table 4.
Methane Programs: Annual Goals and Achievements

	2003 Goal	2003 Achievement	2004 Goal
TOTAL REDUCTIONS (MMTCE)	10.6	11.5	11.1
LMOP			
Number of Projects	249	253	269
Annual Methane Reductions (MMTCE)	4.1	4.1	4.3
Natural Gas STAR			
Industry Participation (% in program)	62%	64%	65%
Annual Gas Savings (MMTCE)	4.8	5.7	5.0
CMOP			
Annual Methane Reductions (MMTCE)	1.7	1.7	1.8

Source: EPA Climate Protection Partnerships Division

METHANE PROGRAMS

AGRICULTURE-BASED PROGRAMS

Through outreach to agriculture-based organizations and farmers, EPA and the U.S. Department of Agriculture (USDA) work together to promote practices that reduce greenhouse gas emissions at U.S. farms. The programs collaborate with the nation's swine and dairy producers to encourage development of waste management systems that generate farm revenues while reducing water and air pollution. EPA provides technical information and tools to aid in the assessment and implementation of these projects.

In 2003, EPA and USDA:

- Coordinated development and implementation of anaerobic digestion funding mechanisms under the 2002 Farm Bill.
- Developed National Standards for Anaerobic Digestion technologies.
- Assisted swine and cattle producers in implementing projects that produced nearly 60 million kWh/year of renewable energy from farms capturing methane—energy then used by the farm and local community.
- Assisted states, including California and New York, in developing programs and policies for the broader deployment of methane-capturing technologies.

In 2004, EPA and USDA will:

- Continue the expansion of methane-reducing technologies in the livestock sector to help ensure clean water and air through implementation of the second year of Farm Bill funding under Section 9006 and hold extension events to market this opportunity.
- Conduct a national conference to provide state-of-the-art technical, environmental, program, market, and funding information on anaerobic digestion systems.
- Collaborate with state energy programs in the west, northeast, southeast, and midwest to facilitate the development of anaerobic digesters as renewable energy resources.
- Update the AgSTAR Handbook and develop the second version of FarmWare to provide farmers with the necessary guidance and tools to evaluate and successfully implement proven anaerobic digestion technology.

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

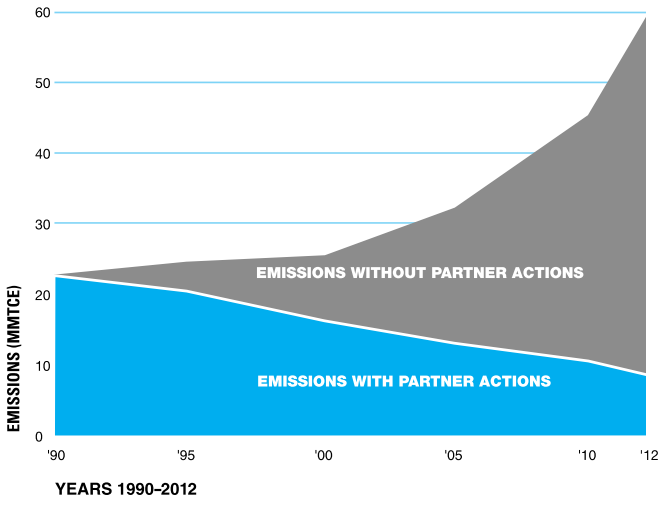
Public-private industry partnerships are substantially reducing U.S. emissions of the high global warming potential (GWP) gases that are released as byproducts of industrial operations. These partnerships involve various industries that are developing cost-effective improvements in their industrial processes to reduce emissions of perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6)—all particularly potent greenhouse gases. When compared ton-for-ton with CO_2, they trap much more heat in the atmosphere. PFCs and SF_6 also have very long atmospheric lifetimes (see Table 2). Despite the potential for sizable growth in high GWP greenhouse gas emissions, these partner industries are expected to maintain their emissions substantially below 1990 levels through the year 2012 (see Figure 9).

THE VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)

The primary aluminum producers are collaborating with EPA to reduce emissions of PFCs, which are a byproduct of the smelting process. The goal is to reduce perfluoromethane (CF_4) and perfluoroethane (C_2F_6) where technically feasible and cost effective. Since the partnership began in 1995, participating industries have had notable success in characterizing the emissions from their smelter operations and reducing overall emissions.

The Aluminum Association, representing 98 percent of primary aluminum production in the United States, has agreed to a direct carbon intensity reduction target of 53 percent from 1990 levels by 2010. The goal includes reductions in emissions of PFCs and CO_2 from the consumption of the carbon anode. As large energy consumers, the primary producers also agreed to continue their efforts to reduce indirect CO_2 emissions through continued energy efficiency improvements. The aluminum industry has been working to reduce greenhouse gas emissions for more than a decade, and this new commitment equates to an additional direct carbon intensity reduction of 25 percent beyond the 2000 achievement.

Figure 9.
Partner actions can maintain voluntary program sector emissions of high global warming potential gases at or below 1990 levels through 2012



Source: EPA Climate Protection Partnerships Division

The new commitment builds on the efforts of EPA's Voluntary Aluminum Industrial Partnership (VAIP). VAIP reduced PFC emissions by more than 45 percent in 2000 and by more than 60 percent in 2003, compared to the industry's 1990 baseline. The Aluminum Association will measure progress for the President's Climate VISION initiative based on data collected from its members and pledges to support climate protection through efforts to increase aluminum recycling and develop lightweight vehicles.

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

In 2003, the Voluntary Aluminum Industrial Partnership:

- Conducted smelter measurements at three partner facilities to complete the U.S. smelter-type data set and to validate past process-type measurements.
- Supported the International Aluminum Institute's efforts to develop a PFC smelter-specific measurement and training module that now serves as an industry-wide, self-supporting measurement program. It helps smelter managers around the world develop PFC emissions reduction strategies and improve the consistency and comparability of global emissions data.
- Completed a survey and evaluation of global smelter emissions measurement data. This evaluation expanded the database used to develop smelter-specific default emission factors needed by national governments and others to estimate PFC emissions from primary aluminum production.

HFC-23 EMISSION REDUCTION PROGRAM

Industry is working with EPA to reduce emissions of the potent greenhouse gas, HFC-23, which is generated as a byproduct in the manufacture of the refrigerant HCFC-22. Through this program, EPA encourages all U.S. producers of HCFC-22 to develop and implement technically feasible, cost-effective processing practices or technologies to reduce HFC-23 emissions.

Partners have reduced emissions of HFC-23 through process optimization and thermal destruction. Their efforts have helped significantly reduce the intensity of HFC-23 emissions (the amount of HFC-23 emitted per kilogram of HCFC-22 manufactured). Due to these efforts, emissions in 2003 were more than 5 MMTCE lower than they would have been at the 1990 emission intensity. In 2003, EPA partnered with 100 percent of the U.S. HCFC-22 producers to use process optimization and abatement to reduce production byproduct emissions of HFC-23—the most potent and persistent of the hydrofluorocarbons.

"In addition to efforts to reduce direct emissions of greenhouse gases, aluminum is also making key contributions to climate protection because it enables lower weight, fuel-efficient engines and parts to be built for cars and trucks as well as for highspeed rail and sea travel."

—*Industry Genius: Inventions and People Protecting the Climate*, 2003

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

THE PFC REDUCTION / CLIMATE PARTNERSHIP FOR THE SEMICONDUCTOR INDUSTRY

Since its inception in 1996, this partnership has been a catalyst for semiconductor companies in Europe, Japan, Korea, Taiwan, and the United States to jointly set the first global target for reducing greenhouse gas emissions. Collaborating with EPA, these companies have identified and implemented process changes and manufacturing tool improvements in the production of integrated circuits to reduce emissions of PFCs.

While the partnership's initial focus was on reducing PFC emissions from U.S. semiconductor fabrication plants, EPA and its industry partners quickly recognized the advantage of addressing this global environmental challenge through international cooperation. Seeking to maintain a "level playing field" for the many multinational partner companies, the partnership encouraged other nations' governments to develop similar voluntary initiatives. Japan was the second country to establish a voluntary partnership following a meeting organized by Japan's Ministry of International Trade and Industry and EPA in 1996. With the United States and Japan gaining momentum in coordinating PFC emissions reduction activities, the remaining major semiconductor producers including Europe, Korea, and Taiwan joined the effort soon thereafter.

In April 1999, the World Semiconductor Council (WSC), whose members include the national semiconductor industry associations of Europe, Japan, Korea, Taiwan, and the United States, announced a technically challenging goal to reduce PFC emissions by at least 10 percent below the 1995 baseline level by year-end 2010. The WSC's goal represents the first greenhouse gas emissions reduction target for an entire global industry. This type of aggressive goal setting reassures international governments, industry suppliers, and the public of the industry's commitment to protect the climate.

In 2003, the PFC Reduction / Climate Partnership for the Semiconductor Industry:

- Reduced absolute PFC emissions by 12 percent below 2002 levels. When accounting for the industry's new capacity and recovering production levels in 2003, the U.S. partners reduced their emissions intensity by roughly 20 percent.
- Continued seeking opportunities for the closely related technical fields of semiconductor and liquid crystal display (LCD) (i.e., flat panel display) manufacturing to exchange information and expedite PFC emissions reductions. EPA met with production equipment suppliers and the Plasma Etch User's Group to discuss technology transfer opportunities and encourage information sharing. In January 2003, the World LCD Industry Cooperation Committee, representing the leading LCD manufacturers from Japan, Korea, and Taiwan, announced the industry's goal to reduce PFC emissions to 0.82 MMTCE by 2010.
- Updated the semiconductor PFC emissions projection "vintage" model to reflect current production levels and manufacturing technologies. This model helps track the partnership's accomplishments, inform future planning, and support EPA's annual greenhouse gas inventory development and economic analyses.

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

SF_6 EMISSIONS REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS

Initiated in 1999, this partnership provides a forum for the electric power industry to work with the U.S. government on reducing sulfur hexafluoride (SF_6) emissions to levels that are technically and economically feasible by identifying and encouraging the adoption of best technologies and management practices.

SF_6 is used in the transmission of high-voltage electricity. Fugitive emissions from aging high-voltage equipment or improper service and maintenance practices contribute to greenhouse gas emissions. SF_6 Emissions Reduction partners are industry leaders, providing reliable power to customers in an environmentally responsible manner. The average emissions rate for partner companies dropped from 17 percent in 1999 to 10 percent in 2003.

In 2003, the SF_6 Emissions Reduction Partnership for Electric Power Systems:

- Developed an SF_6 reduction case study with partner company Pacific Gas & Electric (PG&E) highlighting PG&E's program strategy, activities, and the financial benefits of reducing SF_6 emissions.
- Collected and reviewed partner data on the most effective emissions reduction activities. This analysis contributed to the program's annual report and other information sharing activities.
- Expanded communications and recruiting materials with a new program information kit and an enhanced Web site.

SF_6 EMISSION REDUCTION PARTNERSHIP FOR THE MAGNESIUM INDUSTRY

The U.S. magnesium industry is working with EPA to identify and encourage the adoption of best management practices for reducing emissions of sulfur hexafluoride (SF_6), a long-lived and potent greenhouse gas. Launched in 1999, this partnership to reduce emissions from magnesium production and casting operations represents approximately 80 percent of the U.S. magnesium industry.

In 2003, the SF_6 Emission Reduction Partnership for the Magnesium Industry:

- Supported the President's Climate VISION initiative by announcing the partnership's climate protection goal of eliminating SF_6 emissions by the end of 2010.
- Expanded to 17 partner companies, representing 100 percent of primary magnesium production and 80 percent of domestic casting and recycling capacity.
- Collected the fourth set of annual SF_6 emissions reports from magnesium partners. Emissions estimates are reported using software designed by EPA with input from the partners. Partners have reduced their SF_6 emissions intensity by more than 5 percent since EPA launched the program in 1999.
- With support from partner company Intermet, 3M™, and Australia's CAST Research Centre, EPA completed the first independent measurement campaign to study emissions from SF_6-based cover gas and promising new alternative cover gas technologies used in a full-scale production setting. Both alternative cover gases, AM-Cover™ (HFC-134a) and Novec™ 612 (a fluorinated ketone) reduced greenhouse gas emissions by more than 99 percent compared to the traditional SF_6-based protection system. The results from this study were presented at the Metals, Minerals, and Materials Society's (TMS) annual meeting and the Earth Technologies Forum.

"With a global warming potential of 22,200, the elimination of a small amount of SF_6 can make a major difference in a company's greenhouse gas emissions. That is why the companies of the IMA decided to work together to reduce these emissions. With the coordination of IMA and the expertise of EPA, this partnership of competitive companies will work together to eliminate SF_6 emissions by the end of 2010."

—Helmut Brandt, President, International Magnesium Association

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

MOBILE AIR CONDITIONING CLIMATE PROTECTION PARTNERSHIP

"The Mobile AC Climate Protection Partnership is proving that voluntary programs can gain the support of the automotive industry when they involve the best technical experts and pursue performance-based solutions that reduce greenhouse gas emissions while maintaining or improving cooling performance, safety, and reliability."

—Ward Atkinson, Chair of the SAE Interior Climate Control Standards Committee and Co-Chair of the MAC Partnership

Under the Montreal Protocol for the Protection of the Ozone Layer, new vehicles worldwide have been redesigned to use HFC-134a refrigerants in air-conditioning systems rather than CFC-12. The production of CFC-12 refrigerants for use in developed countries was halted in 1996 and will be phased out globally by 2006. HFC-134a was the universal choice because it has no ozone depleting potential, has six times less global warming potential than CFC-12, is non-flammable, has low toxicity, and has cooling capacity and energy efficiency that can be made comparable to those of CFC-12 through engineering. Although HFC-134a has far less impact on the climate than the CFC-12 it replaced, it is still part of "the basket" of greenhouse gases whose emissions need to be reduced.

The Society of Automotive Engineers (SAE), the Mobile Air Conditioning Society Worldwide, and EPA have organized a global voluntary partnership to promote improved air-conditioning systems and service. This partnership includes environmental authorities from Australia, Canada, Europe, and Japan; environmental and industry non-government organizations (NGOs); and global vehicle manufacturers and their suppliers. Measures to improve the environmental performance of vehicle air-conditioning systems consider (1) both refrigerant and fuel consumption over the life of the vehicle, (2) consumer demand for reliable and affordable transportation, and (3) requirements for special safety systems and technician training.

The partnership has four goals:

- To promote cost-effective designs and improved service procedures to minimize emissions from HFC-134a systems.
- To cooperate on developing and testing the next generation of mobile air-conditioning systems that satisfy customer requirements and environmental, safety, cost, and reliability concerns.
- To communicate technical progress to policymakers and the public.
- To document the current and near-term opportunities for improving the environmental performance of mobile air-conditioning system design, operation, and maintenance.

In 2003, the Mobile Air Conditioning Climate Protection Partnership:

- Confirmed in laboratory testing that air-conditioning systems using CO_2, HFC-152a, and hydrocarbons can be designed to significantly reduce direct emissions of greenhouse gas refrigerant.
- Held meetings in Europe and North America, discussed the upcoming industry announcement, and helped organize the "2004 MAC Summit" in Washington, D.C. to provide the latest technical information to policymakers.
- Instituted the "Automotive Alternative Refrigerant Symposium" as an annual event to showcase technical presentations and road tests of prototype motor vehicles using the new alternative refrigerants HC, HFC-152a, and CO_2.

HIGH GWP ENVIRONMENTAL STEWARDSHIP PROGRAMS

In 2004, the High GWP Environmental Stewardship Programs will:

- Participate in the preparation of the IPCC National Greenhouse Gas Inventory Guidelines for Industrial Processes and Product Use.
- Begin "rolling changes" in the design of mobile air-conditioning systems to reduce greenhouse gas refrigerants by 50 percent and improve fuel efficiency by at least 30 percent, based on an expected announcement at the April 2004 MAC Summit.
- Attend the 2004 MAC Summit at which vehicle manufacturers intend to announce that they will work cooperatively to improve HFC-134a systems to reduce refrigerant greenhouse gas emissions by up to 50 percent and reduce fuel use for air-conditioning by up to 30 percent or more. It is estimated that these improvements will add $35 to $50 to the cost of producing new vehicles with payback in fuel savings within one or two years, and lifetime savings of over $400. By 2025, this technology will save 3.7 billion gallons of fuel in the United States and a comparable amount in the rest of the world. The Mobile Air Conditioning Partnership is developing a new strategy to promote these environmental and product improvements.
- Host the 3rd International Conference on SF_6 and the Environment in Scottsdale, Arizona, in December 2004.
- Conduct an SF_6 circuit breaker leak rate field study to evaluate the performance of new equipment.
- Continue implementing agreements to reduce greenhouse gas intensity for the aluminum, magnesium, and semiconductor sectors through the President's Climate VISION initiative.
- Maintain an effective partnership with HCFC-22 chemical manufacturers to reduce emissions of HFC-23.
- Continue to explore and document the performance of new vehicle air-conditioning designs.
- Carry out a follow-up study to characterize greenhouse gas emissions as well as workplace health and safety concerns associated with alternative cover gas technologies as applied to primary and/or secondary magnesium production.
- Prepare a report on practical emissions reduction strategies for small- and medium-sized semiconductor producers.
- Assess the impact of semiconductor production migration on Asian "foundry" operations and encourage countries with rapidly growing production such as China, Singapore, and Malaysia to join the World Semiconductor Council and establish PFC emissions reduction goals.
- Expand the stewardship programs to reduce high GWP emissions from other key sources, such as the ozone-depleting substance replacement industries.

TABLE 5.
Stewardship Programs: Annual Goals and Achievements

	2003 Goal	2003 Achievement	2004 Goal
TOTAL REDUCTIONS (MMTCE)	8.6	9.2	12.7
VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP			
Industry Participation (% in program)	96%	98%	98%
Reductions (MMTCE)	2.1	2.1	2.2
HFC-23 PARTNERSHIP			
Industry Participation (% in program)	100%	100%	100%
Reductions (MMTCE)[1]	4.9	5.6	7.6
OTHER STEWARDSHIP PROGRAMS			
Industry Participation (% in program)[2]	50%–100%	45%–100%	50%–100%
Reductions (MMTCE)	1.6	1.5	2.9

[1] *These goals have been adjusted downward to reflect lower than expected HCFC-22 production and the closure of one of the four U.S. HCFC-22 plants. The industry average HFC-23 emission factor actually declined more than expected.*

[2] *Participation varies from 45% of net generating capacity for electric power systems to 100% for primary magnesium producers.*

INTERNATIONAL CLIMATE PROTECTION AWARD WINNERS

In 1998, EPA established the Climate Protection Awards to recognize exceptional leadership, personal dedication, and technical achievements in protecting the Earth's climate. Since then, EPA has presented 93 awards to individuals and organizations from 16 countries, including Australia, Belgium, Brazil, Canada, Chile, China, France, India, Italy, Japan, Mexico, the Netherlands, South Korea, Sweden, the United Kingdom, and the United States. This year, 12 individuals and organizations earned the award by crafting international, national, state, and local policies; by reducing energy consumption; and by inventing technologies that protect the climate.

CORPORATE AND GOVERNMENT AWARDS

Interface, Inc.
Kennesaw, GA

Turbocor
Dorval, Canada

China Certification Center for Energy Conservation Products (CECP)
Beijing, China

New York State Energy Research and Development Authority (NYSERDA)
Albany, NY

City of San Diego
San Diego, CA

City and County of San Francisco
San Francisco, CA

European Commission Fluorinated Gas Team
Brussels, Belgium

ASSOCIATION AND TEAM AWARDS

Electrical Inverter Air Conditioning System Team
Kariya, Japan

SF_6 Emission Reduction Partnership for the Magnesium Industry and The International Magnesium Association
Wauconda, IL

INDIVIDUAL AWARDS

Mayor David B. Cohen
Newton, MA

Harry Kauffman, HK Energy Consulting Inc.
Lambertville, NJ

Julia Martinez, Instituto Nacional de Ecología
Mexico City, Mexico

BENEFITS OF VOLUNTARY PROGRAMS

ENERGY STAR and other voluntary programs have been very successful during their first decade. They have dramatically increased the use of energy-efficient products and practices and reduced emissions of carbon dioxide, as well as methane and other greenhouse gases with very high global warming potentials.

For the year 2003, these partnerships prevented 48.2 million metric tons of greenhouse gas emissions (in MMTCE)—equivalent to the annual emissions from 32 million vehicles—while helping Americans save more than $8.2 billion.

And the benefits from these programs extend well beyond the emissions reductions and dollar savings in the year 2003 alone. As the partnership programs spur investment in climate friendly technologies and the purchase of energy-efficient products, they create a stream of benefits that accrue over the lifetime of the investment or product. Overall, the benefits from the investments and product purchases of program partners and consumers through the year 2003 can be summarized as follows:

- More than 650 million metric tons of greenhouse gas emissions are being avoided through 2013.
- Consumers and businesses have locked in investments in energy-efficient technologies exceeding $16 billion.
- Net of the investments in energy-efficient technologies, consumers and businesses are saving more than $89 billion cumulatively through 2013.[10]

The benefits (see Table ES-1 on page 3) and how they are derived are described below for three key climate partnership program areas: ENERGY STAR, Methane Programs, and Environmental Stewardship Programs for the High GWP Gases.

ENERGY STAR. The estimated benefits from the ENERGY STAR program reflect the stream of energy savings that will persist through 2013 due to technology investments and product purchases made through the year 2003 by ENERGY STAR partners and due to the effects of markets already transformed. The persistence is calculated by maintaining the energy savings achieved in 2003 through the year 2013.[11] The underlying assumption is that the lifetime of most building improvements and product purchases is at least 10 years. For products with shorter lifetimes, such as computers, fax machines, and audio equipment, it means that once consumers buy ENERGY STAR qualified products, they are expected to replace them with ENERGY STAR qualified products. The benefits that can be attributed to pre-existing trends are subtracted out of the estimated ENERGY STAR benefits presented in this 2003 annual report. From these expected energy savings, benefits are determined in the following manner:

- Emissions prevented are calculated as the product of the energy savings (e.g., kWh of electricity) and an annual emission factor (e.g., MMTCE prevented per kWh).
- The energy bill savings are determined as the product of the energy saved and the cost of electricity for the affected market segment, residential or commercial.[12]
- The net present value (NPV) of these savings are calculated using a 4-percent discount rate and a 2003 perspective.[13]

[10] *Net economic benefits are calculated by estimating the savings in energy expenditures by partners and customers of ENERGY STAR qualified products and subtracting any additional capital expenditures necessary to purchase qualified products, upgrade to ENERGY STAR specifications, or change from general operating procedures.*

[11] *The energy savings for the year 2003 are estimated from information provided by the Division for the ENERGY STAR Building and Industrial Improvements program and by information provided by the Lawrence Berkeley National Laboratory for ENERGY STAR Qualified Products.*

[12] *The estimates for the retail cost of electricity are taken from the Energy Information Administration's (EIA's) Annual Energy Review for historic prices and from EIA's Annual Energy Outlook 2004 for prospective prices.*

[13] *The 4-percent discount rate used was taken from the Office of Management and Budget Circular 94.*

BENEFITS OF VOLUNTARY PROGRAMS

In addition, EPA estimates the NPV of expenditures on energy-efficient technologies based on the partners' or customers' cost of the energy-efficient equipment, including the cost of financing.[14] For ENERGY STAR qualified products, expenditures were taken as the incremental increase in cost, if any, of purchasing these products. For ENERGY STAR Building and Industrial Improvements, expenditures include the capital costs of upgrading a building to ENERGY STAR specifications. Finally, the NPV of the net savings is the difference between the NPV of energy bill savings and the NPV of expenditures. It represents the net value to partners and ENERGY STAR product consumers of participating in the program.

The estimated benefits for the ENERGY STAR Program from 1993 to 2013 are as follows:

Qualified Products

- Preventing 122 MMTCE in greenhouse gas emissions.
- Catalyzing investment of $3.1 billion in climate friendly technologies.
- Providing energy bill savings net of investment of $44.5 billion.

Building and Industrial Improvements

- Preventing 209 MMTCE in greenhouse gas emissions.
- Catalyzing investment of $9.6 billion in climate friendly technologies.
- Providing energy bill savings net of investment of $42 billion.

Methane Programs. The benefits for programs with a small number of partners, such as Natural Gas STAR and Landfill Methane, are calculated on a project-by-project basis from the list of projects that the programs are known to have affected. Energy bill savings include the revenue from the sale of methane and/or the sale of electricity made from the captured methane. The expenditures include the capital costs agreed to by partners to bring projects into compliance with the Methane Programs' specifications and any additional operating costs engendered by program participation. Both energy bill savings and technology expenditures have been placed in net present value terms. These programs are estimated to have the following benefits from 1993 through 2013:

- Preventing 171 MMTCE in greenhouse gas emissions.
- Catalyzing $3.4 billion in investment in climate friendly technologies.
- Providing energy bill savings net of investment of $3.0 billion.

Environmental Stewardship Programs for the High GWP Gases. The benefits for these programs are derived from direct partner reports of the greenhouse gas emissions the partners have avoided. Program partners are expected to maintain their investments in technologies and practices through 2013. Expenditures and financial savings in the Environmental Stewardship Programs are proprietary and are not included in the summary of economic benefits and expenditures. The programs are estimated to have the following benefits from 1993 through 2013:

- Preventing 144 MMTCE in greenhouse gas emissions.

[14] *The NPV of these expenditures was calculated using a 4-percent real discount rate and a 2003 perspective.*

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FIGURES AND TABLES

COMPANIES AND ORGANIZATIONS MENTIONED IN THIS REPORT

COMPANIES AND ORGANIZATIONS MENTIONED IN THIS REPORT

United States
Environmental Protection Agency
Air and Radiation 6202J
EPA 430-R-04-011
www.epa.gov
September 2004

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