United States Environmental Protection Agency
Air and Radiation 6202J
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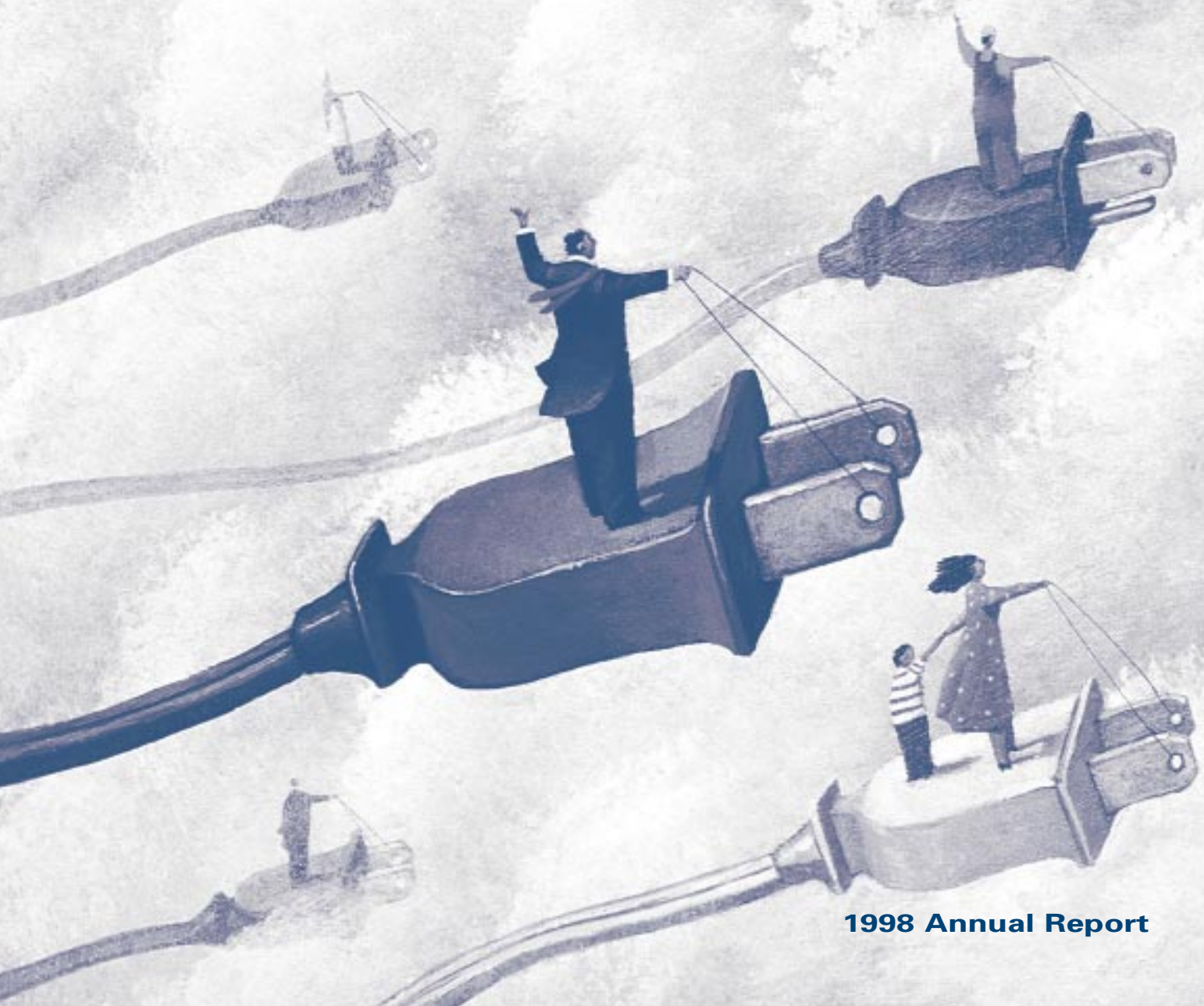
Climate Protection Division

Driving Investment in Energy Efficiency

Energy Star® and Other Voluntary Programs



1998 Annual Report

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

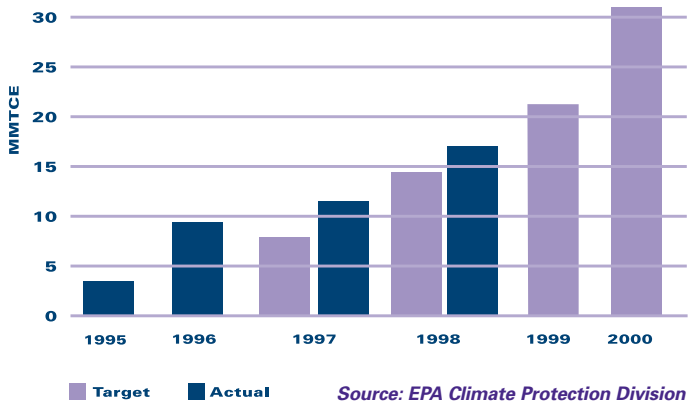
Executive Summary

In partnership, American organizations, businesses, consumers, and the Climate Protection Division (CPD) of the US Environmental Protection Agency (EPA) are successfully reducing emissions of greenhouse gases (GHGs) that contribute to global climate change.

Through voluntary programs that promote cost-effective energy efficiency and GHG emissions reductions, the Division forges partnerships with private and public organizations. These partnerships capitalize on the nation's technological creativity. They are transforming markets by enhancing demand for energy-efficient products and services across all sectors of the economy, driving investment in energy efficiency, and saving consumers and organizations money on energy bills. Many of the improvements catalyzed by the partnerships will provide both environmental and economic benefits for the next 10 to 20 years.

The Climate Protection Division continues to have great success with its partnership programs. In 1998, the Division exceeded its key goal—the Climate Change Action Plan (CCAP) carbon-reduction goal of 14.6 million metric tons of carbon equivalent (MMTCE). The Division remains on target to meet its goal for 2000 (see Figure ES1).

Figure ES1. Division carbon reductions compared with CCAP targets



Source: EPA Climate Protection Division

This annual report summarizes the environmental and economic results from the partnership programs of the Climate Protection Division through the end of 1998:

- ENERGY STAR Buildings℠ and Green Lights®
- ENERGY STAR®-Labeled Products
- Methane Partnerships
- Environmental Stewardship Programs

The major economic and environmental achievements across these voluntary programs through 1998 include the following:

- Annual reductions of GHG emissions totaled 17 MMTCE[1] in 1998—a 40-percent increase over the 1997 emissions reductions.
- Sulfur dioxide (SO_2) emissions were reduced by about 130,000 tons in 1998, while emissions of nitrogen oxides (NO_x) were reduced by about 70,000 tons.
- Cumulative investment in energy-efficient technologies exceeded $4 billion.
- Cumulative energy bill savings for consumers and businesses amount to more than $18 billion.
- The cost of the Division's voluntary programs to the government continues to represent a small percentage of the total investment resulting from the programs—6.3 percent.
- The net increase in economic activity (in effect, the amount of cash added to the economy), which is the difference between cumulative energy bill savings and investment in energy-efficient technologies, amounts to more than $14 billion.
- Program partners' commitments for additional investments will result in further reductions of carbon emissions totaling 146 MMTCE through 2015, cumulative energy bill savings of $23.9 billion, and a net increase in economic activity of more than $19 billion.

Some of the key accomplishments of CPD's programs in 1998 include the following:

- ENERGY STAR Buildings participants represented over 8 billion square feet or 13 percent of the total commercial, public, and industrial building market. They upgraded 3.8 billion square feet, saved nearly 12 billion kWh of energy, prevented emissions of 2.4 MMTCE, and saved over $802 million on utility bills, in 1998 alone.
- EPA and the US Department of Energy (DOE) piloted a performance-based award—the ENERGY STAR Label for Buildings—to help building owners identify properties with the greatest potential for energy-efficiency improvements and to recognize top-performing buildings.
- More than 1,200 manufacturers produced a total of 3,400 individual product models in 29 consumer product categories that were ENERGY STAR compliant; use of these products prevented emissions of 4.0 MMTCE and saved $1.8 billion in 1998.
- Over 900 partnerships achieved reductions of non-carbon dioxide (CO_2) gases—methane, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6)—totaling more than 10.5 MMTCE.

[1] *Reductions in annual greenhouse gas emissions for all CPD programs, including non-CO_2 gases, are expressed in "carbon equivalents" as defined by the Intergovernmental Panel on Climate Change (IPCC).*

The Division's partnership programs reduce GHGs by promoting cost-effective, energy-efficient technologies and practices. The programs drive investment, deliver cost savings, and enhance economic activity. Environmental and economic benefits from these investments will continue well beyond 1998. Many of the investments resulting from the partnership programs have 10- to 15-year lifetimes, and key benefits for the next decades are being "locked in" now.

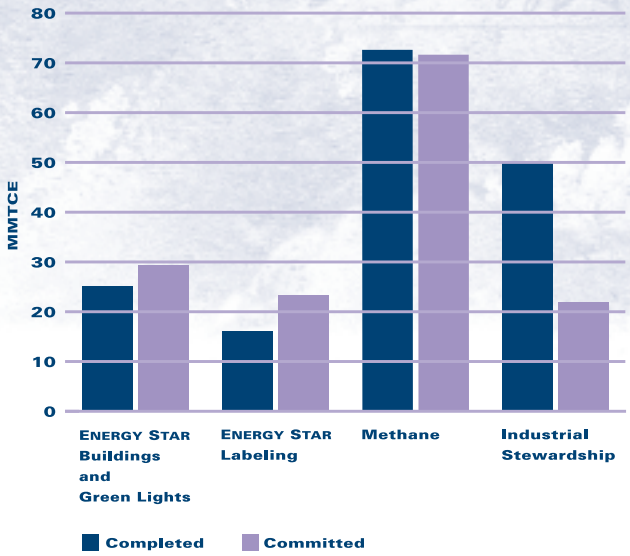
These locked-in benefits through 2015 total:

- **GHG reductions.** 163 MMTCE from completed projects and an additional 146 MMTCE from partner commitments to additional projects.
- **Energy bill savings.** $18.8 billion in bill savings from completed projects and an additional $23.9 billion in bill savings from partner commitments to additional projects.
- **Technology investments.** $4.1 billion in technology expenditures on completed projects and an additional $4.8 billion in technology expenditures from partner commitments to additional projects.
- **Economic activity.** A $14.6 billion net increase in economic activity from completed projects and an additional $19 billion net increase in economic activity from partner commitments to additional projects.

Figures ES2 through ES5 show the distribution of these benefits across the voluntary partnership programs.

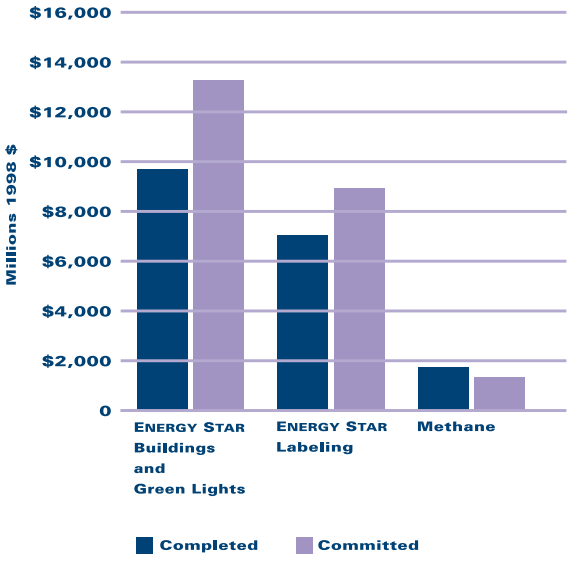
The partnership programs continue to successfully leverage investments in energy efficiency by providing their partners with information, motivation, and tools to help them choose better investments. EPA does not provide financial subsidies to its partners.

Figure ES2. Total GHG emissions prevented to 2015



Source: EPA Climate Protection Division

Figure ES3. Total energy bill savings to 2015



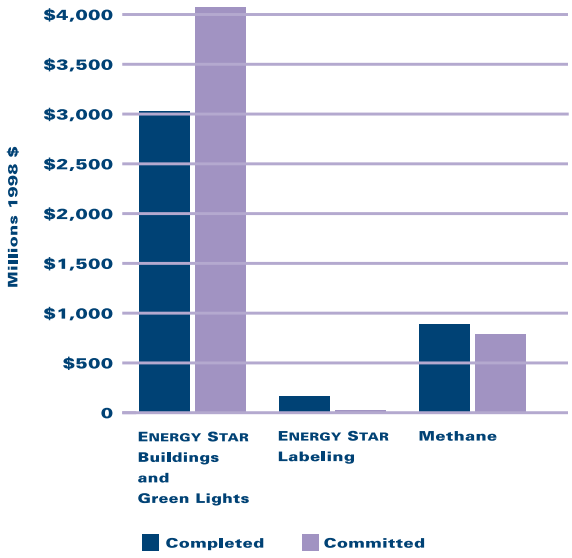
Source: EPA Climate Protection Division

Every federal dollar spent on partnership programs through 1998 means:

- Reductions in GHG emissions of more than 0.6 metric tons of carbon equivalent (2.2 tons of CO_2).
- Savings for partners and consumers of about $75 on their energy bills.
- The creation of $16 in private sector investment.
- The addition of over $58 into the economy.

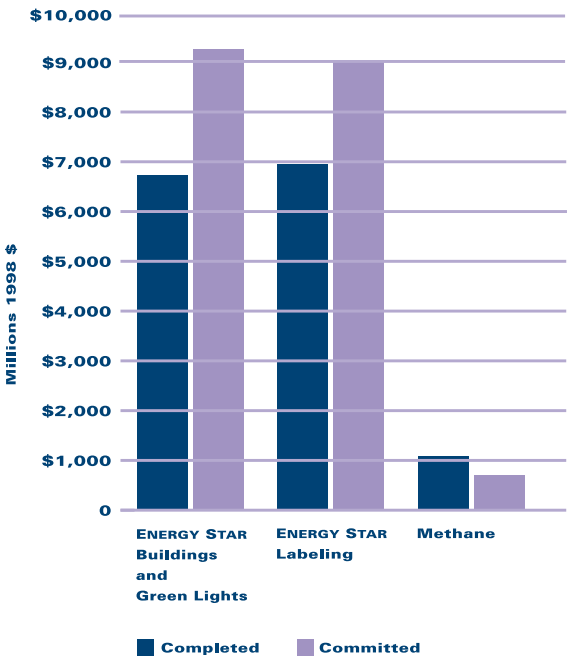
These results are based on the investments, savings, and emissions reductions associated with projects that program participants completed through the end of 1998. As mentioned previously, investments, savings, and environmental benefits of the same order of magnitude will be realized as a result of additional commitments partners have already made.

Figure ES4. Total expenditure on technologies to 2015



Source: EPA Climate Protection Division

Figure ES5. Net increase in economic activity to 2015



Source: EPA Climate Protection Division

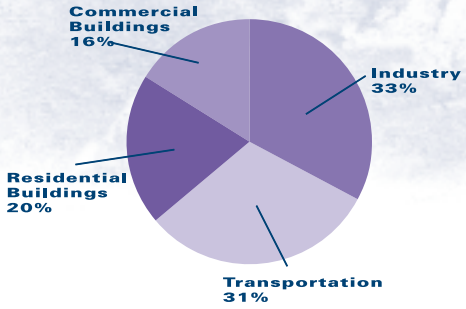
INTRODUCTION

Voluntary Partnerships Save Energy and Prevent Pollution

Protecting our environment is a compelling reason to improve the way we use energy—or more specifically, eliminate the waste in our energy system. Approximately 85 percent of the energy consumed in the United States is produced through the combustion of fossil fuels. As they burn, fossil fuels emit carbon dioxide (CO_2)—the major greenhouse gas (GHG) that contributes to global climate change (see below)—as well as harmful pollutants such as nitrogen oxides (NO_x) and sulfur dioxide (SO_2).

Roughly one-third of the CO_2 emissions come from industry, one-third from commercial and residential buildings, and one-third from transportation (see Figure 1). Technologies available today can cut this energy use significantly and, at the same time, improve our quality of life. EPA's voluntary public-private partnerships promote the widespread use of today's technologies to save energy and reduce emissions of greenhouse gases and other air pollutants across many sectors of the economy.

Figure 1. Carbon dioxide emissions by source



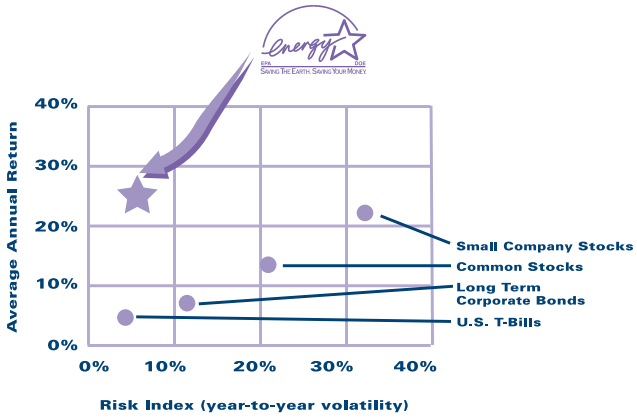
Source: EPA 1998

Global Climate

The earth's land surface, flora and fauna, oceans, and atmosphere absorb energy from the sun. Over time, a balance occurs between this incoming energy and outgoing radiation (long-wave, invisible, infrared energy or heat). Greenhouse gases, among them carbon dioxide (CO_2) and methane, trap the outgoing heat (energy) in the atmosphere. Since the Industrial Revolution, concentrations of CO_2 in the atmosphere have risen about 30 percent. As human and natural activities produce ever more greenhouse gases, the composition of the Earth's atmosphere is changing as is the balance between incoming and outgoing heat energy. The earth's atmosphere is gradually warming.

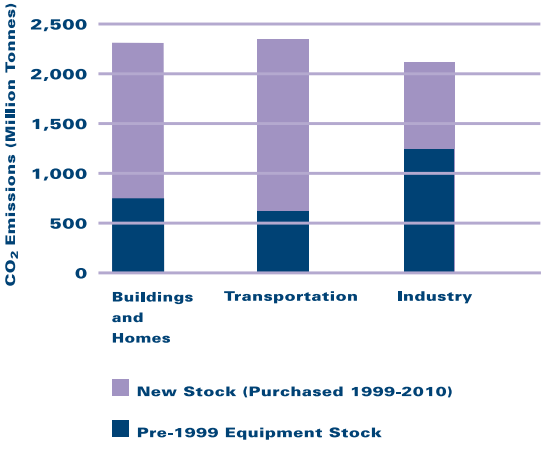
Scientific models predict that the average global temperature will increase 2 to 6 degrees Fahrenheit in the coming 100 years. The Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) noted: "Increasing concentrations of greenhouse gases will raise atmospheric and oceanic temperatures and could alter associated weather and circulation patterns." IPCC is composed of more than 2,000 of the world's leading climate scientists; its peer-reviewed reports are the most widely accepted.

Figure 2. Energy efficiency is a superior investment



Source: Richards et al., 1998

Figure 3. Large opportunity to direct investment to efficient and clean technologies over the next decade



Source: EPA Climate Protection Division

The Importance of Managing Energy

American families and businesses spend over $500 billion each year on energy bills—more than we spend on K-12 education. Energy consumption in the United States has almost tripled since 1950. A growing, mobile population has come to expect more goods and services—more equipment, homes, office buildings, industries, and vehicles. Operating all of these takes energy.

As a nation, we could use energy more efficiently. Numerous studies indicate that greater use of existing energy-efficient technologies can cut energy bills, enhance economic growth, and reduce GHG emissions.

The Division's partnership programs capitalize on the tremendous opportunity for consumers, businesses, and organizations to make smarter equipment purchasing and investment decisions. Thousands of equipment purchases are made every day. People tend to buy the equipment that is the least efficient, thereby committing themselves to higher energy bills for the next 10 to 20 years, depending on the life of the equipment. At the same time, buyers overlook the investment opportunities represented by the more efficient equipment—investment opportunities with more than double the return on investment of other common options, such as money markets or US Treasury bonds (see Figure 2).

Turning the Environmental Challenge into Profitable Opportunities

In the next decade, the nation can capitalize on extensive opportunities to reduce GHG emissions as buyers replace outdated equipment and products as part of normal business operations. More than 60 percent of the CO_2 emissions in the United States in 2010 will be from equipment purchased between now and then (see Figure 3). If the new equipment is energy efficient, it can have a dramatic impact on overall US CO_2 emissions, especially in the buildings/homes and transportation sectors of the economy .

Through its partnership programs—ENERGY STAR Buildings and Green Lights, ENERGY STAR-Labeled Products, Methane Partnerships, and Environmental Stewardship Programs—the Division will continue to deliver the information that organizations and consumers need to choose energy-efficient solutions.

By adopting existing energy-efficient technologies and practices, businesses and individuals can simultaneously lower costs and prevent associated GHG emissions.

- If everyone in the country bought only energy-efficient products marked with the ENERGY STAR label during the next 15 years, the nation would slash its cumulative energy bill by more than $100 billion and reduce carbon emissions by more than 380 MMTCE.
- If all commercial and industrial building owners implemented the ENERGY STAR Buildings strategy, they would shrink their cumulative energy bill by $130 billion by 2010 and reduce GHG emissions by more than 350 MMTCE, eliminating emissions equivalent to those produced by 20 million–30 million cars.

Major opportunities also exist to prevent emissions of other greenhouse gases that ton-for-ton trap more heat in the atmosphere than does CO_2 (see Table 1). Industries—such as semiconductor manufacturing, aluminum smelting, natural gas production, and coal mining—are collaborating with EPA to reduce emissions of methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

EPA's partnership programs are a key component of a successful approach to mitigating climate change while accelerating economic growth. Investments in energy efficiency will continue to pay off in the coming decades in energy savings, increased profits, net reductions in GHG emissions, and lower emissions of other air pollutants, including NO_x and particulates.

Table 1. Numerical Estimates of Global Warming Potentials Compared with Carbon Dioxide

Gas	Direct Effect for 100 Years
Carbon Dioxide	1
Methane	21
Nitrous Oxide	310
Hydrofluorocarbons	140–11,700
Perfluorocarbons	6,500–9,200
Sulfur Hexafluoride	23,900

Source: IPCC 1996.

Voluntary Partnerships Overcome Market Barriers

EPA has designed its voluntary energy-efficiency programs with the long-term goal of transforming the market for products and services that are both energy efficient and cost effective. These programs are sustained efforts to increase the supply of, and demand for, profitable energy-efficient technologies and practices. The Division's efforts include raising the awareness of consumers and business owners about the financial and environmental benefits of energy efficiency.

EPA's approach to transforming and enhancing markets involves both supply- and demand-side strategies. For example, on the supply side, the ENERGY STAR Labeling program stimulates product innovation by specifying energy performance benchmarks for a growing array of products (e.g., copiers, computers, consumer audio equipment, and residential heating, ventilating and air-conditioning (HVAC), and light fixtures). Through its ENERGY STAR label recognition campaign, this program also stimulates demand for labeled products.

ENERGY STAR Buildings focuses on overcoming demand-side market barriers—engaging private companies and public agencies to pursue cost-effective, energy-efficiency measures in their buildings. It also seeks to improve the services that building owners are offered though its ENERGY STAR Buildings ally effort.

Methane outreach focuses on specific market opportunities, such as the development of profitable landfill-gas-to-energy (LGTE) projects.

Bottom-line Benefits

The Energy Cost Savings Council is a coalition of manufacturers, utilities, industry groups, and government agencies working to educate American business leaders on the bottom-line benefits of upgrading buildings with new electrical technologies. Recently, the Council cosponsored a survey with *CFO Magazine* that drew 275 responses from subscribers. Respondents said they had the least amount of control over electrical energy costs compared to seven other typical expenses such as labor, travel, and rent. That suggests the top financial officers may be overlooking opportunities to reduce energy costs because they assume they have relatively little control over them.

Despite the financial attractiveness of these more efficient technologies and practices, many of them have not penetrated the market as much as one might expect given their financial returns. There is clear evidence that their potential is not being realized in the current market system because of various informational, institutional, organizational, and other barriers that work against the diffusion of existing energy-efficient technologies and the development of advanced technologies. Information about these technologies must flow more quickly through the marketplace, and a variety of split incentives (i.e., the buyer is not the builder; the tenant is not the owner) must be more effectively addressed.

Programs like EPA's ENERGY STAR Buildings and Green Lights Partnership, ENERGY STAR Labeling, and ENERGY STAR Homes are working with industry to overcome these market weaknesses. The programs provide partners and consumers with technical assistance, software tools, and objective information on financing options, life-cycle costs versus purchase price, and new energy-efficient products.

Removing the barriers to the diffusion of energy-efficient products causes a substantial ripple effect that enhances the potential for energy-efficient technologies. First, overcoming the barriers against today's technologies will improve the manufacturers' incentive to invest in the R&D needed for the next generation of technologies. This, in turn, will lead to new technologies that expand the potential for future energy savings. Second, as sales and production experience with efficient technologies increase, the costs of production generally fall, reducing the cost of the technology to the end-user. This "learning by doing" improves the cost-effectiveness of energy-efficient technologies and expands the potential for GHG reductions.

The Division continually evaluates the success of its voluntary programs, improving their effectiveness over time and identifying opportunities for new initiatives. One such initiative, the ENERGY STAR Label for Buildings, provides valuable recognition to buildings that operate within the top quartile of energy efficiency for a specific building type (e.g., office buildings or schools). In this endeavor, the Division is collaborating with EPA's Indoor Environments Division to promote the dual benefits of energy efficiency and indoor air quality, particularly in the nation's schools.

The remainder of this 1998 Annual Report discusses the Climate Protection Division's partnership programs in more detail. Included are the major program achievements through 1998, program investments and benefits, annual emissions reductions compared with annual goals, partner success stories, and examples of public outreach efforts.

A WORD FROM OUR ENERGY STAR PARTNERS

KIEL HEATING AND AIR CONDITIONING

By joining forces with manufacturers of ENERGY STAR-labeled HVAC equipment, dealers are increasing sales volume, saving customers money on their utility bills, and helping reduce air pollution associated with energy use. New Jersey dealer Milton Baum considers ENERGY STAR a great way to differentiate his business from the competition. His Kiel Heating and Air Conditioning firm caters exclusively to the residential market. Mr. Baum first learned about ENERGY STAR-labeled products through a national HVAC dealer membership organization. He then attended a 2-hour EPA training session to learn how to market the financial benefits of ENERGY STAR-labeled equipment to customers. "The tools provided by EPA have been great. They really show other dealers and consumers what the actual savings of ENERGY STAR-labeled heating and cooling equipment can be,"says Mr. Baum.

PIPCO A/C & HEATING

Honeywell/GE Capital ENERGY STAR

Consumers are realizing that, with the help of the Honeywell/GE Capital ENERGY STAR loan, they can purchase energy-efficient heating and cooling systems that offer improved home comfort, reduced utility bills, and increased home resale value. This loan offers fixed payments with interest rates as low as 11.9 percent, terms of up to 60 months, and financing up to $10,000 for qualifying ENERGY STAR-labeled products. According to Vince Pipetone, the owner of Pipco A/C & Heating in Timonium, Maryland,"One of the greatest merits of the Honeywell/GE Capital ENERGY STAR loan is its convenience to the customer. The credit decision is quick and there is no paperwork for the customer or dealer." For Mr. Pipetone and his staff, selling high-efficiency equipment is a key business strategy. His clients get a brand new, energy-efficient system, low interest-rate financing, and lower utility bills, which makes the investment "a lot easier to swallow," he says.

1998 Achievements

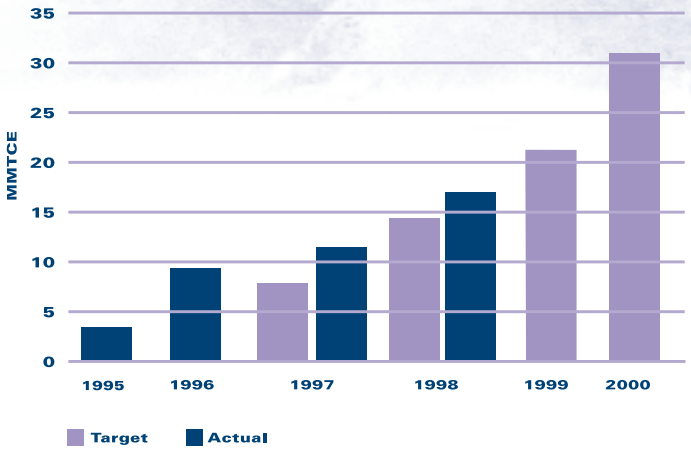
EPA's Climate Protection Division has continued "identifying and implementing low-cost and profitable opportunities to reduce emissions of greenhouse gases," as set out by the Clinton Administration's 1993 *Climate Change Action Plan (CCAP)*. 1998 was an outstanding year for the Division. Its voluntary programs exceeded the reduction targets of 14.6 MMTCE set by CCAP, achieving total carbon reductions of 17 MMTCE (see Figure 4).

At the same time that they cut greenhouse gas emissions, the programs lowered emissions of other pollutants. Sulfur dioxide (SO_2) emissions were reduced by about 130,000 tons, while emissions of nitrogen oxides (NO_x) were reduced by about 70,000 tons (see Figure 5).

The work accomplished by all of the Division's voluntary programs through 1998 yielded these achievements:

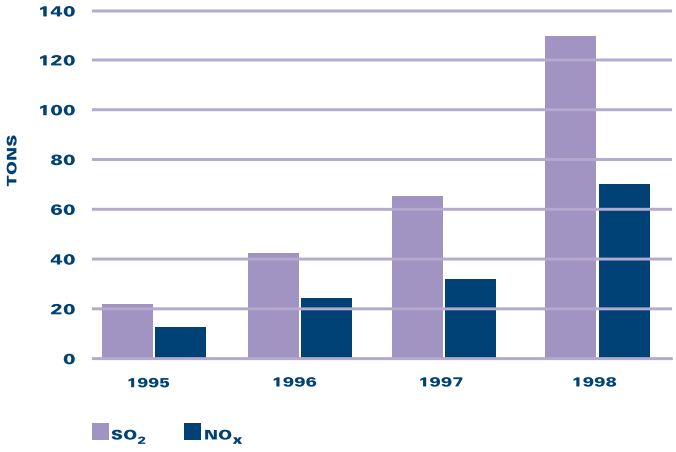
- Annual reductions of GHG emissions totaled 17 MMTCE in 1998—a 40-percent increase over last year's emissions reductions.
- Cumulative investment in energy-efficient technologies exceeded $4 billion.
- Cumulative energy bill savings amount to more than $18 billion for consumers and businesses.
- The low cost of the programs to the government continues to represent a small percentage of the total investment resulting from the programs—6.3 percent.
- The net increase in economic activity (in effect, the amount of cash added to the economy), which is the difference between cumulative energy bill savings and investment in energy-efficient technologies, amounts to more than $14 billion.
- Additional project commitments made by program partners will result in further reductions of carbon emissions totaling 146 MMTCE through 2015, cumulative energy bill savings of $23.9 billion, and a net increase in economic activity of more than $19 billion.

Figure 4. Division carbon reductions compared with CCAP targets



Source: EPA Climate Protection Division

Figure 5. Division SO_2 and NO_x reductions



Source: EPA Climate Protection Division

Key program accomplishments in 1998 include the following:

- ENERGY STAR Buildings participants represented over 8 billion square feet or 13 percent of the total commercial, public, and industrial building market. They upgraded 3.8 billion square feet, saved nearly 12 billion kWh of energy, prevented emissions of 2.4 MMTCE, and saved over $802 million on utility bills.
- A total of 3,400 individual product models in 29 consumer product categories were ENERGY STAR compliant; use of these products prevented emissions of 4.0 MMTCE and saved $1.8 billion in 1998.
- More than 1,200 manufacturers produced ENERGY STAR-labeled products, and over 3,500 retail stores nationwide actively promoted ENERGY STAR products.
- More than 33 utilities serving over 28 million households partnered with ENERGY STAR to promote compliant appliances, windows, HVAC, and consumer electronic equipment.
- EPA and the US Department of Energy (DOE) piloted a performance-based award—the ENERGY STAR Label for Buildings—to help building owners identify properties with the greatest potential for energy-efficiency improvements and to recognize top-performing buildings.
- More than 920 ENERGY STAR Homes builder partners in 50 states participated in profitable energy-efficiency opportunities; a total of more than 5,000 new homes with an ENERGY STAR label averaged energy reductions of over 35 percent.
- Annual reductions of non-CO_2 GHGs—methane, HFCs, PFCs, and SF_6—from over 900 partnerships totaled more than 10.5 MMTCE.
- Awards were presented to 37 top performers across the programs (see pp. 15-16).

Leveraging Federal Dollars

Every federal dollar spent on these partnership programs through 1998 means:

- **Reductions in GHG emissions of more than 0.6 metric tons of carbon equivalent (2.2 tons of CO_2).**
- **Savings for partners and consumers of about $75 on their energy bills.**
- **The creation of $16 in private sector investment.**
- **The addition of over $58 into the economy.**

Voluntary Program Investments and Benefits

EPA's partnership programs drive investment in energy efficiency, which enhances economic activity. They deliver cost savings to consumers, public agencies, organizations, and businesses. The programs also reduce GHGs by promoting cost-effective, energy-efficient technologies and practices. The economic and environmental benefits of the programs' investments will continue well into the next decades. In Table 2, the benefits are presented through 2015 for completed and committed projects.[2]

Table 2. Program Investments and Benefits (in millions of 1998 dollars)

Partners' Completed Investments[1]

	Bill Savings[3]	Technology[4] Expenditures	Net savings[5]	MMTCE[6]
ENERGY STAR Buildings & Green Lights	$9,772.845	$3,061.300	$6,711.545	25.1
ENERGY STAR-Labeled Products	$7,161.403	$204.863	$6,956.540	16.1
Methane Partnerships	$1,867.447	$844.163	$1,023.284	72.1
Environmental Stewardship Programs	– –	N/A	– –	50.2
TOTAL	$18,801.695	$4,110.326	$14,691.369	163.5

Partners' Committed Investments[2]

	Bill Savings[3]	Technology[4] Expenditures	Net savings[5]	MMTCE[6]
ENERGY STAR Buildings & Green Lights	$13,376.602	$4,111.858	$9,264.744	29.4
ENERGY STAR-Labeled Products	$9,008.442	$8.225	$9,000.217	23.4
Methane Partnerships	$1,549.793	$763.254	$786.539	71.8
Environmental Stewardship Programs	– –	N/A	– –	21.8
TOTAL	$23,934.837	$4,883.337	$19,051.500	146.4

– – : Not applicable.
N/A: Not available.
1-6: See end notes on page 35.

2 *For example, ENERGY STAR Buildings partners commit to implementing whole-building upgrades over a 7-year period. For purposes of its evaluation, CPD assumes that these commitments will be met. Even though new partners are certain to join between now and 2015, CPD does not take credit for environmental or economic benefits from prospective partners.*

The end notes to this Annual Report (see page 35) provide detailed documentation of the evaluation methodology and the assumptions used in measuring the performance of these voluntary programs. A few key methodological concepts and assumptions are summarized below.

Emissions Prevented. Most of the Division's programs focus on energy efficiency. For these programs, CPD estimated the expected reduction in electricity consumption in kilowatt hours (kWh). Emissions prevented are calculated as the product of kWh of electricity saved and an emission factor (e.g., MMTCE prevented per kWh). Other programs focus on directly lowering GHG emissions (e.g., Natural Gas STAR, Landfill Methane Outreach, and Coalbed Methane Outreach). These GHG emission reductions were estimated on a project-by-project basis.

Expenditures on Energy-Efficient Technology. For most of its programs, the Division's estimate of expenditures on energy-efficient technology is based on the partners' capital cost of energy-efficient equipment, including the cost of financing.[3] For the Product Labeling and Homes Programs, however, expenditures on energy-efficient technology are based simply on the purchase price of labeled products.

Energy Bill Savings. Energy bill savings are calculated as the product of the kWh of energy saved and the average cost of electricity.

Net Increase in Economic Activity. This is the difference between energy bill savings and investment in energy-efficient technology. Simply put, it is the increase in the amount of money partners have available to invest in the economy as a result of participating in the Division's programs.

Many of the investments resulting from the partnership programs have 10- or 15-year lifetimes, and key benefits over the next 10 to 15 years are being "locked in" now. This analysis shows the locked-in benefits from only those efficiency improvements that current partners have completed (or, in the case of ENERGY STAR-labeled products, products that have already been purchased[4]) or have committed to complete (e.g., by signing an ENERGY STAR Buildings Memorandum of Understanding). It is certain that over time, more businesses will join these partnerships and that ENERGY STAR-labeled products will continue to penetrate markets; however, the figures in Table 2 do not forecast the environmental and economic benefits for actions not already locked in.

[3] *CPD assumes that equipment purchases are financed at a 7-percent real rate of interest by private sector partners and a 4-percent real rate of interest by public sector partners.*

[4] *In the case of ENERGY STAR Office Equipment, EPA estimated environmental and economic benefits for one more product cycle (product cycles range from 4-6 years, depending on the specific product), but assumed conservatively that the rate of market penetration would remain unchanged from 1998.*

1998 Award Winners

ENERGY STAR Labeling

Exit Sign Partner of the Year	*Lithonia Emergency Lighting, Decatur, GA*
Imaging Partner of the Year	*Ricoh Corporation, West Caldwell, NJ*
Computer Partner of the Year	*IBM Corporation, Poughkeepsie, NY*
Home Electronics Partner of the Year (tie - 2)	*Panasonic Communications & Systems Co, Mahwah, NJ* *Sony Electronics, Inc., Park Ridge, NJ*
National Windows Partner of the Year*	*Andersen Corporation, Bayport, MN*
Regional Windows Partner of the Year (2)*	*Soft-Lite L.L.C.,Bedford, OH* *Windowmaster Products, El Cajon, CA*
National Windows Retailer of the Year*	*The Home Depot, Atlanta, GA*
Appliance Partner of the Year*	*Whirlpool Corporation, Benton Harbor, MI*
Appliance Leadership Award*	*Maytag Corporation, Washington, DC*

**DOE ENERGY STAR Labeling and Retail*

ENERGY STAR Homes

Utility of the Year (2)	*Conectiv Power Delivery, Wilmington, DE* *Joint Management Council/Conservation Services Group, Boston, MA*
Manufacturer of the Year	*Andersen Windows, Bayport, MN*
Technical Support Provider of the Year	*Energy Rated Homes of the Midwest, Indianapolis, IN*
State or Local Government Agency of the Year	*Florida Solar Energy Center, Cocoa, FL*
Special Recognition Awards (4)	*Energy Diagnostics, Valparaiso, IN* *Energy Rated Homes of Utah, Orem, UT* *Energy Services Group, Wilmington, DE* *Florida HERO, Newberry, FL*

ENERGY STAR Buildings and Green Lights Partnership

ENERGY STAR Buildings Corporate Partner of the Year	*Polaroid Corporation, Waltham, MA*
ENERGY STAR Buildings Government Partner of the Year	*Broward County, Fort Lauderdale, FL*
ENERGY STAR Buildings Healthcare Partner of the Year	*New York Office of Mental Health, Albany, NY*
ENERGY STAR Buildings Education Partner of the Year	*Wake County Public School System, Raleigh, NC*
ENERGY STAR Buildings Retail Partner of the Year	*Mervyn's California, Hayward, CA*
Green Lights Corporate Partner of the Year	*Boeing Company, Seattle, WA*
Green Lights Government Partner of the Year (2)	*State of Ohio, Columbus, OH* *Mercer County, NJ*
Green Lights Healthcare Partner of the Year	*Northern Illinois Medical Center, McHenry, IL*
Green Lights Education Partner of the Year	*University of Virginia, Charlottesville, VA*
Green Lights Retail Partner of the Year	*Staples, Framingham, MA*
ENERGY STAR Buildings Ally of the Year Facilities >100,000 sq. ft.	*Johnson Controls, Inc., Milwaukee, WI*
ENERGY STAR Buildings Ally of the Year Facilities <100,000 sq. ft.	*CEC Consultants, Inc., Cleveland, OH*
Green Lights Ally of the Year	*Amtech Lighting, Anaheim, CA*

Natural Gas STAR

Production Sector Partner of the Year	*Mobil Exploration and Producing US, Houston, TX*
Transmission Sector Partner of the Year	*Enron - Gas Pipeline Group, Houston, TX*
Distribution Sector Partner of the Year	*Brooklyn Union Gas Company, Brooklyn, NY*

Partnership Programs

Energy Star for Commercial and Industrial Buildings

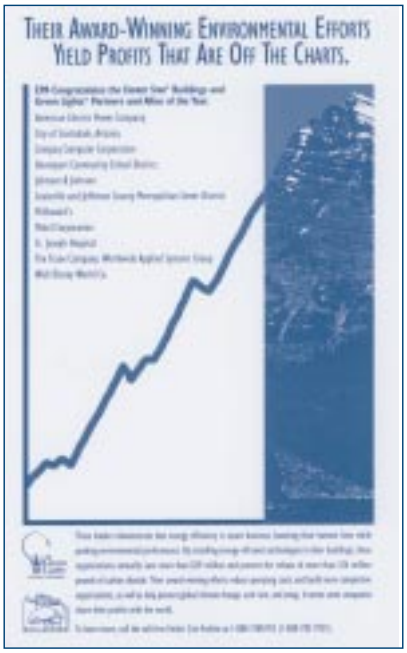
US businesses spend more than $90 billion a year on energy to operate buildings. This energy represents about 16 percent of CO_2 emissions. Many buildings could use 30 percent less energy if owners made profitable investments in energy-efficient products, technologies, and best management practices—investments with high returns and low risks.

ENERGY STAR BUILDINGS AND GREEN LIGHTS PARTNERSHIP

EPA's Energy Star Buildings promotes energy efficiency as a business strategy that owners and managers of commercial, public, and industrial buildings can adopt to improve their bottom line and the environment. The partnership's goal is to provide tools that stimulate organizations to apply best management practices to energy management, evaluate energy use, document energy performance, set goals, and recognize energy excellence all within an integrated investment strategy for energy-efficiency upgrades.

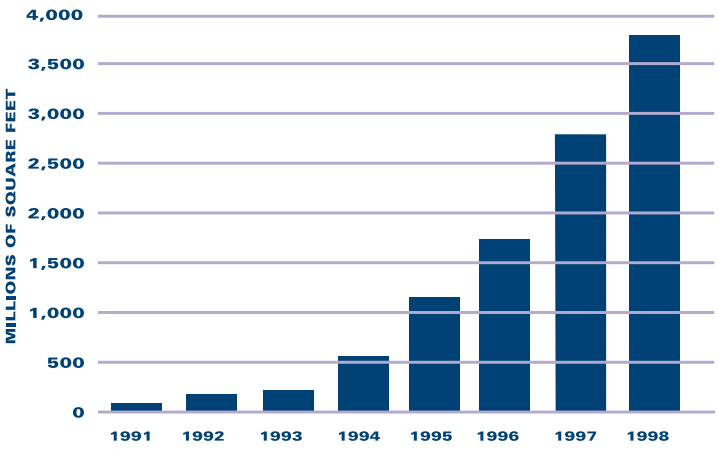
In 1998, more than 4,000 Energy Star Buildings participants represented over 8 billion square feet or 13 percent of the total commercial, public, and industrial building market. Cumulative investments in advanced technology totaled more than $2.3 billion. Partners' achievements for the year are impressive:

- 11.9 billion kWh of energy saved.
- 3.8 billion square feet upgraded (see Figure 6).
- Annual emissions of 2.4 MMTCE prevented.
- $802.2 million saved on annual utility bills.



Placements in prominent magazines and newspapers of articles and public service announcements (PSAs) about Energy Star Buildings are increasing. To honor Partners of the Year, the PSA above appeared in magazines nationwide, including Business Week, Forbes, Fortune, *and* Black Enterprise.

Figure 6. Total upgraded square footage



Source: EPA Climate Protection Division

These achievements measure up very well against the goals established for the program (see Table 3).

ENERGY STAR Buildings is constantly evolving to better serve the needs of the market. In 1998, the program emphasized linking the value of energy efficiency to an organization's business objectives and strongly promoted whole-building upgrades.

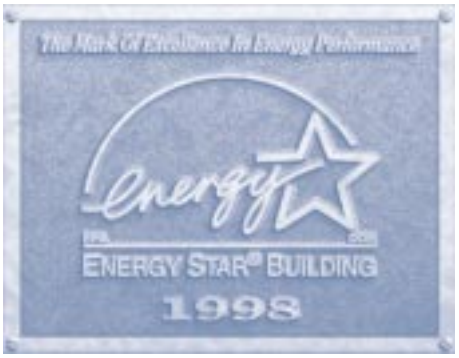
For example, EPA and DOE piloted a voluntary, performance-based award—the ENERGY STAR Label for Buildings—to help building owners identify properties with the greatest potential for energy-efficiency improvements and to recognize top-performing buildings. The first commercial space type to be eligible for this award is office buildings (see below).

ENERGY STAR Buildings services were fine-tuned in 1998 to align with building ownership. Each sector, whether owner-occupied, investor-owned, or publicly owned buildings, values energy differently and faces unique barriers that can prevent efficiency upgrades from being a priority.

The Mark of Excellence in Energy Performance

EPA and DOE have created a tool to help building owners and managers optimize energy management in their facilities. The ENERGY STAR Benchmarking Tool for Buildings allows them to evaluate energy use, document performance, set goals, and compare energy performance of individual office buildings to top-performers nationwide.

Any building manager with access to the Internet can measure a building's energy performance by supplying basic data, such as building size and location, number of occupants, hours of operation, number of computers, and annual energy use (from utility bills). With these data the Benchmarking Tool generates a Statement of Energy Performance, which shows the building's score on a scale of 1 to 100 and serves as a benchmark.



The ENERGY STAR Label for Buildings is awarded only to commercial and public buildings that rank in the top 25 percent of their class nationwide for energy performance and have indoor environmental quality that conforms to industry standards. The Label for high-performing buildings is market based. It recognizes buildings with low energy bills (higher net operating income), higher asset value, and low carbon impact.

Green Lights was completely integrated into ENERGY STAR Buildings, and the focus of the partnership is now whole-building energy upgrades. The last Green Lights partner was received in December 1998, although existing partners will continue to be served.

A key new initiative in 1998 involved working with the commercial real estate market, providing tailored tools and a streamlined partnership letter. Milestones included:

- Final release of a financial analysis tool for real estate asset managers to allocate the costs and benefits of energy-efficiency upgrades between owners and tenants, Quikscope.
- Release of a Letter of Intent tailored for commercial real estate owners wishing to commit to energy efficiency and form partnerships with EPA. Soon after its release in the fall of 1998, EPA began partnering with more than 20 real estate owners, representing over 200 million square feet of owned real estate.
- Use of ENERGY STAR Buildings by the National Realty Committee as a key tool to meet its industry climate change commitment of reducing carbon emissions by 30 percent in 2010.
- Commitment of 25 percent of all retail space to energy efficiency through ENERGY STAR Buildings.

ENERGY STAR SMALL BUSINESS

Complementing ENERGY STAR Buildings, ENERGY STAR Small Business encourages small companies and organizations with less than 100,000 square feet to commit to making energy-efficiency improvements in their facilities. The program tailors the integrated buildings upgrade strategy to meet the needs of small business partners. To reach its market, the program capitalizes on recognized networks, such as the Small Business Administration's Small Business Development Centers, Chambers of Commerce nationwide, and EPA/DOE regional offices. In 1998, the number of program partners rose to more than 1900 small businesses.

TABLE 3. ENERGY STAR Buildings and Green Lights Goals and Achievements

	1998 GOAL	1998 ACHIEVEMENT	1999 GOAL
Square Feet Recruited - Lighting (billion)	**9.0**	**8.6**	**12.2**
Square Feet Recruited - Whole building (billion)	**3.1**	**2.8**	**4.8**
Floorspace Upgraded (billion square feet)	**3.8**	**3.8**	**5.4**
Annual Energy Savings Earned (billion kWh)	**12.2**	**11.9**	**18.5**

ENERGY SAVING STARS

ENERGY STAR Buildings

JOHNSON CONTROLS

From participating in partner events to publicizing ENERGY STAR Buildings on its own Internet site, Johnson Controls actively promotes cost-effective building upgrades. As a performance contractor, Johnson Controls has measured, monitored, and managed energy use for more than 1,400 organizations. The firm helps ENERGY STAR Buildings partners maximize cost savings—over $1 billion to date—and enhance building performance through energy-efficiency upgrades. Upgrades of its own corporate facilities in Milwaukee have reduced the company's annual energy costs by more than $150,000. Johnson Controls was named ENERGY STAR Buildings Large Corporate Ally of the Year.

THE WAKE COUNTY PUBLIC SCHOOL SYSTEM

The Wake County Public School System in North Carolina uses the ENERGY STAR Buildings strategy in its customized Energy Savers Program, which aims to cut the school system's energy expenses. The Energy Savers Program also educates staff and students on energy management and conservation by, for example, conducting energy-efficiency workshops and publishing the annual *Energy Savers Handbook*. This handbook details the goals and objectives of the program, providing suggestions on how individual schools can better manage their energy use. Having saved more than $600,000 in energy costs last year, the system uses its own success with ENERGY STAR Buildings to demonstrate how schools can do likewise. The Wake County Public School System was named ENERGY STAR Buildings Education Partner of the Year.

THE NEW YORK STATE OFFICE OF MENTAL HEALTH

The New York State Office of Mental Health (NYOMH) has made ENERGY STAR Buildings a key part of its Energy Efficiency and Pollution Prevention Program, which has reduced the agency's energy consumption by nearly 55 percent. NYOMH credits this enormous energy reduction to the aggressive, simultaneous pursuit of all five stages of building and lighting upgrades. Realizing a 36-percent internal rate of return, the agency has saved $55 million through energy-efficiency upgrades. These upgrades include the installation of energy-efficient electronic ballasts, T-8 lamps, occupancy sensors, LED exit signs, as well as campus-wide steam and HVAC distribution system improvements. The New York State Office of Mental Health was named ENERGY STAR Buildings Healthcare Partner of the Year.

ENERGY STAR for Home and Office

Americans spend $120 billion per year on home energy. Generating that energy contributes approximately 19 percent of US CO_2 emissions. Like many office buildings, many homes could use 30 percent less energy if builders and owners made sound technology investments.

ENERGY STAR-LABELED PRODUCTS

EPA and DOE offer the ENERGY STAR label to manufacturers to identify high-quality, energy-efficient products—such as computers, lighting, refrigerators, and TVs—that will, as the tag line suggests, save consumers money and help save the environment (see Exhibit 1 on page 25). The ENERGY STAR label gives consumers the information they need to choose energy-efficient products. ENERGY STAR-compliant products now save businesses and consumers more than $1.8 billion per year.

Between 1992 and 1998, the ENERGY STAR label became the national consumer-oriented symbol for energy efficiency. By the end of 1998, 3,400 individual product models in 29 consumer product categories were ENERGY STAR compliant, and more than 1,200 manufacturers were producing ENERGY STAR-labeled products.

In 1998, the labeling program introduced new ENERGY STAR product categories covering windows, TVs, VCRs, audio and DVD products, roofing products, and commercial transformers. The program also strengthened the presence of ENERGY STAR-labeled products in mainstream retail and dealer distribution channels. Over the past year, strong relationships were built with retailers, utilities, and regional groups devoted to promoting energy efficiency.

PSAs and articles about ENERGY STAR-labeled products are also receiving more nationwide media coverage. The article (left) on ENERGY STAR-labeled home electronics and household appliances appeared in the August 1998 issue of Good Housekeeping. *The labeling program PSA (above) appeared in prominent magazines, including* The New Yorker.

ENERGY STAR HOMES

ENERGY STAR homes are at least 30 percent more energy efficient than the current Model Energy Code. Homes that achieve the ENERGY STAR distinction incorporate such features as advanced insulation, advanced duct sealing, high-performance windows, and high-efficiency heating and cooling systems and appliances. The net cost of these homes is less than ordinary ones because energy savings from the improved energy features typically exceed the small increase in monthly mortgage costs.

These initiatives aim to transform the market for energy efficiency in both new and existing housing stock in the United States, while simultaneously improving builder and related industry profitability; increasing home quality, comfort, and value; making energy use more efficient and reducing emissions of greenhouse gases; reducing local air pollution associated with energy production; and enhancing local economies.

Hundreds of builder partners and allies participated in the construction of more than 5,000 new ENERGY STAR homes in 1998. This represents a 210-percent increase over 1997. The energy-use reduction of these new homes averages 36.7 percent, which it is estimated will save owners more than $2.6 billion annually.

ACHIEVEMENTS

The 1998 achievements of the ENERGY STAR-Labeled Products and Homes programs include the following:

- Products bearing the ENERGY STAR label reduced GHG emissions by 4.0 MMTCE and reduced energy consumption by 20 billion kWh.


Front Lines

Wasted watts: Gear that's always on

Nationwide media coverage on ENERGY STAR-labeled products for the home also included this article on wasted watts in the March 1998 **Consumer Reports**.

- More than 33 utilities and energy service providers serving over 28 million households partnered with ENERGY STAR to promote compliant appliances, lighting, windows, HVAC, and consumer electronic equipment.
- Over 3,500 retail stores nationwide actively promoted ENERGY STAR products. Sears, Home Depot, Home Base, and Associated Volume Buyers joined Circuit City and Montgomery Ward as national ENERGY STAR retail partners.
- Sales of ENERGY STAR-compliant clothes washers took off with the introduction of the Maytag Neptune® and Whirlpool Resource Saver™ models, combined with aggressive promotion by the ENERGY STAR labeling program and its partners.
- More than of 5,000 new homes were built with an ENERGY STAR label, averaging an energy reduction of 36.7 percent.
- More than 920 ENERGY STAR Homes builder partners in all 50 states participated.

- Estimated annual savings totaled $2,666,400 for owners of ENERGY STAR homes.
- More than 600 ENERGY STAR Homes allies participated.
- Three national and seven regional lenders offered ENERGY STAR mortgages.

Consumer awareness and understanding of the ENERGY STAR label continued to rise as a result of strong media coverage and outreach efforts. In 1998, Vice President Gore launched ENERGY STAR TVs/VCRs, and Secretary of Energy Peña launched ENERGY STAR windows. Some 20,000 print and broadcast public service announcements (PSAs), achieving an estimated 1 billion viewer impressions, appeared in publications such as *Time* and *People* as well as on local, national network, and cable TV channels. Articles about ENERGY STAR appeared in *Better Homes and Gardens*, *Parade Magazine*, *The Washington Post,* and *The New York Times;* and ENERGY STAR was featured on ABC News and CNN. Bob Vila promoted ENERGY STAR on "Home Again with Bob Vila," and on his home improvement web site, while McDonald's did the same on 100 million bags and cups to celebrate Earth Day.

Research conducted by utilities indicates that because of growing market penetration and EPA's education and outreach efforts, a majority of consumers now understand the meaning of ENERGY STAR and the benefits of energy efficiency.

OUTLOOK

Looking to the future, EPA will continue to play a key role in advancing the efficiency of all buildings, including federal facilities, by expanding beyond current partnerships and launching 25 new ENERGY STAR product lines by 2000. As consumer awareness of the label increases and the number of ENERGY STAR-labeled products grows, consumers, organizations, and businesses across the country will continue to experience increased economic benefits as well as emissions reductions of GHGs and other harmful pollutants.

ENERGY STAR Home Improvement—a new initiative aimed at the existing-homes market—will be launched in 1999. ENERGY STAR Homes will continue to promote consumer awareness about energy efficiency so that market penetration and demand for ENERGY STAR homes and products increase. By the end of 1999, a total of 20,000 new ENERGY STAR homes are expected to be built, meeting the program's goal. ENERGY STAR Homes aims to have at least 10 percent of the annual new construction market—equal to 100,000 homes—built to ENERGY STAR guidelines by the year 2002.


The New York Times

On January 8, 1998, ABC's Good Morning America (top) carried live coverage from the Consumer Electronics Show in Las Vegas, featuring ENERGY STAR-labeled video products. The following day,* The New York Times *(bottom) covered Vice President Gore's launch of ENERGY STAR-labeled TVs and VCRs.

A word from our Energy Star manufacturing partners

LITHONIA EMERGENCY SYSTEMS

Lithonia Emergency Systems, the largest exit sign manufacturer in the United States, was a charter Partner in the Energy Star Exit Signs product category. The company has taken a leading role in educating businesses about the economic and environmental benefits of energy-efficient exit sign products.

"Energy Star Labeling Program officials have done an excellent job of working with manufacturers to develop product criteria that effectively raise the bar for energy-efficient products in our industry. Lithonia Lighting is pleased to be associated with the Energy Star Labeling Program, knowing that together our efforts are contributing to the preservation of critical energy resources," says Britt Lee, Marketing Manager for Emergency Systems.

Lithonia's commitment to the manufacture, sales, and promotion of Energy Star-compliant products runs deep. Half of its existing exit sign models were modified to meet Energy Star guidelines, and the company will incorporate Energy Star specifications into the design of all future LED exit signs. Lithonia has actively educated its entire sales force, as well as more than 1,600 distributors, specifiers, engineers, and sales agency representatives, about the Energy Star label and the benefits of energy efficiency.

Energy-Efficient Technologies

INTEL

Intel has embraced energy efficiency and Energy Star compliance as key goals for its new products and technologies. Using Energy Star compliance as a benchmark, Intel engineers have developed cutting-edge products and technologies that incorporate "user-transparent" power management features. One such technology, called Instantly Available PC (IAPC), ensures that increasing computational power, functionality, and network compatibility go hand-in-hand with the aggressive energy consumption targets established by the Energy Star Labeling Program.

Dave Chan, Strategic Initiatives Manager for Intel's Platform Marketing Group, says: "The Energy Star Labeling Program is being expanded to include new products, such as consumer electronics and appliances, extending the reach and recognition of the Energy Star brand. These developments are influencing the general market, where an increasing number of IT purchasers are requiring products that meet Energy Star guidelines. IAPC technology was developed to respond to these challenges. It establishes a forward-looking delicate balance between high performance, connectivity, and low-power consumption for today's and tomorrow's Intel architecture-based computers, ranging from home and business PCs up through multi-processor high-performance workstations."

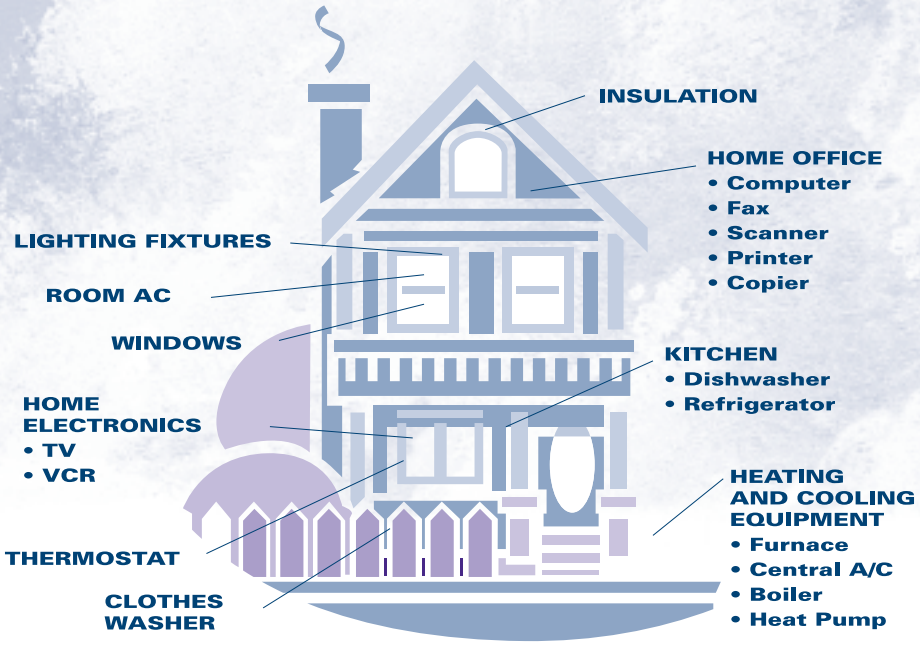


Exhibit 1: A home completely equipped with ENERGY STAR-compliant products can save 30 percent on energy use or up to $400 on utility bills per year.

TABLE 4. ENERGY STAR-Labeled Products Goals and Achievements

	1998 GOAL	1998 ACHIEVEMENT	1999 GOAL
Percent of Market with ENERGY STAR Feature			
Computers	90%	80%	90%
Monitors	90%	95%	90%
Printers	99%	99%	99%
Fax Machines	90%	90%	95%
Copiers	65%	65%	75%
Annual Energy Savings from Office Equipment (billion kWh)	14.9	14.7	19.0
Market Penetration of ENERGY STAR New Homes	.5%	.5%	1.5%

A word from our Energy Star homes partners

Energy-Efficient Homes

BOSSHARDT REALTY SERVICES

Patti Glenn, the Vice President of Bosshardt Realty Services, has been an avid supporter of Energy Star Homes since its inception. As one of the first realtors in the country to market Energy Star Homes, Ms. Glenn accepted her leadership role and the potential to influence the new homes market. She began by nurturing alliances with mortgage lenders, realtors, builders, raters, and utility representatives. Ms. Glenn has educated builders about the benefits of offering Energy Star Homes, trained realtors to sell the homes, and helped consumers understand the benefits of buying energy-efficient homes. Her efforts have stimulated the market for and awareness of Energy Star homes. "The best news about Energy Star is that I sleep well at night, knowing that I've helped developers and builders realize their profit margins, but more importantly, I've helped people realize their dream home . . . a home that saves money, is healthier to live in, offers more comfort, and is more affordable through energy-efficient mortgage benefits," says Ms. Glenn.

THE CONSERVATION SERVICES GROUP

The Conservation Services Group (CSG) has been a major force in the promotion of energy-efficient new construction in New England. This consortium of electric utility companies has developed a marketing strategy that features (1) generous incentives to homeowners who opt for Energy Star-labeled appliances, (2) brochures for builders and consumers, (3) direct mail pieces, (4) a web site, (5) seminars for home buyers, and (6) an extensive newspaper advertising campaign. The Group's efforts have attracted the attention of builders, utilities, service providers, manufacturers, and consumers throughout New England. CSG has recruited more than 65 Energy Star home builders and rated 219 Energy Star homes.

BOB WARD HOMES

As the fourth largest builder of single-family homes in the Baltimore area, Bob Ward Homes has maintained a strong commitment to promoting energy-efficient homes. One-third of the homes built by Bob Ward in 1998—100 of 300—were certified Energy Star homes. While offering affordable housing, President and CEO Robert Ward encourages consumers to consider the benefits of Energy Star homes and Energy Star-labeled appliances. Of his participation in Energy Star Homes, Mr. Ward says, "(It) helps us develop brand awareness and loyalty even before we sell a home. We educate home shoppers about what energy efficiency means; and when they have all the facts, they're more confident decision makers and know they're getting added value. After the sale, an Energy Star home means less need for follow-up service, greater homeowner satisfaction, and higher resale value."

Methane Partnerships

Methane is the most common non-CO_2 greenhouse gas, 21 times more potent than carbon dioxide. If captured, methane is also a source of energy. EPA's Methane Partnerships assist US industries and state and local governments in reducing methane and other GHG emissions from their operations. The five initiatives within the program are Landfill Methane Outreach, Natural Gas STAR, Coalbed Methane Outreach, Ruminant Livestock Efficiency, and AgSTAR. All five follow a common approach, which is to provide sound technical, economic, and regulatory information on emission-reduction technologies and practices, as well as tools to facilitate implementation of methane-reduction opportunities. Partners profit from their involvement in the program by making their operations more efficient and their businesses more competitive.

In 1998, the Methane Partnerships supported more than 200 companies, 500 farms, 29 states, and 22 local communities in reducing emissions of methane by over 5.4 MMTCE (see Table 5).

LANDFILL METHANE OUTREACH PROGRAM

The Landfill Methane Outreach Program (LMOP) helps communities and landfill owners and operators collect and sell landfill gas. LMOP works with the landfill gas industry to overcome project development barriers—such as low avoided-energy costs, public misperceptions, financing, and permitting.

LMOP's main achievements in 1998 include the following:

- Working with 75 new partners to promote projects. The total number of partners and allies reached more than 200; of these, 120 were industry allies, 29 were state allies, 33 were energy allies, and 22 were community partners.
- Facilitating project assessment and development at more than 75 percent of the 55 landfills that came on line in 1998 and at all of the 82 landfills under construction and scheduled to come on line in 1999. In terms of new projects on line, 1998 was the highest growth year in the landfill industry's history.
- Reducing methane emissions by 1.2 MMTCE, which means that LMOP is ahead of schedule for meeting its goal of 1.9 MMTCE by the end of 2000.

A word from our Methane partners

Methane Recovery Projects

YANCY/MITCHELL LANDFILL

Project Branch Out at the Yancy/Mitchell Landfill in Avery County, North Carolina will use landfill gas to operate a greenhouse consortium that will provide hands-on learning centers for high school and college students and a research facility to develop programs that re-establish rare plants in suitable locations, discover new cash crops, and generate income opportunities for the region. This project shows that small landfills can produce economic, environmental, and social benefits.

Approximately 918 landfills are considered "small landfills," which means they have less than 2.75 million tons of waste in place (WIP). The average small landfill has 1.5 million tons of WIP and the potential to generate 1.2 megawatts of electricity. If all small landfill projects were developed, they could generate over 1 gigawatt of electricity and reduce methane emissions by almost 12 MMTCE. This is the equivalent of removing the pollution from more than 19 million cars, planting more than 13 million trees, or creating enough power to heat over 800,000 homes.

APEX PORK

Apex Pork in Rio, Illinois is a 2,000-head finishing farm that uses a closed-cell heated lagoon to control odors and prevent complaints from the neighbors. The farm uses manure off-gases to heat water in a boiler for lagoon and farm heat. Excess gas is flared off.

ENRON'S OIL AND GAS PIPELINE GROUP

Enron's Oil and Gas Pipeline Group implemented leak detection and measurement programs at several compressor facilities, yielding methane emission reductions of 303 million cubic feet (MMcf) and a net profit of $265,000.

JIM WALTER RESOURCES

Jim Walter Resources (JWR), in Brookwood, Alabama has turned coal mines with prohibitively high methane concentrations into financial successes through coal mine methane recovery projects. Each year, four JWR mines produce and sell about 21 Bcf of high-quality coal mine methane. In terms of emission reductions, the capture and use of this coal mine methane is equivalent to removing the pollution from approximately 1.9 million cars each year. In 1990, the Coalbed Methane Outreach Program (CMOP) began working with JWR on innovative ways to boost coal mine methane recovery. Through this collaboration, CMOP has helped JWR raise its coal mine methane recovery from 18.5 Bcf per year to today's 21 Bcf, an increase of 2.5 Bcf per year.

NATURAL GAS STAR PROGRAM

The Natural Gas STAR Program assists the oil and natural gas industry in cost effectively reducing methane emissions from the production, transmission, and distribution of natural gas. In 1998, the Gas STAR Program focused on implementing best management practices—many of which target leak prevention—and on bringing the benefits of the program to independent producers.

Gas STAR Partner companies are expected to report methane emissions reductions of 23 billion cubic feet (Bcf) for 1998.[5] That would bring Gas STAR's cumulative methane emissions reductions to approximately 75 Bcf, worth more than $154 million.

Natural Gas STAR's main achievements in 1998 include:

- Adding three major partners: Spirit Energy 76 (a business unit of Unocal), Koch Gateway Pipeline Company, and Williams Gas Pipeline-Central.
- Providing technical and economic information on methane reduction technologies to oil and gas producers at regional Producer Technology Transfer Workshops.
- Releasing the Partner Reported Opportunities Report, which summarizes economic information on 45 cost-effective methane reduction practices and technologies.
- Holding the 5th Annual Implementation Workshop in Houston, Texas, which brought together representatives from 23 Partner companies.
- Placing articles on the Gas STAR Program in the *American Oil and Gas Reporter* (March 1998) and the *Pipeline and Gas Journal* (December 1998).

Sponsored by an endorser, a Gas STAR Program PSA recognizing companies making a difference appeared in the* Oil and Gas Journal *(December 1998).

"The STAR Program has helped us save gas, increase profits, and improve system efficiency. It is a good example of how voluntary efforts can help our business and improve the environment."

Mike Sellers, Environmental and Safety Manager
Chevron USA Headquarters

[5] *1998 reports from Gas STAR Partners come into EPA in mid-1999.*

COALBED METHANE OUTREACH PROGRAM

The Coalbed Methane Outreach Program (CMOP) encourages coal mine owners and operators to recover and use coal mine methane as an energy source. CMOP provides high-quality, project-specific information to coal mine operators and supports coal mines in project implementation activities, such as technology research and cultivating investor interest. Also, CMOP documents state-of-the-art technology for coal mine methane use and disseminates this information to interested parties.

CMOP's main achievements in 1998 include:

- Generating $30 million in direct gas sales through reducing methane emissions by 15 Bcf, which is equivalent to removing the pollution from more than 1.3 million cars per year.
- Developing three new projects, expected on line in 1999, and expanding two existing projects, bringing to 18 the total number of CMOP projects in the United States.

Table 5. Methane Partnerships Goals and Achievements

	1998 GOAL	1998 ACHIEVEMENT	1999 GOAL
LMOP			
Number of Projects	25	42	45
Annual Methane Reduction (MMTCE)	0.5	1.2	1.2
CMOP			
Number of Projects	17	18	21
Annual Methane Reduction (MMTCE)[7]	1.5	1.7	1.7
NATURAL GAS STAR[8]			
Transmission Pipeline Miles (% in program)	80%	68%	85%
Distribution Pipeline Miles (% in program)	80%	43%	85%
Natural Gas Production (% in program)	70%	37%	70%
Annual Gas Savings (MMTCE)[7]	2.5	2.3	3.9
AGSTAR & RLEP			
Partner Farms	250	503	400
Annual Methane Reduction (MMTCE)[7]	0.5	0.2	0.6

[7] *Includes both CCAP program and base reductions*
[8] *Estimated*

RUMINANT LIVESTOCK EFFICIENCY PROGRAM

The Ruminant Livestock Efficiency Program (RLEP) is a joint EPA-US Department of Agriculture (USDA) effort that helps livestock managers reduce emissions of methane and other greenhouse gases through the adoption of improved management practices.

RLEP's achievements in 1998 include the following:

- Developing a model state forage and grazing management program in Virginia with the collaboration of USDA, the Virginia Cooperative Extension Service, Virginia Cattlemen's Association, and Virginia Forage and Grasslands Council.
- Demonstrating to more than 3,000 farmers how improved management can lead to lower methane emissions per unit of product (such as gallon of milk or pound of beef) and increased profitability. Farmers participated in field-day activities and visits to 48 farms across the southeast.

ALAN GRAYBEAL

With assistance from RLEP, Alan Graybeal, a beef producer in Blacksburg, Virginia developed a business plan for his cow-calf operation, which included improved grazing management practices that reduced methane emissions per unit of product. Mr. Graybeal says that he has already begun to reap the benefits of RLEP after only one year.

AGSTAR PROGRAM

The AgSTAR Program aims to reduce greenhouse gases from confined animal feeding operations. It assists farmers in assessing and implementing manure off-gas recovery systems whenever these are environmentally and economically appropriate compared to conventional waste management systems.

In 1998, AgSTAR focused on information exchange, environmental accounting, and commercial farm demonstration activities, which attracted strong interest from livestock producers and the electric utility industry.

AgSTAR's main achievements in 1998 include:

- Initiating environmental monitoring of commercial systems as the first step in establishing a comprehensive environmental accounting methodology for livestock waste management systems.
- Hosting a series of field days with producers, utilities, state government officials, and the public.
- Starting several demonstration farms in key dairy and swine livestock producing regions.

Environmental Stewardship Programs

Many opportunities exist for making industrial processes more efficient. EPA's Environmental Stewardship Programs promote cost-effective opportunities for improving the efficiency of processes used in the industrial sector, particularly in energy-intensive industries. These programs strive to reduce GHG emissions from industrial sectors that use or emit perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), or sulfur hexafluoride (SF_6) because ton-for-ton these gases trap more heat in the atmosphere than does CO_2.

In 1998, the Stewardship Programs supported 23 semi-conductor firms, 11 aluminum smelting companies, 4 HCFC-22 producers, 50 electric utilities, and 7 companies in the magnesium casting industry in achieving GHG reductions of 5.2 MMTCE (see Table 6).

EPA plans to expand these efforts by promoting combined heat and power (CHP) to its program partners in cooperation with DOE. This initiative addresses the regulatory and institutional barriers that currently prevent more rapid dissemination of CHP technology. EPA and DOE are working together to identify the economic potential for CHP within different segments of industry and for different commercial building types. A strategic mix of tools, determined by the specific barriers dominating each segment, will then be applied to facilitate broader implementation of CHP where opportunities are the most profitable.

Reducing PFC Emissions

IBM

IBM demonstrated its environmental leadership by commercializing a new system to replace perfluoroethane (C_2F_6) with a dilute mixture of nitrogen trifluoride (NF_3) for use in the chemical vapor deposition (CVD) cleaning process for semiconductors. The new NF_3 technology reduces PFC emissions from the process by more than 95 percent. "The new technology avoids $3 million in capital and $3 million to $4 million in annual operating expenses associated with the recycling alternative that IBM was considering as a means of reducing PFC emissions," says Wayne Balta, Director of Corporate Environmental Affairs for IBM. This effort is part of IBM's voluntary corporate goal to reduce its PFC emissions 40 percent by year-end 2002, indexed to production against a base year of 1995, as announced in October 1998.

The stewardship initiatives for specific industries made steady progress in 1998.

THE SEMICONDUCTOR INDUSTRY

The Emission Reduction Partnership for the Semiconductor Industry made great strides in 1998 in identifying practical methods to reduce emissions of PFCs and began the important work of setting specific goals for reductions. EPA completed two workshops with the semiconductor industry in 1998. In April, some 150 participants attended the Global Semiconductor Industry Conference on Perfluorocompound Emissions Control; in September, over 60 participants attended the Semiconductor Industry Energy Opportunities Workshop.

THE ALUMINUM INDUSTRY

Eleven of the 12 primary US aluminum smelting companies now participate in the Voluntary Aluminum Industrial Partnership. Partners have lowered their annual PFC emissions by 31 percent, or 1.8 MMTCE, and are on track to achieve their goal of reducing annual PFC emissions by a total of 2.2 MMTCE by 2000. In 1998, the industry and EPA not only worked jointly on reducing emissions, but also gathered data on international efforts to reduce PFCs. This work was highlighted in a well-received article in the February 1999 issue of *Light Metal Age*.

THE CHEMICAL INDUSTRY

All four US chemical producers are working with CPD to reduce emissions of HFC-23, which is inadvertently produced during the manufacture of HCFC-22. In 1998, partners reduced emissions of this highly potent greenhouse gas by 3.4 MMTCE. Also in 1998, EPA completed two significant studies in collaboration with manufacturers. One focused on performance standards for determining emissions of HFC-23 from HCFC-22 production. The other completed an audit of reporting methods.

THE MAGNESIUM AND ELECTRIC POWER SYSTEMS INDUSTRIES

The Division created the SF_6 Emission Reduction Partnership for the Magnesium Industry and the SF_6 Emissions Reduction Partnership for Electric Power Systems in 1998. These new partnerships were established because the magnesium casting industry and firms with electric power systems that use SF_6 expressed interest in working with EPA on a voluntary basis to reduce emissions. The two partnerships will identify and encourage adoption of best management practices to cut emissions of SF_6—an extremely potent greenhouse gas.

Table 6. Stewardship Initiatives Goals and Achievements

	1998 GOAL	1998 ACHIEVEMENT	1999 GOAL
Annual GHG Reductions (MMTCE)	**3.5**	**5.2**	**5.7**

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End Notes for Table 2

1. **Partners' Completed Investments.** These are energy-efficiency and methane project investments for which partners have made initial technology expenditures in 1998 or prior years. This category also includes sales of Energy Star-labeled products through 1998. The benefits of these Completed Investments have accrued since they were made and will continue to accrue until the end of their useful lives.
2. **Partners' Committed Investments.** These are energy-efficiency and methane project investments for which partners have committed to make initial technology expenditures in years after 1998. This category also includes one cycle of replacements for Energy Star office products with lifetimes of 6 years or less. Replacement of Energy Star office products is assumed to be at the same penetration rates as in 1998. All benefits from Committed Investments will accrue in the years after 1998.
3. **Bill Savings.** These represent the total savings in energy bills, or income associated with Energy Star programs or methane programs, in 1998 dollars, to partners or purchasers of Energy Star products over the lifetime of the investment or through 2015, whichever comes first. The investments have varying lifetimes. Some, such as PCs and monitors, have short expected lifetimes, e.g., 4 years. Others, such as the thermal envelope improvements associated with Energy Star Homes, have much longer lifetimes, e.g., 30+ years. A cut-off of 2015 was chosen as a reasonable end-point to assess benefits, even though the benefits of the Division's voluntary programs and partner investments will often continue to be realized after that year.
4. **Technology Expenditures.** These represent the total cost to partners, in 1998 dollars, of investments in energy efficiency, including the cost of financing the investment over the life of the investment at a 7-percent real rate of interest (4 percent for public sector investments). This category includes any premium, and the cost of financing that premium, for the purchase of Energy Star-labeled products. The 7-percent interest rate is the standard rate recommended by the Office of Management and Budget in Circular No. A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs for Base-Case Analysis*. As stated in the circular, "(The 7.0 percent) rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years."
5. **Net Savings.** This category represents the difference between Bill Savings and Technology Expenditures. It is the amount of cash available to partners and purchasers of Energy Star products to put back into the economy over the life of the investment, or through 2015, whichever comes first.
6. **MMTCE.** This column presents the amount of carbon emission equivalents avoided by investments in energy-efficient products over the lifetime of the investments or through 2015, whichever comes first. It includes the emissions avoided by methane programs, using a Global Warming Potential of 21. For energy-efficiency investments and purchases, the carbon emission equivalents are based on an analysis of marginal carbon emissions. The marginal carbon emission rate varies over time. In the year 2000, it is assumed to be 1.64 lbs. CO_2/kWh; in the year 2005, it is assumed to be 1.20 lbs. CO_2/kWh; and in 2010, it is assumed to drop to 1.09 lbs. CO_2/kWh.

For more detailed information on the program cost and benefits calculations, call CPD at 202-564-9190.

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