



ENERGY STAR

ENERGY STAR® and Other Climate Protection Partnerships

2007 Annual Report



ENERGY STAR® AND OTHER CLIMATE PROTECTION PARTNERSHIPS 2007 ANNUAL REPORT

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For additional information, please visit our Web sites at www.epa.gov/cppd, www.energystar.gov,
www.epa.gov/cppd/climatechoice, www.epa.gov/cleanenergy/stateandlocal/index.htm, www.epa.gov/methane,
and www.epa.gov/highgwp.

October 2008

I am pleased to present this report on the accomplishments of the U.S. Environmental Protection Agency's climate protection programs. Through these partnerships, EPA has provided tools, resources, and guidance to thousands of organizations nationwide during the past 15 years to reduce greenhouse gas emissions by investing in energy efficiency and clean energy. Together, we made 2007 our most successful year to date and made significant progress toward reaching the President's goal to improve greenhouse gas intensity by 18 percent by 2012.

Increasing the use of energy-efficient products and practices is a critical strategy in the fight against global warming. This year EPA offered more energy efficiency solutions to a wider audience than ever through the ENERGY STAR program—with impressive results. In 2007 alone, Americans, with the help of ENERGY STAR, saved more than \$16 billion on their utility bills while preventing greenhouse gas emissions equivalent to those from 27 million vehicles.

EPA is also actively involved in increasing the supply of clean energy resources. The Fortune 500 partners of the Green Power Partnership responded successfully to EPA's challenge to double their purchases of green electricity in 2007 by purchasing more than 6.5 billion kWh and contributing more than half of the 11.5 billion kWh purchased by all partners last year. The more than 200 partners of the Combined Heat and Power Partnership have installed over 4,450 MW of new combined heat and power capacity.

In 2007, EPA's partners used EPA tools and resources to avoid emissions of methane and fluorinated gases equivalent to those from more than 20 million vehicles. As a result, emissions of these gases remain significantly below 1990 levels.

Corporations, utilities, and state and local governments are capitalizing on the multiple benefits of energy efficiency, clean energy, and other strategies to reduce greenhouse gas emissions. EPA's corporate commitment program, Climate Leaders, grew nearly 50 percent to 155 partners in 2007. EPA also provided support to utilities and state and local governments as they develop and implement the energy efficiency and clean energy policies that can reduce greenhouse gas emissions.

The success of ENERGY STAR and EPA's other partnership programs proves that proactive climate protection efforts can be part of successful business strategies. Together with our partners, EPA looks forward to even greater results in 2008!



Stephen L. Johnson
Administrator
U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

Global climate change has emerged as one of the most serious environmental problems facing the United States today. Combined with rising energy prices, increased volatility in energy markets, and growing concerns about national energy security, the need to capitalize on proven, cost-effective opportunities to reduce greenhouse gas emissions in the energy sector has never been greater. In 2007, the U.S. Environmental Protection Agency's (EPA's) climate protection partnership programs significantly reduced the emissions of greenhouse gases that contribute to global climate change by breaking down the identifiable market barriers that limit investments in energy efficiency, clean energy supply, and other climate-friendly technologies and practices.

Through EPA's suite of well-designed partnerships, more than 14,000 organizations nationwide have invested in protecting the environment and made significant progress toward the President's greenhouse gas intensity reduction goal for 2012¹ (see Table 1 and Figure 1).

The measures adopted by EPA's partners through 2007 have resulted in the following major environmental and economic benefits:

- Prevention of 78 million metric tons (in MMTCE²) of greenhouse gases, equivalent to the emissions from 52 million vehicles, and net savings to consumers and businesses of \$17 billion in 2007 alone.
- Prevention of more than 1,000 MMTCE and net savings to consumers and businesses of about \$200 billion over the lifetime of their investments.
- Investment of more than \$55 billion in energy-efficient, climate-friendly technologies.

Highlights of 2007

- Climate Leaders, the Administration's corporate leadership program, grew nearly 50 percent in 2007 for a total of 155 partners. Seven partner companies announced that they had achieved greenhouse gas

reduction goals set through Climate Leaders. More than half of the partners have announced aggressive targets for the future. Together, these goals represent a potential reduction in greenhouse gas emissions of more than 13 MMTCE (see p. 12) over business-as-usual outcomes.

- Through the ENERGY STAR program in 2007, EPA helped Americans save 180 billion kilowatt-hours (kWh)—about 5 percent of U.S. electricity demand—prevent the emissions of 40 MMTCE of greenhouse gases, and save \$16 billion on their energy bills (see Figure 2). Other ENERGY STAR program highlights include:

Offering More Qualified Products to More Consumers

- More than 2,000 manufacturers are using the ENERGY STAR label on over 40,000 individual product models across 50 product categories.
- Americans purchased about 500 million ENERGY STAR qualified products in 2007, bringing the total to more than 2.5 billion since 1992.
- EPA expanded the suite of ENERGY STAR qualified products to include digital-to-analog converter boxes (DTAs), decorative light strings, and commercial dishwashers and ice machines, and completed important revisions to the specifications for residential light fixtures and roofing products.

Raising the Bar for New Home Construction

- Despite the downturn in the new housing market, more than 120,000 new homes were constructed to meet ENERGY STAR guidelines in 2007, which represents about 12 percent of the U.S. new housing starts in 2007 and brings the total to almost 840,000 qualified homes nationwide.

Improving the Comfort and Efficiency of Existing Homes

- More than 38,000 homeowners are enjoying greater savings and comfort in their homes thanks to state and locally sponsored Home Performance with ENERGY STAR programs. Seven sponsors launched new programs in 2007, bringing the total to more than 20 programs in 21 states.

¹ Greenhouse gas intensity is the ratio of greenhouse gas emissions to economic output (measured by the gross domestic product). EPA's climate programs are expected to contribute about 70 percent of the emissions reductions needed to achieve the President's goal of an 18 percent reduction in greenhouse gas intensity by 2012. For more information on the Administration's goal, see <http://www.whitehouse.gov/news/releases/2002/02/climatechange.html>

² Million metric tons of carbon equivalent (MMTCE). Reductions in annual greenhouse gas emissions for EPA's climate programs 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.

**TABLE 1. Annual and cumulative benefits from partner actions through 2007
(in billions of 2007 dollars and MMTCE)**

Program	BENEFITS FOR 2007		CUMULATIVE BENEFITS 1993 - 2017			
	Net Savings (Billion \$)	Emissions Avoided (MMTCE)	PV of Bill Savings (Billion \$)	PV of Technology Expenditures (Billion \$)	PV of Net Savings (Billion \$)	Emissions Avoided (MMTCE)
ENERGY STAR Total	\$16.3	42.4	\$244.5	\$53.1	\$191.4	536
Qualified Products and Homes	\$8.8	18.1	\$118.9	\$15.1	\$103.8	233
Buildings	\$5.4	18.0	\$99.6	\$32.7	\$66.9	214
Industry	\$2.1	6.3	\$26.0	\$5.3	\$20.7	90
Clean Energy Supply Programs	—	4.8	—	na	—	63
Methane Programs	\$0.5	17.4	\$10.1	\$4.0	\$6.1	229
Fluorinated Gas Programs	—	13.8	—	na	—	243
TOTAL	\$16.7	78.4	\$254.7	\$57.1	\$197.5	1,070

PV: 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. Totals may not equal sum of components due to independent rounding. For details on cumulative benefits, see page 56.

—: Not applicable

na: Not available

FIGURE 1. Greenhouse gas emissions reductions exceed 75 MMTCE—Equivalent to emissions from 52 million vehicles

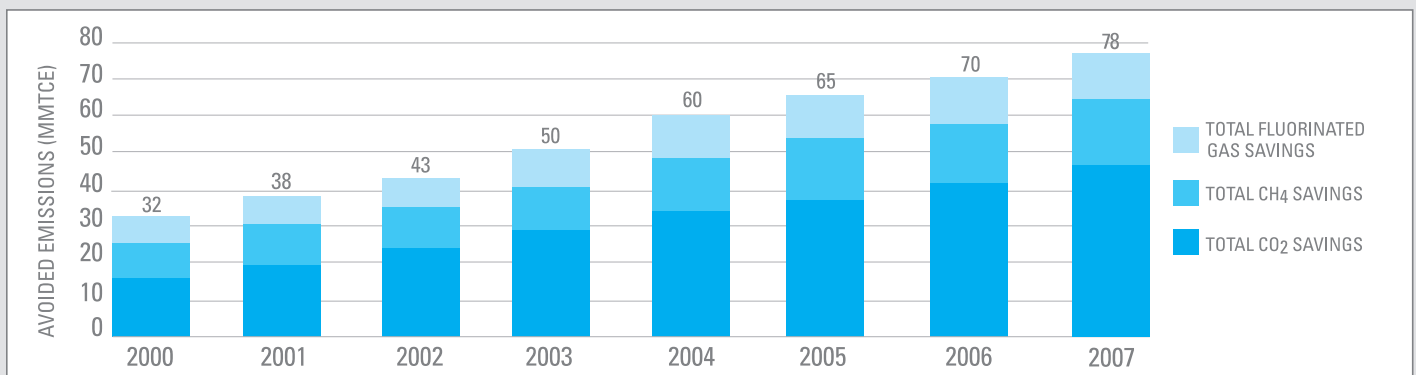
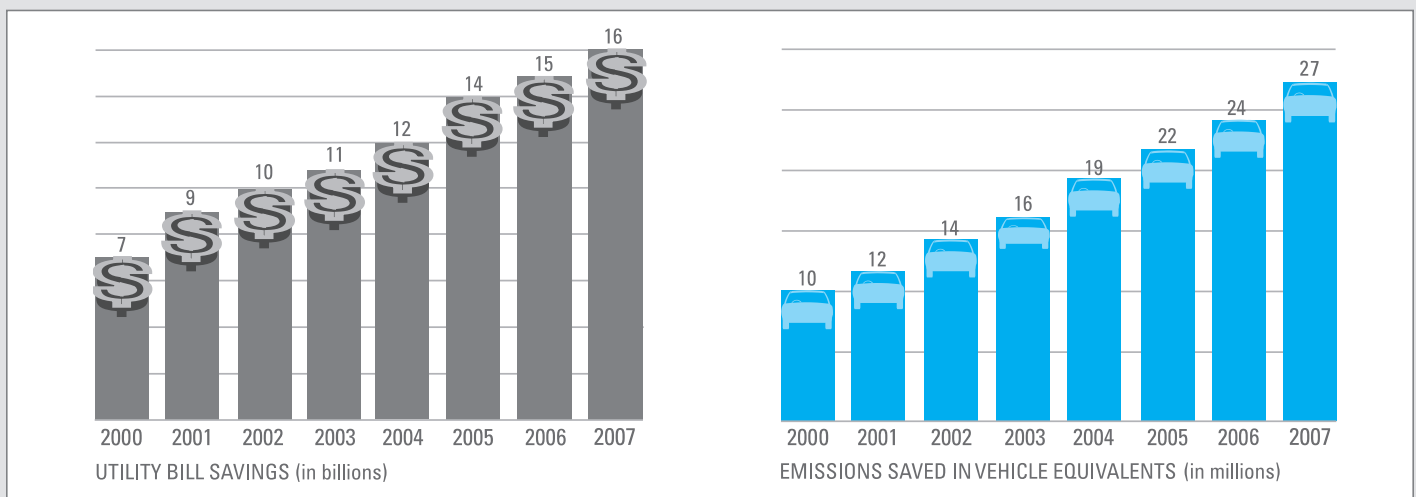


FIGURE 2. ENERGY STAR benefits continue to grow



Saving Energy in the Commercial and Industrial Sectors

- Almost 800 organizations and individuals nationwide have joined the ENERGY STAR Challenge to improve the energy efficiency of their commercial buildings by 10 percent or more.
- Use of EPA's energy performance rating system experienced tremendous growth; building owners and operators used the system to rate the performance of more than 62,000 buildings—doubling the number of buildings rated in just one year and representing more than 7.5 billion square feet of building space.
- More buildings than ever have qualified for the ENERGY STAR, over 4,000, representing more than 740 million square feet. These buildings use nearly 40 percent less energy than typical buildings.
- Almost 40 auto assembly, corn refining, cement—and for the first time, petroleum refining—facilities in the United States have earned the ENERGY STAR for superior energy performance.
- More than 1,000 partners in EPA's Clean Energy Supply programs, which include the Green Power Partnership and Combined Heat and Power (CHP) Partnership, purchased more than 11 billion kWh of green power in 2007. Collectively, they have installed more than 4,450 megawatts (MW) of new, environmentally beneficial CHP capacity.
- EPA enhanced its efforts to assist state and local governments in their pursuit of clean energy policies by expanding its state partnership and municipal network to include 15 states and hundreds of local governments.
- The EPA- and U.S. Department of Energy (DOE)-facilitated National Action Plan for Energy Efficiency (Action Plan) released *Vision for 2025: Developing a Framework for Change*, which offers a framework of state-specific policies and programs to enable the acquisition of all cost-effective energy efficiency measures by 2025. Across 49 states, 120 organizations have made commitments to advance energy efficiency through the Action Plan.
- The methane (CH₄) programs continued to reduce emissions of this potent greenhouse gas from landfills, agriculture, natural gas systems, and coal mines. In 2007, these programs avoided more than 17 MMTCE of greenhouse gas emissions, exceeding their emissions reductions goals and maintaining national methane emissions 11 percent below 1990 levels.

- The partnerships that focus on fluorinated gases (F-gases) kept national emissions of these gases from industrial sources over 55 percent below 1990 levels. Further, EPA has made important progress in the effort to reduce emissions related to vehicle air conditioners. Collectively, these programs avoided more than 13 MMTCE of greenhouse gas emissions in 2007.
- In 2007, EPA recognized the accomplishments of outstanding partners in the voluntary partnership programs described above. In addition, EPA's International Climate Protection Awards honored forward-thinking individuals, companies, and organizations for their leadership and achievements (see Figure 4, p. 7).

Looking Forward to 2008 and Beyond

EPA continually refines and expands its climate protection programs to increase the environmental benefits. As a result, the benefits from these partnership programs have more than doubled since 2000 and are on track to double again within 10 years, while meeting aggressive interim goals (see Table 3 and Figure 3, p. 7). Key steps EPA will take in 2008 and beyond to reach those goals are outlined below.

Climate Leaders. In 2008, EPA will engage more organizations in understanding their carbon risks and reducing their carbon footprint by helping them accurately inventory their greenhouse gas emissions, set aggressive reduction goals, and report on progress. EPA expects to welcome 35 new partners into Climate Leaders and have 25 existing partners announce reduction targets. In addition, EPA will incorporate the tenets of Climate Leaders program protocols and lessons from partner reporting experiences into the development of future climate policy.

ENERGY STAR. A growing body of evidence demonstrates that efforts such as ENERGY STAR are critical to addressing climate change. The greenhouse gas and energy bill savings from the ENERGY STAR program in 2007 were 15 percent greater than those of the prior year and more than double the savings in 2000 (see Table 2). In 2008 and beyond, EPA will continue to build the ENERGY STAR program as a credible guide for investing in energy efficiency for consumers, businesses, and other organizations to leverage as part of their own efficiency and greenhouse gas reduction efforts. EPA will also maintain the integrity and build the value of the ENERGY STAR program.

TABLE 2. ENERGY STAR key program indicators, 2000 and 2007

ENERGY STAR PROGRAM STRATEGY	KEY INDICATOR	YEAR OF RESULTS	
		2000	2007
Efficient Products <i>(for more information, see p. 14)</i>	Product Categories Eligible for the ENERGY STAR	33	>50
	Individual Product Models Qualified	11,000	>40,000
	Products Sold ^{1, 2}	600 million	>2.5 billion
	Public Awareness	40%	>70%
	Manufacturing Partners	1,600	>2,000
	Retail Partners	550	>1,000
	EE Program Administrator Partners	100	>550
Home Improvement <i>(for more information, see p. 20)</i>	Homes Improved through Home Performance with ENERGY STAR ¹	--	~ 40,000
	EE Program Administrator Partners	--	>20
	Homes Benchmarked using Yardstick	--	>95,000
New Homes <i>(for more information, see p. 22)</i>	Number of New Homes Built ¹	25,000	~ 840,000
	Percent of National New Home Starts	<1%	~ 12%
	States and Metro Areas with over 20% Market Share	0	39
	Builder Partners	1,600	>5,000
Existing Commercial Buildings <i>(for more information, see p. 24)</i>	Number of Buildings Rated ¹	4,200	>62,000
	Building Square Footage Rated ¹	800 million	>7.5 billion
	Percent of Commercial Square Footage Rated	1%	~ 10%
	Building Types Eligible for the ENERGY STAR Label	2	11
	Number of Buildings Labeled ¹	545	>4,000
	Building Square Footage Labeled	128 million	>740 million
	Number of Labeled Buildings Using 50% Less Energy	--	~ 500
New Commercial Buildings <i>(for more information, see p. 28)</i>	Number of Buildings Achieving Designed to Earn the ENERGY STAR	--	35
Industrial Improvements <i>(for more information, see p. 30)</i>	Industrial Partners	--	~ 480
	Industrial Sectors (and subsectors)	0	12
	Facility Types Eligible for the ENERGY STAR Label	--	4
	Number of Facilities Labeled	--	37
Annual Results <i>(for more information, see p. 14)</i>	Energy Saved (kWh)	62 billion	180 billion
	Emissions Avoided (MMTCE)	15.8	>40
	Net Savings (USD)	\$5 billion	\$16 billion

¹Results are cumulative. ²The cumulative total of product sales across the entire ENERGY STAR program, including those from the efforts of the U.S. Department of Energy. The results for energy saved and the resulting environmental and economic benefits represent EPA efforts alone.

Key 2008 milestones for the ENERGY STAR program include:

- Expanding the ENERGY STAR label to new product categories when the core program principles of cost-effectiveness and maintenance of product performance can be met. EPA will revise the requirements for products already in the program as conditions warrant. In 2008, EPA expects to finalize revised specifications for TVs, set-top boxes, external power adapters, computers, imaging equipment, commercial food-grade refrigerators, and furnaces. EPA will also continue to work with its vast network of partners to encourage consumers and businesses to choose ENERGY STAR qualified products. Overall, EPA expects more than 300 million ENERGY STAR qualified products to be sold each year for the foreseeable future.
- Partnering with more home builders and other organizations in the industry to construct more than 100,000 new ENERGY STAR qualified homes and bring them to more markets throughout the country. Additionally, EPA will evaluate pilots for a Multi-Family High Rise Program and explore the next generation of ENERGY STAR specifications for new homes through EPA's Climate Choice program.
- Expanding Home Performance with ENERGY STAR by launching the program in four new markets and having more than 15,000 homes retrofitted in 2008, bringing the national total to over 50,000 homes made more efficient.
- Intensifying building efficiency efforts across the commercial buildings sector through the ENERGY STAR Challenge and other activities. EPA will continue to partner with states, trade associations, and others to engage, train, and facilitate building improvements. Strategies include advancing effective energy management as a core business strategy, as well as promoting standardized measurement systems for assessing the efficiency of these facilities, targeting improvements, and tracking progress over time.
- Building on the progress made to date in the industrial sector, which includes finalizing two industrial energy performance indicators (EPIs) and expanding the system for labeling to certain food processing and glass manufacturing plants in 2008. EPA expects to expand its work to more industrial partners and add two additional Industrial Focus sectors each year.

- Providing recognition to partners who have demonstrated outstanding leadership across the residential, commercial, and industrial sectors through the ENERGY STAR Partner of the Year Awards and other efforts.

Clean Energy Supply Programs. In 2008, EPA will continue to help partners improve the supply of the nation's clean energy resources. The Green Power Partnership will support the purchase of more than 16 billion kWh of green power by extending the highly successful Fortune 500 Challenge into a second year. The CHP Partnership will assist in identifying and developing new CHP projects with special emphasis on the dry mill ethanol sector, wastewater treatment facilities, and casinos and hotels.

State and Local Government Clean Energy Programs. EPA will continue to assist state and local officials in their quest to develop and implement clean energy strategies through its state partnership, municipal network, and utility policy programs. In 2008, EPA plans to add one new partner to the state partnership, share best policy practices, expand the municipal network, and provide support to communities addressing urban heat island effects. In its role as co-facilitator of the Action Plan, EPA will focus on increasing outreach and education, and developing additional resources to help utilities and other stakeholders fully capture the benefits of energy efficiency.

Methane and Fluorinated Gas Programs. National methane emissions and F-gas emissions are currently below 1990 baselines³ and are expected to stay that way into the future because of EPA's partnership programs, such as the Landfill Methane Outreach Program, the Natural Gas STAR Program, and a suite of programs addressing the F-gases. In 2008, EPA will strive for further achievements in these programs by:

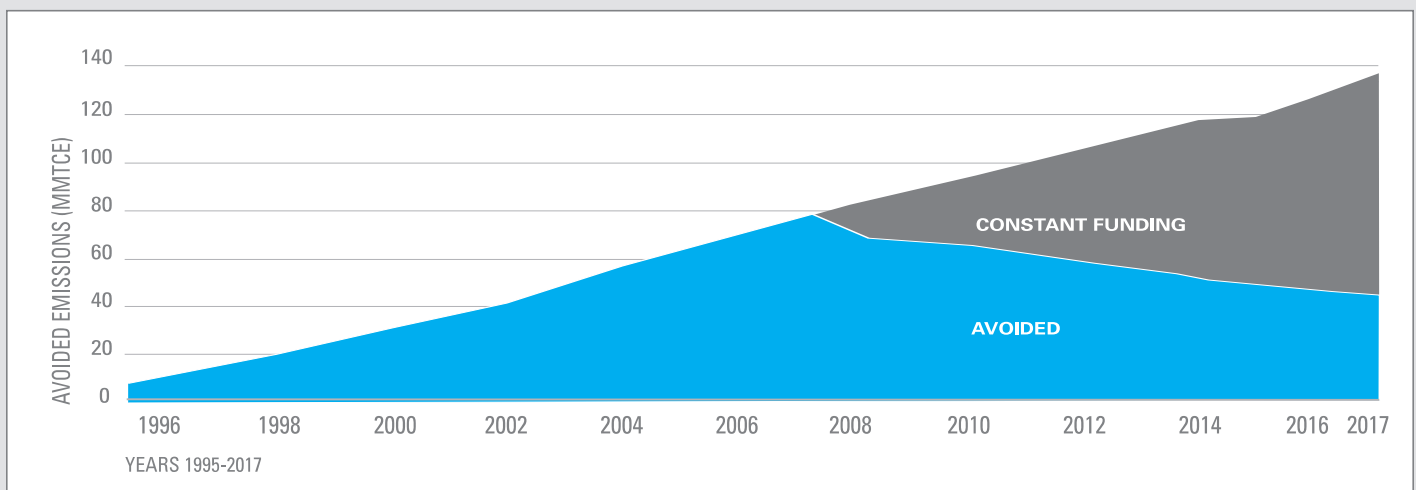
- Working aggressively with existing and new partner companies to develop more methane emissions reduction projects and maintain overall methane emissions below 1990 levels.
- Partnering with companies in the aluminum, magnesium, semiconductor, utility, HCFC-22, and mobile air conditioning sectors to reduce emissions of F-gases.
- Continuing to spread the success of EPA's domestic methane partnership programs overseas through the Methane to Markets Partnership.

³ Emissions do not include those used in mobile air conditioning or as replacements for ozone depleting substances.

TABLE 3. Long-term greenhouse gas reduction goals for EPA Climate Partnership Programs (MMTCE)

PROGRAM	ACCOMPLISHMENTS			GOALS		
	2007	2012	2015	2007	2012	2015
ENERGY STAR*	42.4	52	64			
Clean Energy Supply Programs	4.8	8	12			
Methane Programs	17.4	18	20			
Fluorinated Gas Programs	13.8	19	22			
TOTAL	78.4	97	118			

*Does not include ENERGY STAR products managed by DOE.

FIGURE 3. Potential for additional greenhouse gas reductions from EPA Climate Partnership Programs

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

FIGURE 4. International Climate Protection Awards

EPA established the Climate Protection Awards in 1998 to recognize outstanding accomplishments in protecting the Earth's climate. So far, 154 individuals,

companies, and organizations from 18 countries have earned the EPA Climate Protection Award. This year's 15 winners are from Argentina, Costa Rica, India, and the United States. They are reducing greenhouse gas emissions by improving energy efficiency, introducing new technologies, purchasing green power, and inspiring local and global action to protect the climate. Each winner serves as an example and inspiration for others to take action to protect the climate.

CORPORATE AND GOVERNMENT AWARD WINNERS

Advanced Micro Devices
Sunnydale, CA

Austin Energy
Austin, TX

City of Albuquerque
Albuquerque, NM

Xerox Corporation
Norwalk, CT

MEGTEC Systems
De Pere, WI

TEAM AWARD WINNERS

Climate Protection Team of Mr. Durwood Zaelke & Mr. Scott Stone
Washington, DC

Life Cycle Analysis Team of Dr. Stella Papasavva & Mr. William R. Hill
Warren, MI

INDIVIDUAL AWARD WINNERS

Ms. Gay Browne
Montecito, CA

Mr. John Morrill
Arlington, VA

Mr. Kenneth Davis
Warren Air Force Base, WY

Ms. Laura Miller
Dallas, TX

Ms. Laurie David
Pacific Palisades, CA

Mr. Marco Gonzalez
Costa Rica

Ms. Romina Picolotti
Buenos Aires, Argentina

LIFETIME ACHIEVEMENT AWARD

Dr. Rajendra K. Pachauri
New Delhi, India

INTRODUCTION TO EPA'S CLIMATE PROTECTION PROGRAMS

In the United States, there is enormous potential to cost-effectively reduce greenhouse gas emissions; however, pervasive market barriers have long discouraged some consumers and organizations from taking advantage of these “win-win” opportunities. For the past 15 years, the U.S. Environmental Protection Agency’s (EPA’s) voluntary climate protection programs have helped break down the barriers that can stifle cost-effective investment in energy efficiency, clean energy, and other climate-friendly technologies and practices (see Table 4, p. 11). EPA’s public-private partnerships provide a suite of tools, resources, practices, and policies for thousands of partners, who count on and benefit from—

- Objective information
- Technical assistance
- Recognition for environmental leadership

Through these partnerships, U.S. consumers, businesses, and organizations are stepping up to the nation’s challenge and taking action to reduce their energy use, avoid greenhouse gas emissions, and hedge against volatile fuel markets. Their actions result in real financial and environmental benefits across the residential, commercial, and industrial sectors, which increase every year as the number of partners and variety of tools and strategies offered through EPA’s programs continue to grow. The impressive level of benefits achieved in 2007 is expected to double by 2017, making EPA’s suite of climate protection programs an important component of the President’s plan to reduce greenhouse gas intensity 18 percent by 2012.

The programs summarized in this report⁴ focus on the broad strategies described below to achieve their environmental goals:

Corporate Commitments To Reduce Greenhouse Gas Emissions



Partners in EPA’s Climate Leaders program are Fortune 500 and other leading corporations that

have committed to aggressively reducing their greenhouse gas (GHG) emissions. When they join the partnership, these companies agree to complete a comprehensive inventory of their greenhouse gas emissions, set an ambitious long-term reduction goal, and annually report their progress to EPA. Climate Leaders are reducing their carbon footprint and earning recognition for environmental stewardship through the program by investing in energy efficiency, clean energy, and measures to reduce emissions of other greenhouse gases.

Energy Efficiency



Energy efficiency—obtaining identical services or output (such as heating, cooling, and lighting) with less energy input—offers one of the lowest cost means of reducing energy bills and addressing climate

change (see Figure 5). Since 1992, EPA has helped individuals and organizations nationwide adopt cost-effective, energy-efficient technologies and practices and save up to 30 percent on their energy bills by:

- Clearly identifying energy-efficient products with superior performance in the market place.
- Improving the energy efficiency standards of new home construction and existing home renovations.
- Promoting strategic energy management practices across the commercial and industrial sectors so that businesses and organizations can proactively manage their energy use (see Figure 6, p. 11).
- Developing new efforts to accelerate the adoption of emerging greenhouse gas-reducing technologies.

Expansion of Clean Energy Supply



In 2001, EPA launched two partnership programs in fulfillment of the National Energy Policy—the Green Power Partnership and the Combined Heat and Power (CHP)

Partnership—to increase the nation’s supply of clean

⁴ This report provides results for the Climate Protection Partnership Programs operated by the Office of Atmospheric Programs at EPA. 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 that the reduction in greenhouse gas emissions across the entire set of climate programs to be about 110 million metric tons of carbon equivalent (MMTCE) in 2007.

FIGURE 5. Two new reports highlight the critical role of energy efficiency and clean energy as low-cost opportunities for greenhouse gas emissions reductions

As the effects of climate change continue to manifest themselves in the United States and abroad, the demand is growing for near-term, low-cost solutions across all sectors of the economy. In 2007, two new important reports were published that highlight the substantial opportunities for low-cost greenhouse gas emissions reductions through energy efficiency and clean energy. These reports join a growing body of research that conclude that ENERGY STAR and EPA's other climate protection programs are delivering low-cost, near-term solutions to address climate change.

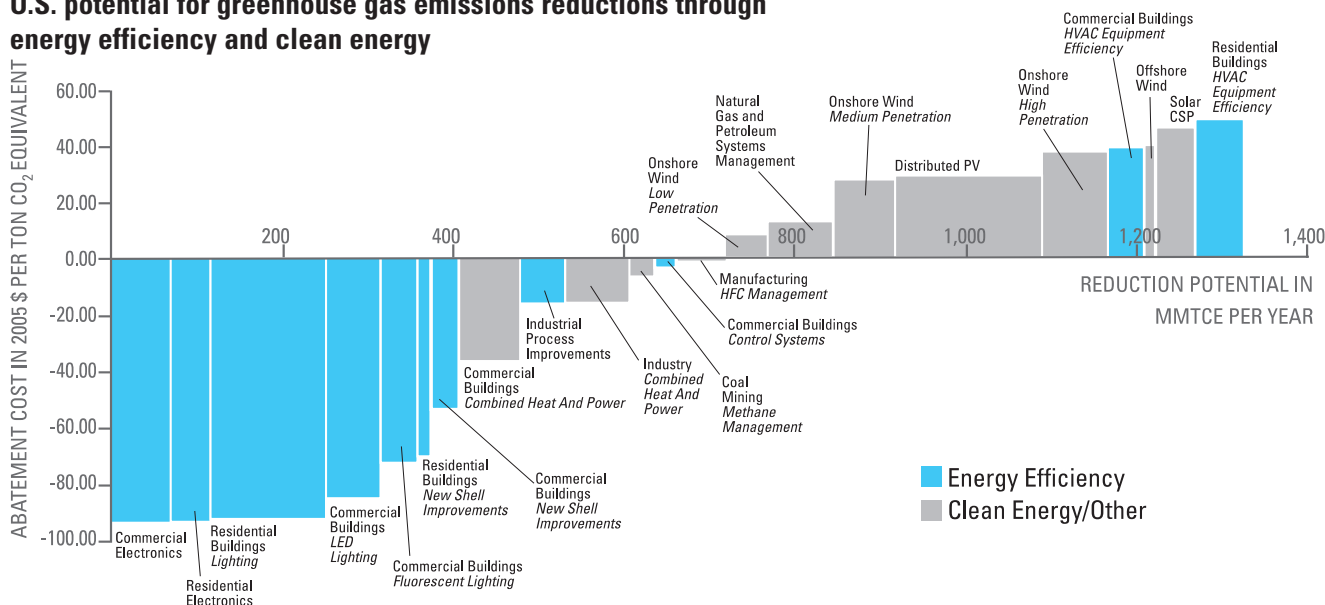
The Intergovernmental Panel on Climate Change (IPCC) *Fourth Assessment Report: Working Group III*, approved in May 2007, presents a comprehensive update on global greenhouse gas mitigation opportunities and reaches the following conclusions:¹

- Globally, the residential and commercial sectors have the potential to reduce approximately 29 percent of the projected baseline emissions by 2020 at negative cost—the highest potential improvement among all sectors studied in the report.
- Sound policy combined with strong enforcement is necessary to overcome the substantial barriers that exist, especially in the residential and commercial sectors, to achieve these improvements.
- Substantial reductions in carbon dioxide (CO₂) emissions from energy use in buildings can be achieved over the coming years using mature technologies for energy efficiency that already exist widely and that have been successfully used.

In December 2007, the management consulting firm McKinsey & Company released its report *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?*, which concludes:²

- By 2030, the United States has the potential to reduce greenhouse gas emissions by 3.0 to 4.5 gigatons of CO₂ equivalent using low-cost abatement options—available at marginal costs of less than \$50 per ton if the nation can capture sizable gains from energy efficiency and clean energy.
- Prompt action and a strong, coordinated, economy-wide implementation strategy is necessary in the near future to reduce greenhouse gas emissions at the lowest cost to the economy.
- Energy efficiency in buildings and appliances has the potential to reduce greenhouse gas emissions by 710 – 870 megatons through options including lighting retrofits, office electronics, appliances, and improved heating, ventilation, and air conditioning systems (see figure below).
- Almost 40 percent of targeted reductions, primarily improvements in energy efficiency in buildings, could be achieved at negative costs, which could substantially offset the cost of other higher cost abatement options, although it requires some funding to capture these opportunities.
- These savings could only be realized by overcoming persistent barriers to market efficiency, including mismatches between who pays the cost of an option and who gains the benefit, lack of information about the impact of individual decisions, and consumer desire for rapid payback (typically 2 to 3 years) when incremental up-front investment is required.

U.S. potential for greenhouse gas emissions reductions through energy efficiency and clean energy



¹ For more information, see Intergovernmental Panel on Climate Change (IPCC), 2007.

² For more information, see McKinsey & Company, 2007.

energy (see Figure 7). These partnerships are spurring resource growth by promoting greater purchase of electricity derived from renewable sources and greater investment in environmentally friendly combined heat and power. EPA has partnered with hundreds of organizations through these two programs to provide technical assistance, minimize transaction costs, and promote technologies that significantly reduce greenhouse gas emissions from energy generation.

State and Local Energy Policy Evolution



Significant informational and institutional barriers can prevent state and local entities from implementing policies and making investments that spur development in

energy efficiency and clean energy. Through the Clean Energy-Environment State Partnership and the Clean Energy-Environment Municipal Network, EPA provides state and local energy policymakers with tools and resources that allow them to explore, evaluate, and implement a variety of clean energy policies. EPA is also facilitating the National Action Plan for Energy Efficiency (Action Plan) along with DOE. In addition to other EPA utility policy efforts, the Action Plan builds awareness of and provides guidance on how to overcome state policies that limit greater investment in energy efficiency by utilities and other third-party administrators of energy efficiency programs.

Non-CO₂ Greenhouse Gas Emissions Reductions

A number of greenhouse gases can trap more heat in the earth's atmosphere, on a per molecule basis, than carbon dioxide (CO₂). Many of these gases are released as byproducts of industrial operations. EPA's climate partnerships are significantly reducing emissions of these gases, as described below:



- Methane is both a potent greenhouse gas and a highly desirable clean fuel. EPA partners with the natural gas, coal mining, agriculture, and landfill gas development industries to help them capture methane in a cost-effective manner and use it or sell it as a clean energy source.
- Many of the fluorinated gases (F-gases)—including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—are extremely powerful and persistent greenhouse gases. To avoid significant accumulation of these gases in the atmosphere, EPA is collaborating with the aluminum, magnesium, and semiconductor industries; the HCFC-22 industries; the electric utilities; and those companies engaged in the mobile air-conditioning industry.



The 2007 Annual Report

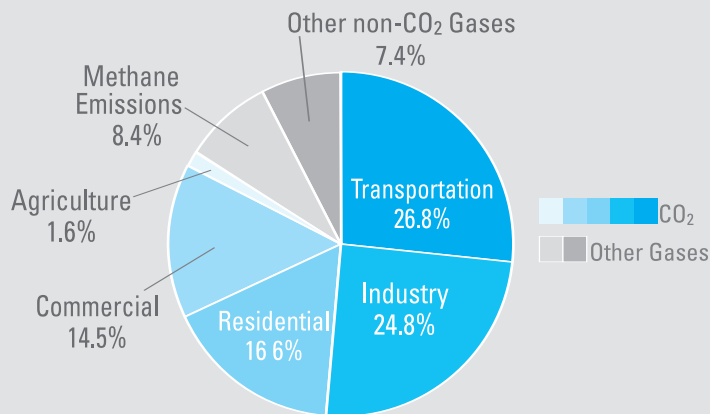
This annual report for 2007 provides detailed information on EPA's efforts within each of the five strategies mentioned above. The individual program sections that follow this introduction include an overview and accomplishments, environmental and economic benefits achieved in 2007, goals for the future, and summaries of the major tools and resources offered by the program. EPA is committed to documenting quantifiable program results and using well-established methods to estimate the benefits of its climate partnership programs. Specific approaches vary by program strategy, sector, availability of data, and market characteristics (these methods are reviewed in the final section of the report, page 56). For each program, EPA addresses common issues that arise when estimating program benefits, such as data quality, double counting, free-ridership, external promotion by third parties, and market effects, among others. The information presented in this annual report is similar to much of the information used in the U.S. Office of Management and Budget (OMB) Program Assessment Rating Tool (PART), which found these EPA programs to be achieving their goals.

TABLE 4. Market barriers addressed by EPA's Climate Partnership Programs

AUDIENCE OR TARGET MARKET	MARKET BARRIERS ADDRESSED	CLIMATE PROTECTION PARTNERSHIP PROGRAM									
		Climate Leaders	ENERGY STAR	Green Power	Combined Heat & Power	National Action Plan for Energy Efficiency	Methane	Fluorinated Gas	Clean Energy-Environment State Partnership	Clean Energy-Environment Municipal Network	
Energy Consumers	Lack of information about energy efficiency and renewable energy options		●	●	●						
	Competing claims in the marketplace		●	●							
	Lack of objective measurement tools	●	●	●							
	High transaction costs	●	●	●	●						
	Lack of reliable technical assistance	●	●	●	●						
	Split incentives		●								
	Perceptions of organizational risks	●	●	●							
	Lack of objective basis for recognition of environmental stewardship	●	●	●	●						
Utilities	Assessing objective measurement tools	●	●	●	●						
	Lack of information about energy efficiency program costs and benefits		●		●	●					
	Disincentives for energy efficiency in existing regulations and energy planning processes					●					
Industries with Byproduct GHG Emissions*	Lack of reliable technical assistance	●					●	●			
	Lack of objective basis for recognition of environmental stewardship	●					●	●			
State and Local Policy and Decisionmakers	Lack of information about clean energy policies					●			●	●	
	Lack of reliable technical assistance					●			●	●	
	Lack of objective basis for recognition of environmental stewardship					●			●	●	

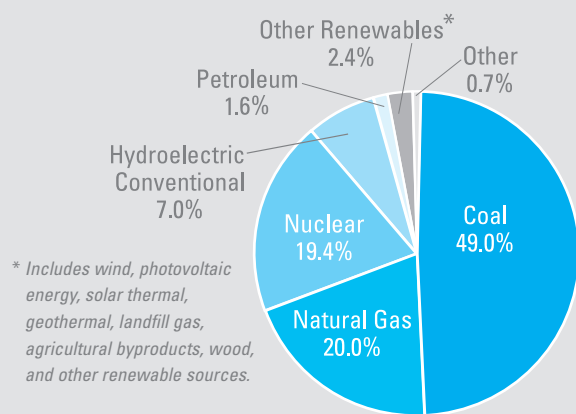
*Includes utilities

FIGURE 6. U.S. CO₂ emissions by sector and non-CO₂ gases by percent of total GHGs



Source: EPA 2007

FIGURE 7. U.S. electricity generation by fuel type



* Includes wind, photovoltaic energy, solar thermal, geothermal, landfill gas, agricultural byproducts, wood, and other renewable sources.

Source: EIA 2007

CLIMATE LEADERS



EPA launched the Climate Leaders program in 2002 to assist leading companies

across the country in developing comprehensive climate change strategies. Marking its fifth anniversary in February 2007, Climate Leaders achieved a number of significant milestones through the end of the year (see Table 5).

The number of Climate Leaders partners continued to grow in 2007. They represent a broad range of industry sectors, including cement, forest products, pharmaceuticals, utilities, information technology, and retail (see Figure 8). Partners operate in all 50 states and provide nearly 7 million jobs worldwide. When joining the Climate Leaders partnership, companies make a commitment to reduce their impact on the global environment by completing a corporate-wide inventory of their greenhouse gas emissions based on a quality management system, setting aggressive reduction goals, and annually reporting their progress to EPA.

EPA provides valuable guidance and recognition to partner companies as they develop and work toward their emissions reduction goals. Using EPA's wide range of tools, expertise, and resources, partners can make informed decisions about cost-effective strategies, investments, and projects in the areas of energy efficiency, clean energy, and non-carbon dioxide (CO₂) emissions reductions. EPA continuously tracks partner progress through a variety of means and ensures the credibility of reported data by performing detailed reviews and making site visits.

Achievements in 2007

- The number of Climate Leaders partners grew to 155, an increase of nearly 50 percent in just one year, with the addition of 50 new corporate partners. These companies represent more than 8 percent of total U.S. greenhouse gas (GHG) emissions.
- Seven additional partners successfully achieved their initial Climate Leaders GHG reduction goals: Advanced Micro Devices, Caterpillar, Hasbro, Pfizer, Roche Group U.S. Affiliates, Sun Microsystems, and Xerox Corporation (see Table 6). Of the 15 companies that have met their initial goals in the program, 12 have committed to a second round of reduction goals.

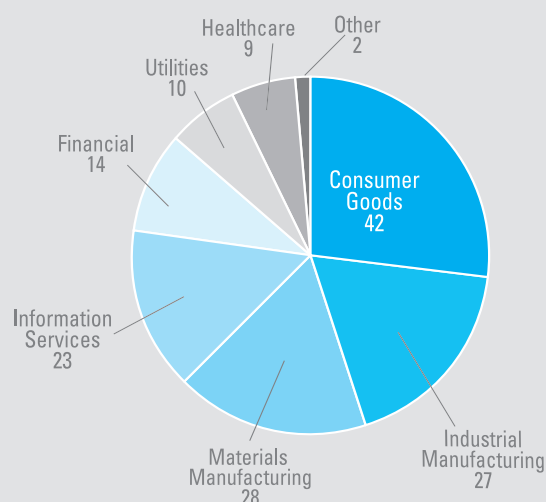
- The total number of partners that have announced corporate GHG goals through 2007 grew to 80; 22 partners announced goals in 2007 alone. More than half of the companies in the partnership have publicly announced GHG goals.
- EPA estimates that GHG reductions by the Climate Leaders partners will prevent 13 million metric tons of carbon equivalent (MMTCE) per year relative to business-as-usual scenarios. These reductions are equivalent to eliminating the annual GHG emissions from more than 8 million vehicles.
- EPA has received initial GHG inventories from 111 partners. This is a necessary step for all partners before establishing an emissions reduction goal. EPA technical experts performed 81 site visits to review partner GHG inventories and Inventory Management Plans and to recommend improvements.
- EPA road-tested draft offsets protocols, released guidance on setting carbon neutral goals and using offsets toward meeting reduction goals, and published a peer-reviewed paper on negotiating aggressive goals to provide rigorous, yet flexible, accounting principles for companies to manage their GHG emissions. These tools join the suite of existing Climate Leaders resources for companies to manage and reduce their GHG emissions (see Table 7).
- EPA recognized those partners that have set emissions reduction goals in a public service announcement (PSA) and supplements that ran in nine publications with a combined circulation of more than 10 million.

What to Expect in 2008 and Beyond

EPA will continue to recruit new, diverse partners to be part of the Climate Leaders program, as well as support existing partners that are working toward achieving their GHG reduction goals. In 2008, EPA expects to welcome an additional 35 partners into the Climate Leaders program and anticipates 25 current partners will announce new corporate GHG reduction goals. In addition, the Climate Leaders program will release a guide for small businesses to reduce their carbon footprint. EPA will continue to incorporate the tenets of Climate Leaders program protocols and lessons from partner reporting experiences into the development of future climate policy.

TABLE 5. Climate Leaders key program indicators for 2004 – 2007 (cumulative)

CLIMATE LEADERS INDICATOR	2004	2005	2006	2007
Partners	64	78	107	155
Initial Inventories Submitted	45	60	75	111
Site Visits	9	30	42	81
Goals Announced	25	38	59	80
Goals Achieved	0	5	8	15

FIGURE 8. The 155 Climate Leaders by sector**TABLE 6. Seven Climate Leaders achieve their climate protection goals in 2007**

PARTNER	GOAL ACHIEVED
Advanced Micro Devices Inc.	AMD achieved its initial goal by reducing global GHG emissions by 53% per manufacturing index from 2002 to 2006.
Caterpillar, Inc.	Caterpillar achieved its initial goal by reducing global GHG emissions by 28% per dollar revenue from 2002 to 2006.
Hasbro, Inc.	Hasbro achieved its initial goal by reducing total U.S. GHG emissions by 43% from 2000 to 2007.
Pfizer Inc.	Pfizer achieved its initial goal by reducing global GHG emissions by 43% per million dollars of revenue from 2000 to 2007.
Roche Group U.S. Affiliates	Roche achieved its initial goal by reducing total U.S. GHG emissions by 11% from 2001 to 2006.
Sun Microsystems, Inc.	Sun achieved its initial goal by reducing total U.S. GHG emissions by 23% from 2002 to 2007.
Xerox Corporation	Xerox achieved its initial goal by reducing total global GHG emissions by 18% from 2002 to 2006.

TABLE 7. Key resources of the Climate Leaders Program

RESOURCES FOR CALCULATING GREENHOUSE GAS (GHG) EMISSIONS	RESOURCES FOR CALCULATING GREENHOUSE GAS (GHG) REDUCTIONS FROM OFFSET INVESTMENTS AND RENEWABLE ENERGY PURCHASES
<ul style="list-style-type: none"> • Design Principles: overall guidance on developing a corporate-wide GHG inventory • Cross-Sector Guidance Documents <ul style="list-style-type: none"> • Stationary Combustion • Electricity and Steam • Mobile Combustion Sources • Refrigeration and Air Conditioning (use) • Sector-Specific Guidance Documents <ul style="list-style-type: none"> • Municipal Solid Waste Landfilling • Refrigeration and Air Conditioning (manufacturing) • Iron and Steel Production • Aluminum Production • Cement Production • Pulp and Paper Production 	<ul style="list-style-type: none"> • Offset Project Methodologies <ul style="list-style-type: none"> • Commercial Boiler • Industrial Boiler • Landfill Methane • Manure Management: Anaerobic Digester • Reforestation/Afforestation • Transit Bus Efficiency • Green Power Purchases

ENERGY STAR OVERVIEW



Climate change has emerged as one of the world's most significant environmental challenges, and energy efficiency offers one of the lowest cost options for reducing the greenhouse gas emissions that contribute to climate change—all

while saving money and growing the economy. Since its inception in 1992, the ENERGY STAR program has worked to dismantle identifiable and pervasive market barriers stifling the adoption of cost-effective, energy-efficient technologies and practices in the residential, commercial, and industrial sectors. And since 1996, the U.S. Department of Energy (DOE) has joined with EPA and assumed specific ENERGY STAR program responsibilities.

The number of products, practices, and policies that EPA offers through ENERGY STAR grows every year, allowing an ever-increasing number of American organizations and consumers to save money on their energy bills while protecting the environment. Nevertheless, numerous opportunities still exist for cost-effective energy efficiency investments. Given the rising concerns about the environmental, economic, and security implications of energy use, the nation's need to invest in energy efficiency is greater than ever.

The ENERGY STAR program plays a vital role as a credible, objective source of information for Americans wanting to make well-informed decisions to improve the energy efficiency of their homes and businesses. By clearly identifying the financially attractive options that save energy, the ENERGY STAR program has helped millions of consumers and thousands of businesses and organizations save money and protect the environment—and the program is poised to continue to do so well into the future.

Achievements in 2007

The broad achievements across the ENERGY STAR program include the following:

- Americans saved about \$16 billion on their utility bills across the residential, commercial, and industrial sectors (see Table 1, p. 3), largely by avoiding the need for more than 180 billion kilowatt-hours (kWh) of electricity or almost 5 percent of the total 2007 U.S. electricity demand. This included 38 gigawatts (GW) of peak power, or the equivalent of the generation capacity of almost 65 new power plants.
- Americans also avoided more than 40 million metric tons of greenhouse gas emissions (see Table 8), equivalent to the greenhouse gas emissions from 27 million vehicles.
- Facilitating the purchase of energy-efficient products and improving the level of energy efficiency in new home construction and existing home renovations accounted for about 40 percent of the program benefits achieved, while promoting improved energy management strategies for organizations in the commercial and industrial sectors accounted for the remaining 60 percent.
- U.S. consumers purchased about 500 million ENERGY STAR qualified products in 2007, and about 12 percent of all new homes built in 2007 earned the ENERGY STAR.⁵
- Nationwide awareness of ENERGY STAR continued to grow, and it is now recognized by more than 70 percent of the American public.
- EPA completed an assessment of the ENERGY STAR brand, working with a leading brand strategy and management company. The assessment found the ENERGY STAR brand to be strong and provided recommendations for protecting the integrity of the brand in the coming years (see Figure 9).⁶

⁵ Single-family site-built new homes

⁶ For more information, see Interbrand, 2007.


TABLE 8. ENERGY STAR program achievements exceed goals in 2007

	2007				2008	
	Energy Saved (Billion kWh)		Emissions Avoided (MMTCE)		Energy Saved (Billion kWh)	Emissions Avoided (MMTCE)
	Goal	Achieved	Goal	Achieved	Goal	Goal
All Qualified Products ¹	—	87.8	16.5	17.6	—	18.5
Commercial Building Improvements ²	—	78.3	12.5	18.0	—	13.5
New Homes ³	—	1.7	0.8	0.5	—	1.0
Industrial Improvements ⁴	—	14.1	3.9	6.3	—	4.2
PROGRAM TOTAL for ENERGY STAR	150	181.8⁵	33.7	42.4	165	37.2
ACHIEVEMENTS BY PRODUCT TYPE						
	Energy Saved 2007 (Billion kWh)			Emissions Avoided 2007 (MMTCE)		
Consumer Electronics ⁶	14.7			2.8		
Residential Appliances ⁷	1.0			0.2		
Residential Office Equipment	8.5			1.6		
Lighting	7.1			1.3		
Heating and Cooling	7.2			2.4		
Residential Products	38.4			8.3		
Commercial Appliances	1.4			0.3		
Office Equipment	39.5			7.5		
Commercial Lighting	1.4			0.3		
Other	7.0			1.2		
Commercial Products	49.3			9.3		

¹Results for qualified products from Sanchez et al., 2008. ²Results from building improvements based on methodology presented in Horowitz, 2008. ³Results for qualified homes from CPPD, 2008. ⁴Electricity results from industrial improvements based on methodology presented in Horowitz, 2007. ⁵The kWh savings imply peak demand savings of more than 35 gigawatts (GW), based on conservation load factors developed by LBNL (Kooimey et al., 1990). ⁶A small portion of consumer electronics may be used in commercial buildings such as hotels. For reporting purposes, all consumer electronics results are included under Residential Products. ⁷EPA results only, does not include products under the responsibility of DOE. Totals may not equal sum of components due to independent rounding.

—: Not applicable

FIGURE 9. Keeping ENERGY STAR strong for the future



In 2007, an international brand consulting firm, Interbrand, released a report on the ENERGY STAR brand, which focused on:

- The art and science of branding.
- The core principles of the ENERGY STAR brand.
- The evolution of the ENERGY STAR brand.
- Future opportunities and challenges for the brand.
- Ways to ensure future success of the brand.

According to this report, “ENERGY STAR has grown into a well-recognized consumer brand, the result of well-crafted strategies, market-defined insights, and a perseverance to always improve on the past.” In addition, the report noted that, “...EPA has put the brand management tools and standards in place to manage the brand for continued success.”

The report is available at www.energystar.gov/publications.

EPA now engages more than 12,000 businesses and organizations across the country to spur the adoption of energy-efficient products, practices, homes, buildings, and services that lower energy bills and benefit the environment. These partners include:

- About 2,000 manufacturers using the ENERGY STAR to distinguish the energy efficiency of over 40,000 individual product models across more than 50 product categories. These products can save consumers up to 30 percent in total savings on their household energy bills (see Table 9).
- More than 1,000 retail partners bringing ENERGY STAR qualified products and educational information to their customers.
- More than 5,000 builder partners constructing new homes that qualify for the ENERGY STAR in every state and the District of Columbia.

- About 3,000 private businesses and public sector organizations investing in energy efficiency and reducing energy use in their buildings and facilities.
- More than 40 states, 550 utilities, and many other energy efficiency program sponsors leveraging ENERGY STAR to improve the efficiency of commercial buildings, industrial facilities, and homes.
- Hundreds of energy service providers, energy raters, architects, building engineers, and financial lenders making energy efficiency more widely available through ENERGY STAR and providing additional value to their customers.

EPA and DOE recognized the outstanding commitments of 74 partners at the 2007 Partner of the Year Awards (see Figure 10).

TABLE 9. Average energy savings of ENERGY STAR qualified products

ENERGY STAR PRODUCT CATEGORY	AVERAGE ENERGY SAVINGS** ABOVE STANDARD PRODUCT	ENERGY STAR PRODUCT CATEGORY	AVERAGE ENERGY SAVINGS** ABOVE STANDARD PRODUCT
Office		Lighting	
Monitors	20-60%	Compact fluorescent light bulbs (CFLs)*	75%
Computers	5-55%	Decorative light strings	70%
Fax machines	20%	Residential light fixtures	75%
Copiers	20%	Residential Appliances	
Multifunction devices	20%	Room air conditioners*	10%
Scanners	50%	Dehumidifiers	15%
Printers	10%	Room air cleaners	45%
Consumer Electronics		Exhaust fans	70%
TVs	25%	Ceiling fans	45%
VCRs	30%	Dishwashers*	20%
TVs/DVDs/VCRs	90%	Refrigerators*	15%
DVD products	60%	Clothes washers*	30%
Audio equipment	60%	Commercial Appliances	
Telephony	55%	Water coolers	45%
Digital-to-analog converter (DTA)	50%	Commercial solid door refrigerators and freezers	35%
External power adapters	35%	Commercial hot food holding cabinets	60%
Battery charging systems	35%	Commercial fryers	15%
HVAC		Commercial steamers	55%
Furnaces	15%	Vending machines	40%
Central air conditioners	15%	Home Envelope	
Air source heat pumps	10%	Insulation/Sealing	N/A
Geothermal heat pumps	30%	Roof	N/A
Boilers	5%	Windows, doors, & skylights*	N/A
Programmable thermostats	15%		
Light commercial HVAC	5%		

* DOE managed products

** Actual savings will vary by climate region and home characteristics.

FIGURE 10. ENERGY STAR Awards

The success of the ENERGY STAR program depends on the initiative and day-to-day efforts of its thousands of partners. EPA and DOE recognized 74 of more than 12,000 partners at the annual ENERGY STAR Partner of the Year Awards for their outstanding work in 2007 advancing energy efficiency in the United States. Their accomplishments are summarized in the report, *Profiles in Leadership*.*

SUSTAINED EXCELLENCE

3M

*St. Paul, MN*Advantage IQ, Inc.
*Spokane, WA*Austin Energy
*Austin, TX*California Portland Cement
Company
*Glendora, CA*CenterPoint Energy
*Houston, TX*Food Lion, LLC
*Salisbury, NC*Ford Motor Company
*Dearborn, MI*GE Consumer & Industrial
*Louisville, KY*Giant Eagle, Inc.
*Pittsburgh, PA*Gorell Enterprises, Inc.
*Indiana, PA*Marriott International Inc.
*Bethesda, MD*Merck & Co., Inc.
*Whitehouse Station, NJ*Nevada ENERGY STAR Partners
*Las Vegas, NV*New York State Energy Research
and Development Authority
*Albany, NY*NewYork-Presbyterian Hospital
*New York, NY*Northeast ENERGY STAR
Products Initiative
*Lexington, MA*Oncor Electric Delivery
*Dallas, TX*OSRAM SYLVANIA
*Danvers, MA*PepsiCo
*Purchase, NY*ProVia Door
*Sugarcreek, OH*Raytheon Company
*Waltham, MA*Sea Gull Lighting Products, LLC
*Riverside, NJ*Southern California Edison
*Rosemead, CA*Toyota Motor Engineering &
Manufacturing North America,
Inc.
*Erlanger, KY*Transwestern
*Houston, TX*USAA Real Estate Company
*San Antonio, TX*Whirlpool Corporation
*Benton Harbor, MI*Wisconsin Focus on Energy
*Madison, WI***PARTNER OF THE YEAR**Allergan, Inc.
*Irvine, CA*ArcelorMittal USA
*Chicago, IL*Arizona Public Service (APS)
*Phoenix, AZ*Building Owners and Managers
Association (BOMA)
International
*Washington, DC*CB Richard Ellis, Inc.
*Los Angeles, CA*Colorado Springs Utilities
*Colorado Springs, CO*Council Rock School District
*Newtown, PA*Energy Inspectors
*Las Vegas, NV*Environmental Building Solutions
*Matthews, NC*Gresham-Barlow School District
*Gresham, OR*ITW Food Equipment Group,
North America
*Troy, OH*J. C. Penney Company, Inc.
*Plano, TX*Lithonia Lighting, an Acuity
Brands Company
*Conyers, GA*National Grid
*Westborough, MA*Pacific Gas and Electric
Company
*San Francisco, CA*Pella Corporation
*Pella, IA*Providence Health & Services
*Seattle, WA*Rocky Mountain Power
*Salt Lake City, UT*Seattle Lighting
DestinationLighting.com
*Seattle, WA*Simon Property Group
*Indianapolis, IN*Southern Energy Management
*Raleigh, NC*Southwest Energy
Conservation, LLC
*El Paso, TX*The Dow Chemical Company
*Midland, MI*The Joint Management
Committee representing
Massachusetts
New Homes with ENERGY STAR
*Massachusetts*TIAA-CREF
*New York, NY*TRC Energy Services
*Windsor, CT***AWARDS FOR EXCELLENCE**Best Buy Co., Inc.
*Richfield, MN*Bosch Home Appliances
*Huntington Beach, CA*Canon USA, Inc.
*Lake Success, NY*Efficiency Vermont
*Burlington, VT*Energy Trust of Oregon, Inc.
*Portland, OR*Forest City Stapleton
*Denver, CO*Georgia Power
*Atlanta, GA*Haven Properties
*Alpharetta, GA*Ideal Homebuilders
*Lexington, KY*Ivey Residential
*Evans, GA*Long Island Power Authority
*Uniondale, NY*Lowe's Companies, Inc.
 *Mooresville, NC*Nashville Area Habitat for
Humanity
*Nashville, TN*Nationwide Marketing Group
*Winston-Salem, NC*Nevada Power & Sierra Pacific
Power ENERGY STAR Lighting
and Appliance Program
*Reno, NV*NJBP, New Jersey's Clean
Energy Program
*Newark, NJ*Pacific Gas and Electric
Company
*San Francisco, CA*The Home Depot
*Atlanta, GA*Utah Division of Housing and
Community Development
*Salt Lake City, UT*Virgin Islands Water and Power
Authority
*St. Thomas, U.S. Virgin Islands*Winton/Flair Custom Homes
*El Paso, TX***SPECIAL RECOGNITION**3M's Optical Systems Division
*St. Paul, MN*Lennar Homes—Bay Area,
California
*San Ramon, CA*Menards
*Eau Claire, WI** For more information, see www.energystar.gov/ia/partners/pt_awards/2008_profiles_in_leadership.pdf

ENERGY STAR IN THE RESIDENTIAL SECTOR

High utility bills and growing interest in green products and practices are leading an ever-increasing number of Americans to use ENERGY STAR as a trusted guide for improving the efficiency of their homes, saving money, and preventing greenhouse gas emissions. By using the ENERGY STAR qualified products and practices recommended by EPA, households can reduce their energy use up to 30 percent and save \$600 a year on their utility bills—all while enjoying the comfort and performance levels they expect. In 2007, many households benefitted from:

- Buying products that earned the ENERGY STAR (see Figure 11).
- Assessing the efficiency of their homes and undertaking home improvement projects that go beyond buying efficient products.
- Purchasing new homes that earned the ENERGY STAR.

ENERGY STAR Qualified Products

Activities in 2007 included adding new qualified products, updating specifications for select products (see Table 10), continuing national and international government coordination, and promoting broad outreach efforts that help consumers find ENERGY STAR qualified products. Highlights of these activities are described below.

New ENERGY STAR Qualified Products. EPA added two new product categories to the ENERGY STAR program. In anticipation of the nationwide changeover to digital television signals in February 2009, EPA established a new specification for digital-to-analog converter boxes (DTAs) that is expected to cut the energy use of these devices by more than 70 percent, with the potential to save Americans over \$1 billion in energy costs. In addition, EPA adopted the specification developed for ENERGY STAR by Natural Resources Canada for decorative light strings. By using solid state lighting technology, an ENERGY STAR qualified decorative light string consumes 70 percent less energy than an incandescent light string.

Raising the Bar for ENERGY STAR. In 2007, EPA finalized revisions for an additional two specifications. One was a groundbreaking revision to the ENERGY STAR specification for residential light fixtures. For the first time, consumers will be able to purchase qualified GU-24 based compact fluorescent light bulbs (CFLs) for use in ENERGY STAR qualified fixtures.⁷ The bulbs allow consumers to change the light output, shape, and color of the bulbs without rewiring. Most other qualified fixtures use less flexible, fixed-wattage bulbs.

Awareness of ENERGY STAR Continues to Grow. The success of the ENERGY STAR program depends on public awareness of the financial and environmental benefits of ENERGY STAR qualified products, homes, and buildings. The 2007 ENERGY STAR national campaigns and PSAs reached millions of people through TV, magazine, radio, and other media outlets. Articles mentioning ENERGY STAR reached over one billion readers. Public awareness of the ENERGY STAR label grew to more than 70 percent in 2007—a 20 percentage point increase over the past 5 years (see Figure 12). Other highlights of the survey findings⁸ include:

- Public awareness is even greater—80 percent—in major markets where local utilities and other organizations use ENERGY STAR as the platform to promote energy efficiency to their customers.
- More than 35 percent of American households knowingly purchased an ENERGY STAR qualified product in 2007.
- More than 70 percent of these households reported being favorably influenced by the ENERGY STAR label, up from about 50 percent in 2003.
- More than 80 percent of these households reported they are likely to recommend ENERGY STAR products to their friends, with 29 percent of households reporting they are “extremely likely” to do so.

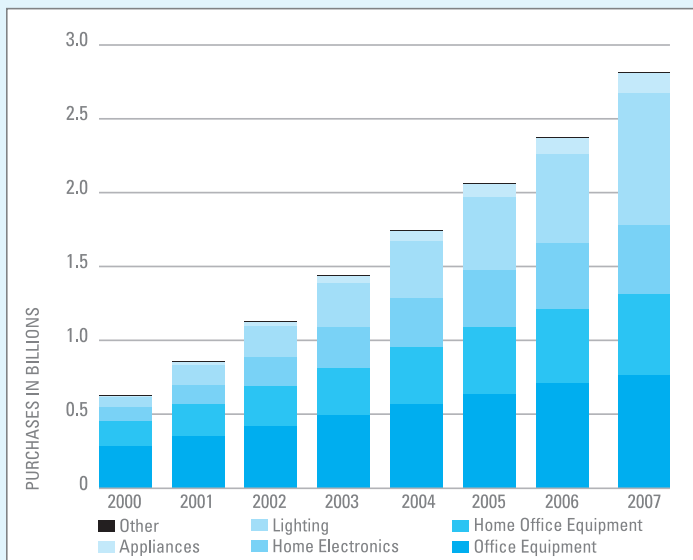
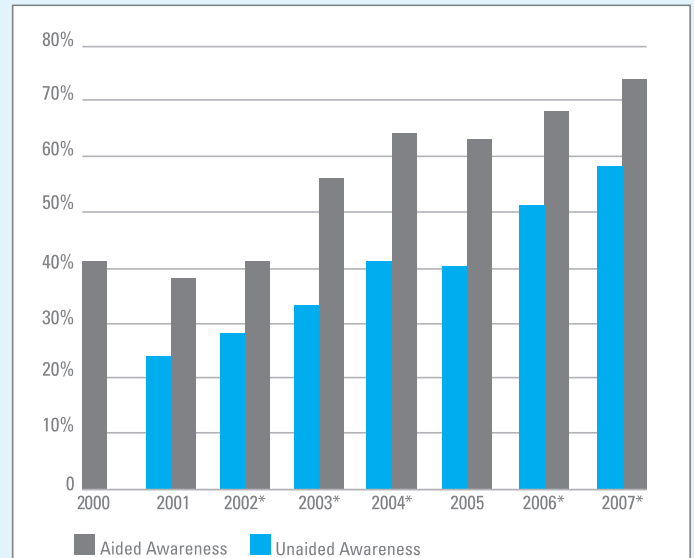
Further, the ENERGY STAR Web site experienced significant growth in 2007. Visitor sessions reached 10 million, up from 7 million in 2006.

⁷ Most qualified fixtures use the GU-24 base, which accepts pin-based CFLs rather than screw-based bulbs.

⁸ For more information, see U.S. EPA, 2008b.

TABLE 10. ENERGY STAR residential product specifications added, revised, and in progress

Product Category	Year Introduced and (Year Revised)	Responsible Agency	Status of Activity in 2007
NEW SPECIFICATIONS			
Digital-to-Analog Converter Boxes (DTAs)	2007	EPA	New specification took effect January 31, 2007.
Decorative Light Strings	2007	EPA	New specification took effect in August 2007.
2007 REVISIONS COMPLETED			
Residential Lighting Fixtures	1997 (2001, 2002, 2003, 2005)	EPA	Revision completed. Revised specification to take effect August 1, 2008.
Roof Products	1999 (2001, 2003, 2007)	EPA	Revision completed. Revised specification took effect December 31, 2007.
2007 REVISIONS IN PROGRESS			
Computers	1992 (1995, 1999, 2000, 2007)	EPA	Revision initiated in 2007, expected to be complete in 2008.
External Power Adapters	2005	EPA	Revision initiated in 2007, expected to be complete in 2008.
Furnaces	1995 (2006)	EPA	Revision initiated in 2007, expected to be complete in 2008.
Imaging Equipment	2007	EPA	Revision initiated in 2007, expected to be complete in 2008.
Monitors/Displays	1992 (1995, 1998, 1999, 2005, 2006)	EPA	In progress.
Programmable Thermostats	1995	EPA	In progress.
Set-Top Boxes	2001	EPA	Specification suspended in 2005. Revision initiated in 2007, expected to be complete in 2008.
Telephony	2002 (2004, 2006)	EPA	Revision initiated in 2007, expected to be complete in 2008.
Televisions	1998 (2002, 2004, 2005)	EPA	Revision initiated in 2007, expected to be complete in 2008.
Ventilation Fans	2001 (2003)	EPA	In progress.

FIGURE 11. More than 2.5 billion ENERGY STAR qualified products purchased since 1992**FIGURE 12. Awareness of ENERGY STAR growing in the United States**

* Annual result is statistically different from the result of the prior year.

ENERGY STAR *Change a Light, Change the World Campaign.* The eighth annual ENERGY STAR *Change a Light, Change the World* campaign was a major part of the year's outreach efforts. The first-ever ENERGY STAR *Change a Light* bus tour stopped at 16 events in 10 cities across the United States (see Figure 13), engaged more than 1,100 organizations, and catalyzed over 1.3 million pledges to replace an incandescent light with an ENERGY STAR qualified CFL.

Continuing International Cooperation. In 2007, EPA signed a Memorandum of Understanding (MOU) with the China Standard Certification Center (CSC) to explore harmonization of ENERGY STAR and the Chinese labeling programs. In addition, EPA continued its collaboration with the European Union in revising specifications for ENERGY STAR qualified office equipment and its work as co-chair of the Asia-Pacific Partnership's Buildings and Appliances Task Force.

Home Improvement through ENERGY STAR

In addition to purchasing ENERGY STAR qualified products, homeowners can take a number of steps to reduce the overall energy consumption of their homes, raise the value of their homes, and improve their comfort, safety, and health. These steps range from using the online ENERGY STAR Home Advisor to identify recommended improvements to having a whole-house energy assessment and retrofit performed by a trained, qualified technician. EPA's home improvement programs offer consumers tools, resources, and information to help guide them through the various stages of home improvement. Highlights of 2007 follow.

Home Performance with ENERGY STAR. Home Performance with ENERGY STAR is an effort supported by EPA and DOE to promote whole-house, energy efficiency retrofits through a qualified contractor network that is backed by a quality assurance program. EPA estimates that a typical home can save, on average, more than 20 percent of its total energy use and between \$400 and \$500 a year if the recommended improvements are made. Regional sponsors implement Home Performance with ENERGY STAR by recruiting and training contractors, marketing contractor services, and overseeing the quality of their work. In 2007:

- More than 11,000 Home Performance with ENERGY STAR retrofits were reported by program sponsors, bringing the total number of homes improved under this program to over 38,000 retrofits.

- Seven new program sponsors brought the total number of regional and local sponsors to more than 20 (see Figure 14).⁹
- EPA, in conjunction with DOE and the U.S. Department of Housing and Urban Development (HUD), concluded a 3-year grant with the Building Performance Institute (BPI) to develop a home performance contractor infrastructure. BPI reported more than 1,500 certified technicians in 34 states and 300 accredited contractors in 9 states by the end of 2007.
- EPA recognized six partners in 2007—Austin Energy, Efficiency Vermont, the New Jersey Board of Public Utilities, National Grid, New York State Energy Research and Development Authority (NYSERDA), and Wisconsin Focus on Energy—for their successful implementation of Home Performance with ENERGY STAR.

The Home Energy Advisor. EPA released the Home Energy Advisor, an interactive Web-based tool that offers homeowners recommendations on how to improve the efficiency of their homes. The tool complements the Home Energy Yardstick, which gives homeowners a ranking, on a scale from 1 to 10, of the efficiency of their home. In 2007, more than 95,000 homeowners benchmarked their homes with the Yardstick, and 23,000 identified specific recommendations using the Home Energy Advisor.

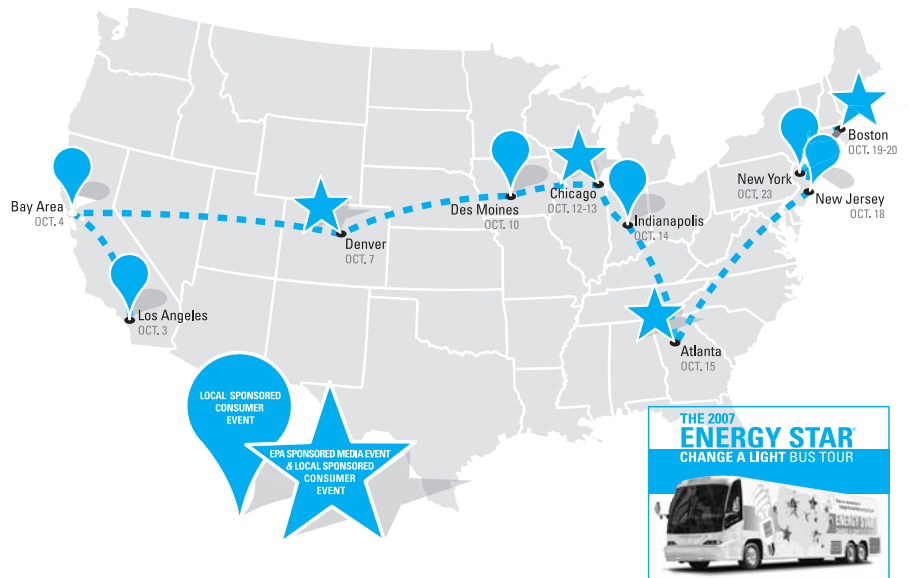
Seal and Insulate with ENERGY STAR. Air sealing and insulation are among the easiest, cost-effective ways to reduce energy bills and increase home comfort. In 2007, EPA developed new retail-oriented materials and helped retail partners promote this information. In addition, homeowners downloaded more than 80,000 copies of EPA's *Do-It-Yourself Guide to Sealing and Insulation*.

Proper HVAC Installation. Installing and maintaining an appropriately sized heating, ventilation, and air conditioning (HVAC) system can offer homeowners significant energy savings. EPA estimates that the improper sizing and installation of an HVAC system can reduce system performance by as much as 30 percent, and that more than half of all systems nationwide are installed incorrectly. In 2007, EPA launched an HVAC Quality Installation (QI) program in collaboration with two utilities, Oncor and Southern California Edison, setting the stage for a national program rollout in 2008. The HVAC QI program provides an industry-accepted set of installation guidelines to ensure that the system performs at its rated capacity.

⁹ New program sponsors in 2007 for Home Performance with ENERGY STAR include: City of Anaheim, CA, First Energy, Foundation for Senior Living, Gainesville Regional Utility, Maryland Energy Administration, Missouri Department of Natural Resources, and Southern California Edison.

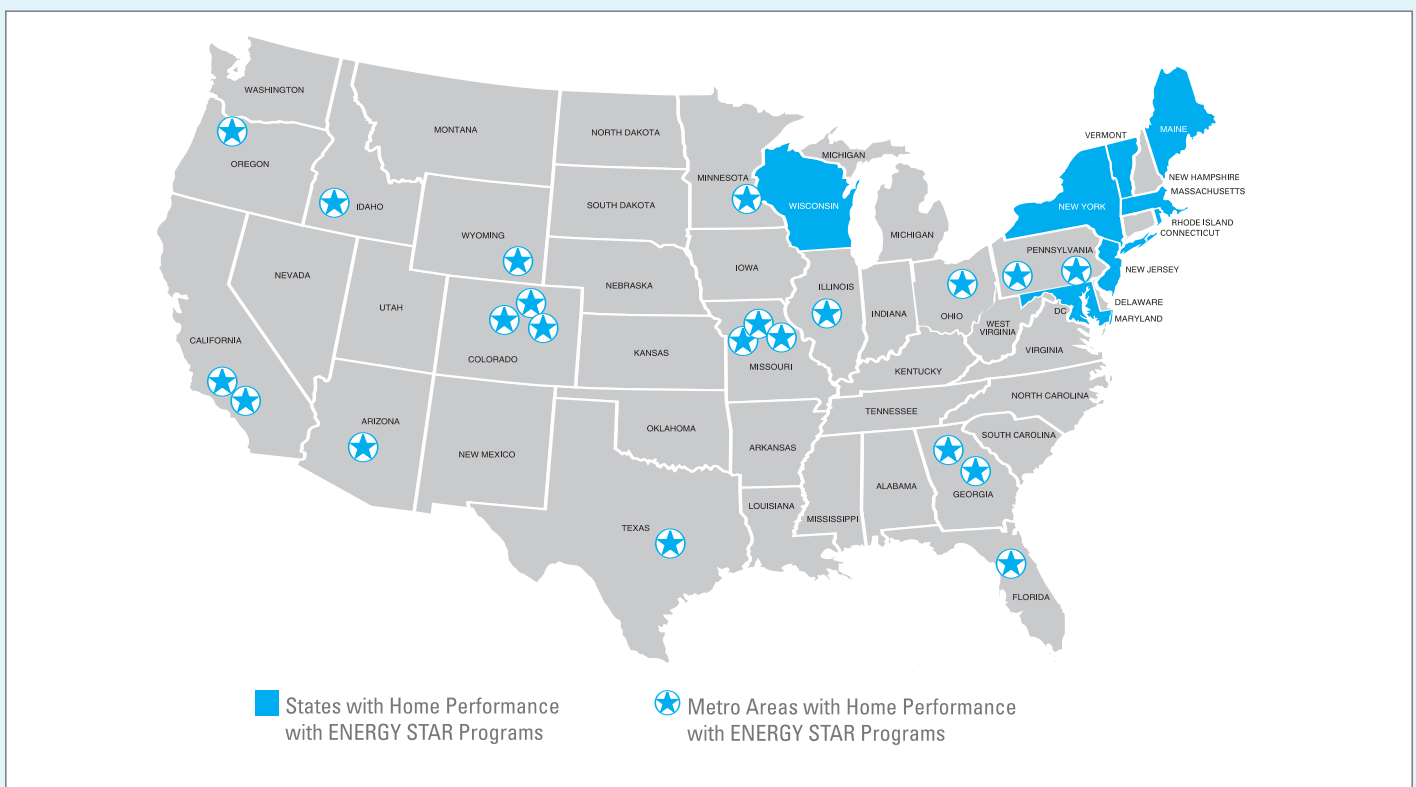
FIGURE 13. National bus tour helps ENERGY STAR campaign reach millions

On Wednesday, October 3, 2007—ENERGY STAR Change a Light Day—EPA kicked off the first-ever ENERGY STAR Change a Light bus tour. As the newest strategy in EPA’s highly successful ENERGY STAR *Change a Light, Change the World* campaign, the bus completed a 20-day national tour, stopping at 16 events in 10 cities on its way from Anaheim, CA, to Boston, MA. Sponsored and hosted by ENERGY STAR partners, the bus made its way east showing Americans how just one small action—changing an incandescent bulb to a CFL—taken by many individuals can collectively make a tremendous contribution to addressing the problem of global climate change.



The bus tour received extensive media coverage in the 10 markets visited. Highlights included television segments on NBC’s Today Show and Los Angeles’ highly-rated news KABC, a live interview segment on Good Day Colorado! (KDVR), and a spotlight of the bus tour and Durham Middle Schools as part of the Atlanta, GA, tour stop on WSB-TV. In addition to broadcast coverage, the bus tour was featured in photo spreads in *The Boston Globe* and *Boston Herald* and in articles in online media outlets Reuters and CNNMoney.com. All told, local, regional, and national coverage of the tour and campaign resulted in more than 27 million media impressions during the fall of 2007, as well as more than 85 million online impressions during the same time.

FIGURE 14. Home Performance with ENERGY STAR spreads across the country



ENERGY STAR Qualified New Homes

ENERGY STAR qualified homes held steady at about 12 percent of the housing market nationwide even though the number of qualified homes totaled more than 120,000 as the new construction market retracted during 2007. ENERGY STAR remains a dominant presence in more than 50 markets where the penetration of qualified homes equals or exceeds 20 percent of the housing stock (see Figure 15). To date, the number of ENERGY STAR qualified homes constructed totals almost 840,000, providing homeowners savings of more than \$200 million annually (see Figure 16). EPA's 2007 efforts included:

New Homes Outreach Partnership. EPA worked with 28 local markets in 17 states to mount long-running consumer campaigns for ENERGY STAR qualified new homes. This partnership leveraged federal efforts with local private-sector funds to increase the promotion of ENERGY STAR qualified homes during the peak buying seasons for new homes.

Affordable Housing. More than 7,700 ENERGY STAR qualified homes were built using public funding in FY 2007, guaranteeing that the families most in need will save money on their utility bills. EPA worked with 21 state housing finance agencies (HFAs) to promote ENERGY STAR qualified products and homes in their funding criteria for housing projects. More than 30 HFAs now give preference to projects that include ENERGY STAR products and construction guidelines, while four states—New Jersey, Nevada, Utah, and Washington—now require all new homes funded with housing tax credits to be ENERGY STAR qualified.

Marketing Tools That Work. EPA updated its marketing kit for home builders so they have the means to develop customized ads, brochures, and signage. Through this Web-based toolkit, each builder can incorporate its own brand message within the ENERGY STAR marketing template.

Green Homes. EPA continued to work with green building programs across the country to promote ENERGY STAR as the first step to a green home. Leadership in Energy and Environmental Design® (LEED) requires, at a minimum, that a LEED Home be built to the ENERGY STAR specification. Through the Office of Radiation and Indoor Air, EPA also refined its indoor air quality program, coupling indoor air specifications with ENERGY STAR Homes to provide a significant step toward green construction.

Exploring Energy Efficiency in Multi-Family High Rises. In 2007, the State of New York, through NYSERDA, and the Energy Trust of Oregon kicked off their ENERGY STAR Multi-Family High Rise Programs, labeling several buildings whose energy efficiency is at least 20 percent better than those built to the commercial building code. These projects will help develop a national ENERGY STAR effort to label efficient multi-family high rise buildings.

What to Expect in 2008 and Beyond

- EPA will finalize specification revisions for a variety of home electronics (TVs, set-top boxes, and external power adapters), office equipment (imaging equipment and computers), and furnaces. In addition, EPA will initiate a new specification for game consoles and start specification revisions for audio equipment and DVD players. EPA will continue to expand the ENERGY STAR label to new product categories when the core program principles can be met and will revise the requirements for product categories already in the program as conditions warrant.
- EPA will continue to work with its vast partnership network to help consumers and businesses of all sizes choose ENERGY STAR qualified products—particularly lighting products, small household appliances, commercial food service equipment, office equipment, and heating and cooling products. Overall, EPA expects more than 300 million ENERGY STAR qualified products to be sold each year for the foreseeable future.
- EPA projects more than 50,000 homes will be improved through Home Performance with ENERGY STAR by the end of 2008. Five new sponsors are expected to join in 2008.
- EPA will launch the ENERGY STAR HVAC QI program in 2008 in Texas and focus on recruitment in 2008 to broaden the adoption of this program.
- EPA will continue to promote ENERGY STAR qualified new homes to meet the builders' need to differentiate themselves in the tight housing market and the growing consumer demand for energy-efficient and green homes. EPA will also explore the next generation of ENERGY STAR specifications for new homes through vehicles such as EPA's new Climate Choice program (see page 34).
- EPA will continue to develop the ENERGY STAR Multi-Family High Rise Program for new construction and intends to expand the pilot to New Jersey, Colorado, and Nevada in 2008.

FIGURE 15. ENERGY STAR qualified new homes gaining market share

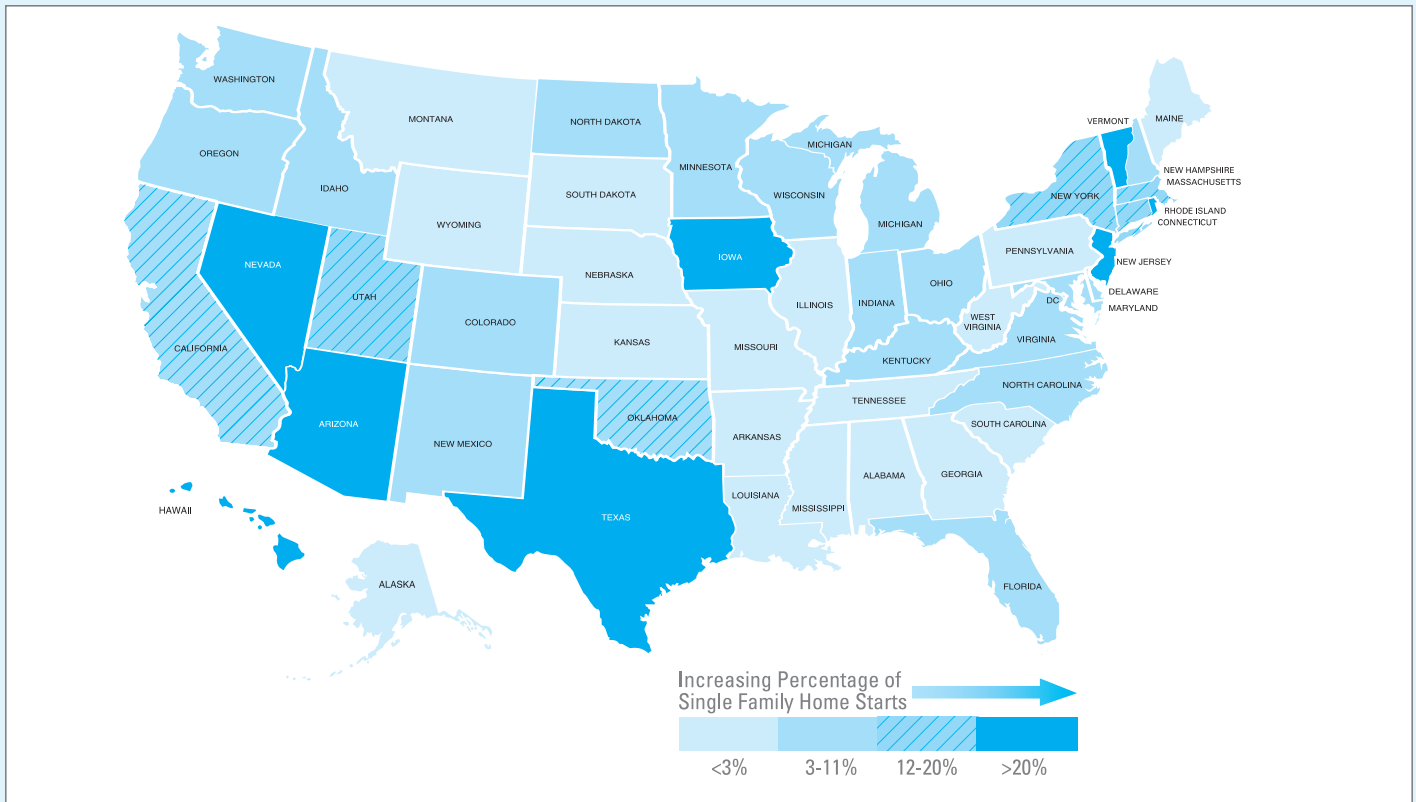
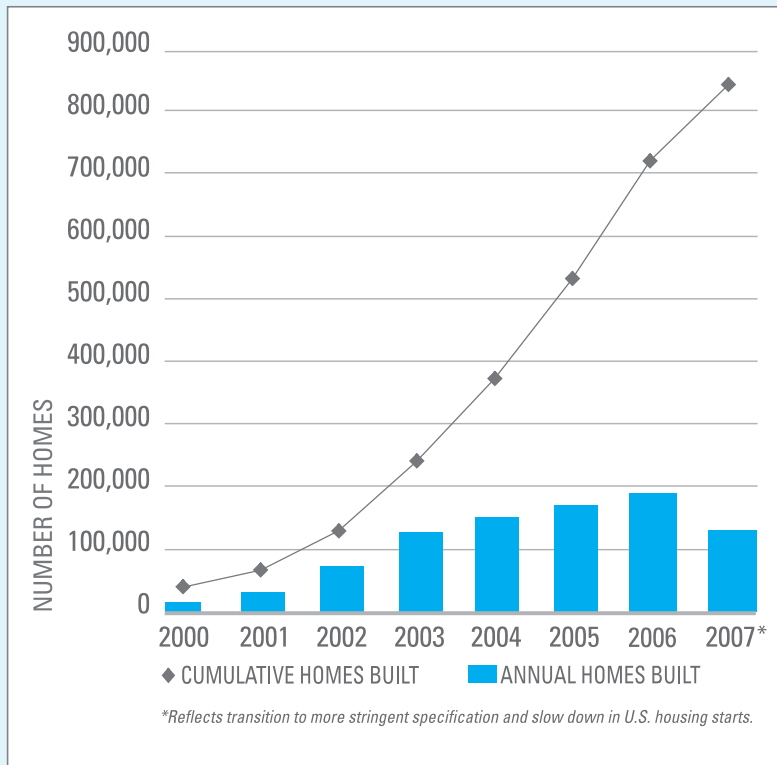


FIGURE 16. 840,000 homes nationwide bear the ENERGY STAR



ENERGY STAR qualified new homes can include a variety of tried-and-true energy-efficient features:

- Tight construction and ducts
- Effective insulation systems
- Efficient heating and cooling equipment
- High-performance windows
- Efficient lighting and appliances

ENERGY STAR IN THE COMMERCIAL SECTOR

Commercial businesses and organizations are increasingly turning to ENERGY STAR to learn how to improve the energy efficiency of their buildings and facilities and prevent greenhouse gas emissions. Commercial buildings alone represent 14.5 percent of U.S. (CO₂) emissions and account for more than \$100 billion in energy costs.¹⁰ Through ENERGY STAR, EPA promotes corporate energy management approaches by offering guidance, tools, and other resources to help businesses and organizations reduce their energy use.

Working closely with leading businesses, trade associations, and local governments to bring energy and climate change solutions to their constituents, EPA leveraged ENERGY STAR to deliver unprecedented progress in the commercial marketplace in 2007. These efforts resulted in exponential growth in the number of buildings rated for their energy use, in buildings that earned the ENERGY STAR for superior energy performance (see Figure 17), and in the use of other ENERGY STAR tools and resources.

Achievements in 2007

Growing Partnership. Partnering with ENERGY STAR continued to be an important first step for many businesses and organizations working to improve efficiency and lower energy costs. For example:

- More than 1,800 commercial, public, and industrial organizations have joined EPA's ENERGY STAR program and committed to continuous improvement and superior energy management in their buildings. These ENERGY STAR partners own or operate more than 11.5 billion square feet of building space across the country, approximately 15 percent of the commercial building market.
- Close to 20 utilities or other energy efficiency program sponsors (EEPS) joined ENERGY STAR in 2007, bringing the total to more than 90. These EEPS, along with the more than 1,300 Service and Product Providers, offer their clients and customers valuable energy efficiency services that incorporate ENERGY STAR tools and resources.
- Nearly 1,500 new participants joined either the ENERGY STAR Congregations or Small Business Networks, bringing the total to more than 3,000 members in both networks.

Spurring Building Owners Toward Superior Energy Performance. In 2007, EPA extended the reach of the ENERGY STAR Challenge, which calls on all U.S. businesses and institutions to reduce energy use by 10 percent or more. By year end, nearly 800 organizations and individuals had joined the Challenge (see Figure 18). Leading associations such as the U.S. Conference of Mayors (USCM) and the Building Owners and Managers Association (BOMA) International are reaching out to their members nationwide and motivating them to work toward achieving superior energy performance in their facilities. Below are highlights from 2007:

- The U.S. Conference of Mayors passed a resolution endorsing the ENERGY STAR Challenge as the key strategy in meeting its goals for the Conference's Climate Protection Agreement. The National Association of Counties (NACo) and Public Technology Institute (PTI) also actively promoted the Challenge. Their efforts contributed to more than 150 local governments joining the Challenge in 2007.
- BOMA launched its 7-Point Challenge to achieve a 30-percent improvement in members' building portfolios and chose ENERGY STAR as the mechanism to track and verify improvement. About 25 organizations and more than 35 local BOMA chapters responded.
- More than half of the states and the District of Columbia have taken the ENERGY STAR Challenge and lead the way in rating the most floor space in the country—making up nine of the top 10 states in cumulative rated floor space through 2007.
- States also enacted legislation to set energy use reduction goals and require the use of EPA's tools. For example, California passed legislation requiring disclosure of the EPA energy performance rating starting in 2010 and utility data transfer to Portfolio Manager. Ohio approved the adoption of Portfolio Manager to fulfill benchmarking mandates, and Minnesota enacted legislation setting goals for achieving ENERGY STAR qualified buildings in the state.

¹⁰ For more information, see Energy Information Administration (EIA), 2006.

FIGURE 17. More than 4,000 buildings have earned the ENERGY STAR

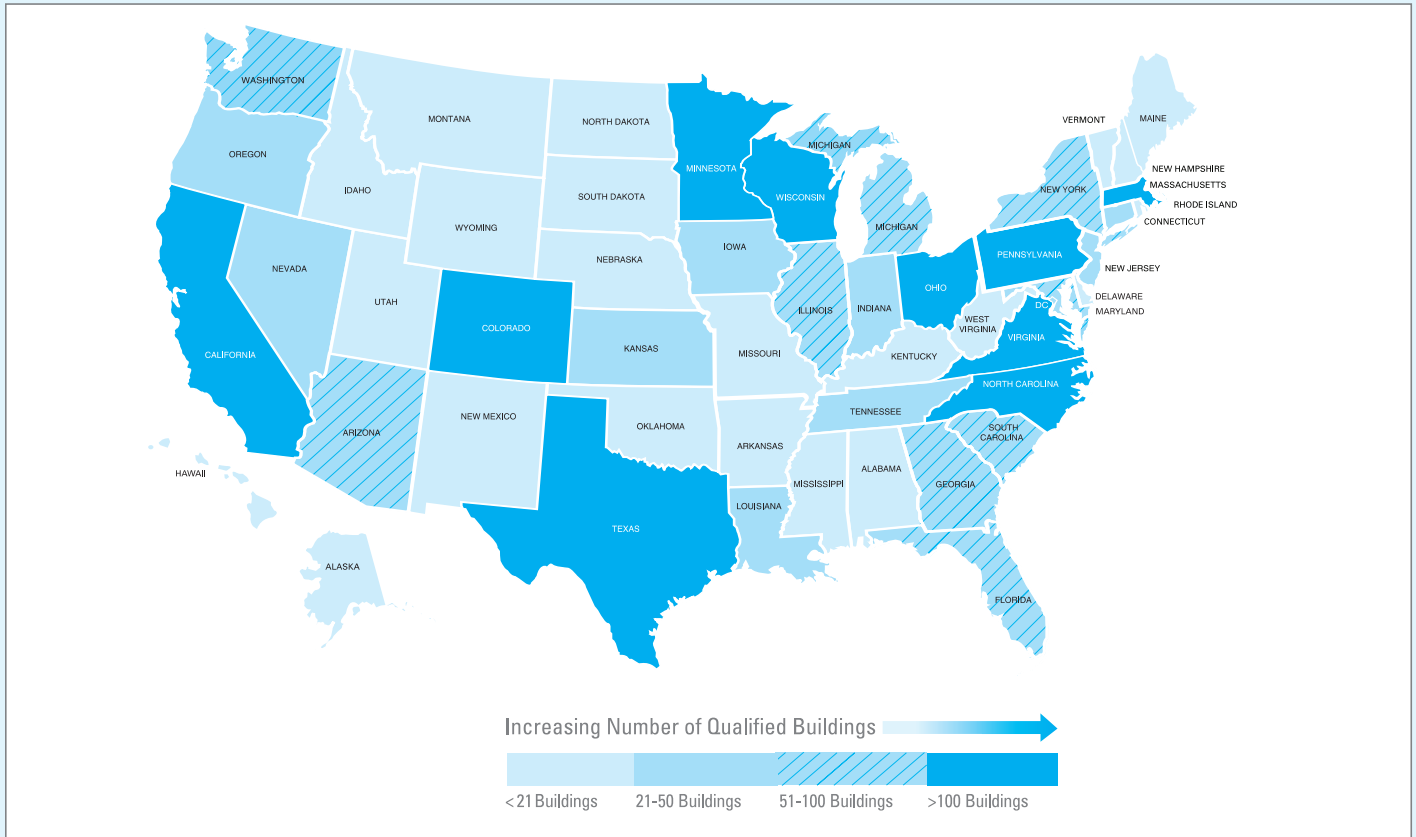
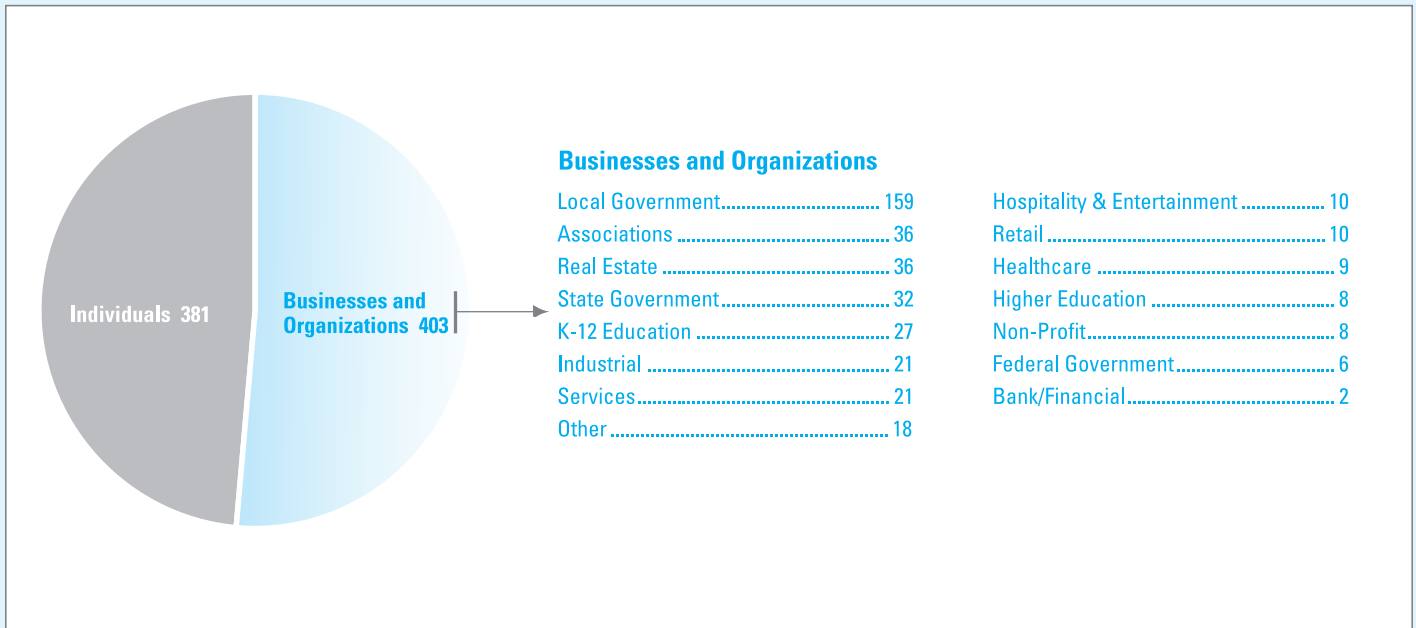


FIGURE 18. ENERGY STAR Challenge participants



Honoring Excellence in Leadership. EPA recognized the outstanding accomplishments of commercial sector businesses and organizations for instituting superior energy management across their portfolio of buildings in two main ways:

- EPA honored 24 organizations for Sustained Excellence or as an ENERGY STAR Partner of the Year for Energy Management, Service and Product Provider, or Energy Efficient Program Delivery.
- EPA recognized more than 50 partners as ENERGY STAR Leaders for meeting important energy-saving milestones across their entire building portfolio.

Making Performance Rating the First Step to Improvement. Benchmarking energy use is critical to identifying energy efficiency opportunities. Hundreds of businesses and organizations are taking the important step of using EPA's energy performance rating system to assess the energy use of their buildings. Since 1999, EPA's online tool, Portfolio Manager, has enabled building owners and managers to rate their individual commercial buildings on a scale of 1 to 100 against similar buildings nationwide, track energy performance over time, and target investments in energy efficiency (see Figure 21). In 2007:

- EPA's energy performance rating system experienced exponential growth and was expanded to include retail stores. Over 62,000 buildings have been rated—more than double the number since the end of 2006. These buildings represent more than 7.5 billion square feet, which is an increase of more than 50 percent from the previous year (see Figure 19). They include 55% of hospital space (acute care), more than 50% of supermarket space, 30% of office building space, nearly 25% of school space, and nearly 25% of hotel space across the country.¹¹
- Rating of retail space—first made available in 2007—accounted for more than 40 percent of the new activity with over 14,000 stores rated, representing more than 1 million square feet (see Figure 20).
- For the first time, water utilities were able to track energy use and associated carbon emissions, set targets for investment priorities, and verify efficiency improvements using Portfolio Manager. In addition, building owners tracked water usage alongside their energy use. Partners had entered data for more than 10,000 water meters in Portfolio Manager by the end of 2007.
- A key program focus in 2007 was to help automate the transfer of energy data directly into Portfolio Manager,

eliminating the need for manual entry. Automated Benchmarking Services (ABS), which facilitates building benchmarking across a portfolio of buildings through third-party servers, grew more than 400 percent during the year and serviced about 30,000 buildings. Service and Product Providers helped rate over 32,000 buildings—most of them through ABS—and assisted close to 500 client buildings in achieving at least a 10-point improvement in their energy performance rating in 2007.

Recognizing More Buildings for Excellence.

More buildings than ever qualified for the ENERGY STAR in 2007, bringing the total to more than 4,000 buildings, representing over 740 million square feet. These top performing buildings earned the ENERGY STAR by achieving a score of 75 or higher on EPA's energy performance rating system and meeting relevant requirements for indoor air quality. ENERGY STAR qualified buildings use nearly 40 percent less energy, on average, than typical buildings; almost 500 of them use 50 percent less energy. Their owners save about \$800 million annually on their energy bills compared to those of typical buildings. In 2007:

- The first retail stores—four JC Penney stores in the state of Washington—and the first warehouses earned the ENERGY STAR.
- CoSTAR, the leading information services provider to U.S. commercial real estate, integrated ENERGY STAR information into its Web site and building research. As a result, its online database identifies ENERGY STAR qualified buildings for users.

Challenging Small Businesses to Save Energy.

The number of small businesses and congregations partnering with EPA through ENERGY STAR almost doubled in 2007. By using ENERGY STAR tools, these more than 3,300 organizations are improving their energy efficiency, reducing energy costs, and leading their communities in environmental stewardship. In addition, several key associations representing small businesses and faith-based organizations were active participants in the ENERGY STAR Challenge in 2007. For example:

- The National Automobile Dealers Association (NADA) outreach resulted in more than 500 auto dealerships becoming ENERGY STAR Small Business Network participants. NADA delivered training sessions on ENERGY STAR tools and resources to more than 300 members during the year.

¹¹ Calculated using CBECS 2003, see EIA 2006.

FIGURE 19. Commercial building rating and labeling activity gains momentum

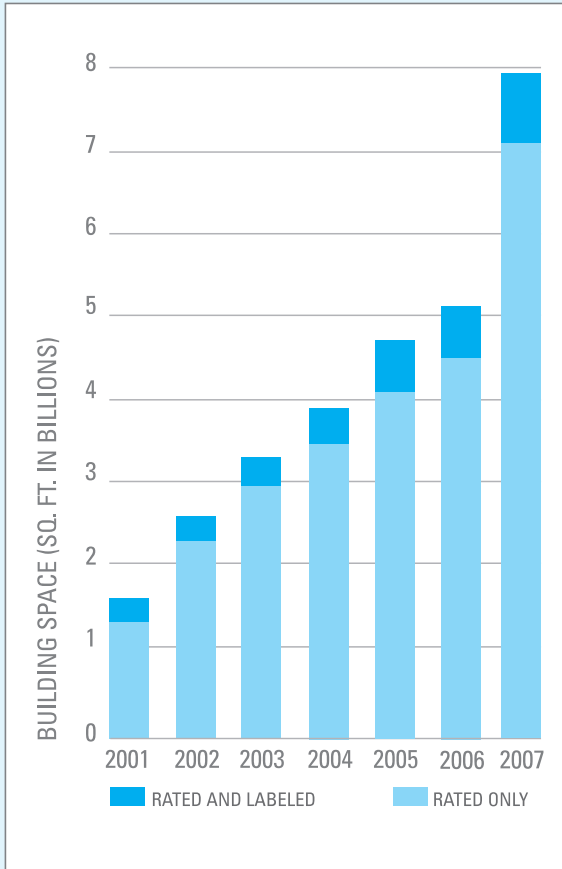


FIGURE 20. 10 percent of commercial square footage is rated

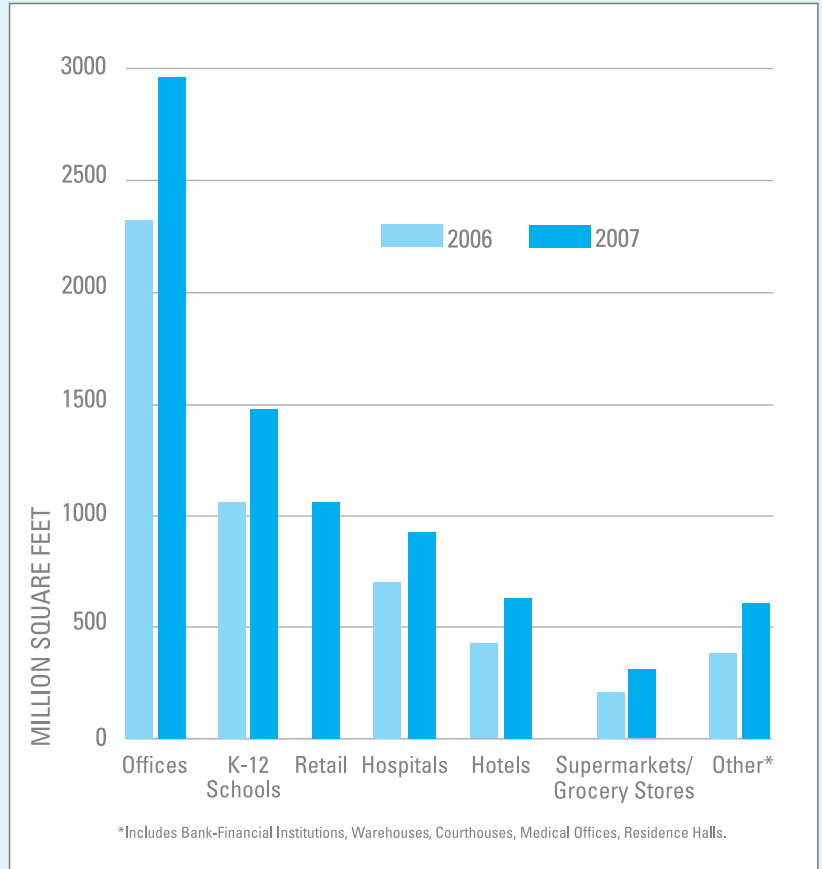
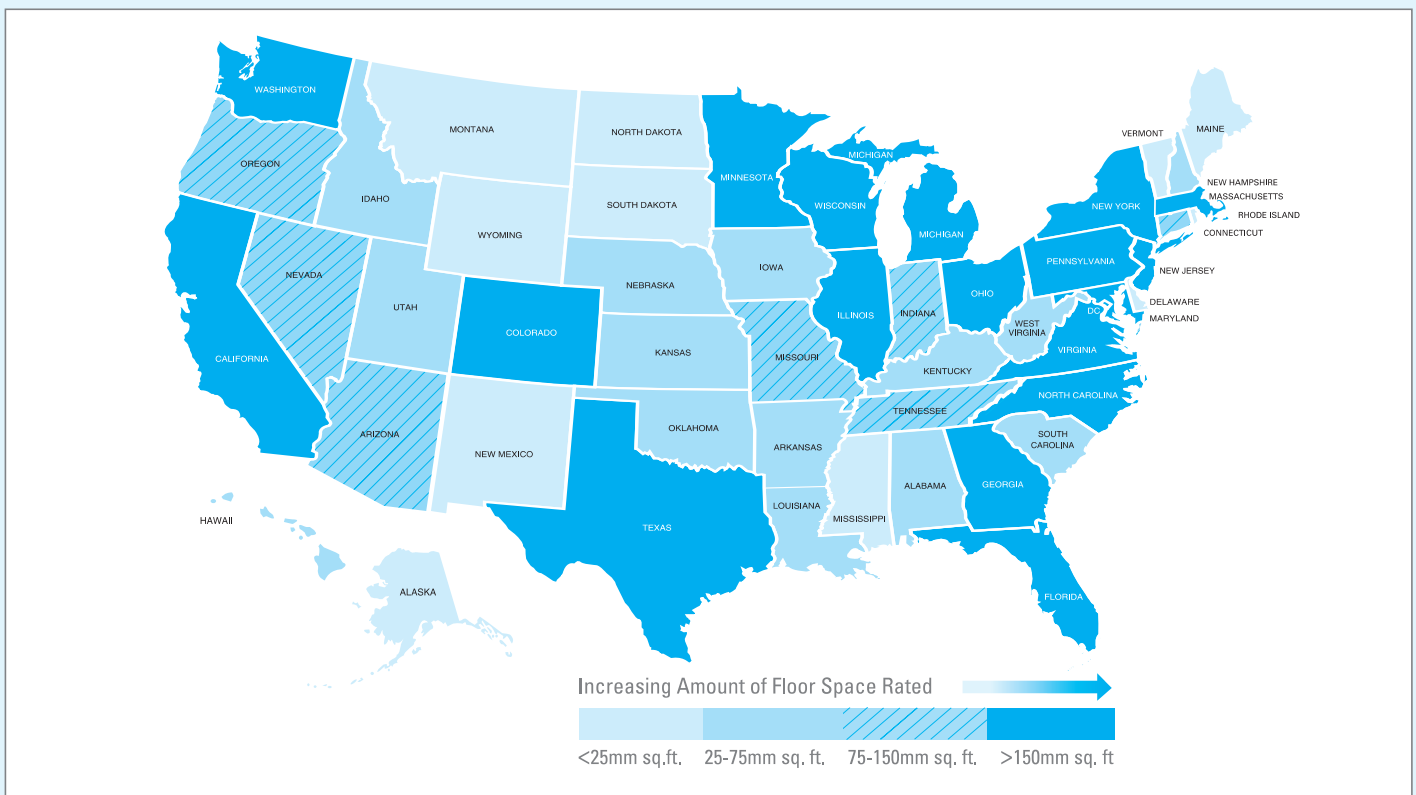


FIGURE 21. Amount of rated floor space by state



- The Independent Community Bankers Association (ICBA) promoted and supported the benchmarking of some 18,000 buildings belonging to its 5,000 members. With EPA, ICBA is exploring the design of a “green loan” program for members’ small business customers.
- The National Association of Evangelicals hosted regional “creation care” conferences in Minnesota and Florida, bringing together religious leaders to discuss global warming and ways in which using technical support from ENERGY STAR could improve the stewardship of energy and financial resources in houses of worship.
- EPA honored 14 small businesses and congregations with the ENERGY STAR Small Business Award for showing exemplary environmental stewardship.

Adding Efficient Commercial Products. In 2007, EPA expanded the suite of commercial kitchen products eligible to earn the ENERGY STAR by finalizing new specifications for commercial dishwashers and ice machines (see Table 11). The specifications cover several types of machines in both categories and require them to deliver both energy and water efficiency savings. These products will help improve the energy and greenhouse gas intensity of food service operations, which consume roughly 2.5 times more energy per square foot than other commercial buildings. In addition, EPA completed revisions to the commercial roofing specification. Given the successful transformation of markets for traffic lights and transformers, EPA sunsetted the specifications for these products.

Looking at the Impact of Climate Change. EPA added carbon emissions factors to the energy performance rating system that are consistent with those used by major greenhouse gas reporting protocols and allow businesses to compare the CO₂ emissions of their buildings to others in the same region and across the country. These factors help organizations assess and address the climate change impact of their buildings according to standardized protocols, prioritize energy efficiency improvements, and lessen their buildings’ impact on the environment. EPA continues to promote energy efficiency as the first step to being green by working with organizations to develop policies that encourage energy efficiency and reflect the financial savings buildings offer when well designed.

Designing High Performance New Buildings. Thirty-five commercial new construction projects achieved Designed to Earn the ENERGY STAR in 2007. Kinard Junior High School in Poudre, CO, became the

first building to achieve Designed to Earn the ENERGY STAR in 2005 that went on to earn the ENERGY STAR label in 2007 based on demonstrated operating performance.

What to Expect in 2008 and Beyond

EPA will continue to promote greater energy efficiency across the commercial sector. Specifically, EPA will:

- Work with leading local government partners to help them bring ENERGY STAR tools and resources to their communities through the ENERGY STAR Challenge. Louisville, KY, will serve as a model in 2008. In addition, EPA will continue to engage trade associations and motivated sectors in spreading awareness of ENERGY STAR to additional commercial market sectors.
- Demonstrate to utilities and other energy efficiency service providers the value of automatic energy bill exchange to make it easier and faster for customers to benchmark and effectively manage their portfolios. EPA will also expand the use of ENERGY STAR by these organizations to help them deliver greater savings to their customers.
- Enhance partner tools by updating the energy performance rating system for supermarkets, developing a rating system for the data center industry, and updating the Automated Benchmarking System to improve its ability to manage data in bulk.
- Recognize commercial buildings that are top performers in terms of both energy efficiency and carbon emissions, relying on the well-established measurement and verification protocols already in place in EPA’s Portfolio Manager.
- Enhance the measurement and verification capability of Portfolio Manager and expand it to include carbon emissions reductions from energy efficiency measures in commercial buildings. The benchmarking system’s use of real, verifiable energy use data, combined with user-friendly functionality, will allow building owners and others to establish a clear record of carbon reductions.
- Work with Service and Product Providers to increase the use of ENERGY STAR as part of market transactions such as performance contracting, financing, and other mechanisms.
- Complete new specifications for commercial griddles and data servers (see Figure 22) and complete the specification revision for commercial solid door freezers.

TABLE 11. ENERGY STAR commercial product specifications added, revised, and in progress

PRODUCT CATEGORY	YEAR INTRODUCED AND (YEAR REVISED)	RESPONSIBLE AGENCY	STATUS OF ACTIVITY IN 2007
NEW SPECIFICATIONS			
Commercial Dishwashers	2007	EPA	New specification took effect October 11, 2007.
Commercial Ice Machines	2007	EPA	New specification to take effect January 1, 2008.
2007 REVISIONS COMPLETED			
Roof Products	1999 (2001, 2003)	EPA	Revision completed. Revised specification took effect December 21, 2007.
2007 REVISIONS IN PROGRESS			
Commercial Refrigerators/Freezers	2001 (2003)	EPA	Revision initiated in 2007, expected to be complete in 2008.
NEW SPECIFICATIONS IN DEVELOPMENT			
Data Servers		EPA	New specification initiated in 2007.
Commercial Griddles		EPA	New specification initiated in 2007.
SPECIFICATIONS SUNSETTED			
Traffic Signals	2000 (2003)	EPA	Due to successful transformation of market, specification was sunsetted, effective May 2007.
Transformers	1995	EPA	Due to successful transformation of market, specification was sunsetted, effective May 2007.

FIGURE 22. EPA reports that improving energy efficiency in U.S. data centers could save \$4 billion annually

As the U.S. economy increasingly shifts from paper-based to digital information management, data centers have become a vital part of business, communication, academic, and governmental systems. Over the past 5 years, increased use of these systems—and the power and cooling infrastructure that supports them—has doubled energy use, increased greenhouse gas emissions, and raised concerns about power grid reliability.

At the request of Congress, EPA published the Report to Congress on Server and Data Center Energy Efficiency in 2007, which outlined current trends in data center energy use and made recommendations to improve the efficiency of data centers in the future. Data centers in the United States have the potential to save up to \$4 billion in annual electricity costs through more energy-efficient equipment and operations, as well as the broad implementation of best management practices. Other key findings from the report include:

- Data centers consumed about 60 billion kWh in 2006, roughly 1.5 percent of total U.S. electricity consumption.
- The energy consumption of servers and data centers has doubled in the past 5 years and is expected to continue increasing over the next 5 years to more than 100 billion kWh, costing about \$7.4 billion annually.
- Existing technologies and strategies could reduce typical server energy use by an estimated 25 percent, with even greater energy savings possible with advanced technologies.

EPA is developing a suite of resources to help managers of U.S. data centers improve energy efficiency and reduce energy costs, including developing new ENERGY STAR specifications for data center equipment, as well as a new energy performance rating that reflects whole building operations.

For more information, visit www.energystar.gov/datacenters.

ENERGY STAR IN THE INDUSTRIAL SECTOR

Increasing uncertainty and volatility in energy markets, combined with greater awareness of the need to manage greenhouse gas emissions, are stimulating U.S. companies to establish corporate energy management programs. In search of guidance, tools, and support networks, industrial companies are turning to the expanded energy management resources available through ENERGY STAR. As these corporations embrace energy management, EPA has observed that many of them recognize the need to adjust their strategies to anticipate future energy and environmental risks. Working closely with U.S. industrial partners, EPA is encouraging more comprehensive energy strategies and programs that will achieve greater energy efficiency and savings.

Achievements in 2007

Enhancing Energy Efficiency through Advanced Strategies. ENERGY STAR is recognized by U.S. industry as a leading source of guidance on the fundamentals of developing a corporate energy management program. In 2007:

- EPA worked with 20 leading senior executives to produce *Energy Strategy for the Road Ahead*, which enables corporations and their boards to evaluate business risks concerning the future of energy and plan accordingly. Distributed to more than 700 CEOs of major U.S. industrial companies, this report recommends long-term planning and provides a set of robust strategies (see Figure 23, p. 33).
- EPA partnered with the Carbon Disclosure Project, over 30 major institutional investors, and 75 companies to discuss best practices in reporting and analyzing corporate energy and greenhouse gas management approaches and the role of ENERGY STAR as a best practice approach.

Empowering Industries for Greater Energy Efficiency. EPA works directly with individual industrial sectors to improve energy efficiency and overcome barriers such as a lack of information and an inability to assess energy performance. Through tailored Industrial Focuses, EPA and its industry partners develop plant-level energy performance indicators (EPIs), support peer networking, and produce guidance on improving energy efficiency in the industry. As of 2007, 14 sectors and

subsectors were actively involved in Industrial Focuses (see Table 12). EPA advanced existing industry focus partnerships with automobile manufacturing, cement, corn refining, food processing, glass, pharmaceuticals, petrochemicals, petroleum refining, pulp and paper, and water/wastewater treatment industries. Highlights of 2007 include:

Plant-level Recognition for Excellence

- Almost 40 industrial facilities—including top performing manufacturing plants in the auto assembly, cement, and corn refining industries where EPIs have been established—earned the ENERGY STAR, including seven U.S. petroleum refineries earning the ENERGY STAR for the first time (see Table 13).

New Tools and Resources

- Initiated studies of plant-level energy performance measurement tools for two new subsector industries—food processing/potato products and glass manufacturing/fiberglass—bringing the total number to eight.
- Released revised draft EPIs for industry review and testing for manufacturers of pharmaceuticals, tomato products, fresh juices, flat glass, and container glass.
- Issued the first update of the auto assembly EPI to reflect the increasing efficiency of the sector. The associated analysis indicates that over the past 4 years, auto manufacturers have reduced their electricity use by 2 percent and their fossil fuel use by 12 percent on a per vehicle basis.
- Expanded the suite of energy guides available to focus industries by releasing final guides for the food processing and glass industries—and drafting an energy guide for petrochemical production, bringing the total number of Industry Guides to eight.
- Published guidance for facility-level benchmarking to encourage energy efficiency where EPIs have yet to be developed.
- Shared best practices across the ENERGY STAR focus industries at their annual meetings, in concert with the Association of Energy Engineers' World Energy Engineering Congress.

TABLE 12. Summary of EPA's ENERGY STAR Industrial Focuses

FOCUS	YEARS ACTIVE	SCOPE	PEER EXCHANGE OPPORTUNITY	INDUSTRY ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR
Cement Manufacturing	4	75% of U.S.-based clinker ^{1*} production capacity	•	Complete	Final
Corn Refining	5	95% of U.S.-based refining capacity	•	Complete	Final
Food Processing	2	80% of U.S. processed fruit, vegetable, and grain sales	•	In process	In process
Potato Products	New				
Tomato Products	New				
Glass Manufacturing	2	50% of U.S. flat, container, and fiberglass sales	•	In process	In process
Flat Glass Products	New				
Container Glass Products	New				
Motor Vehicle Manufacturing	6	75% of the industry with U.S.-based production	•	Complete	Final, updating
Petrochemical Manufacturing	1	83% of U.S. ethylene production capacity	•	In process	In draft
Petroleum Industry	3	64% of U.S.-based refining capacity	•	Complete	Private system recognized by EPA
Pharmaceuticals	3	Over 50% of the global and U.S. manufacturing capacity	•	Complete	In process
Pulp & Paper	1	70% of U.S.-based companies' global sales	•	In process	Exploring options
Water/Wastewater	2	40% of the total U.S. population represented	•	In process	In process

¹ *Clinker is the output from a cement kiln.*

**Source: U.S. Census Bureau, December 2006 and 2005.*

TABLE 13. EPA expands ENERGY STAR for superior energy management of industrial plants

SECTOR FACILITY	LABELS EARNED IN 2007	TOTAL PLANTS EARNING LABELS SINCE 2006
Cement Plants	12	12
Auto Assembly Plants	7	15
Petroleum Refineries	7	7
Wet Corn Mills	1	3
Total Plants Labeled	27	37
Total Estimated Energy Savings (compared with average plants)	59,700,000 mmBtu	77,600,000 mmBtu

Expanding Industrial Partnerships. EPA supports partners from a wide variety of industrial sectors. These partners have access to energy management resources, including the core materials for effective energy management available on the ENERGY STAR Web site, communication materials, an active network of energy managers, and opportunities for recognition for superior energy management. In 2007:

- The number of ENERGY STAR industrial partners grew to almost 480.
- EPA's peer exchange network grew by 42 percent. The 620 participants, representing more than 220 organizations, discussed topics such as energy and greenhouse gas management, retro commissioning, facility assessments, and sub-metering for strategic energy management.
- ENERGY STAR industrial partners continued to support consumer awareness of the environmental benefits of ENERGY STAR qualified lighting by encouraging employees to take the ENERGY STAR *Change a Light, Change the World* pledge.

Recognizing Leadership in Industrial Energy Efficiency. Recognition plays a large part in influencing corporate culture change around energy management. The ENERGY STAR Partner of the Year Awards identify the industrial leaders and showcase their achievements, serving as an example for other corporations. In 2007, the ranks of industrial corporations achieving a high level of superior energy management grew to include:

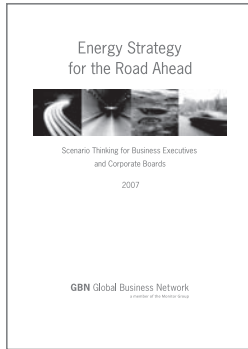
- Seven ENERGY STAR industrial partners honored for Sustained Excellence in Energy Management: 3M, California Portland Cement Company, Ford Motor Company, Merck & Co, Inc., PepsiCo, Raytheon Company, and Toyota Motor Manufacturing North America. Sustained Excellence awardees continually challenge their organizations to improve energy efficiency and consistently achieve impressive energy savings.
- Three industrial partners recognized as ENERGY STAR Partner of the Year for the first time: Allergan, Inc., ArcelorMittal USA, and The Dow Chemical Company.

What to Expect in 2008 and Beyond

Breaking down the market barriers that limit the adoption of energy efficiency will require outreach to new industrial organizations and continued support for partners. EPA will:

- Continue the Industrial Focuses with the 14 participating sectors and subsectors. EPA expects to finalize two industrial EPIs in 2008—one in the food processing industry and another in the glass production industry.
- Offer new directions for industrial companies to address the risks and costs associated with the embedded energy of the supplies and services they bring into their manufacturing processes in line with the recommendations in *Energy Strategy for the Road Ahead*.
- Continue to support peer exchange forums for the industrial focus sectors and convene initial meetings as new Focuses are formed.
- Expand the system for labeling energy-efficient U.S.-based plants with the ENERGY STAR. EPA expects that certain plants engaged in food processing and glass manufacturing will be eligible to earn the ENERGY STAR by the end of 2008.
- Collaborate with EPA's Laboratories for the 21st Century program to assess using EPA's energy performance rating system to help benchmark laboratories.
- Increase the impact of ENERGY STAR in the manufacturing sector by completing an agreement with the nation's largest industrial trade association, the National Association of Manufacturers (NAM), to provide ENERGY STAR resources to NAM's broad membership.
- Continue to partner with the Carbon Disclosure Project to identify and promote best practices in voluntary reporting of climate risks, emissions reduction opportunities, and energy management practices to financial audiences.
- Recognize excellence in industrial energy management through the annual Partner of the Year Awards.

FIGURE 23. Energy Strategy for the Road Ahead



A growing awareness of the impacts of energy on business and its relationship to global warming has prompted many industries to turn to ENERGY STAR for strategies to manage these risks. Through ENERGY STAR, EPA set out to identify the key strategies corporations must implement now to prepare for the future of energy. EPA collaborated with the executives of 20

leading companies and the strategy consultancy Global Business Network. A year of work resulted in the 2007 release of a transformative report, *Energy Strategy for the Road Ahead—Scenario Thinking for Business Executives and Corporate Boards*.*

Key Strategies

1. **Master the fundamentals** of energy efficiency by creating a strong energy management program empowered across the organization and supported by senior executives. ENERGY STAR resources provide the guidance to do this.
Transformative thinking: Understand that energy efficiency is the best hedge against future price or availability risks.
2. **Take a longer and broader view** of investments and strategic decisions about energy. **Transformative thinking:** Value energy in terms of corporate productivity, placing energy on equal footing with labor, material, capital, and other operational expenses. View energy projects over the long-term because they carry some of the more attractive returns and lowest risk.
3. **Search out business transformation opportunities** in the way the company manages, procures, and uses energy.
Transformative thinking: View energy as a lever for positive growth and change within the business, not simply as a feedstock, facilitator of a service, or cost to manage. Evaluate and potentially redesign how products and services are offered.
4. **Prepare contingency strategies** for emerging future scenarios.
Transformative thinking: Continue to consider how the future may unfold and actively manage for exposure to these potential risks.
5. **Take personal action.** Corporate leaders—individually, in companies, on boards, and across industries—set the tone for a corporation and must actively manage energy from their positions. **Transformative thinking:** Empower staff to fulfill the fundamentals, push for efficiency, enable energy investments by valuing them differently from other projects, and educate customers on the value of energy performance in products and services.

Energy To-Do List

Of one thing we can be sure: energy will be more challenging and more important in the future. Will you, and your business, be ready?

What Executives, Senior Managers, and Board Members Can Do:

Manage energy actively from your position.

- Empower energy staff to fulfill the fundamentals.
- Push for strong energy efficiency from all parts of the business.
- Enable energy investments by valuing them differently from other projects.
- Educate customers on the value of energy performance in products.
- Involve yourself.

Make strategic energy management a Board-level issue.

- Are you a member of the Board of another corporation?
- Can you influence the corporation to examine its energy and climate strategy?
- Is the corporation practicing strategic energy management?

Influence your industry.

- Do you participate in industry associations?
- Can you initiate and lead discussions among your industry counterparts on why strategic energy management is important?

Use scenario thinking in your ongoing strategic discussions.

- Wind-tunnel your current energy and climate strategy in these scenarios.
- Connect energy and climate strategy with broader company programs, goals, and strategies.

PARTICIPATING COMPANIES

California Portland Cement	Mercury Marine
Cascade Engineering	Mittal Steel
CEMEX	National Starch & Chemical
Dow Chemical	Owens Corning
Eastman Chemical	PepsiCo / Frito-Lay
Genentech	PPG Industries
General Motors	Proctor & Gamble
HSBC	Shell NA
Jones Lang LaSalle	Toyota NA
Merck & Co.	UPS

* *Energy Strategy for the Road Ahead* may be downloaded at www.energystar.gov/energystrategy.

CLIMATE CHOICE

In managing the ENERGY STAR program over the past 15 years, EPA has gained significant experience in identifying and dismantling market barriers that inhibit the adoption of commercially proven, cost-effective energy-efficient technologies. When considering emerging technologies, EPA recognizes their tremendous potential to reduce greenhouse gas emissions. To gain wider use, these cutting edge technologies must also face and overcome significant barriers, such as a lack of awareness and long payback periods.

To help overcome the unique barriers facing emerging technologies and accelerate their widespread adoption, EPA launched a new climate technology initiative in 2007 called Climate Choice. It focuses on technologies that:

- Are commercially available but not yet widely adopted.
- Have demonstrated environmental performance.
- Have the potential to significantly reduce greenhouse gas emissions across the marketplace at competitive costs in the future.

Climate Choice is designed to target the early technology adopters and consumers looking for green options (see Figure 24). They are often eager and able to take additional steps to protect the environment beyond those taken by mainstream consumers who depend on the ENERGY STAR label to guide their purchasing decisions of energy-efficient products.

Building on EPA's experience in facilitating technology adoption, Climate Choice can offer selected emerging technologies the following assistance:

- **Recognition.** To promote consumer awareness and provide objective information in the marketplace, EPA will feature selected emerging technologies on the Climate Choice Web site, and offer other recognition opportunities.
- **Tailored technology assistance.** EPA will work with program stakeholders to develop a coordinated technology adoption plan that identifies barriers to wider technology deployment and ways EPA can address them. The plan will also identify opportunities for information sharing through existing ENERGY STAR networks and the Climate Leaders peer exchange.
- **ENERGY STAR candidate development.** The Climate Choice coordinated technology adoption plan will

identify key milestones each technology must reach to become a candidate for certification under the ENERGY STAR program, if appropriate.

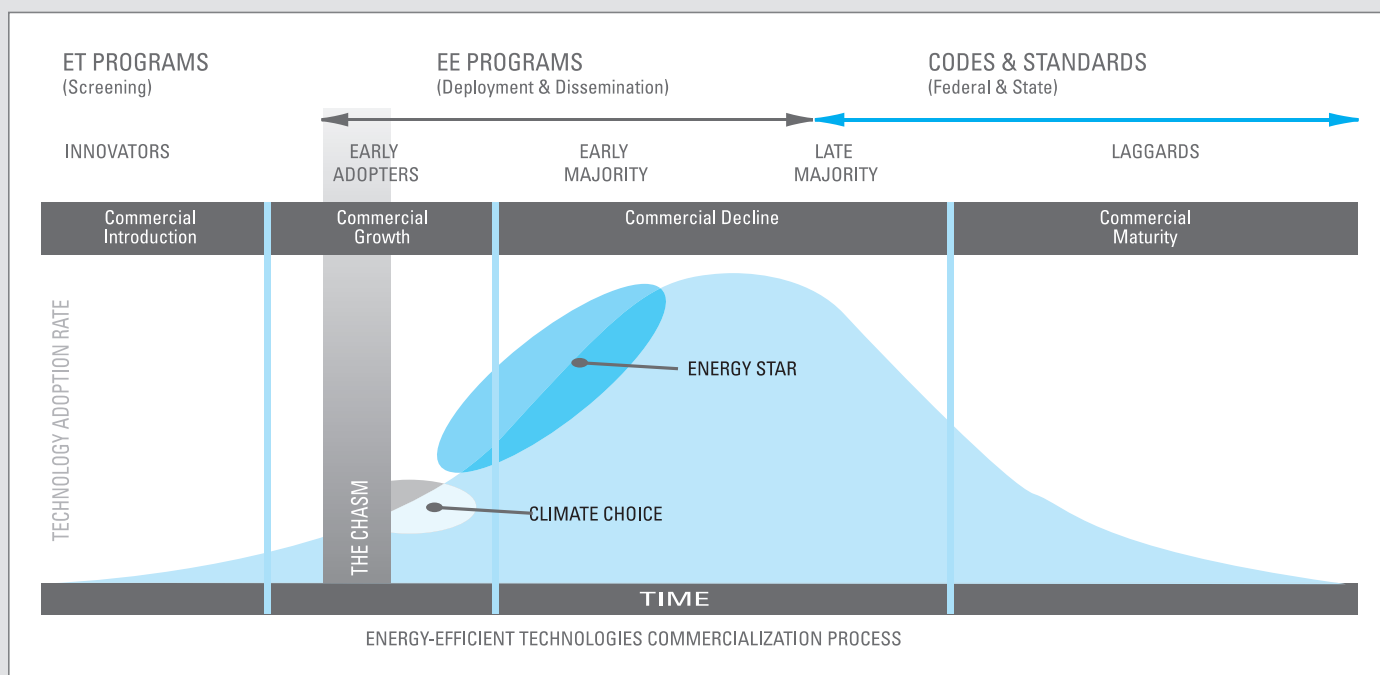
Achievements in 2007

In 2007, EPA and its stakeholders took the first steps to identify how EPA could effectively address the unique market barriers facing climate-friendly emerging technologies, including:

- Publishing a proposal for the Climate Choice climate technology initiative and soliciting and incorporating public comments.
- Hosting the Climate Technology Initiative Conference in October 2007, which brought together more than 70 experts from government, industry, and nongovernmental organizations (NGOs) to make recommendations on EPA's efforts for promoting emerging climate protection technologies and defining criteria for the Climate Choice pilot program (see Table 14).
- Adopting criteria for the Climate Choice pilot program. As an outcome of the conference, EPA adopted the pilot program criteria recommended by the conference attendees and other stakeholders. To qualify for participation in the Climate Choice pilot program, emerging technologies must:
 1. Be commercially available but not widely adopted (< 5% market share).
 2. Preferably be offered by more than one supplier.
 3. Have verified environmental performance.
 4. Be likely to significantly reduce greenhouse gas emissions at the sector level at competitive costs.
 5. Have capable business partners and be adequately financed.
 6. Be matched to EPA core competencies.
 7. Have no unacceptable environmental trade-offs.

What to Expect in 2008 and Beyond

In 2008, EPA will continue to collaborate with its stakeholders in the roll out of the Climate Choice program. Major program milestones include launching the Climate Choice Web site, selecting three pilot technologies, developing and implementing coordinated technology adoption plans for pilot technologies, continuing to refine program criteria, and establishing a formal technology nomination and selection process.

FIGURE 24. Climate Choice targets early adopters and environmentally motivated consumers*

*Figure adapted from the California Energy Commission

TABLE 14. Findings of the Climate Technology Initiative Conference

The EPA Climate Technology Initiative Conference brought together more than 70 experts from government, industry, and NGOs to provide guidance for EPA in facilitating the adoption of emerging climate protection technologies. Their findings, approved by consensus, include:

FINDING 1	Concern for Climate Change Has Created a Market for New Technology	FINDING 7	EPA Will Want To Concentrate on Technologies Within Its Core Competencies
FINDING 2	EPA Can Speed Commercialization of Environmentally Superior Technology	FINDING 8	EPA Needs Partners to Complement & Supplement Its Core Competencies
FINDING 3	Understand the Market and the Technology	FINDING 9	A Portfolio Approach Can Support Multiple Products at Different Stages
FINDING 4	Vigorously Protect the ENERGY STAR Brand	FINDING 10	Pilot Projects Must Be Strategically Selected and Agilely Pursued
FINDING 5	Develop Unique Recognition Programs for Emerging Climate Protection Technology	FINDING 11	EPA Can Help Define New Product Carbon Performance Standards
FINDING 6	Emerging Climate Protection Technology Can Be Promoted At Every Stage of Development		

CLEAN ENERGY SUPPLY PROGRAMS

Since 2001, EPA's Clean Energy Supply Programs, which include the Green Power Partnership (GPP) and the Combined Heat and Power (CHP) Partnership, have made tremendous progress in facilitating the explosive growth of green electricity generation and environmentally beneficial CHP across the country. Both programs work to dismantle market barriers and provide cost-effective solutions for their hundreds of partners by offering technical resources, credible benchmarks, access to expertise, and recognition for environmental leadership. The investments in clean energy made by EPA's partners result in environmental benefits for all, namely the reduction of greenhouse gas emissions and criteria pollutants. Achievements have been impressive; in 2007 alone, EPA's Clean Energy Supply programs reduced greenhouse gas emissions by 4.8 MMTCE (see Table 15).

Green Power Partnership



Purchasing electricity generated from green power resources through EPA's Green Power

Partnership offers organizations an easy and attractive way to reduce the environmental impact of their operations, hedge against volatile energy prices, increase employee and stakeholder morale, and demonstrate environmental leadership. The commitments of new and existing program partners—who range in size from Fortune 500 corporations to neighborhood businesses, large public universities to small private colleges, local communities to city, state, and federal government agencies—made 2007 a banner year for the Green Power Partnership.

In 2007, the Green Power Partnership:

- Added 250 new partners, increasing the total number of partners to more than 850. These organizations have committed to buying more than 11.5 billion kWh annually of green power—an increase of almost two-thirds over 2006 and enough to run nearly 1.2 million average American homes for one year (see Figure 25).
- Recognized the participants in EPA's Fortune 500 Green Power Challenge, a year-long initiative focused on doubling the collective green power purchases of eligible Fortune 500 corporations to exceed 5 billion kWh annually (see sidebar on p. 38). GPP partners

surpassed the goal, buying more than 6 billion kWh of green power. Among the Challenge participants were Intel Corporation, PepsiCo, Wells Fargo & Company, Whole Foods Market, The Pepsi Bottling Group, Inc., Johnson & Johnson, Cisco Systems, Inc., Kohl's Department Stores, Starbucks, and DuPont Company.

- Acknowledged participating partners in EPA's College & University Green Power Challenge, which concluded in April 2007. EPA ranked individual school's purchases of green power against others within their athletic conference and calculated cumulative purchase amounts between competing athletic conferences.
- Presented 17 Green Power Leadership Awards to top purchasers of green power and onsite renewable power systems (see Table 16).
- Launched the Green Power Communities initiative, recognizing the collective action of local government, business, and citizens in buying green power through community organized campaigns. By the end of 2007, 10 communities across the nation had met EPA Green Power Community purchase requirements.

Combined Heat and Power Partnership



The CHP Partnership seeks to reduce the environmental impact of power generation by promoting the use of combined heat and power as an efficient, clean, and reliable approach to generating power and thermal energy from a single fuel source. CHP projects are up to 25 percent more efficient than traditional separate heat and power generation.¹² The Partnership works closely with energy users, the CHP industry, state and local governments, and other stakeholders to support the development of new projects and promote their energy, environmental, and economic benefits. The program is playing a vital role in efforts to achieve the national goal of doubling the capacity of CHP in the United States to 92 gigawatts (GW) by 2010.

In 2007, the CHP Partnership:

- Added 33 new partners for a total of 233 and assisted in the deployment of more than 850 MW of new CHP nationwide, bringing the cumulative impact of the program to over 4,450 MW of new CHP (see Figure 26, p. 39).

¹² For more information, see www.epa.gov/chp/basic/efficiency.html

FIGURE 25. Green Power purchases and avoided greenhouse gas (GHG) emissions almost doubled in 2007

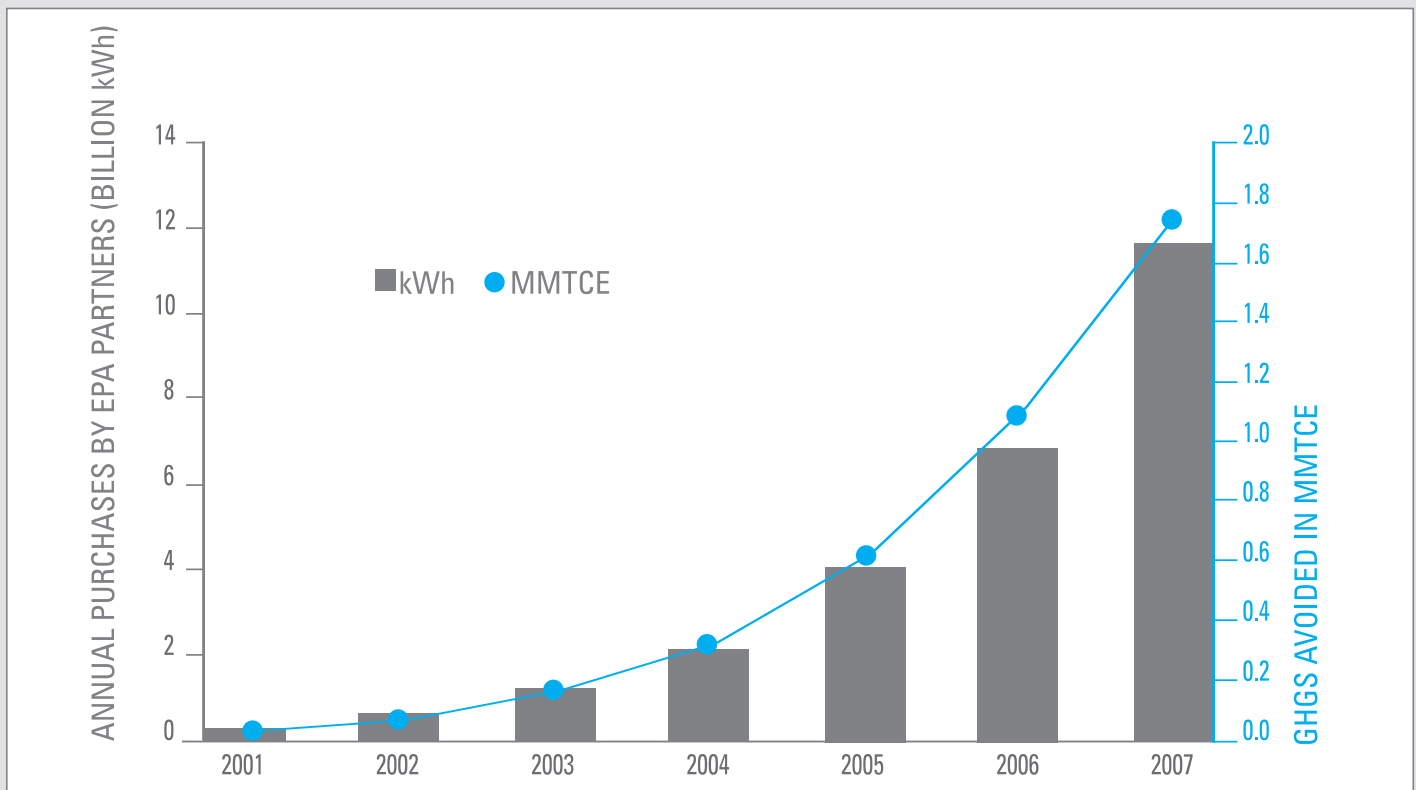


TABLE 15. Greenhouse gas emissions avoided by EPA's Clean Energy Supply Programs (MMTCE)

	2002	2003	2004	2005	2006	2007
Clean Energy Supply Programs	0.6	1.0	2.0	3.2	3.7	4.8

TABLE 16. EPA recognizes 17 leading Green Power partners in 2007

ONSITE GENERATION	GREEN POWER PURCHASING		PARTNER OF THE YEAR	
City of Chico <i>Chico, CA</i>	Kohl's Department Stores <i>Menomonee Falls, WI</i>	Sloan Valve Co. / IL Manufacturing Facility <i>Franklin Park, IL</i>	City of Bellingham <i>Bellingham, WA</i>	Staples <i>Framingham, MA</i>
Macy's, Inc. West Division <i>San Francisco, CA</i>	New York University <i>New York, NY</i>	Starbucks <i>Seattle, WA</i>	Johnson & Johnson <i>New Brunswick, NJ</i>	Wells Fargo & Company <i>San Francisco, CA</i>
The Timberland Company <i>Stratham, NH</i>	Pepsi Bottling Ventures <i>Raleigh, NC</i>	The Pepsi Bottling Group, Inc. <i>Somers, NY</i>	Mohawk Fine Papers Inc. <i>Cohoes, NY</i>	Whole Foods Market <i>Austin, TX</i>
	PepsiAmericas, Inc. <i>Schaumburg, IL</i>		PepsiCo <i>Purchase, NY</i>	

- Provided technical assistance to 30 candidate sites across the country, including those in the municipal, utility, biofuels, industrial, and financial sectors.
- Provided public support and recognition for highly efficient CHP projects, by presenting six ENERGY STAR CHP Awards. These winning systems ranged from a 5 MW system at an ethanol facility to a 15 MW facility that supports a large university campus (see Table 17).
- Collaborated with states, regional organizations, and other federal agencies to promote CHP as an efficient application for biomass fuels.
- Offered training and ongoing support to the air regulatory community on the benefits of CHP and highlighted opportunities to encourage CHP through permitting and other regulatory frameworks.
- Expand the Green Power Partnership to achieve its goal of reaching more than 16 billion kWh in annual green power purchases by year's end and work with green power suppliers to increase the supply of attractive green power products in the market.
- Aggressively promote the Fortune 500 Green Power Challenge to current and prospective Fortune 500 partners and recognize the winners of the second College & University Green Power Challenge.
- Provide assistance in the development of CHP projects and expand work with strategic sectors, including the dry mill ethanol sector, wastewater treatment facilities, and casinos and hotels. Through the CHP program, EPA will also begin outreach to municipal and cooperative utilities to identify CHP opportunities.
- Foster partnerships between rural electricity producers and facilities needing thermal energy for mutually beneficial economic and environmental projects.
- Reach out to more states and municipalities and provide technical information on other state or local energy, environmental, and utility practices that encourage environmentally beneficial CHP.

What to Expect in 2008 and Beyond

In 2008, EPA's clean energy programs will continue to dismantle the market barriers that can stifle investment in clean electricity generation and environmentally beneficial CHP. In particular, EPA will:

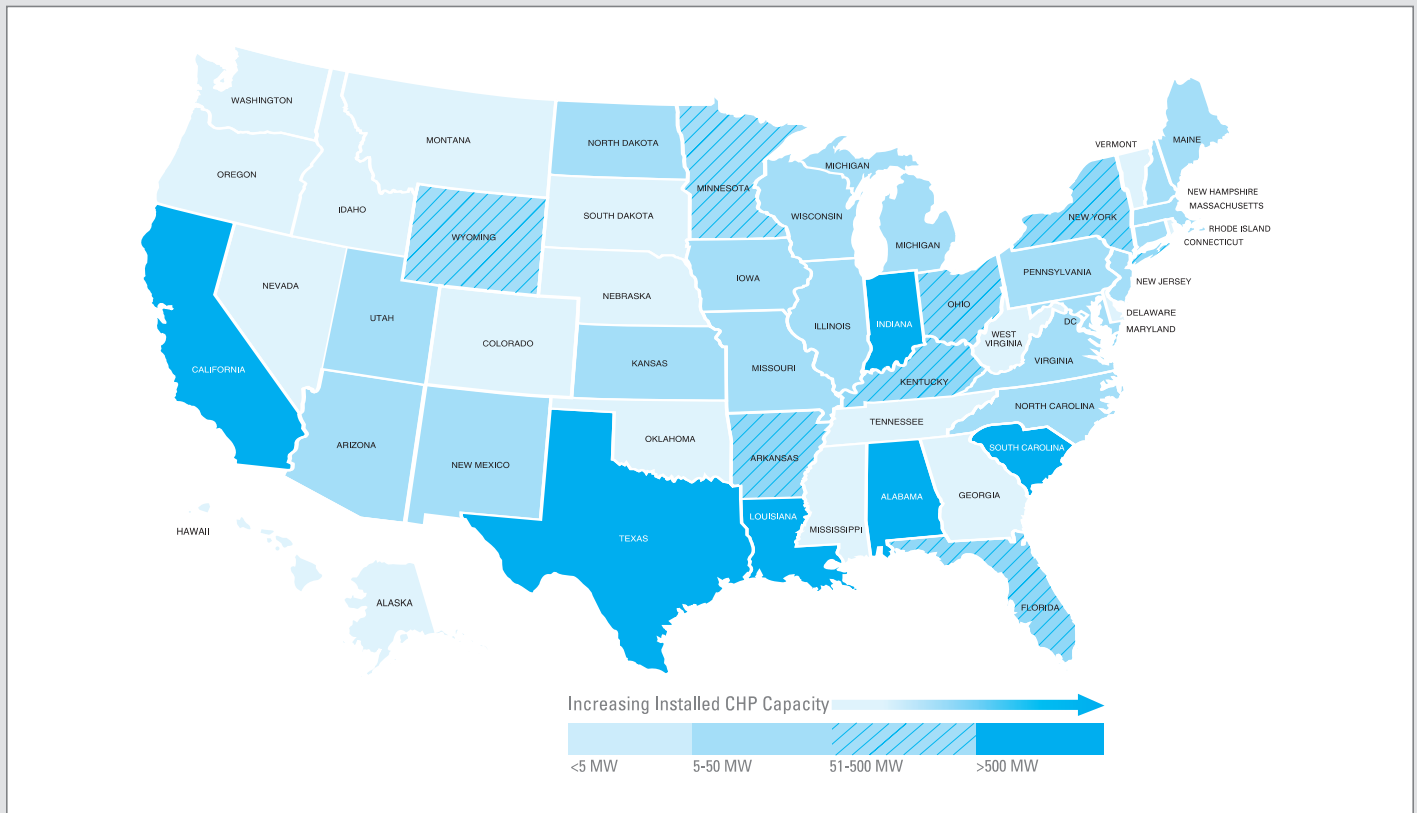
FORTUNE 500 COMPANIES MEET THE GREEN POWER CHALLENGE



In December 2006, EPA challenged Fortune 500 companies to increase their green power purchases to more than 5 billion kWh annually through the Fortune 500 Challenge, launched by EPA's Green Power Partnership. In response, 53 Fortune 500 companies stepped up their commitment to environmental stewardship by collectively doubling their annual green power purchases to more than 6 billion kWh. These purchases made 2007 a banner year and helped avoid the greenhouse gas emissions equivalent to more than 570 million gallons of gasoline.

Leading the charge was Intel, which assumed the Number 1 spot with a purchase of more than 1.3 billion kWh of clean, carbon-free green power. The company's purchase is the largest to date among all the Green Power partners, and it alone represents enough electricity to power more than 130,000 average American homes each year. PepsiCo is second on EPA's list of Fortune 500 companies, followed by Wells Fargo & Company, Whole Foods Market, The Pepsi Bottling Group, and Johnson & Johnson. Cisco Systems and Kohl's Department Stores recently made sizable purchase increases to put them at seventh and eighth on the list, respectively. Rounding out the top 10 green power purchasers are Starbucks and DuPont Company.

FIGURE 26. Combined heat and power capacity by state as of 2007*



*All data are self-reported; states might have more capacity than reported or shown.

TABLE 17. 2007 ENERGY STAR Combined Heat and Power Awards

Adkins Energy CHP System Adkins Energy, LLC <i>Lena, IL</i>	Macon Energy Center CHP Project Macon Municipal Utilities and Northeast Missouri Grain, LLC <i>Macon, MO</i>
Arizona State University CHP System Arizona State University <i>Tempe, AZ</i>	Princeton University Energy Plant Princeton University <i>Princeton, NJ</i>
Kent State University Cogeneration Plant Kent State University <i>Kent, OH</i>	University of New Mexico CHP Project University of New Mexico <i>Albuquerque, NM</i>

STATE AND LOCAL PROGRAMS AND INITIATIVES



EPA supports the states and localities that are developing initiatives aimed at providing an increasingly clean, renewable, and efficient supply of energy. EPA assists their development and deployment of emerging technologies and helps address their need to achieve energy cost savings through

greater end-use efficiency in residential and commercial buildings, municipal facilities, and transportation. This federal assistance is important to state and local governments as they address the continuing challenges of rising energy demand, rising energy prices, air quality issues, and global climate change.

The potential impact of state and local policies is enormous. EPA estimates that if all 50 states implemented cost-effective clean energy and environment policies, the projected growth in demand for electricity could be cut in half by 2025. The additional remaining increase in demand could be met with cleaner energy supplies. This translates into a projected annual savings of \$70 billion in energy costs by 2025—avoiding the need for more than 300 power plants and preventing the greenhouse gas emissions equivalent to those from 80 million vehicles.

EPA's Clean Energy-Environment state and local programs assist state and municipal governments in their clean energy efforts by providing technical assistance, analytical tools, and outreach support. Specific assistance includes:

- Identifying and documenting cost-effective policies and initiatives that promote renewable energy, energy efficiency, and related clean energy technologies.
- Providing tools and guidance that help state and local governments measure and evaluate the environmental, economic, and public health benefits of clean energy initiatives (see Figure 27).
- Offering a suite of national voluntary programs that provide partners with assistance and recognition for their clean energy actions.
- Fostering peer-exchange opportunities for state and local officials to share information on best practices and innovative policies.

EPA also provides technical assistance to public utility commissions that are exploring options to reduce the regulatory barriers to adopting comprehensive energy efficiency, renewable energy, and combined heat and power programs in their states.

Clean Energy-Environment State Partnership

In 2007, EPA assisted state governments by:

- Expanding the focus of support from a targeted group of state partners to a comprehensive nationwide program to help all states learn from the experiences gained through the partnership.
- Adding Hawaii to the State Partnership program, bringing the total to 15 partners.
- Supporting states as they analyzed clean energy options and prioritized policies of interest, developed and implemented programs, and identified additional guidance and technical assistance from EPA that would be helpful in the coming years (see Table 18).
- Conducting eight peer exchange sessions through the EPA Clean Energy-Environment Technical Forum—involving a total of more than 200 state environmental, energy, and utility regulatory officials from over 35 states—to examine best practices on topics such as renewable energy credits, state energy planning, high-performance buildings, and clean distributed generation.

Clean Energy-Environment Municipal Network

In 2007, EPA assisted local governments by:

- Expanding the Clean Energy-Environment Municipal Network—a complementary program to the Clean Energy-Environment State Program—to provide one-stop access to the wealth of EPA programs that offer technical assistance or resources to local governments.
- Developing an online, searchable database of resources to help local governments assess clean energy policies and programs.
- Providing support to Dallas, TX, and Philadelphia, PA, for their urban heat island efforts through activities

Figure 27. Tools and resources for states

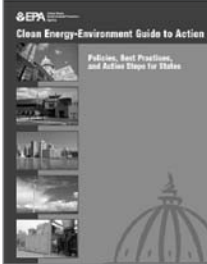
<p>EPA's State Greenhouse Gas Inventory and Projection Tool: Based upon IPCC and the U.S. National Greenhouse Gas Inventory methods, this user-friendly tool helps states develop state-level greenhouse gas inventories and project future emissions. http://epa.gov/climatechange/emissions/state_guidance.html</p>	<p>State Climate Change Mitigation Actions: Maps and tables summarizing state programs, initiatives, and policies to promote clean energy and reduce greenhouse gases. http://epa.gov/climatechange/wycd/stateandlocalgov/state_actionslist.html</p>
<p>eGRID E-Grid: A comprehensive source of data on the environmental characteristics of U.S. power generation at various levels of aggregation. Links electricity generation, air emissions, and resource mix. http://www.epa.gov/cleanenergy/egrid/index.htm</p>	<p>EPA's Greenhouse Gas Equivalency Calculator: A Web-based calculator that enables organizations and individuals to quickly and easily translate greenhouse gas reductions from units typically used to report reductions into terms that are easier to conceptualize (e.g., passenger cars not driven for one year). http://epa.gov/cleanenergy/energy-resources/calculator.html</p>
	<p>Clean Energy-Environment Guide to Action: Policies, Best Practices, and Action Steps for States: 16 best practices states have found to cost-effectively advance clean energy and other environmental goals. http://epa.gov/cleanenergy/stateandlocal/guidetoaction.htm</p>

TABLE 18. Clean Energy-Environment State Partnership grows to 15 partners in 2007

STATE CLEAN ENERGY-ENVIRONMENT ACTIONS	PARTNERS WITH NEW PROGRAMS IN 2007	TOTAL PARTNERS WITH PROGRAMS
Energy Efficiency Savings Goals in Public Facilities	10	14
Energy-Efficient Appliance and Equipment Purchase Requirements for Public Facilities	4	11
Renewable Energy Goals for Public Facilities	5	9
State & Regional Energy Planning	1	15
Energy Efficiency Portfolio Standards	3	10
Public Benefit Funds for Energy Efficiency	1	10
Commercial Energy Efficiency Building Codes	2	12
Residential Energy Efficiency Building Codes	2	12
State Appliance Energy Efficiency Standards	0	5
Renewable Portfolio Standards	1	12
Public Benefit Funds for Renewable Energy	1	10
Output-Based Environmental Regulation To Support Clean Energy	0	7
Clean Distributed Generation	0	13
Net Metering	0	15

such as quarterly Webcast training sessions on how to reduce urban heat islands.

- Forming a Transportation Research Board Subcommittee on Pavements and the Urban Climate to help advance research on and understanding of cool pavement technologies and policies.

What to Expect in 2008 and Beyond

EPA will continue to support state and local governments as they develop, implement, and refine their clean energy and climate protection activities. Specifically, EPA will:

- Add one additional state partner, bringing the total number of partners in the State Partnership program to 16 in 2008, and provide resources to additional states across the country.
- Expand the real time, online information about state clean energy and climate policies as well as best practices.

Clean Energy and Utility Policy Programs



National Action Plan for Energy Efficiency

Despite the proven economic and environmental benefits of energy efficiency, a range of barriers have hindered utilities and others from making greater investments in these cost-effective measures. EPA continues to provide state public utility commissions and others with tools and resources for exploring and implementing policies that will reduce the

barriers to adopting comprehensive energy efficiency, renewable energy, and combined heat and power programs at the state and local level.

In 2007, EPA:

- Co-facilitated the National Action Plan for Energy Efficiency (Action Plan) with DOE. This effort brings together a Leadership Group of more than 60 top utilities, utility regulators, state agencies, large energy users, consumer advocates, energy service providers, and environmental and energy efficiency organizations. During its first 2 years, the Leadership Group reviewed and identified the barriers limiting greater investment in cost-effective energy efficiency, developed five key policy recommendations for increasing investment in energy efficiency, and presented a suite of resources to help committed organizations implement the recommendations. Through 2007, 120 organizations across 49 states had

made commitments to advance energy efficiency through the Action Plan (see Table 19).

- Released *Vision for 2025: Developing a Framework for Change*, which offers a framework for state-specific policies and programs to overcome barriers and enable the acquisition of all cost-effective energy efficiency potential by 2025. The *Vision for 2025* identifies 10 implementation goals for states to consider in order to help them achieve energy efficiency improvements by the year 2025 (see Table 20).
- Continued to provide technical assistance to states through the EPA-State Energy Efficiency Renewable Energy Pilots, including New Mexico, Florida, and Maryland.
- Provided policy assistance about the electric sector to states developing rules and policies that will accelerate the deployment of customer-sited clean distributed generation, including Hawaii, Florida, Maryland, and South Dakota.

What to Expect in 2008 and Beyond

EPA will continue to assist interested state public utility commissions in their efforts to advance clean energy by sharing information on how other states have removed barriers and pursued best practice policies and programs. EPA will also continue to facilitate the Action Plan in conjunction with DOE. In its third year, the Action Plan will focus on outreach and education, measuring progress toward the *Vision for 2025*, and developing additional educational resources. These new resources will address:

- The role of energy efficiency as a low-cost strategy for reducing carbon emissions.
- Coordinating demand response and energy efficiency policies and programs.
- Defining cost-effectiveness of energy efficiency programs.
- Advancing building energy codes through energy efficiency programs.
- Energy efficiency design and implementation best practices.
- Customer incentives for energy efficiency.
- Availability of energy bill data to customers.
- Designing and implementing state and local lead-by-example programs.

TABLE 19. 120 organizations have made commitments under the National Action Plan for Energy Efficiency

TYPE OF COMMITMENT	NUMBER OF ORGANIZATIONS MAKING A COMMITMENT UNDER THIS RECOMMENDATION*
Establishing and supporting state-level collaborative processes to explore how best to increase investment in energy efficiency	15
Investing additional money in energy efficiency programs	4
Starting new and/or expanding existing energy efficiency programs	17
Exploring policies and practices to align utility incentives with the delivery of cost-effective energy efficiency	5
Advancing efforts to include energy efficiency on a consistent and comparable basis with supply-side resources in future resource planning activities	24
Meeting aggressive energy savings goals	26
Proactively educating stakeholders on the benefits of and opportunities for energy efficiency	68

* See the Action Plan Web site (www.epa.gov/eeactionplan) for a full listing of energy efficiency commitments.

TABLE 20. Resources available in support of the Action Plan's Vision for 2025 goals

VISION FOR 2025 GOALS	INTRODUCTION TO ISSUES IN JULY 2006 ACTION PLAN REPORT	ACTION PLAN TOOLS AND RESOURCES
GOAL ONE Establishing Cost-Effective Energy Efficiency as a High-Priority Resource	●	<ul style="list-style-type: none"> • Guide to Resource Planning with Energy Efficiency • Guide for Conducting Energy Efficiency Potential Studies • Communications Kit
GOAL TWO Developing Processes To Align Utility Incentives Equally for Efficiency and Supply Resources	●	<ul style="list-style-type: none"> • Aligning Utility Incentives with Investment in Energy Efficiency Paper
GOAL THREE Establishing Cost-Effectiveness Tests	●	<ul style="list-style-type: none"> • Guide to Resource Planning with Energy Efficiency • Guide for Conducting Energy Efficiency Potential Studies
GOAL FOUR Establishing Evaluation, Measurement, and Verification Mechanisms	●	<ul style="list-style-type: none"> • Model Energy Efficiency Program Impact Evaluation Guide
GOAL FIVE Establishing Effective Energy Efficiency Delivery Mechanisms	●	<ul style="list-style-type: none"> • Regional Implementation Meetings • Resources Database
GOAL SIX Developing State Policies To Ensure Robust Energy Efficiency Practices		<ul style="list-style-type: none"> • Building Codes for Energy Efficiency Fact Sheet
GOAL SEVEN Aligning Customer Pricing and Incentives To Encourage Investment in Energy Efficiency	●	
GOAL EIGHT Establishing State of the Art Billing Systems		<ul style="list-style-type: none"> • Sector Collaborative on Energy Efficiency
GOAL NINE Implementing State of the Art Efficiency Information Sharing and Delivery Systems		<ul style="list-style-type: none"> • Paper on Coordination of Demand Response and Energy Efficiency (under development)
GOAL TEN Implementing Advanced Technologies		

METHANE PROGRAMS

Methane (CH₄) is both a potent greenhouse gas—over 20 times more effective than CO₂ at trapping heat in the atmosphere—and a valuable energy resource (see Table 21). Methane emissions from sources including agriculture, landfills, coal mines, and oil and natural gas systems currently represent about 7 percent of total U.S. greenhouse gas emissions. The recovery and utilization of methane as an energy source offers substantial opportunities for cost-effective greenhouse gas emissions reductions that deliver significant economic, environmental, and energy benefits.

For more than a decade, EPA has managed a suite of partnership and outreach programs designed to reduce emissions of methane by removing the market barriers that discourage investment in its recovery and use as an energy resource. All of these programs, including the Natural Gas STAR Program, AgSTAR, the Coalbed Methane Outreach Program, and the Landfill Methane Outreach Program, follow a successful strategy: they provide reliable and comprehensive technical, economic, and policy information to facilitate the adoption of cost-effective emissions reduction technologies and practices. These programs also offer tools and targeted technical assistance to help both public and private sector partners implement methane reduction project opportunities. Partners can gain a competitive advantage by improving their operating efficiency and receive recognition from EPA for their leadership in reducing methane emissions.

In 2007, the methane programs saved a combined 17.4 MMTCE, an increase of more than 85 percent since 2000 (see Table 22). These climate partnerships, in conjunction with a regulatory program to limit air emissions from the nation's largest landfills, have reduced national methane emissions to 11 percent below 1990 levels. They are projected to remain below 1990 levels through at least 2012 (see Figure 28).

Building off this success in the United States, EPA is now leveraging its experience and expertise to achieve economic and environmental results on a global scale. The Methane to Markets Partnership works to advance the recovery and use of methane as a clean energy source (see Figure 32, p. 51). Since its launch in 2004 with 14 partner countries, the Partnership has grown substantially to include 27 partner governments and more than 800 public and private sector organizations.

Natural Gas STAR Program



Natural Gas STAR is a 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 methane emissions. Initiated in 1993, Natural Gas STAR partners with companies from all sectors of the natural gas supply chain—production, processing, transmission, and distribution—to reduce gas losses, improve system efficiency, and ensure that more gas gets to market. EPA has developed a range of tools and resources to help partners implement a wide range of cost-effective methane reduction best management practices and technologies.

In 2007, Natural Gas STAR:

- Reduced methane emissions by 10.2 MMTCE and achieved cumulative reductions of more than 75 MMTCE since 1990 (see Figure 29, p. 47).
- Maintained 62 percent industry participation across all major sectors—production, processing, transmission, and distribution.
- Partnered with nine new companies, bringing the total number of partners to more than 120.
- Collaborated with eight Natural Gas STAR International partners to develop Program Implementation Plans and identify and prioritize methane mitigation opportunities.
- Conducted six onsite and three online technology transfer workshops covering the four major gas sectors, each of which provided an excellent forum for company representatives and industry experts to receive and share information on current cost-effective technologies and practices for reducing methane emissions.
- Recognized 10 partner companies for significant corporate achievements in reducing methane emissions from oil and gas systems at the 14th Annual Implementation Workshop in Houston, TX (see Table 23, p. 47).

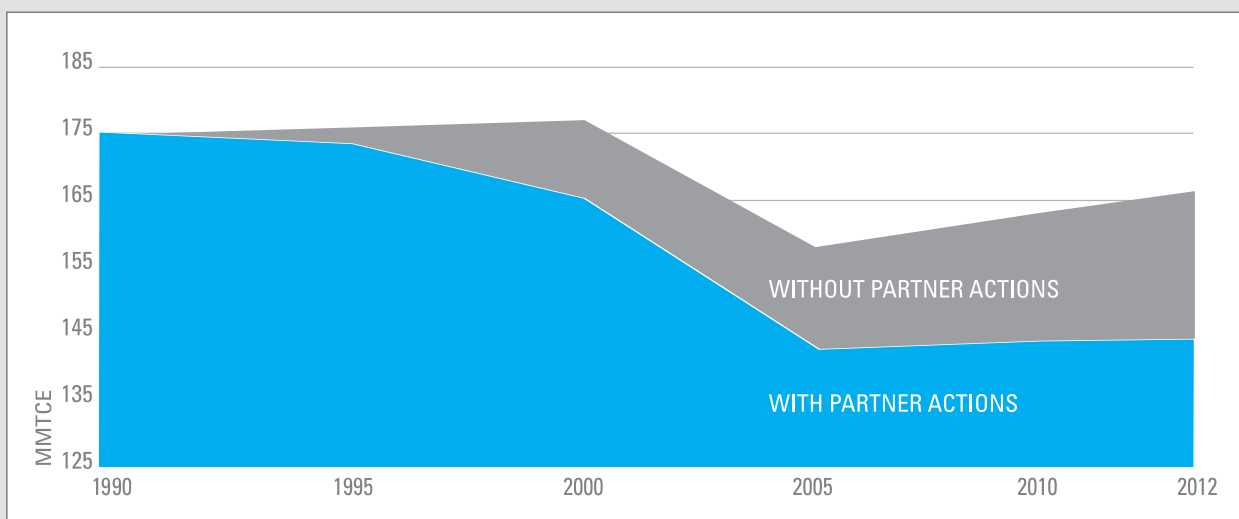
TABLE 21. Global warming potentials (GWPs) and atmospheric lifetimes of greenhouse gases

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
HFC-134a	1,300	14
Perfluorocarbons	6,500-9,200	3,200-50,000
Sulfur Hexafluoride	23,900	3,200

Source: IPCC 1996

TABLE 22. EPA's Methane Programs meet and surpass goals

PROGRAM	2007 GOAL	2007 ACHIEVEMENT	2008 GOAL
NATURAL GAS STAR			
Industry Participation (% in program)	59%	62%	60%
Annual Gas Savings (MMTCE)	6.7	10.2	7.0
COALBED METHANE OUTREACH PROGRAM			
Annual Methane Reductions (MMTCE)	2.0	2.0	2.2
LANDFILL METHANE OUTREACH PROGRAM			
Number of Projects	329	360	349
Annual Methane Reductions (MMTCE)	5.2	5.2	5.5
TOTAL REDUCTIONS (MMTCE)	13.9	17.4	14.7

FIGURE 28. Partner actions are projected to maintain methane emissions below 1990 levels through 2012

What to Expect in 2008 and Beyond

EPA will continue to support Gas STAR partners in the following ways as they implement programs to reduce their methane emissions:

- Develop additional tools and resources that highlight the environmental and economic benefits of methane reductions and facilitate company implementation of emissions reduction projects.
- Provide one-on-one assistance to partners in identifying and prioritizing new, cost-effective opportunities to further reduce methane emissions.
- Conduct six onsite and six Web-based technology transfer workshops, and expand the Annual Implementation Workshop to include a broader international focus.
- Conduct measurement studies and technology transfer workshops at oil and gas operations globally to assess key emissions sources and identify potential mitigation measures, as well as to provide critical technical training in leak detection and quantification methods.

AgSTAR Program



Through the AgSTAR Program, EPA, the U.S. Department of Agriculture (USDA), and DOE collaborate with the nation's agriculture industry to reduce methane emissions by promoting the use of anaerobic digesters and biogas recovery systems to manage animal wastes. EPA provides technical information and tools to help implement systems and assess potential projects. In addition to avoiding greenhouse gas emissions, the technologies and practices encouraged through AgSTAR reduce local water and air pollution and generate renewable energy that improves farm revenues. Currently, there are nearly 200 operating or planned systems in the United States.

In 2007, AgSTAR:

- Assisted livestock producers in project planning and implementation that, when completed, will produce nearly 275 million kWh/year of renewable energy from farms capturing methane. This energy will then be used by the farms and local communities.
- Continued to expand methane-reducing technologies in the livestock sector to help ensure clean water and air and held events with local extension services to market these opportunities. These activities took place as part of the implementation of Section 9006 of the Farm Bill.

- Developed and updated several important project implementation tools and resources, including the AgSTAR industry directory and the FarmWare project development software.

What to Expect in 2008 and Beyond

In 2008, AgSTAR will:

- Formalize collaboration with state energy programs across the country to facilitate the development of anaerobic digestion systems as renewable energy sources.
- Host the fourth annual national conference to provide environmental, program, market, state-of-the-art technical, and funding information on anaerobic digestion systems.
- Deliver state and regional workshops to educate livestock producers and promote anaerobic digestion systems, in collaboration with USDA and state energy programs.
- Continue to develop a national database to house information on current and pending anaerobic digestion systems.

Coalbed Methane Outreach Program



The Coalbed Methane Outreach Program (CMOP) collaborates with coal companies and related industries to reduce methane emissions from coal mines through the development of environmentally beneficial, cost-effective coal mine methane (CMM) recovery and utilization projects. CMOP efforts focus on mitigating emissions from degasification systems at underground coal mines and underground mine ventilation systems. The program provides high-quality, project-specific information and technical assistance to the coal mining industry and project developers. These efforts include analyses of technologies and potential projects, technology demonstrations, mine-specific project feasibility assessments, state-specific analyses of project potential, market evaluations, and guides to state, local, and federal assistance programs.

As a result of EPA's successful collaboration with coal companies and specialized businesses, the percentage of drained coal mine methane that is recovered and used has grown from 25 percent in the early 1990s to more than 80 percent in 2007. To capture the remaining methane emitted from degasification systems, EPA is working with industry to use CMM for injection in natural gas pipelines

FIGURE 29. Natural Gas STAR cumulative greenhouse gas emissions reductions and gas savings

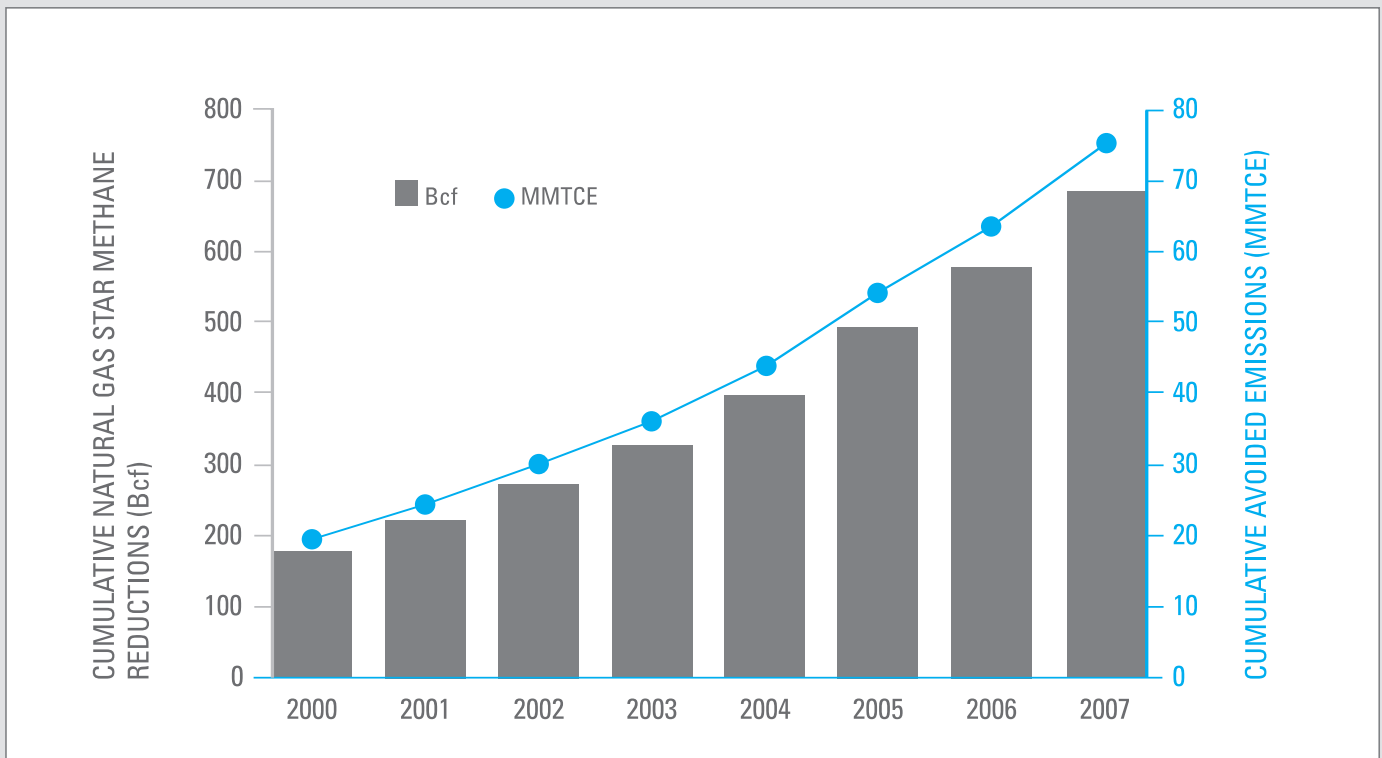


TABLE 23. 2007 Natural Gas STAR Awards

<p>PRODUCTION PARTNER OF THE YEAR EnCana Oil & Gas Inc. (USA) <i>Calgary, Alberta</i></p>	<p>CONTINUING EXCELLENCE (12 YEARS) Chevron Corporation <i>San Ramon, CA</i></p>	<p>CONTINUING EXCELLENCE (5 YEARS) Northern Natural Gas Company <i>Omaha, NE</i></p>
<p>PROCESSING PARTNER OF THE YEAR Enbridge Energy Partners, Inc. <i>Houston, TX</i></p>	<p>Great Lakes Gas Transmission Company <i>Troy, MI</i></p>	<p>ROOKIE OF THE YEAR Southwestern Energy Company <i>Houston, TX</i></p>
<p>TRANSMISSION PARTNER OF THE YEAR Columbia Gas Transmission Corporation <i>Houston, TX</i></p>	<p>CONTINUING EXCELLENCE (10 YEARS) Consumers Energy <i>Jackson, MI</i></p>	
<p>DISTRIBUTION PARTNER OF THE YEAR Alliant Energy <i>Madison, WI</i></p>	<p>Southwest Gas Corporation <i>Las Vegas, NV</i></p>	

(with or without upgrading, as needed), in power generation, and for mine heating and coal drying. EPA is also expanding its focus to include the methane emitted from coal mine ventilation systems and from abandoned underground mines. Mine ventilation systems account for 80 billion cubic feet (Bcf) of U.S. methane emissions annually, or more than 50 percent of U.S. CMM liberated in a single year.

In 2007, the Coalbed Methane Outreach Program:

- Reduced emissions of methane by an estimated 2.0 MMTCE. These results include those from about 20 projects that captured and used methane from some 30 closed U.S. coal mines.
- Worked in cooperation with CONSOL Energy and DOE to support the successful commissioning and operation of a technology demonstration project to mitigate methane emissions from diluted mine ventilation air. This is the first demonstration of its kind in the United States. This test-scale demonstration is being conducted at a closed mine in West Virginia to simulate active mine conditions.
- Promoted CMM recovery and utilization at closed underground mines and active surface mines by developing a database of candidate mines and preparing case studies of successful projects.
- Organized a national conference to address the opportunities and challenges of CMM project development in the United States, including site visits to coal mine methane recovery and use projects at abandoned mines.
- Engaged with officials from leading coal mining and end-use application companies.
- Performed an economic risk analysis for a coal mine methane recovery and use project in the western United States to assess various end-use options.

What to Expect in 2008 and Beyond

In 2008, the Coalbed Methane Outreach Program will:

- Launch tools to assist potential CMM project developers, including an online model for project finance and economics.
- Continue supporting the demonstration project on ventilation air methane mitigation in the United States.

- Update technical reports to provide more accessible information about technologies for recovering coal mine methane and using it effectively.
- Directly engage project developers, investors, technology vendors, and the mining community through effective outreach events, including a conference and roundtable.

Landfill Methane Outreach Program



Landfills are the second largest anthropogenic source of CH₄ emissions in the United States, accounting for approximately 23 percent of total CH₄ emissions in 2006. To reduce emissions from this sector, EPA launched the Landfill Methane Outreach Program (LMOP) in 1994 to facilitate the development of landfill gas energy (LFGE) projects. The program focuses its efforts on smaller landfills not required by EPA regulations to collect and combust their landfill gas, as well as larger, regulated operations that are combusting their gas but not using it as a clean energy source. LFGE projects not only prevent the direct methane emissions from landfills, but also reduce indirect CO₂ emissions by displacing electricity generated from the burning of fossil fuels (see Figure 30).

Through LMOP, EPA provides landfill owners and operators a suite of tools and technical resources to help them overcome the hurdles to LFGE project development, including feasibility analyses, decision-making software for evaluating project economics, a database of more than 540 candidate landfills, a project development handbook, and energy end-user analyses.

Over the past 13 years, LMOP has assisted approximately 360 projects (see Figure 31) that reduced methane emissions from landfills and avoided CO₂ emissions amounting collectively to about 36.0 MMTCE. These efforts are partially responsible for the 16-percent decrease in methane emissions from landfills since 1990.

In 2007, the Landfill Methane Outreach Program:

- Reduced methane emissions by 5.2 MMTCE by assisting in the development of 30 new LFGE projects and 20 project expansions.
- Welcomed 108 new partners, increasing participation by 18 percent and bringing the total to more than 700 LMOP partners.

FIGURE 30. Direct use and electric capacity of LMOP-assisted projects

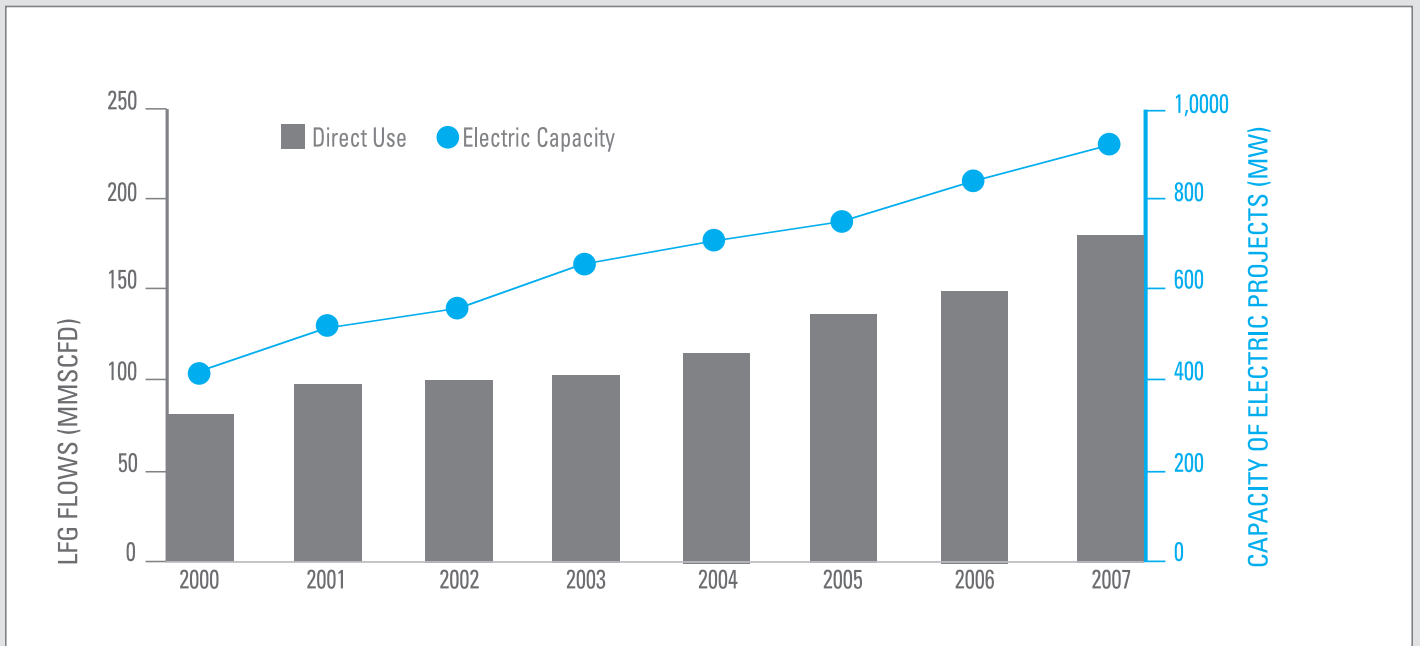
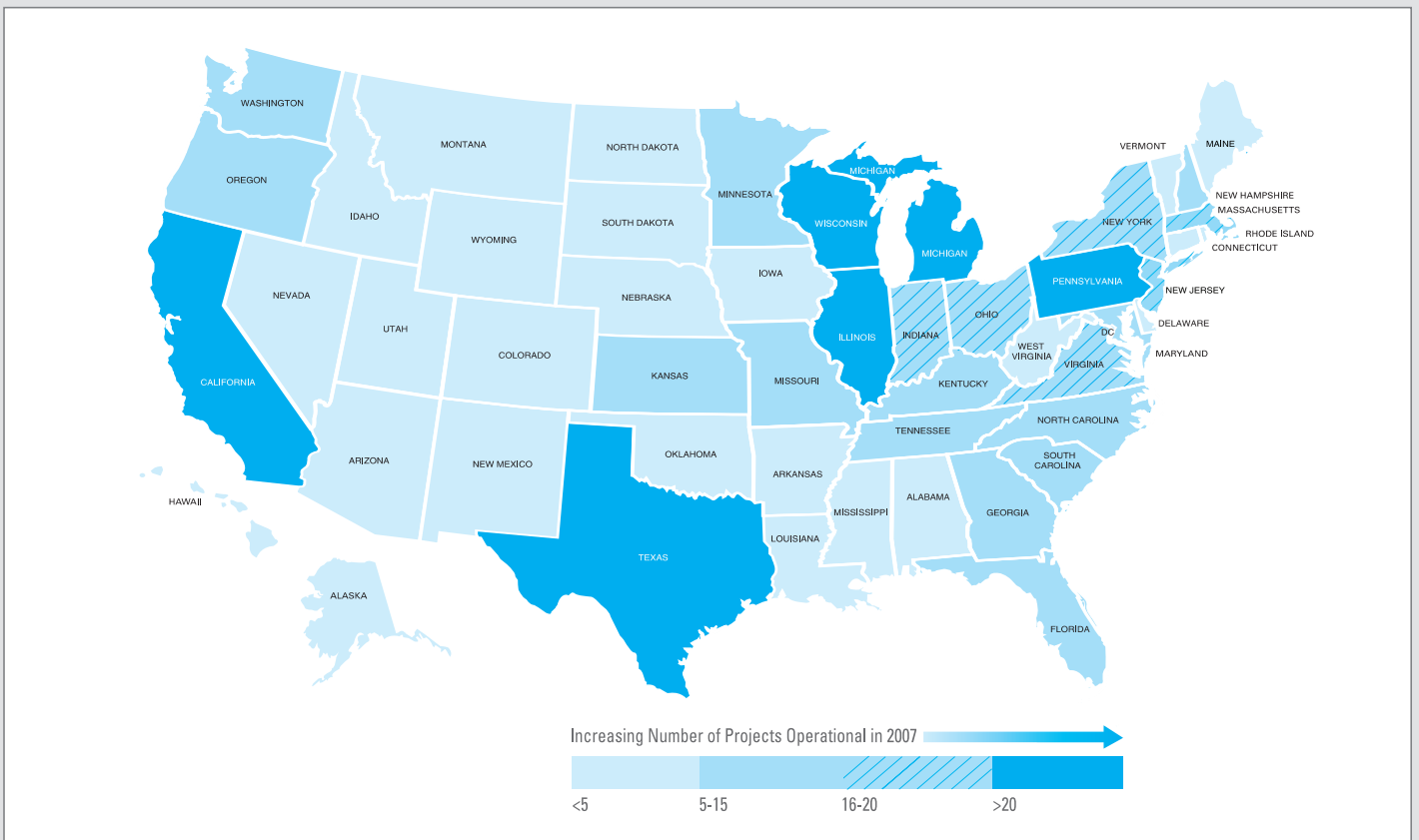


FIGURE 31. Landfill gas energy projects across the country



- Provided technical assistance to more than 40 corporations, helping them identify opportunities to advance LFGE as a reliable, low-cost source of energy. Over the past 3 years, this technical assistance has included performing over 80 cost analyses, conducting 70 locator searches used to match end-users and landfills, and running models for 40 landfill gas recovery projects.
- Highlighted a dozen landfills to attract investment opportunities during the 11th Annual LMOP Conference and Project Expo. Over 500 people attended the conference at which EPA Administrator Stephen L. Johnson gave the keynote address.
- Garnered public attention for LMOP partners and LFGE projects, which were featured by numerous media outlets, including CNN, *The Wall Street Journal*, *The New York Times*, and *The Boston Globe*.
- Launched several new LMOP partner tools and resources: an update to the funding guide, five project profiles to highlight the 2007 award recipients, and an updated boiler fact sheet.
- Recognized the outstanding accomplishments of four landfill methane partners and three exemplary projects at the 11th Annual LMOP Conference and Project Expo (see Table 24).

What to Expect in 2008 and Beyond

In 2008, the Landfill Methane Outreach Program will:

- Assist in the development of more than 40 new LFGE projects.
- Expand efforts to promote the benefits of LFGE to economic development offices, emphasizing job creation and tax revenue opportunities for states and communities.
- Host the 12th Annual LMOP Conference, Project Expo, and Awards Ceremony to showcase the top LMOP Partners and projects and discuss the latest industry trends.
- Update the LMOP Project Development Handbook and Web site.

FLUORINATED GAS PROGRAMS

Many fluorinated gases (F-gases), such as perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), nitrogen trifluoride (NF₃), and sulfur hexafluoride (SF₆), trap substantially more heat in the atmosphere than does CO₂ on a per mass basis (see Table 21, p. 45). In addition, some of these gases can have very long atmospheric lifetimes compared with CO₂. As a result, F-gases possess very high global warming potentials (GWPs).

Emissions of many F-gases occur as byproducts of U.S. industrial operations. To develop cost-effective operational improvements that will reduce these emissions, EPA has worked closely with key industries to create and manage a suite of partnership programs. Three of these industries are implementing agreements to reduce emissions under the President's Climate VISION (Voluntary Innovative Sector Initiatives: Opportunities Now) plan (see Table 25, p. 53). Despite the potential for sizable growth in F-gas emissions, EPA's partner industries are expected to maintain their emissions substantially below 1990 levels through the year 2012 thanks to the emissions reduction strategies developed by EPA's partnerships (see Figure 33, p. 53). Greenhouse gas emissions reductions across these programs totaled 13.8 MMTCE in 2007 (see Table 26, p. 53).

The Voluntary Aluminum Industrial Partnership (VAIP)



The Voluntary Aluminum Industry Partnership (VAIP) program was launched in 1995 as a joint effort between

EPA and the U.S. primary aluminum industry to reduce perfluorocarbon (PFC) emissions from aluminum production. In 2003, the aluminum industry committed to reducing direct carbon intensity by 53 percent from 1990 levels by 2010 in support of the Climate VISION plan. The plan involves reducing emissions of perfluoromethane (CF₄) and perfluoroethane (C₂F₆), which are inadvertent byproducts of the smelting process, and reducing CO₂ emissions caused by the consumption of the carbon anode. This ambitious goal signifies an additional direct carbon intensity reduction of 25 percent beyond 2000 levels.

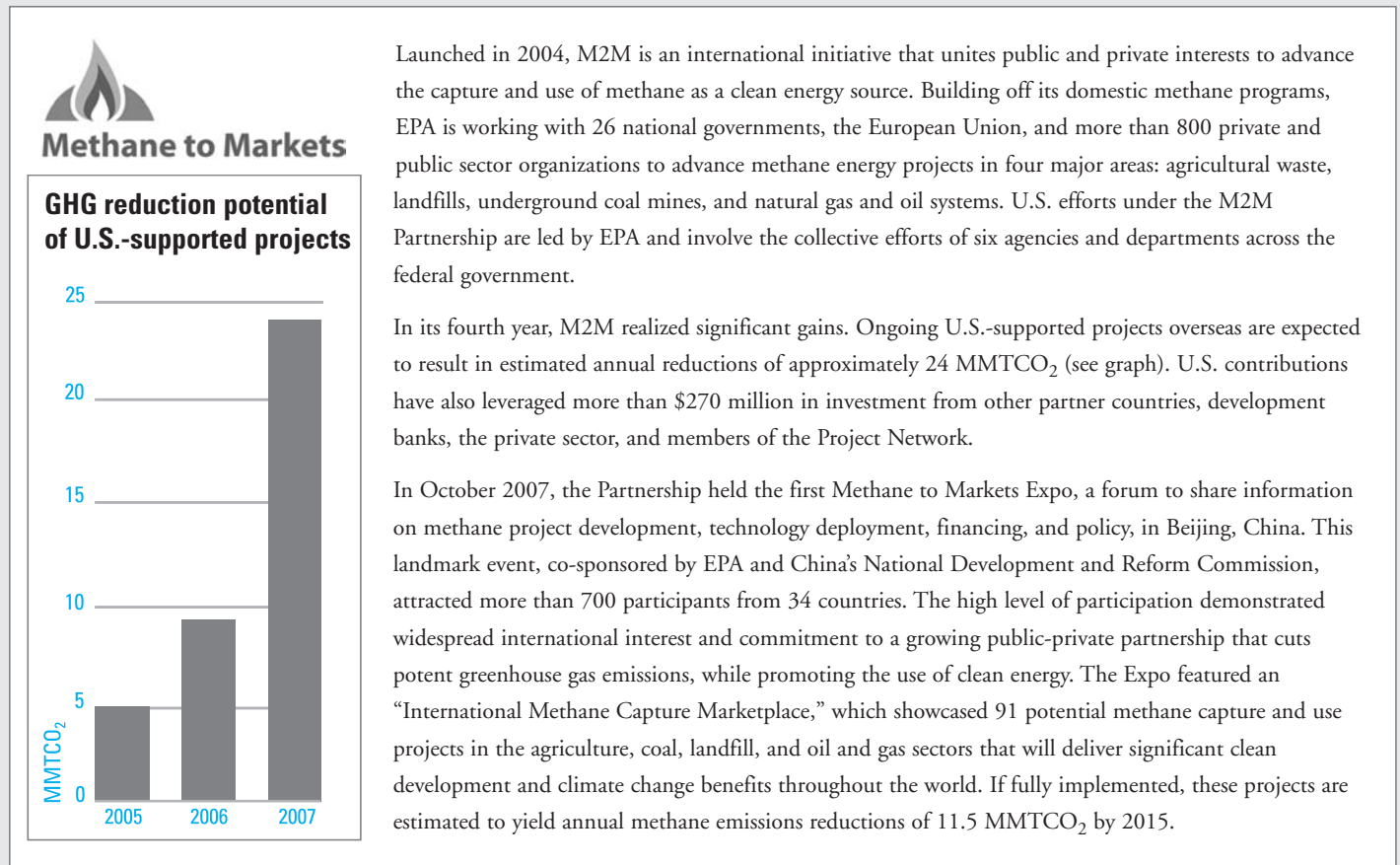
In 2007, the Voluntary Aluminum Industrial Partnership:

- Reduced 2.5 MMTCE in direct greenhouse gas emissions, which represents reduced PFC emissions of

TABLE 24. 2007 Landfill Methane Outreach Program Awards

<p>PROJECT OF THE YEAR Greentree Landfill Gas Energy Project <i>Kersey, PA</i></p> <p>PROJECT OF THE YEAR Iris Glen Landfill Gas Energy Project <i>Johnson City, TN</i></p> <p>PROJECT OF THE YEAR Southeastern Chester County Refuse Authority (SECCRA) Landfill Gas Energy Project <i>Chester County, PA</i></p> <p>INDUSTRY PARTNER OF THE YEAR Ameresco <i>Framingham, MA</i></p>	<p>COMMUNITY PARTNER OF THE YEAR Greater Lebanon Refuse Authority (GLRA) and PPL Energy Landfill Gas Energy Project <i>Lebanon, PA</i></p> <p>ENDORSER OF THE YEAR CIFAL-Atlanta <i>Atlanta, GA</i></p> <p>ENERGY PARTNERS OF THE YEAR Alameda Power & Telecom and City of Palo Alto <i>Watsonville, CA</i></p>
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FIGURE 32. Exporting the success of EPA’s domestic Methane Programs: Methane to Markets (M2M)



more than 75 percent and reduced direct carbon emissions of more than 53 percent on a per-ton basis compared to the industry's 1990 baseline.

- Completed a Web-based training module, Anode Effect Management, for use by pot room operators and smelter managers.
- Worked with the International Aluminium Institute (IAI) to update the EPA/IAI PFC Measurement Protocol, which enables the collection of consistent data from smelter-specific PFC measurements being completed around the world.
- Organized a PFC Management Workshop in Beijing, China, to support the greenhouse gas reduction efforts by the Aluminum Task Force of the Asia Pacific Partnership for Clean Development and Climate.

HFC-23 Emission Reduction Program

HFC-23 is a byproduct in the production of HCFC-22, a common commercial and residential air conditioning refrigerant. Through its partnership with 100 percent of the U.S. HCFC-22 industry, EPA encourages the development and implementation of feasible, cost-effective processing practices and technologies that reduce HFC-23 emissions. Since the partnership began in 1993, U.S. HCFC-22 manufacturers have made significant progress in lowering emissions of HFC-23 through process optimization and thermal destruction. As a result, HFC-23 emission intensity has dropped dramatically.¹³

In 2007, the HFC-23 Emission Reduction Program:

- Reduced emissions by 7.0 MMTCE below what they would have been had production continued at 1990 emissions intensity levels.
- Completed, in collaboration with the HCFC-22 producers, a comprehensive data audit that reviewed estimates of HFC-23 emissions and HCFC-22 production on a plant-specific basis from 1990 to 2006.

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, Asia, and North America to set the first global industry target for reducing

greenhouse gas emissions. Semiconductor manufacturers have worked alongside EPA to identify and implement PFC-reducing process changes and manufacturing tool improvements for the production of integrated circuits. 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 very 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 world's first industry-wide, global greenhouse gas emissions reduction target.

The aggressive goal set by WSC demonstrates the semiconductor industry's commitment to climate protection in the international community. The present challenge for WSC and EPA is to maintain flexibility and leadership when aligning the initiative with the industry's plan to include emerging production centers in Malaysia and Singapore.

In 2007, the PFC Reduction/Climate Partnership for the Semiconductor Industry:

- Reduced absolute PFC emissions by 2.4 MMTCE, or more than 75 percent below business-as-usual (BAU) levels, while U.S. manufacturing continued to expand. EPA's semiconductor industry partners are on track to meet their 2010 WSC/Climate VISION commitments.
- Worked with partner companies NEC and Qimonda to evaluate installed PFC abatement devices in full-scale production settings. The goals of the studies were to evaluate and validate EPA's proposed standard measurement protocol and to help partners learn how their installed emissions control technologies operate between periodic maintenance.
- Led a collaborative effort to develop a new standard method for characterizing destruction or removal efficiency (DRE) of PFC abatement technologies.
- Supported the WSC's negotiation with China to set an aggressive PFC emissions reduction target by developing a model to project China's emissions through 2020 under various goal scenarios.¹⁴

¹³ HFC-23 emission intensity is the amount of HFC-23 emitted per kilogram of HCFC-22 manufactured.

¹⁴ For more information, see Bartos SC, et al., 2008.

TABLE 25. Climate VISION* goals for EPA's Fluorinated Gas Programs

EPA PROGRAM	CLIMATE VISION GOAL
Voluntary Aluminum Industrial Partnership (VAIP)	Has committed to achieving a direct carbon intensity reduction of 53% from 1990 levels by 2010.
The SF ₆ Emission Reduction Partnership for the Magnesium Industry	Has committed to eliminating SF ₆ emissions by the end of 2010.
The PFC Reduction/Climate Partnership for the Semiconductor Industry	Has committed to reducing absolute perfluorocarbon emissions by 10% below the 1995 baseline level by the end of 2010.

* Voluntary Innovative Sector Initiatives: Opportunities Now

FIGURE 33. Partner actions are projected to maintain emissions of fluorinated gases below 1990 levels through 2012

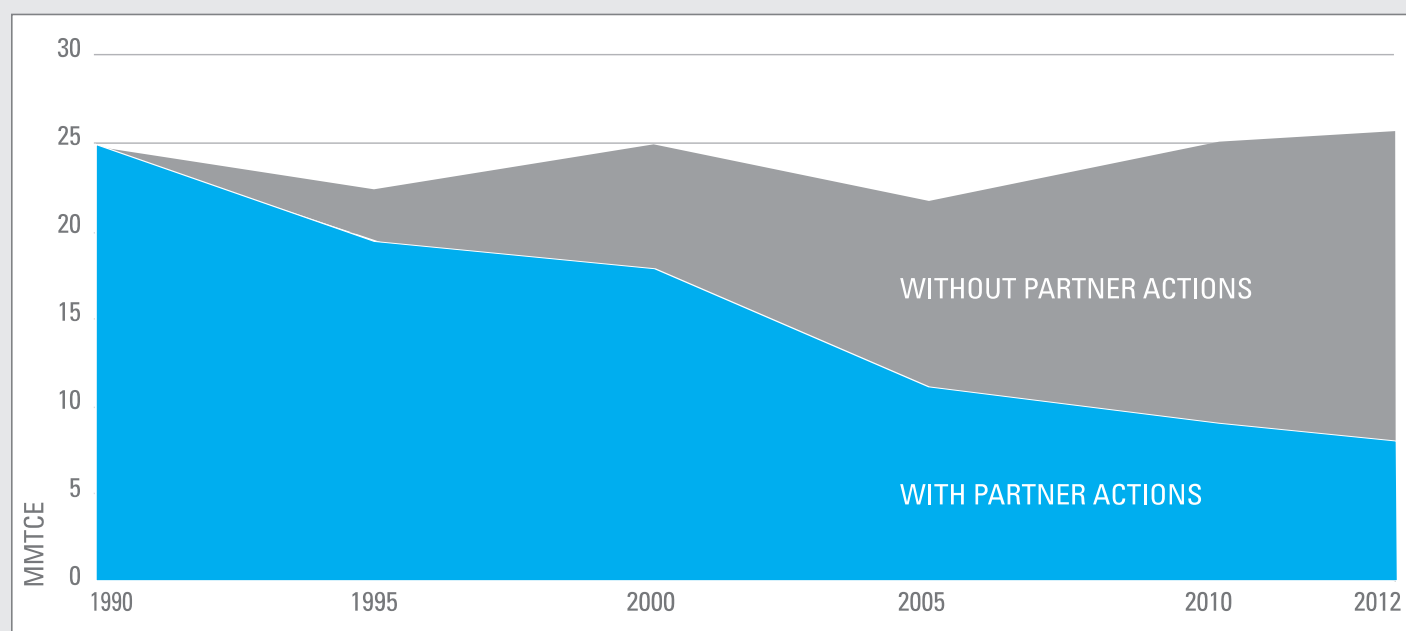


TABLE 26. Goals and achievements of EPA's Fluorinated Gas Programs

PROGRAM	2007 GOAL	2007 ACHIEVEMENT	2008 GOAL
VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)			
Industry Participation (% in program)	99%	99%	99%
Reductions (MMTCE)	2.7	2.5	2.7
HFC-23			
Industry Participation (% in program)	100%	100%	100%
Reductions (MMTCE)	4.9	7.0	4.7
OTHER STEWARDSHIP PROGRAMS			
Industry Participation (% in program)*	50-100%	50-100%	50-100%
Reductions (MMTCE)	4.7	4.3	5.9
TOTAL REDUCTIONS (MMTCE)	12.3	13.8	13.3

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

Sulfur Hexafluoride (SF₆) Emissions Reduction Partnership for Electric Power Systems



SF₆ is the most potent and persistent greenhouse gas. Used primarily by electric utilities, SF₆ is a gaseous dielectric for high-voltage circuit breakers and gas-insulated substations. The global warming potential of SF₆ is 23,900 over a 100-year time period, which means it is 23,900 times more effective at trapping infrared radiation than an equivalent amount of CO₂.

Since 1999, EPA has partnered with several electric utilities in a voluntary program to reduce SF₆ emissions. In addition to providing a means to actively address climate change, this program has helped partner companies reap financial savings through reduced SF₆ gas purchases. Members of the partnership represent 46 percent of the total U.S. transmission system.

In 2007, the SF₆ Emissions Reduction Partnership for Electric Power Systems:

- Reduced emissions by 1.7 MMTCE, bringing average SF₆ emissions rates down to 5.4 percent of the total equipment nameplate capacity.
- Recruited four new companies into the Partnership: City of Palo Alto Utilities, Oglethorpe Power, PNM Resources, and ITC *Transmission*.
- Partnered with service providers to complete two training Webcasts on gas inventory management and monitoring leaks.
- Continued to work with partners to update SF₆ reduction goals through the year 2012.
- Recognized two partners—MidAmerican Energy and Southern Company—for their significant emissions reductions and their exemplary participation in the Partnership.

SF₆ Emission Reduction Partnership for the Magnesium Industry



The U.S. magnesium industry and the International Magnesium Association (IMA) are working with EPA to identify and adopt best management practices

for reducing and eliminating emissions of SF₆. Launched in 1999, this partnership works to reduce SF₆ emissions from magnesium production and casting operations, and currently includes more than 80 percent of the U.S. magnesium industry. Partner companies are supporting the President's Climate VISION initiative and striving to completely eliminate their firms' SF₆ emissions by the end of 2010.

In 2007, the SF₆ Emission Reduction Partnership for the Magnesium Industry:

- Reduced SF₆ emissions equivalent to 0.18 MMTCE. 2007 was the eighth year in which EPA collected annual SF₆ emissions reports from magnesium industry partners.
- Organized and led the 3rd International Melt Protection Users Group Round Table in conjunction with the 2007 Annual World Magnesium Conference in Vancouver, British Columbia. More than 25 industry and government participants from Asia, Europe, North America, and the Middle East exchanged technical information on phasing out SF₆-based melt protection.
- Completed the fourth study of alternative melt protection technologies and associated air emissions. Partner company MagReTech hosted the study. EPA's evaluation of cover gas alternatives included quantification of cover gas destruction values to better determine actual emissions rates.
- Maintained U.S. industry participation in the partnership, representing 100 percent of primary magnesium production and 80 percent of domestic casting and recycling capacity.
- Announced that two partner companies—Meridian and MagReTech—have initiated SF₆ phase-out projects to transition to alternative cover gases.

Mobile Air Conditioning Climate Protection Partnership

Motor vehicle air conditioners contribute significantly to global greenhouse gas emissions through vehicle gasoline consumption and direct refrigerant emissions. In the United States alone, vehicle air conditioners use 7 billion gallons of gasoline every year, equivalent to over 16 MMTCE.¹⁵ Additionally, refrigerant emissions contribute more than 8 MMTCE annually.¹⁶

¹⁵ For more information, see Andersen, S., et al., 2004.

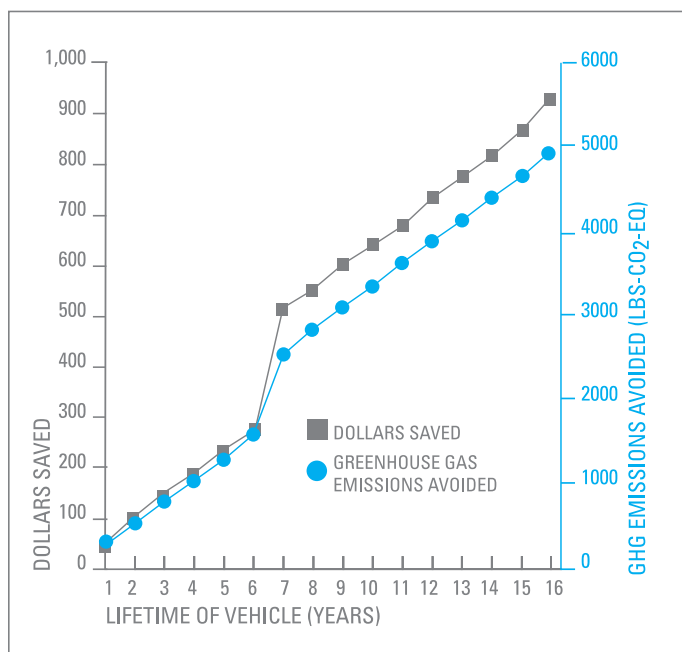
¹⁶ HFC-134a emissions: the refrigerant most commonly used in mobile AC systems since 1994. This does not include emissions of CFC-12 from pre-1994 automobile models still in the U.S. fleet.

The global partnership formed in 1998 among the Society of Automotive Engineers (SAE), the Mobile Air Conditioning Society Worldwide, and EPA to reduce the climate impacts of mobile air conditioning (MAC) systems now includes most of the world's vehicle manufacturers and their suppliers, environmental and industry NGOs, and representatives from industrialized and developing country governments. The MAC Partnership has four goals:

- Promote cost-effective designs and improved service procedures to minimize refrigerant emissions.
- Promote next-generation MAC systems that are better for the environment while satisfying customer safety, cost, and reliability concerns.
- Communicate technical progress to policymakers and the public.
- Document current and near-term opportunities to improve the environmental performance of MAC system design, operation, and maintenance.

The partnership is now working to meet ambitious, quantitative goals announced in 2004 to reduce air conditioning fuel consumption by at least 30 percent and cut refrigerant emissions by 50 percent.

FIGURE 34. Over the lifetime of a vehicle, an IMAC* system will save more than \$900 and prevent almost 5,000 lbs of greenhouse gas emissions



* Improved Mobile Air Conditioning (IMAC) systems leak 50% less and are 30% more efficient than standard systems. Due to their leak-tight design, IMAC systems do not require the refrigerant recharging that regular mobile AC systems do.

In 2007, the Mobile Air Conditioning Climate Protection Partnership:

- Published the Global Refrigerants Energy & Environmental Mobile Air Conditioning Lifecycle Climate Change Performance—GREEN-MAC-LCCP¹⁷. The tool allows environmental and industry experts to compare alternative MAC refrigerants for the best climate performance.
- Issued a government-industry consensus report on how HFC-152a can be safely and efficiently used in MACs with secondary-loop technology and published guidelines for efficient secondary-loop HFC-152a MAC design.
- Formed an industry and government expert team to develop safety recommendations for R744, the industry term for CO₂-based vehicle air conditioners.

What to Expect in 2008 and Beyond for the Fluorinated Gas Programs

The fluorinated gas partnership programs for the industrial sector will continue to work with their partners and implement strategies to keep emissions below 1990 levels. EPA plans to:

- Continue to implement agreements with industry to reduce greenhouse gas intensity for the aluminum, magnesium, and semiconductor sectors through the Climate VISION effort.
- Continue recruiting companies to participate in the SF₆ Emissions Reduction Partnership for Electric Power Systems and training partners to ensure the collection and reporting of high quality data by electric power partners.
- Evaluate the technical feasibility and cost of continuous emissions monitoring (CEM) of F-gases from the electronics industry.
- Support efforts of magnesium partners to eliminate emissions of SF₆ by demonstrating alternative melt protection technologies for primary producers and secondary ingot casters.
- Announce plans in 2008 to introduce new AC technology using refrigerants with low global warming potentials.
- Translate the Web-based training module, Anode Effect Management, into other languages to facilitate global PFC emissions reduction efforts.
- Launch a PFC Management Demonstration Project in China to support efforts to reduce PFC emissions by the Asia Pacific Partnership for Clean Development and Climate. China is the largest global producer of primary aluminum.
- Maintain active partnerships with HCFC-22 chemical manufacturers to continue to reduce emissions of HFC-23.

¹⁷ To view the tool, please visit <http://epa.gov/cppd/mac/compare.htm>.

DEMONSTRATING PROGRESS: MEASURING RESULTS OF THE EPA CLIMATE PROTECTION PARTNERSHIP PROGRAMS

EPA's climate protection programs are an important component of the U.S. government's strategy to address climate change; they are expected to contribute about 70 percent of the emissions reductions necessary to reach the President's greenhouse gas intensity improvement goal in 2012. As such, EPA is committed to documenting quantifiable program results and using well-established methods to estimate the benefits of its programs. For each program, EPA has a robust process in place to regularly review and improve the program evaluation approaches.

The approaches used for each specific program are summarized in the sections below. They vary by program strategy, sector, availability of data, and market characteristics. In order to present the most realistic estimates of program benefits, EPA employs a common analytical framework across all of the individual program approaches:

- The benefits discussed represent the results attributable to EPA efforts above pre-existing trends or BAU scenarios.
- Program methods address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects.
- Where marginal uncertainty exists, EPA uses the best available information and best practices that yield conservative benefit estimates.
- Cumulative estimated benefits reflect the stream of energy savings that will persist through 2017 due to investments made through 2007. For this analysis, EPA assumes no new investments will be made through its programs in 2008 or beyond.
- Financial benefits are placed in present value terms.

Environmental and financial benefits for 2000 to 2007 are summarized in Table 1 on p. 3. The historical environmental benefits and cost effectiveness of these programs are summarized on the next page (see Table 27 and Figure 35). The information presented in this report is similar to much of the information used in the U.S. Office of Management and Budget (OMB) Program Assessment Rating Tool (PART), which found these EPA programs to be achieving their goals.

ENERGY STAR

Through the ENERGY STAR program, EPA helps U.S. businesses and consumers save money and reduce greenhouse gas emissions by labeling energy-efficient products, raising the bar of energy efficiency in new home construction, and encouraging superior energy management practices in the commercial and industrial sectors. The methods for estimating the benefits of each of these strategies are described below.

Products

- Sales of products due to the ENERGY STAR program are determined as those above and beyond established BAU purchases of these products.¹⁸ These sales are estimated by:
 - Collecting annual sales data on ENERGY STAR qualifying products from participating product manufacturers as a condition of partnership and supplementing these data by industry reports on total annual product sales as necessary. These data are screened and issues resolved.
 - Using established BAU baselines for annual product sales for each product category. These baselines use historic data and expert judgment, and they typically reflect increasing market shares for efficient products and increasing product efficiencies over time.
 - Applying a conservative estimate of the effect of market transformation to account for EPA efforts when product specifications are revised and qualified product shipments fall as manufacturers transition to the new specification.
- Annual energy savings are calculated using established values for the difference in annual energy use between a single ENERGY STAR product and a typically purchased product. For these values, EPA:
 - Assumes that ENERGY STAR products just meet the ENERGY STAR thresholds, even though there are some products that exceed this level.
 - Assumes the typically purchased product meets minimum efficiency standards where standards exist or uses the average energy use for the product category where there are no standards.

¹⁸ For more details on many aspects of this method, see Sanchez 2008 and Weber 2000.

TABLE 27. Overview of EPA's Climate Partnership Programs reviewed in this annual report with greenhouse gas reductions since 2000

PROGRAM	GHGs ADDRESSED	KEY SECTOR(S)	SCOPE OF PARTNERS AS OF 2007	GHG REDUCTIONS* (MMTCE)							
				2000	2001	2002	2003	2004	2005	2006	2007
Climate Leaders	All	Commercial, Industrial	155	Climate Leaders' reductions are reflected in the data shown for other programs.							
ENERGY STAR	CO ₂	Residential, Commercial, Industrial	12,000	15.2	17.7	21.3	25.0	28.5	32.2	36.1	42.4
Clean Energy-Environment State Partnership	CO ₂	State Government	15						N/A	N/A	N/A
CLEAN ENERGY SUPPLY											
Green Power	CO ₂	State & Local Government, Commercial, Industrial	850								
Combined Heat and Power	CO ₂	Commercial, Industrial	200	N/A	N/A	0.6	1.0	2.0	3.2	3.7	4.8
METHANE PROGRAMS											
Natural Gas STAR	CH ₄	Natural Gas	62% of industry	4.1	4.8	5.7	6.0	7.9	10.1	9.4	10.2
Coalbed Methane Outreach Program (CMOP)	CH ₄	Coal Mining	N/A	2.1	2.3	1.7	1.7	1.9	2.4	2.5	2.0
Landfill Methane Outreach Program (LMOP)	CH ₄	Waste Management	700	3.2	3.7	3.9	4.1	4.4	4.5	4.8	5.2
FLUORINATED GAS PROGRAMS											
Voluntary Aluminum Industrial Partnership	PFCs	Aluminum Smelting	99% of industry	2.0	2.1	1.8	2.2	2.2	2.3	2.4	2.5
HFC-23 Partnership	HFCs	Chemical Industry	100% of industry	4.7	5.1	4.5	6.1	6.4	6.2	7.0	7.0
Stewardship Programs	SF ₆ PFCs	Magnesium Production, Semiconductor Manufacturing, Electric Power Systems	50%–100% of industry	0.8	0.8	1.3	1.8	3.1	3.0	3.8	4.3
Mobile Air Conditioning (MAC) Partnership	CO ₂ HFCs	MAC Industry	N/A	Working toward technology improvement goals							

*These reductions reflect the most up-to-date data collected from EPA partners and may differ from reductions reported in previous annual reports.

N/A: Not applicable

FIGURE 35. EPA programs are highly cost-effective mechanisms for reducing greenhouse gas emissions

EPA's climate protection programs are a very cost-effective approach for reducing U.S. greenhouse gas emissions. Moreover, it is clear from sources such as the IPCC's Fourth Assessment Report and McKinsey's recent study that there are still great untapped opportunities for these programs to capture—meaning they will continue to be cost-effective far into the future (see Figure 5, p. 9). Every federal dollar spent on these partnership programs through 2007 means:

- Reductions in greenhouse gas emissions of 1.0 metric ton of carbon equivalent.
- Savings for partners and consumers of more than \$75 on their energy bills.
- Private sector investment of more than \$15.
- A net savings of more than \$60.

- Supports primary data collection, such as product metering to collect power use information, where additional information is necessary to estimate energy savings.
- Uses product-specific lifetimes that vary from 4 to 20 years. While those who purchase an ENERGY STAR qualified product are likely to replace it with one, EPA includes only a fraction of replacement purchases and investments in the program benefits.
- Peak power savings are estimated using product-specific factors that reflect the contribution of the annual energy savings from a product to peak load savings.
- Net energy bill savings is the present value (PV) of energy bill savings minus the PV of any incremental cost of purchasing an ENERGY STAR product above a standard model over the product lifetimes discussed above.¹⁹ All energy bill calculations use national sector-specific fuel prices.
- Avoided emissions of greenhouse gases for 2007 are determined using marginal emissions factors for CO₂ based on factors established as part of the U.S. government's reporting process to the UN Framework Convention on Climate Change, as well as historical emissions data from EPA's eGRID database.²⁰ For future years, EPA uses factors derived from energy efficiency scenario runs of the integrated utility dispatch model, Integrated Planning Model (IPM®).²¹
- Annual energy savings are calculated using established values for the energy savings from a home that meets the ENERGY STAR specification relative to a home built to code. Energy bill savings are calculated using a similar approach as for products and average national energy prices for the residential sector. The average lifetime of a home for both energy and bill savings is 30 years.
- Peak power savings and avoided emissions of greenhouse gases are determined using approaches similar to those described for products.

Commercial Buildings

- Annual electricity and natural gas savings are determined based on a peer-reviewed methodology developed for the commercial building sector.²² The methodology involves a counterfactual econometric analysis that forecasts state level electricity use in the absence of commercial building energy efficiency programs. Key determinants of electricity demand that are controlled for in the analysis include state energy prices, weather conditions, economic conditions, other federal programs—such as DOE's Rebuild and Federal Energy Management Program (FEMP)—and the long-term U.S. trend in commercial sector electronic technologies. Once the net national change in electricity use due to publicly funded energy efficiency programs is calculated, ENERGY STAR accomplishments are differentiated from other national and regional demand-side management (DSM) and market transformation programs. The methodology used for 2007 is an update of two former peer-reviewed methodologies used by EPA; nevertheless, the results of all three methodologies yield consistent estimates of ENERGY STAR accomplishments.²³
 - The peak power savings are estimated using system-specific factors that reflect the contribution of the energy savings from lighting and other building improvements to peak load savings.
- ## New Homes
- EPA receives data quarterly from third-party verifiers (home energy raters) on the number of homes they verified to be ENERGY STAR, as a condition of program partnership. These raters abide by a set of quality assurance practices to ensure data quality. In addition, EPA reviews the submitted data and resolves any data irregularities.
 - EPA recognizes that some new homes that qualify for ENERGY STAR are not a direct result of the program and that many homes built to ENERGY STAR levels due to the program are not labeled or reported to the program. Currently, EPA estimates the former number of homes to be lower than the latter.

¹⁹ Calculated using a 7% discount rate and 2007 perspective.

²⁰ For more details on eGRID, see U.S. EPA, 2007.

²¹ For more details on IPM, see U.S. EPA, 2006.

²² For more details on many aspects of this method, see Horowitz, M.J., 2007 and 2008.

²³ For more details on many aspects of this method, see Horowitz, M.J., 2007.

- As with products, net energy bill savings reflect the incremental investment necessary to upgrade the building to ENERGY STAR specifications determined by using simple payback period decision criteria. EPA assumes most building and industrial facility improvements last at least 10 years and uses national commercial sector fuel prices.
- Avoided emissions of greenhouse gases are determined using marginal emissions factors for CO₂ as with products.

Industry

Annual industrial electricity and natural gas savings are determined using a peer-reviewed methodology similar to that used for the commercial sector.²⁴ The methodology distinguishes savings due to ENERGY STAR from those due to utility-run DSM programs and other market transformation programs such as DOE's Industrial Technology Program (ITP). Greenhouse gas emissions are calculated using marginal CO₂ emissions as with products.

The Clean Energy Supply Programs

Combined Heat and Power (CHP) Partnership

The CHP Partnership dismantles the market barriers stifling investment in environmentally beneficial CHP projects. Program partners such as project owners voluntarily provide project-specific information on newly operational CHP projects to EPA. These data are screened and any issues resolved.

Energy savings are determined on a project-by-project basis, based on fuel type, system capacity, and operational profile. Estimates of the use of fossil and renewable fuels are developed, as well as the efficiency of thermal and electrical use or generation, as appropriate.

Emissions reductions are calculated on a project-by-project basis to reflect the greater efficiency of onsite CHP. Avoided emissions of greenhouse gases from more efficient energy generation are determined using marginal emissions factors derived from energy efficiency scenario runs of IPM, and displaced emissions from boiler produced thermal energy are developed through engineering estimates. In addition, emissions reductions may include avoided transmission and distribution losses, as appropriate.

Only the emissions reductions from projects that meet the assistance criteria for the program are included in the program benefit estimates. EPA also addresses the potential for double counting benefits between this and other partnerships by having program staff meet annually to identify and resolve any overlap issues.

Green Power Partnership

The Green Power Partnership boosts supply of clean energy by helping U.S. businesses purchase electricity from green generation sources. As a condition of partnership, program partners submit data annually on their purchases of qualifying green power products. These data are screened and any issues resolved.

Avoided emissions of greenhouse gases are determined using marginal emissions factors for CO₂ derived from scenario runs of IPM.

The potential for double counting, such as counting green power purchases that may be required as part of a renewable portfolio standard or may rely on resources that are already part of the system mix, is addressed through a partnership requirement that green power purchases be incremental to what may already be required.

EPA estimates that the vast majority of the green power purchases made by program partners are due to the partnership, as partners comply with aggressive green power procurement requirements (usually at incremental cost) to remain in the program. Further, EPA estimates that its efforts to foster a growing voluntary green power market have likely led to additional voluntary green power purchases that have not been reported through the program.

²⁴ For more details on many aspects of the previous methods, see Horowitz, M.J., 2004 and 2001.

The Methane Programs

EPA's methane programs facilitate recovering methane from landfills, natural gas extraction systems, agriculture, and coal mines as well as using methane as a clean energy resource. The expenditures used in the program analyses include the capital costs agreed to by partners to bring projects into compliance with program specifications and any additional operating costs engendered by program participation.

Natural Gas STAR

As a condition of partnership, program partners submit implementation plans to EPA describing the emissions reduction practices they plan to implement and evaluate. In addition, partners submit progress reports detailing specific emissions reduction activities and accomplishments each year.

EPA does not attribute all reported emissions reductions to Natural Gas STAR. Partners may only include actions that were undertaken voluntarily, not those reductions attributable to compliance with existing regulations.

Emissions reductions are estimated by the partners either from direct before-and-after measurements or by applying peer-reviewed emissions reduction factors.

Landfill Methane Outreach

EPA maintains a comprehensive database of the operational data on landfills and landfill gas energy projects in the United States. The data are updated frequently based on information submitted by industry, LMOP outreach efforts, and other sources.

Reductions of methane that result from compliance with EPA's air regulations are not included in the program estimates. In addition, only the emissions reductions from projects that meet the LMOP assistance criteria are included in the program benefit estimates.

EPA uses emissions factors that are appropriate to the project. The factors are based on research, discussions with experts in the landfill gas industry, and published references.

Coalbed Methane Outreach

Through cooperation with the U.S. Mine Safety & Health Administration, state oil and gas commissions, and the mining companies themselves, EPA collects mine-specific data annually and estimates the total methane emitted from the mines and the quantity of gas recovered and used.

There are no regulatory requirements for recovering and using coal mine methane; such efforts are entirely voluntary. EPA estimates coal mine methane recovery attributable to its program activities on a mine-specific basis, based on the program's interaction with each mine.

The Fluorinated Gas Programs

Due to the small pool of potential partners for the F-gas programs, financial expenditures and savings are proprietary information of program partners and not included in the summary of economic benefits.

Voluntary Aluminum Industry Partnership

VAIP partners agree to report aluminum production and anode effect frequency and duration in order to estimate annual PFC emissions.

Reductions are calculated by comparing current emissions to a BAU baseline that uses the industry's 1990 emissions rate. Changes in the emissions rate (per ton production) are used to estimate the annual greenhouse gas emissions and reductions resulting from the program.

The aluminum industry began making significant efforts to reduce PFC emissions as a direct result of EPA's climate partnership program. Therefore, all reductions achieved by partners are assumed to be the result of the program.

HFC-23 Emission Reduction Program

Program partners report HCFC-22 production and HFC-23 emissions to a third party that aggregates the estimates and submits the total estimates for the previous year to EPA.

Reductions are calculated by comparing current emissions to a BAU baseline that uses the industry's 1990 emissions rate. Changes in the emissions rate are used to estimate the annual greenhouse gas emissions and reductions resulting from the program.

Subsequent to a series of meetings with EPA, industry began making significant efforts to reduce HFC-23 emissions. All U.S. producers participate in the program; therefore, all reductions achieved by manufacturers are assumed to be the result of the program.

Environmental Stewardship Programs

EPA's Environmental Stewardship Programs include the PFC and SF₆ Electric and Magnesium Reduction Partnerships. Partners report emissions and emissions reductions based on jointly developed estimation methods and reporting protocols. Data collection methods are sector specific, and data are submitted to EPA either directly or through a designated third party.

Reductions are calculated by comparing current emissions to a BAU baseline, using industry-wide or company-specific emissions rates in a base year. The reductions in emissions rates are used to calculate the overall greenhouse gas emissions reductions from the program.

The share of the reductions attributable to EPA's programs is identified based on a detailed review of program activities and industry-specific information.

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