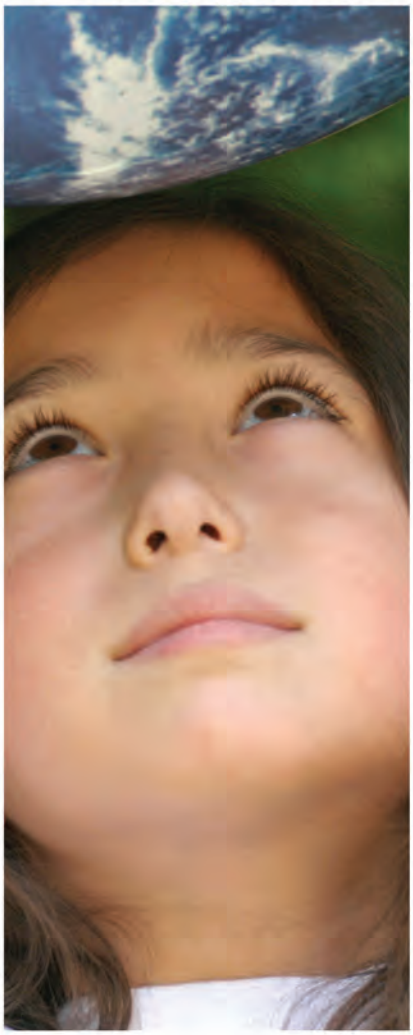
ENERGY STAR® and Other Climate Protection Partnerships

2008 Annual Report



United States Environmental Protection Agency

ENERGY STAR® AND OTHER CLIMATE PROTECTION PARTNERSHIPS
2008 ANNUAL REPORT

CONTENTS

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

NOTE: The data source for all figures and tables in this 2008 Annual Report is EPA's Climate Protection Partnership Programs unless otherwise noted. Historical totals have been updated based on the most recent available data.

December 2009

Climate change is the greatest environmental challenge of our time, and effective public-private partnerships are instrumental in this fight. By bringing together strong incentives, serious commitments, and transparent processes, EPA's voluntary programs have produced credible and lasting results, and promoted the economic and environmental leadership we need to protect our planet.

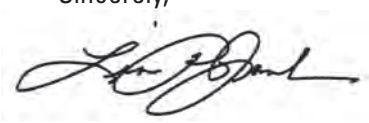
For the past 16 years, EPA has partnered with thousands of organizations across the United States to reduce greenhouse gas emissions through energy-efficient products and practices and expanded use of clean energy. Our partners, who range from Fortune 500 companies to educational institutions, are laying the groundwork for innovative, economy-wide practices. Together, we are pioneering change that can improve bottom lines and strengthen the fight against climate change.

The 2008 accomplishments of EPA's voluntary climate protection programs are significant and set the stage for progress in the years ahead. Here are just a few highlights:

- Americans, with the help of ENERGY STAR, saved $18 billion in 2008 on their utility bills and prevented the equivalent of greenhouse gas emissions from 29 million vehicles.
- Since the Green Power Partnership's inception in 2002, more than 1,000 partners have committed to buying more than 16 billion kilowatt-hours of green power each year.
- Since the Combined Heat and Power Partnership program launched in 2002, more than 260 partners have installed more than 4,700 megawatts of new combined heat and power.
- The partners of EPA's methane and fluorinated greenhouse gas partnership programs used EPA tools and resources in 2008 to avoid the equivalent of emissions from more than 23 million vehicles.
- EPA's corporate commitment program, Climate Leaders, grew 60 percent in 2008 to 250 participants.

ENERGY STAR and EPA's other climate protection programs make clear that climate protection efforts are good for the environment and good for the economy. EPA will build upon this experience and success of these programs as we continue to address climate change in aggressive, comprehensive, and common-sense ways.

Sincerely,



Lisa P. Jackson

Administrator

U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

Global climate change is a pressing national and international environmental problem. Meeting this challenge calls for immediate, proven, cost-effective solutions to establish limits on overall emissions of greenhouse gases (GHGs) and remove the barriers that hinder investment in low-cost energy efficiency and clean energy supply options. The U.S. Environmental Protection Agency's (EPA's) climate protection partnership programs have implemented a comprehensive set of policies and programs for 16 years—successfully removing many of those barriers—with outstanding financial and environmental results and overall program cost-effectiveness (see Table 1 and Figure 1, p. 4).

EPA's climate protection partnerships employ a combination of voluntary standards, outreach and education, technical assistance, facilitated peer exchange, and recognition for organizations taking important steps to protect the global environment. As a result of these efforts, many households, businesses, and other organizations are changing the way they use energy and joining in the fight against global climate change.

In 2008, EPA's climate protection partnerships once again realized impressive results. The more than 18,000 organizations across the United States that have partnered with EPA in these programs have achieved significant environmental and economic benefits:

- Preventing 86 million metric tons (in MMTCE[1]) of GHGs—equivalent to the emissions from 57 million vehicles—and net savings to consumers and businesses of more than $18 billion in 2008 alone.
- Preventing more than 1,200 MMTCE cumulatively and net savings to consumers and businesses of more than $220 billion over the lifetime of their investments.
- Investing $65 billion in energy-efficient, climate-friendly technologies.

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[1] 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.

Highlights of 2008

ENERGY STAR®

Through the ENERGY STAR program, EPA continued to promote energy efficiency across the residential, commercial, and industrial sectors to help reduce GHG emissions, the primary cause of global climate change. In 2008, EPA's ENERGY STAR efforts helped Americans:

- Save about 190 billion kilowatt-hours (kWh)—about 5 percent of U.S. electricity demand.
- Prevent the emissions of 45 MMTCE of GHGs.
- Save $18 billion on their energy bills (see Figure 2, p. 4).

These benefits are more than double those in 2000 (see Table 2, p. 6). Additional ENERGY STAR program highlights, with notable achievements for 2008 and cumulatively, include:

More Savings to More Consumers through ENERGY STAR Products

More than 40,000 ENERGY STAR qualified product models across 60 product categories are produced by more than 2,400 manufacturers and offer consumer savings of as much as 75 percent relative to standard models.

- Americans purchased about 550 million ENERGY STAR qualified products in 2008, bringing the total to more than 2.5 billion since 2000.[2]
- EPA increased the stringency of the ENERGY STAR criteria for seven product categories: set-top boxes, TVs, imaging products, computers, external power adapters, telephony, and furnaces.

Raising the Bar for New Home Construction

More than 100,000 new homes—nearly 17 percent of the U.S. new housing starts—were constructed to meet ENERGY STAR guidelines in 2008, despite the continued decline in the housing market. This brought the total number of ENERGY STAR qualified new homes to nearly 940,000 nationwide.

Improving the Efficiency of Existing Homes

More than 50,000 older homes have been retrofitted through the whole home retrofit program—Home Performance with ENERGY STAR—with more than 25 sponsors across the country now offering this service program.

TABLE 1. Annual and Cumulative Benefits From Partner Actions Through 2008 (in Billions of 2008 Dollars and MMTCE)

PROGRAM	BENEFITS FOR 2008		CUMULATIVE BENEFITS 1993 - 2018			
	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	**$18.0**	**45.0**	**$276.3**	**$60.1**	**$216.2**	**589**
Qualified Products and Homes	$10.0	19.9	$138.3	$19.2	$119.1	265
Buildings	$5.3	18.5	$107.5	$33.9	$73.6	222
Industry	$2.7	6.6	$30.5	$7.0	$23.5	102
Clean Energy Supply Programs	—	6.1	—	N/A	—	82
Methane Programs	$0.6	20.3	$12.1	$4.9	$7.2	289
Fluorinated Greenhouse Gas Programs	—	14.8	—	N/A	—	267
TOTAL	**$18.6**	**86.2**	**$288.4**	**$65.0**	**$223.4**	**1,228**

PV: *Present Value*

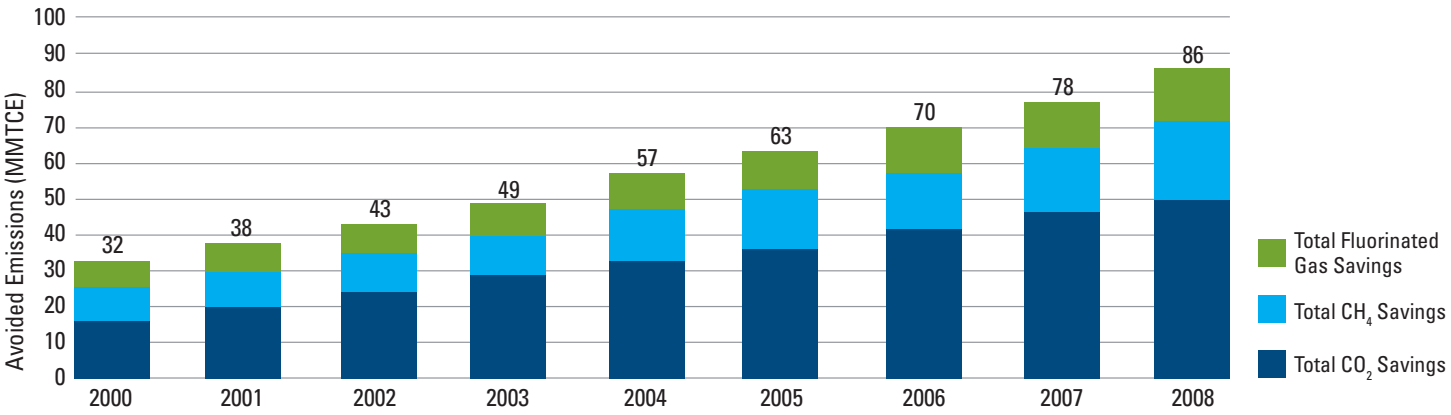
NOTES: *Technology Expenditures include O&M expenses for Methane Programs. Bill Savings and Net Savings include revenue from sales of methane and electricity. Totals may not equal sum of components due to independent rounding. For details on cumulative benefits, see page 67.*

— : *Not applicable*

N/A: *Not available*

[2] *Does not include purchases of compact fluorescent bulbs.*

FIGURE 1. GHG Emissions Reductions Exceed 85 MMTCE—Equivalent to Emissions From 57 Million Vehicles



Saving Energy in Commercial Buildings

Over 2,400 organizations—including more than 300 local governments—have joined EPA's ENERGY STAR Challenge to improve the efficiency of the nation's commercial buildings by 10 percent or more as measured by EPA's energy performance rating system.

- More than 80,000 buildings, representing over 11.5 billion square feet—or 16 percent—of U.S. building space, have been assessed for efficiency as an important step in targeting improvements.
- More than twice as many buildings earned the ENERGY STAR in 2008 as in the previous year. Overall, more than 6,200 buildings—representing over one billion square feet—have been recognized for top performance. These buildings use nearly 35 percent less energy than typical buildings.

Designing Commercial Buildings To Be Efficient

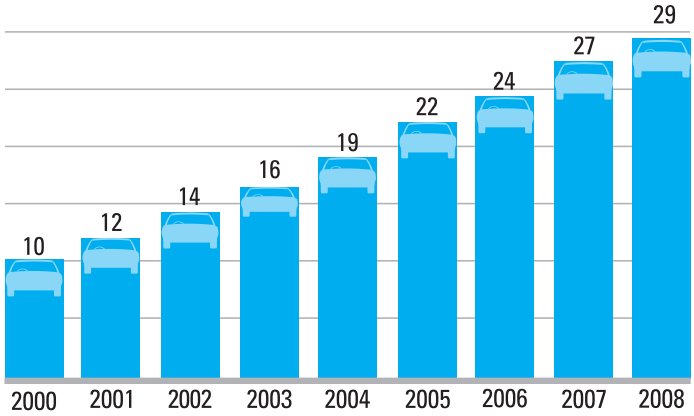
More than 75 projects achieved Designed to Earn the ENERGY STAR, for a cumulative total of 130. Each of these future buildings has been designed with the intent of earning the ENERGY STAR.

Saving Energy in the Industrial Sector

- EPA engaged the U.S. steel industry to participate in an Industrial Focus—the Industrial Focuses now include 16 major industries—and expanded the industrial program to include a total of more than 550 partners working to improve their corporate energy management systems.
- The number of ENERGY STAR labeled industrial plants grew to 45, with the addition of another eight plants earning the ENERGY STAR for the first time in 2008.

FIGURE 2. ENERGY STAR Benefits Continue To Grow

Utility Bill Savings (in billions)



Emissions Saved in Vehicle Equivalents (in millions)

FIGURE 3. 2008 International Climate Protection Awards

The Climate Protection Awards were established in 1998 to recognize outstanding accomplishments in protecting the Earth's climate. So far, 169 individuals, companies, and organizations from 19 countries have earned the EPA Climate Protection Award. For 2008, 17 individuals and organizations were recognized for reducing GHG 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. This year's winners are from Argentina, India, the Federated States of Micronesia, Mauritius, Mexico, and the United States.

CORPORATE AND GOVERNMENTAL AWARD WINNERS

- California Climate Action Team, United States
- City of Berkeley, United States
- Mauritius and the Federated States of Micronesia
- Regional Greenhouse Gas Initiative, United States
- Sun Microsystems, United States

TEAM AND ORGANIZATION AWARD WINNERS

- Building Owners and Managers Association International, United States
- Consortium for Energy Efficiency, United States
- Pacific Forest Trust, United States
- Agustín Sánchez and Laura Berón, Mexico and Argentina

INDIVIDUAL AWARD WINNERS

- Mr. George David Banks, United States
- Ms. Sandra Ely, United States
- Mr. Edward Thomas Morehouse, Jr., United States
- Dr. Ajeet Rohatgi, United States
- Dr. Joseph Senecal, United States
- Mr. Rajendra Shende, India

Climate Leaders

Climate Leaders, the largest corporate GHG goal-setting program, grew to nearly 250 participants—an increase of 60 percent in one year. Further, about half of the partners have publicly announced and are working to meet their aggressive GHG reduction goals. Twenty-one partners have achieved their initial emissions reduction goals and are pursuing new ones. Together, the announced goals represent a potential reduction in GHG emissions of more than 13 MMTCE over business-as-usual outcomes.

Clean Energy Supply Programs

Increasing clean energy supply through efficient and low-emitting supply options is another critical strategy for reducing GHG emissions. EPA's Clean Energy Supply programs, which provide technical assistance and recognize significant purchasers of renewable energy, engaged more than 1,300 partners in the purchase of over 16 billion kWh of green power and the installation of over 130 megawatts (MW) of new, environmentally beneficial combined heat and power (CHP) capacity—about 50 percent of nationwide capacity that came on line in 2008.

State and Local Government Clean Energy Programs

EPA made important progress assisting state and local governments in exploring and implementing a broad range of energy efficiency, clean energy, and climate change policies and programs.

- EPA established a comprehensive nationwide program that helps states learn from the experiences of the 16 states in the partnership and others. EPA also expanded its municipal network to include hundreds of local governments.
- The EPA- and U.S. Department of Energy (DOE)-facilitated National Action Plan for Energy Efficiency released *Vision for 2025: Framework for Change*, which provides a comprehensive framework for state-specific policies and programs to overcome barriers and realize all cost-effective energy efficiency potential. Many states received assistance in advancing these policies.

TABLE 2. ENERGY STAR Key Program Indicators, 2000 and 2008

ENERGY STAR PROGRAM STRATEGY	KEY INDICATOR	YEAR OF RESULTS	
		2000	2008
Efficient Products (for more information, see p.18)	Product Categories Eligible for ENERGY STAR	33	>60
	Individual Product Models Qualifying	11,000	>40,000
	Products Sold[1,2]	600 million	>2.5 billion[3]
	Public Awareness	40%	>75%
	Manufacturing Partners	1,600	2,400
	Retail Partners	550	>1,000
	EE Program Administrator Partners	100	>550
Home Improvement (for more information, see p. 25)	Homes Improved through Home Performance with ENERGY STAR[1]	—	50,000
	EE Program Administrator Partners	—	27
	Homes Benchmarked using Yardstick[1]	—	200,000
New Homes (for more information, see p. 26)	Number of New Homes Built[1]	25,000	940,000
	Percent of National New Home Starts	<1%	17%
	Markets with over 20% Market Share	0	15
	Builder Partners	1,600	6,500
Existing Commercial Buildings (for more information, see p. 29)	Number of Buildings Rated[1]	4,200	>80,000
	Building Square Footage Rated[1]	800 million	>11.5 billion
	Percent of Commercial Square Footage Rated	1%	16%
	Building Types Eligible for the ENERGY STAR Label	2	11
	Number of Buildings Labeled[1]	545	6,200
	Building Square Footage Labeled[1]	128 million	>1 billion
New Commercial Buildings (for more information, see p. 33)	Number of Buildings Designed to Earn the ENERGY STAR[1]	—	130
Industrial Improvements (for more information, see p. 34)	Industrial Partners	—	>550
	Industrial Sectors (and subsectors)	0	16
	Facility Types Eligible for the ENERGY STAR Label	—	5
	Number of Facilities Labeled[1]	—	45
Annual Results (for more information, see p. 67)	Energy Saved (kWh)	62 billion	188 billion
	Emissions Avoided (MMTCE)	15.8	45
	Net Savings (USD)	$5 billion	$18 billion

[1] Results are cumulative.

[2] The cumulative total of product sales across the entire ENERGY STAR program from 1992-2008, 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.

[3] Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.

— : Not applicable

Methane Partnership Programs

EPA's methane programs continued to reduce the emissions of this potent GHG from landfills, agriculture, oil and natural gas systems, and coal mines and to develop projects to use the methane whenever feasible. In 2008, these programs avoided more than 20.3 MMTCE of GHG emissions, exceeding their emissions reductions goals and maintaining national methane emissions 14 percent below 1990 levels.

Fluorinated GHG Partnership Programs

EPA's fluorinated GHG (FGHG) partnerships kept national emissions of these gases from industrial sources more than 30 percent below 1990 levels.[3] Together, these programs avoided more than 14.8 MMTCE of GHG emissions in 2008.

Recognizing Partner Accomplishments

EPA recognized the accomplishments of many outstanding partners in its climate protection partnership programs with the following awards:

- International Climate Protection Awards (see Figure 3, p. 5)
- ENERGY STAR Award Winners (see Figure 6, p. 17)
- Green Power Leadership Awards (see Table 12, p. 43)
- ENERGY STAR CHP Awards (see Table 14, p. 46)
- Natural Gas STAR Awards (see Table 18, p. 55)
- Landfill Methane Outreach Awards (see Table 19, p. 60)

TABLE 3. Long-term Greenhouse Gas Reduction Goals for EPA Climate Partnership Programs (MMTCE)

	ACCOMPLISHMENTS	GOALS	
PROGRAM	2008	2012	2015
ENERGY STAR*	45.0	52	64
Clean Energy Supply Programs	6.1	8	12
Methane Programs	20.3	18	20
Fluorinated GHG Programs	14.8	19	22
TOTAL	**86.2**	**97**	**118**

**Does not include ENERGY STAR products managed by DOE.*

Looking Forward to 2009 and Beyond

EPA's programs continue to advance GHG reduction goals and deliver greater benefits each year. Expected to double again within 10 years, these benefits can only grow as more organizations, households, and others adopt the practices promoted by the climate protection partnerships (see Table 3). The following voluntary programs are an important complement to state and federal regulatory actions on climate change. EPA will pursue broad strategies to reach aggressive interim goals and achieve growing environmental and economic benefits.

ENERGY STAR

EPA will continue to build the ENERGY STAR program as a credible source of information for investing in energy efficiency for consumers, businesses, and other organizations to leverage as part of their own efficiency and GHG reduction efforts in the following ways:

- Expand to cover new product categories—adding about two each year—and increase the stringency of ENERGY STAR requirements for products where appropriate.
- Increase the number of builders offering ENERGY STAR qualified new homes, expand market share, and work to increase the stringency of the requirements for these homes.
- Launch Home Performance with ENERGY STAR in new regions of the country.
- Expand the use of the energy assessment tools available through ENERGY STAR as a way to target improvements in commercial building efficiency and use the ENERGY STAR label to recognize new and existing high performing commercial buildings.
- Work with Industrial Focuses, finalize energy performance indicators, and expand the ENERGY STAR labeling program for efficient plants.

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

- Review and evaluate the methodologies and assumptions used to calculate the benefits associated with ENERGY STAR qualified products.

Climate Leaders

EPA will continue to engage organizations of all kinds, while providing support to existing partners to reach their GHG reduction goals. EPA expects growing interest from organizations interested in better understanding and reducing their carbon footprints. EPA will also assist these organizations in encouraging their suppliers to develop their own GHG management strategies.

Clean Energy Supply Programs

EPA will continue to help partners improve the supply of the nation's clean energy resources, supporting the purchase of green power by aggressively promoting sector leadership among colleges and universities, state and local governments, and the Fortune 500. EPA will also assist in the development of new CHP projects in sectors such as municipal and cooperative utilities, wastewater treatment facilities, tribal casinos, and data centers.

State and Local Government Clean Energy Programs

EPA will continue to assist state and local governments in advancing clean energy policies and programs. EPA will:

- Establish an online State Network for officials in all 50 states to learn from and exchange information about energy and climate change initiatives, as well as provide new guidance materials for implementing key policies.
- Use the policy framework created through the National Action Plan for Energy Efficiency to support the development of a long-term energy efficiency program and policy infrastructure, including supporting energy efficiency advanced through the American Recovery and Reinvestment Act (ARRA) of 2009.

Methane and Fluorinated GHG Programs

With national methane and F-gas emissions below 1990 baselines, EPA will strive for further achievements in these programs by working aggressively with companies in the aluminum, magnesium, semiconductor, utility, HCFC-22, and mobile air conditioning sectors to reduce emissions of F-gases. EPA will also work to enhance its partnerships with companies and communities to develop new methane emissions reduction projects at coal mines, oil and gas systems, landfills, and farms across the country. Through the Methane to Markets Partnership, EPA will continue to spread the successful practices of these domestic methane partnership programs overseas.

INTRODUCTION TO EPA'S CLIMATE PROTECTION PROGRAMS

Across the United States a number of cost-effective opportunities exist to greatly reduce GHG emissions and protect the environment. However, consumers and organizations have not seized many of these opportunities due to pervasive market barriers. For the past 16 years, EPA has worked to dismantle the barriers that have prevented the adoption of and investment in energy efficiency, clean energy, and other climate-friendly technologies and practices through its comprehensive suite of climate protection partnership programs (see Table 4, p. 10). Through these partnership programs, EPA offers a broad collection of tools, resources, best practices, and policies to thousands of partners and consumers. The core elements of these programs are:

- Objective information
- Technical assistance
- Public recognition for environmental leadership

As a result of their participation, EPA's partners—along with American consumers—have significantly reduced energy use; avoided GHG emissions across the residential, commercial, and industrial sectors; and captured real financial and environmental benefits. As these partnership programs continue to grow each year, so do their environmental and financial benefits; in 2008, EPA's climate partnerships achieved remarkable benefits, which are expected to double by 2018.

The programs summarized in this report[4] focus on the five broad strategies described below to achieve their goals.

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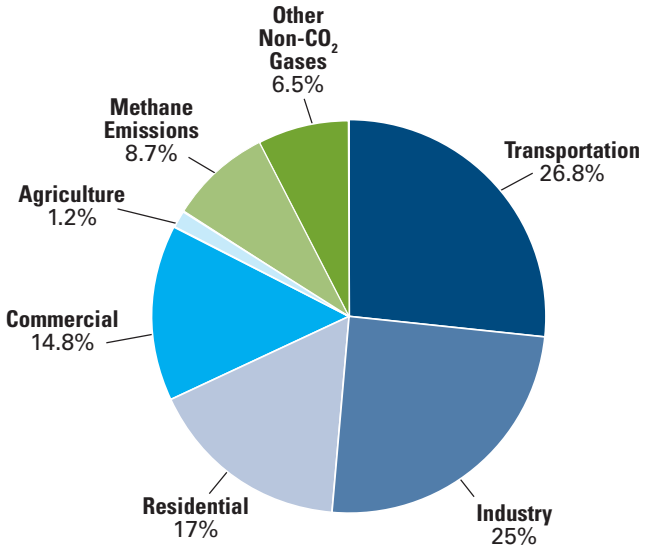
[4] *This report provides results for the Climate Protection Partnership Programs operated by the Office of Atmospheric Programs at EPA. It does not include emissions reductions attributable to WasteWise, transportation programs, the Significant New Alternatives Program, or the landfill rule, which are 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 120 million metric tons of carbon equivalent (MMTCE) in 2008.*

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	Lack of objective measurement tools	●	●	●	●	●	●	●		
	Lack of information about energy efficency 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					●			●	●

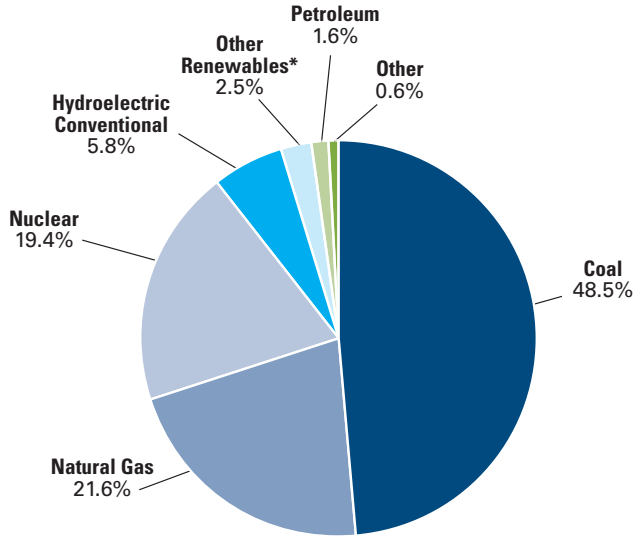
*Includes utilities.

FIGURE 4. U.S. CO_2 Emissions by Sector and Non-CO_2 Gases by Percent of Total GHGs



Source: EPA 2009a

FIGURE 5. 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 2009c

Program Strategies

Promoting Energy Efficiency

Energy efficiency—obtaining identical services or output (such as heating, cooling, and lighting) with less energy input—is one of the lowest cost solutions for combating global climate change (see Figure 4). Since 1992, EPA has been expanding the ENERGY STAR program to help individuals and organizations across the nation adopt proven, cost-effective, energy-efficient technologies and practices by:

- Clearly identifying energy-efficient products with superior performance in the marketplace.
- Improving voluntary energy efficiency specifications for 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 reduce their energy use.

Facilitating Corporate Commitments To Reduce GHG Emissions

Partners in EPA's Climate Leaders program are Fortune 500 and other leading corporations that have committed to aggressively reducing their GHG emissions. Companies agree to complete a comprehensive inventory of their GHG emissions, set an ambitious long-term reduction goal, and annually report their progress to EPA when they join. Climate Leaders are reducing their carbon footprint and earning recognition for environmental stewardship through the program by investing in energy efficiency, clean energy, and other measures to reduce emissions of GHGs.

Expanding Clean Energy Supply

In 2001, EPA launched the Green Power Partnership and the Combined Heat and Power (CHP) Partnership to accelerate the adoption of clean energy supply technologies across the United States (see Figure 5). These partnerships are spurring resource growth by promoting greater purchase of electricity derived from renewable sources and greater investment in environmentally friendly CHP. EPA has partnered with hundreds of organizations through these programs to provide technical assistance, minimize transaction costs, and promote technologies that significantly reduce GHG emissions from energy generation.

The 2008 Annual Report

This annual report presents detailed information on EPA's 2008 efforts within each of the five strategies mentioned in this section. Each individual program section includes:

- Program overview and accomplishments.
- Environmental and economic benefits achieved in 2008.
- Goals for the future.
- 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 67). 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.

Advancing State and Local Energy Policy

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.

Reducing Non-CO_2 GHG Emissions

While carbon dioxide (CO_2) is the most recognizable GHG, a number of GHGs can trap significantly more heat in the earth's atmosphere, on a per molecule basis, than CO_2. 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 GHG and a highly desirable clean fuel. EPA partners with the oil and 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 (SF_6)—are extremely powerful and persistent GHGs. To avoid significant accumulation of these gases in the atmosphere, EPA collaborates with the aluminum, magnesium, and semiconductor industries; the HCFC-22 industries; the electric utilities; and companies engaged in the mobile air-conditioning industry.

ENERGY STAR OVERVIEW

Energy efficiency is a proven, practical solution to the critical issues facing the United States and the global community. It is the lowest cost, fastest, and largest untapped answer for reducing GHG emissions in the near future. At the same time, greater efficiency of the nation's housing, buildings, and industries will help Americans meet today's energy and environmental challenges, while creating new jobs and stimulating the U.S. economy.

Since its inception by EPA in 1992, the ENERGY STAR program has helped drive investment in energy-efficient products, technologies, and practices that go well beyond existing appliance standards and building codes. EPA has used a variety of strategies to catalyze market transformation, including information dissemination; technical assistance; definition of specifications and verification of top performing products, buildings, and new homes; and recognition of organizations that have made substantial progress in reducing GHG emissions. In 1996, EPA partnered with DOE, which assumed responsibility for specific product categories.

Many homeowners, businesses, and other consumers rely on the ENERGY STAR program as a trusted source of unbiased information to help them lower their energy bills while fighting global climate change. The program benefits have grown steadily since 1992 and will continue to grow as consumers and businesses leverage the ENERGY STAR program and take steps to:

- Select efficient products in more than 60 product categories.
- Undertake home improvement retrofits.
- Buy efficient new homes.
- Improve the efficiency of public and private commercial buildings.
- Design efficient buildings.
- Improve the efficiency of industrial facilities.

Achievements in 2008

National Benefits

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

- **Financial Savings.** Americans saved about $18 billion on their utility bills across the residential, commercial, and industrial sectors (see Table 1, p. 3).
- **Energy Savings.** Americans avoided the need for about 190 billion kilowatt-hours (kWh) of electricity or almost 5 percent of the total 2008 U.S. electricity demand.
- **GHG Emissions Prevented.** Americans avoided 45 million metric tons of GHG emissions (see Table 5), equivalent to the GHG emissions from 29 million vehicles.

TABLE 5. ENERGY STAR Program Achievements Exceed Goals in 2008

	2008 ENERGY SAVED (BILLION KWH)		2008 EMISSIONS AVOIDED (MMTCE)		2009 ENERGY SAVED (BILLION KWH)	2009 EMISSIONS AVOIDED (MMTCE)
	GOAL	ACHIEVED	GOAL	ACHIEVED	GOAL	GOAL
All Qualified Products[1]	—	97.7	18.5	19.4	—	20.5
New Homes[2]	—	1.8	1.0	0.5	—	1.3
Commercial Building Improvements[3]	—	72.9	13.5	18.5	—	14.5
Industrial Improvements[4]	—	16.5	4.2	6.6	—	4.5
PROGRAM TOTAL for ENERGY STAR	**165**	**188.9**	**37.2**	**45.0**	**—**	**40.8**

ACHIEVEMENTS BY PRODUCT TYPE	2008 ENERGY SAVED (BILLION KWH)	2008 EMISSIONS AVOIDED (MMTCE)
Residential Products Total	**45.3**	**9.6**
Consumer Electronics[5]	19.2	3.6
Residential Appliances[6]	1.4	0.3
Residential Office Equipment	7.7	1.5
Lighting	9.1	1.7
Heating and Cooling	7.9	2.5
Commercial Products Total	**52.4**	**9.8**
Commercial Appliances	2.5	0.5
Office Equipment	39.8	7.6
Commercial Lighting	1.3	0.2
Other	8.8	1.5
CUMULATIVE TOTAL	**97.7**	**19.4**

[1]Results for qualified products from Homan et al., 2009. [2]Results for qualified homes from CPPD, 2009. [3]Results from building improvements based on methodology presented in Horowitz, 2009. [4]Electricity results from industrial improvements based on methodology presented in Horowitz, 2009. [5]A 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. [6]EPA results only, does not include products under the responsibility of DOE. Totals may not equal sum of components due to independent rounding.

—: Not applicable

Key Achievements by Program Focus

About 40 percent of the program benefits achieved in 2008 came from the purchase and use of ENERGY STAR qualifying products and new homes. Promoting improved energy management strategies for organizations in the commercial and industrial sectors accounted for the remaining 60 percent. Other key achievements in 2008 include:

- **ENERGY STAR Awareness.** Public awareness of the ENERGY STAR label rose to more than 75 percent.
- **Products.** U.S. consumers purchased more than 550 million ENERGY STAR qualified products for a total of more than 2.5 billion since 2000.[5]
- **Residential Buildings.** About 17 percent of all new homes built in 2008 were constructed to meet ENERGY STAR guidelines.[6] There was a grand total of nearly 940,000 homes and multifamily units constructed by the end of 2008. The number of whole home retrofits continued to grow; and new programs were rolled out to improve the installation of heating and cooling equipment.
- **Commercial Buildings.** To date, more than 2,400 organizations have joined EPA in the challenge to reduce energy use in their buildings by 10 percent or more; 16 percent of the nation's building space has been assessed for energy performance; more than 6,200 buildings have earned the ENERGY STAR for superior energy performance; and 130 new building design projects are Designed to Earn the ENERGY STAR.
- **Industrial Facilities.** EPA's ENERGY STAR Industrial Focuses expanded to include 16 sectors with the launch of a new Steelmaking Focus; participation in the peer exchange network increased by 30 percent; and 28 plants earned the ENERGY STAR, including eight for the first time, across three sectors—automobile manufacturing, cement manufacturing, and petroleum refining—bringing the total to 45.

Partnership-Driven Change

EPA now engages more than 15,000 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:

- **Manufacturers.** Over 2,400 manufacturers using the ENERGY STAR label to differentiate more than 40,000 individual product models across more than 60 product categories. These products can save consumers up to one-third on their annual total household energy bills (see Table 6, p. 16).
- **Retailers.** More than 1,000 retail partners bringing ENERGY STAR qualified products and educational information to their customers.
- **Builders.** More than 6,500 builder partners constructing new homes that qualify for the ENERGY STAR in every state and the District of Columbia—saving homeowners money while maintaining high levels of comfort.
- **Building and Facility Owners.** Nearly 2,500 private businesses, public sector organizations, and industrial facilities investing in energy efficiency and reducing energy use in their buildings and facilities.
- **Energy Efficiency Program Sponsors.** More than 40 states, 550 utilities, and many other energy efficiency program sponsors leveraging ENERGY STAR resources to improve the efficiency of commercial buildings, industrial facilities, and homes.
- **Other Partners.** Hundreds of energy service providers, energy raters, financial institutions, architects, and building engineers making energy efficiency more widely available through ENERGY STAR—providing additional value to their customers.
- **Environmental Leaders.** EPA and DOE recognizing the outstanding commitments of 89 partners at the 2008 Partner of the Year Awards (see Figure 6, p. 17).

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[5] *Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.*

[6] *Single family site-built new homes.*

TABLE 6. Average Consumer Energy Savings of ENERGY STAR Qualified Products

ENERGY STAR PRODUCT CATEGORY	AVERAGE ENERGY SAVINGS** ABOVE STANDARD PRODUCT
OFFICE	
Monitors	35-65%
Computers	20-50%
Fax machines	40%
Copiers	20%
Multifunction devices	20-55%
Scanners	10%
Printers	10-35%
CONSUMER ELECTRONICS	
TVs	20%
VCRs	55%
TVs/DVDs/VCRs	35%
DVD products	35%
Audio equipment	30%
Telephony	55%
Digital-to-analog converter (DTA)	50%
External power adapters	5%
Battery charging systems	30%
Set-top boxes	30%
HVAC	
Furnaces	10%
Central air conditioners	10%
Air source heat pumps	10%
Geothermal heat pumps	30%
Boilers	5%
Programmable thermostats	N/A
Light commercial HVAC	5%

ENERGY STAR PRODUCT CATEGORY	AVERAGE ENERGY SAVINGS** ABOVE STANDARD PRODUCT
LIGHTING	
Compact fluorescent light bulbs (CFLs)*	75%
Decorative light strings	70%
Residential light fixtures	75%
RESIDENTIAL APPLIANCES	
Room air conditioners*	10%
Dehumidifiers	15%
Room air cleaners	40%
Exhaust fans	70%
Ceiling fans	50%
Dishwashers*	15%
Refrigerators and freezers*	15%
Clothes washers*	30%
COMMERCIAL APPLIANCES	
Water coolers	45%
Commercial solid door refrigerators and freezers	35%
Commercial hot food holding cabinets	65%
Commercial fryers	20%
Commercial steamers	50%
Vending machines	40%
HOME ENVELOPE	
Insulation/Sealing	N/A
Roof	N/A
Windows, doors, and skylights*	N/A

** DOE managed products.*

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

N/A: Not available

FIGURE 6. ENERGY STAR Award Winners

To learn more about these award winners and their great accomplishments, see *Profiles in Leadership: 2009 ENERGY STAR Award Winners.**

SUSTAINED EXCELLENCE

3M
St. Paul, MN

Advantage IQ, Inc.
Spokane, WA

Anderson/Vanguard Homes, Inc.
Cary, NC

Austin Energy
Austin, TX

Building Owners & Managers Association (BOMA) International
Washington, DC

CalPortland Company
Glendora, CA

CenterPoint Energy
Houston, TX

Food Lion, LLC
Salisbury, NC

Ford Motor Company
Dearborn, MI

GE Consumer & Industrial
Louisville, KY

Giant Eagle Incorporated
Pittsburgh, PA

Gorell Enterprises, Inc.
Indiana, PA

Gresham-Barlow School District
Gresham, OR

Hines
Houston, TX

J. C. Penney Company, Inc.
Plano, TX

Marriott International, Inc.
Washington, DC

Merck & Co., Inc.
Whitehouse Station, NJ

National Grid
Waltham, MA

Nevada ENERGY STAR Partners
Las Vegas, NV

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

Northeast ENERGY STAR Products Initiative
Lexington, MA

Oncor
Dallas, TX

OSRAM SYLVANIA
Danvers, MA

Pacific Gas and Electric Company
San Francisco, CA

Pella Corporation
Pella, IA

PepsiCo, Inc.
Purchase, NY

ProVia Door
Sugarcreek, OH

Providence Health & Services
Renton, WA

Raytheon Company
Waltham, MA

Sea Gull Lighting Products LLC
Riverside, NJ

Southern California Edison Company
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

Winton/Flair Custom Homes
El Paso, TX

Wisconsin Focus on Energy
Madison, WI

PARTNER OF THE YEAR

Akridge
Washington, DC

Arizona Public Service
Phoenix, AZ

ArcelorMittal USA
Chicago, IL

Bosch Home Appliances
Huntington Beach, CA

CB Richard Ellis, Inc.
Los Angeles, CA

CEMEX USA
Houston, TX

Colorado Governor's Energy Office
Denver, CO

Council Rock School District
Newtown, PA

Energy Education
Dallas, TX

Energy Inspectors Corporation
Las Vegas, NV

EnergyLogic
Berthoud, CO

Energy Trust of Oregon, Inc.
Portland, OR

Fox Energy Specialists
Fort Worth, TX

ITW Food Equipment Group - North America
Troy, OH

The Joint Management Committee representing Massachusetts New Homes with ENERGY STAR
Massachusetts

Kennedy Associates Real Estate Investment Advisors
Seattle, WA

Kimberly-Clark Corporation
Irving, TX

Lowe's Companies, Inc.
Mooresville, NC

MaxLite
Fairfield, NJ

Nash-Rocky Mount Public Schools
Nashville, NC

NJBPU, New Jersey's Clean Energy Program
Newark, NJ

Northwest Energy Efficiency Alliance
Portland, OR

Puget Sound Energy
Bellevue, WA

Rocky Mountain Power, a Division of PacifiCorp
Salt Lake City, UT

Saint-Gobain
Valley Forge, PA

Satco Products, Inc. featuring Nuvo Lighting
Brentwood, NY

Schering-Plough Corporation
Kenilworth, NJ

SENERCON
El Paso, TX

Servidyne
Atlanta, GA

Southern Energy Management
Morrisville, NC

Sunoco, Inc.
Philadelphia, PA

Technical Consumer Products, Inc.
Aurora, OH

TIAA-CREF
New York, NY

Whitefish Bay School District
Whitefish Bay, WI

Xcel Energy
Minneapolis, MN

AWARDS FOR EXCELLENCE

Actus Lend Lease
Nashville, TN

Best Buy Co., Inc.
Richfield, MN

Blue Hills Community Services
Kansas City, MO

City of Topeka, Housing & Neighborhood Development
Topeka, KS

CoStar Group, Inc.
Bethesda, MD

Energy Kinetics, Inc.
Lebanon, NJ

Georgia Power
Atlanta, GA

Ithaca Housing Authority
Ithaca, NY

Ivey Residential, LLC
Augusta, GA

KB Home
Los Angeles, CA

Maryland Energy Administration
Annapolis, MD

Menards
Eau Claire, WI

Nashville Area Habitat for Humanity
Nashville, TN

Nationwide Marketing Group
Winston-Salem, NC

Samsung Electronics Co., Ltd.
Suwon, Korea

Seattle Lighting and DestinationLighting.com
Seattle, WA

Vietnamese American Initiative for Development, Inc.
Dorchester, MA

*For more information, see http://www.energystar.gov/ia/partners/pt_awards/2009_profiles_in_leadership.pdf.

ENERGY STAR QUALIFIED PRODUCTS

Recognized by an ever-growing number of consumers, ENERGY STAR continues to be the trusted symbol of energy efficiency, as demonstrated by increasing sales of ENERGY STAR qualified products. Americans purchased about 550 million ENERGY STAR qualified products in 2008—across more than 60 product categories—for a cumulative total of more than 2.5 billion products since 2000 (see Figure 7, p. 20). These products offer consumers energy savings of as much as 75 percent compared with standard models. Key activities in 2008 included:

- Updating specifications for 10 product categories (see Table 7).
- Educating consumers on the benefits and availability of ENERGY STAR qualified products.
- Supporting and developing key partnerships with energy efficiency program sponsors, lighting showrooms, and retailers.
- Monitoring and protecting the use of the ENERGY STAR label.

Table 7. ENERGY STAR Product Specifications Added, Revised, and in Progress

PRODUCT CATEGORY	YEAR INTRODUCED (AND REVISED)	RESPONSIBLE AGENCY	STATUS OF ACTIVITY IN 2008
2008 REVISIONS COMPLETED			
External Power Adapters	2005 (2008)	EPA	Revision completed. Revised specification took effect November 1, 2008.
Televisions	1998 (2002, 2004, 2005, 2008)	EPA	New specification took effect November 1, 2008.
Telephony	2002 (2004, 2006, 2008)	EPA	Revision completed. Revised specification took effect November 1, 2008.
Imaging Products	2007 (2009)	EPA	Revision completed. Revised specification to take effect July 1, 2009.
Set-top Boxes	2001 (2005, 2009)	EPA	Revision completed. Revised specification to take effect January 1, 2009.
Computers	1992 (1995, 1999, 2000, 2007, 2009)	EPA	Revision completed. Revised specification to take effect July 1, 2009.
Furnaces	1995 (2006, 2008)	EPA	Revision completed. Revised specification took effect October 1, 2008.
2008 REVISIONS IN PROGRESS			
Commercial Solid Door Frig/Freezer	2001 (2003)	EPA	Revision initiated in 2007.
Monitors/Displays	1992 (1995, 1998, 1999, 2005, 2006)	EPA	In progress, expected to be complete in 2009.
Programmable Thermostats	1995	EPA	In progress, current specification scheduled to be sunsetted December 31, 2009.
Ventilation Fans	2001 (2003)	EPA	Revision initiated in 2007, expected to be complete in 2009.
Game Consoles	2007	EPA	In progress, expected to be complete in 2010.
NEW SPECIFICATIONS IN DEVELOPMENT			
Commercial Griddles		EPA	New specification to be completed in 2009.
Commercial Glass Door Frig/Freezer		EPA	New specification to be completed in 2009.
Commercial Ovens		EPA	New specification to be completed in 2009.
Lab Grade Frig/Freezer		EPA	New specification to be completed in 2009.
Enterprise Servers		EPA	New specification to be completed in 2009.
SPECIFICATIONS SUNSETTED			
Exit Signs	1996	EPA	Due to successful transformation of market, specification was sunsetted in 2008.
VCRs	1998	EPA	Due to changes in the market, specification was sunsetted November 1, 2008.

Achievements in 2008

Raising the Bar for ENERGY STAR

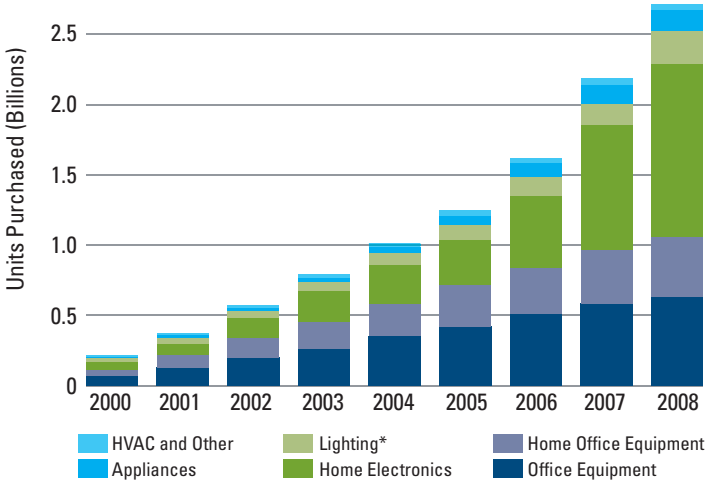
EPA increased the stringency for seven ENERGY STAR specifications: set-top boxes, TVs, imaging products, computers, external power adapters, telephony, and furnaces.

- **Set-top Boxes.** EPA revised specifications for set-top boxes. Cable, satellite, and telecom set-top boxes that can now earn the ENERGY STAR are at least 30 percent more efficient than conventional models. In conjunction with the new specification for set-top boxes, EPA launched a partnership with cable, satellite, and telecommunications companies that deliver content to consumers. As ENERGY STAR partners, these companies agreed to improve the energy efficiency of a significant number of set-top boxes by offering qualified boxes to subscribers or by upgrading boxes already in homes. If all set-top boxes sold in the

United States met the new ENERGY STAR requirements, the savings in energy costs would grow to about $2 billion each year and GHG emissions would be reduced by the equivalent of those from about 2.5 million vehicles.

- **TVs.** EPA finalized an important enhancement to the ENERGY STAR specification for TVs, ensuring that qualified models save energy not only while they are off, but also when they are on. The potential savings from this program update are substantial: if all TVs sold in the United States met these ENERGY STAR requirements, the savings in energy costs would grow to about $1 billion annually and the reductions in GHG emissions would grow to the equivalent of the emissions from about one million vehicles.
- **Imaging Products.** Revisions to the ENERGY STAR specification for imaging products—including printers, copiers, scanners, fax machines, and all-in-one devices—delivered an average 14-percent improvement in energy efficiency compared to previously qualified models. If all imaging products sold in the United States met the new specification, consumers would save nearly $500 million a year in energy costs and prevent GHG emissions equivalent to those from more than 500,000 vehicles.
- **Computers.** EPA capitalized on the rapidly evolving computer market, further increasing the stringency of the ENERGY STAR specification for desktop and notebook (or laptop) computers, integrated computer systems, desktop-derived servers, and workstations, ensuring that the label continues to designate top performers. If all computers sold in the United States met the new requirements, the savings in energy costs would grow to more than $2 billion each year and prevent GHG emissions equivalent to the emissions from more than 3 million vehicles.
- **External Power Adapters.** EPA finalized revisions to specifications for external power adapters. Consumers can now purchase a growing number of products that are packaged with qualified power adapters, which are on average 30 percent more efficient than conventional models. If all external power adapters sold in the United States met the revised specifications, consumers would save more than $2 billion each year and prevent GHG emissions equivalent to those from more than 1.5 million vehicles.

FIGURE 7. More Than 2.5 Billion ENERGY STAR Qualified Products Purchased Since 2000



*Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.

- In addition, EPA made significant progress in updating specifications for displays, commercial solid door refrigerators/freezers, and ventilation fans.

Empowering Consumers

The success of the ENERGY STAR program depends on the public's awareness of both the financial and environmental benefits of ENERGY STAR qualified products, homes, and buildings. Each year, EPA engages in public outreach campaigns to help raise awareness of ENERGY STAR and these benefits. In 2008:

- EPA-managed ENERGY STAR national campaigns (see sidebar, p. 21) and public service announcements (PSAs) reached millions of people through TV, magazine, radio, and online media outlets, and articles mentioning ENERGY STAR had a reach of more than one billion readers.
- More than 75 percent of American households recognized the ENERGY STAR label (see Figure 8).[7]
- More than 35 percent of American households knowingly purchased an ENERGY STAR qualified product and more than 75 percent of these households reported being favorably influenced by the ENERGY STAR label and/or likely to recommend ENERGY STAR products to their friends.[7]
- The ENERGY STAR Web site experienced impressive growth; visitor sessions reached 11 million, up from 10 million in 2007.

[7] *For more information, see U.S. EPA, 2009b.*

Fostering Partnerships

Partnerships with many types of organizations are critical to the success of the ENERGY STAR program. These partners not only offer ENERGY STAR qualified products in the marketplace, but also educate consumers on a broad range of energy-saving steps and provide incentives for purchasing energy-efficient products. Highlights of these partnerships include:

- **Energy Efficiency Program Sponsors.** Many utilities and other energy efficiency program sponsors (EEPS) are leveraging ENERGY STAR products and campaigns to help their customers control energy costs, all while meeting regional energy system needs. These include reducing peak demand, delaying or avoiding the need to build new power plants, and emitting fewer GHGs. To date more than 550 utilities and other program sponsors servicing 75 percent of U.S. households have partnered with ENERGY STAR to deliver an increasingly broad portfolio of offerings to their customers. Education about ENERGY STAR is now incorporated in energy efficiency programs in all 50 states, the District of Columbia, and U.S. territories. Significant progress was made with partnerships in the areas of commercial food service equipment, residential light fixtures, and the Change the World, Start with ENERGY STAR campaign.
- **Lighting Showrooms.** EPA worked closely with lighting showroom partners to increase information available to consumers in the important product area of ENERGY STAR qualified light fixtures and fans, with an emphasis on residential construction projects in the Pacific Northwest. These efforts included providing key information to partner showroom sales staff and representatives serving local builders, training the Seattle-area builders, assisting local showrooms and

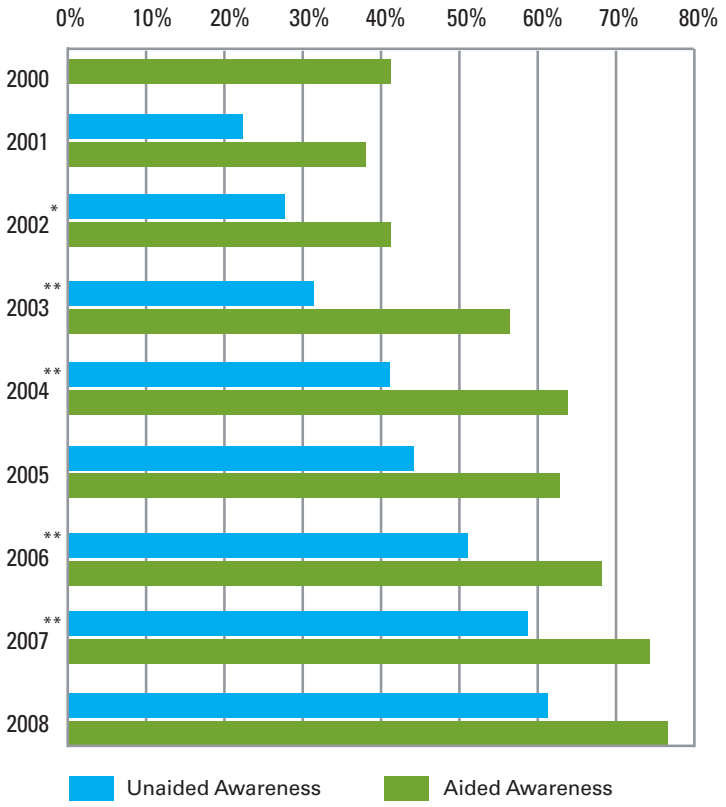
Change the World, Start with ENERGY STAR Campaign

Building on the success of the ENERGY STAR Change a Light, Change the World campaign, EPA launched Change the World, Start with ENERGY STAR in 2008. This national campaign challenged Americans to pledge to make energy-efficient choices at home that help fight global climate change. People who took the ENERGY STAR pledge committed to:

- Choosing ENERGY STAR qualified appliances and electronics.
- Maintaining home heating and cooling systems to improve efficiency.
- Ensuring homes are well sealed and insulated.
- Enabling power management features on home computers and monitors.

Featuring a six-city tour of an energy-efficient home exhibit, the campaign message reached 28 million people and generated nearly 500,000 new pledges, equivalent to individual actions that could save up to 800 million pounds of GHG emissions.

FIGURE 8. Awareness of ENERGY STAR Growing in the United States



** Unaided annual result is statistically different from the result of the prior year.*

*** Aided and unaided annual results are statistically different from the results of the prior year.*

their builder customers in developing lighting plans for model homes, and helping create a media event to highlight the installations.

- **Retailers.** The nation's retailers continue to be one of the largest sources of information on ENERGY STAR products for consumers. Sixty-five percent of households have been exposed to the ENERGY STAR on store displays[8]—making retail partnerships critical not just for consumer access to ENERGY STAR products, but also for consumer education. EPA works with key retailers to help them gain ever greater traction for ENERGY STAR with shoppers. In 2008, retailers made significant progress in increasing ENERGY STAR electronic retailing—e-tailing—and grew their online sales, particularly with enthusiastic support from partners Lowe's, Best Buy, Menards, and Amazon.com.

Protecting the Value of ENERGY STAR

The ENERGY STAR identity is a valuable asset, and the mark must be properly used and protected to ensure the integrity and value of ENERGY STAR. EPA takes a number of measures to maintain the integrity of the brand so that consumers will continue to trust ENERGY STAR as a source of unbiased information about energy efficiency.[9]

Key accomplishments included:

- Perfoming numerous onsite retail store-level assessments of product shelf inventory; reviewed more than 3,200 unique product models for labeling violations; and identified eight violations during the retail store level assessments.
- Negotiating agreements with the Home Ventilating Institute (HVI), Air Movement & Control Association (AMCA), and Association of Home Appliance Manufacturers (AHAM) to leverage existing testing of ENERGY STAR products through their third-party certification and verification programs.
- Developing a new verification testing requirement for computer manufacturers, which will mandate impartial testing of ENERGY STAR qualified products in accredited laboratories on an annual basis.
- Conducting verification testing for digital TV adapters (DTAs) and computers.
- Completing two rounds of quality assurance testing for light fixtures.

What To Expect in 2009 and Beyond

New Qualified Products

EPA will continue to expand the list of ENERGY STAR qualified products by introducing new product categories, initiating new product specification development activities, and looking for new product categories that meet the core ENERGY STAR principles. New specifications will cover enterprise servers, commercial griddles, commercial glass door refrigerators/freezers, lab grade refrigerators/freezers, and commercial ovens. EPA will also begin discussions with key stakeholders on the specifications for data center storage devices and home network equipment.

Specification Revisions

EPA will again raise the bar on many common products by revising ENERGY STAR specifications to make them even more efficient. EPA will finalize revisions for nine product categories—computers; displays; TVs; audio/video products; game consoles; light commercial heating, ventilating, and air conditioning equipment; geothermal heat pumps; ventilation fans; and commercial food-grade refrigerators. The Agency will also make important advances in the specification process for enterprise servers, programmable thermostats, residential furnaces, and water coolers.

Partnerships

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, household appliances, commercial food service equipment, office equipment, and heating and cooling products. The Agency expects more than 300 million ENERGY STAR qualified products to be sold each year for the foreseeable future.[10]

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[8] *For more information, see http://www.cee1.org/eval/2008_ES_survey_rep.pdf.*

[9] *For more information, see* Maintaining the Value of ENERGY STAR.

[10] *Number of products above does not include individual compact fluorescent bulbs.*

Integrity

EPA will continue to ensure the integrity of ENERGY STAR by implementing a range of monitoring measures:

- Completing two sets of retail store-level assessments to evaluate the use of the ENERGY STAR label and the consumer experience at the point of purchase.
- Coordinating testing with a third-party certification program for exhaust fans and dehumidifiers.
- Finalizing verification testing requirements for computer manufacturers.
- Verification testing of select electronics products.
- Increasing quality assurance testing for light fixtures.

In addition, EPA will initiate a peer review to evaluate the methodologies and assumptions used to calculate the benefits associated with ENERGY STAR products, thus further strengthening the value and integrity of the program.

About ENERGY STAR Product Specification Revisions

When the ENERGY STAR program was established in 1992, EPA offered the label for two products—computers and monitors. Since then, the program has grown to include more than 60 product categories. Through the ENERGY STAR program, EPA provides value to consumers by enabling them to easily identify energy-efficient products. To achieve this, EPA sets specifications that may only be met by the most efficient products. For a product to qualify for the ENERGY STAR label, it must meet a unique set of specifications to guarantee that the product:

- Is energy-efficient
- Is cost-effective
- Maintains product performance or features

Revising ENERGY STAR Specifications

While EPA continues to expand its suite of labeled products, it also revises numerous specifications to ensure that the ENERGY STAR label remains meaningful to consumers. Over the years, specifications for the majority of the product categories have been revised to achieve additional energy savings (see Table 8). Each year, EPA reviews current product specifications and carefully considers the following questions to assess whether a specification revision is appropriate:

- Can significant additional energy savings be realized nationally?
- Can energy consumption and performance be measured and verified with testing?
- Can product or service performance be maintained or enhanced with increased energy efficiency?
- Will purchasers be able to recover an additional investment in increased energy efficiency within a brief period of time?
- Can additional energy efficiency be achieved without unjustly favoring one technology?
- Will ENERGY STAR labeling effectively differentiate products and services and be visible to purchasers?

EPA carefully weighs these questions to decide which products warrant specification revisions.

TABLE 8. EPA Maintains Efficiency Standards With 125 Product Specifications and Revisions

PRODUCT TYPE	NUMBER OF PRODUCT CATEGORIES	TOTAL NUMBER OF SPECIFICATIONS	SPECIFICATIONS ≤ 3 YEARS OLD AS OF DECEMBER 2008	SPECIFICATIONS IN PROCESS OF REVISION IN 2008
Consumer Electronics	11	30	9	1
Office Equipment	9	33	9	1
HVAC	9	21	5	1
Commercial Food Service Equipment	9	6	2	1
Lighting	5	18	5	—
Building Envelope	2	5	1	—
Appliances	2	5	3	—
Other	3	7	3	1

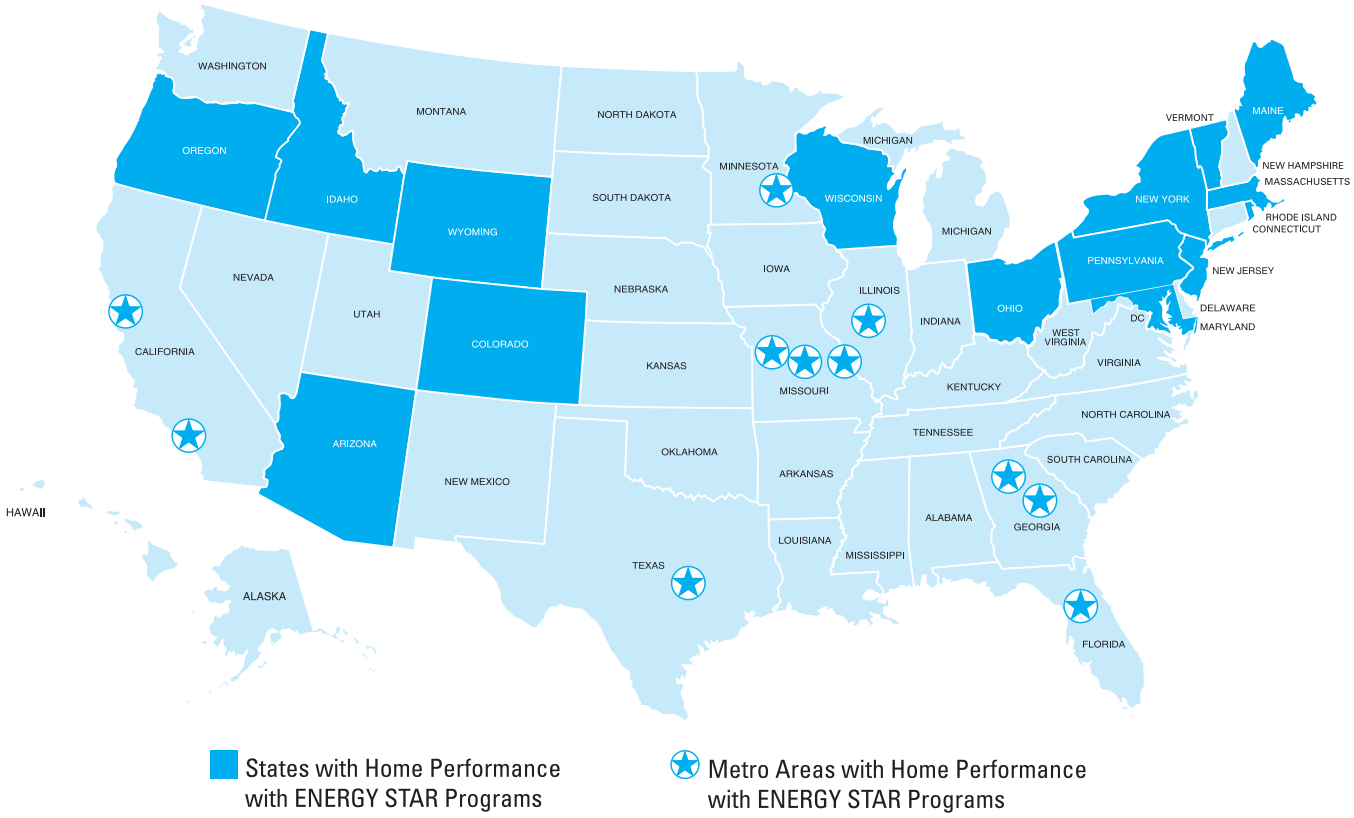
—: Not applicable

ENERGY STAR IN THE RESIDENTIAL SECTOR

The energy used in homes currently accounts for nearly 17 percent of U.S. GHG emissions. To help meet the nation's goal of improving energy efficiency and reducing emissions, it is critical for the building and contracting industry, homeowners, and renters to make every effort to reduce the energy used in homes. Through ENERGY STAR, EPA offers many tools and resources to help households and the housing industry learn how to increase energy efficiency. Key 2008 program highlights included:

- More than 100,000 ENERGY STAR qualified homes were built in 2008—over 17 percent of all new homes built in 2008—bringing the total number of qualified homes nationwide to nearly 940,000.
- More than 12,000 homes were retrofitted through Home Performance with ENERGY STAR in 2008, for a total of over 50,000 homes across more than 25 states or regions of the country.
- More than 6,500 builders were active ENERGY STAR partners in 2008.
- Several national production builders committed to building 100 percent of their homes to meet ENERGY STAR guidelines.

FIGURE 9. Home Performance with ENERGY STAR Spreads Across the Country



Achievements in 2008

ENERGY STAR Home Improvement

Low-cost efficiency improvements in an existing home that go beyond simply choosing energy-efficient products can save households between 20 and 30 percent on their energy bills—or $450 to $650 per year—while improving the comfort, indoor air quality, value, and safety of their homes. Since 2001, EPA has designed programs that help households capture the benefits of reducing home energy consumption. EPA offers a range of tools and resources for consumers to learn about their home improvement options. EPA also works with utilities and other program sponsors who provide incentives and training so that more and more households can take advantage of improving home energy efficiency.

Expanding Home Performance with ENERGY STAR. Home Performance with ENERGY STAR (HPwES) is a defined service for comprehensive, whole-house energy efficiency improvements through a network of contractors trained in whole-house assessments. Regional HPwES sponsors are responsible for the third-party quality review of the contractors' work. Over the past 8 years, EPA has worked with sponsoring partners such as state energy offices, utilities, and not-for-profits to implement HPwES in more than 25 markets (see Figure 9). By the end of 2008, over 50,000 homes had been retrofitted through HPwES programs.

In 2008, EPA recognized more than 20 HPwES contractors with the ENERGY STAR Century Club awards for each completing 100 or more home performance jobs. In addition, EPA and DOE hosted the National HPwES Symposium, which brought the program's diverse sponsors together for the fifth consecutive year to share valuable lessons and discuss ways to expand the delivery of HPwES. Representatives from more than 32 states and Canada participated, demonstrating the growing interest in HPwES as a solution for improving the efficiency of existing homes.

Launching ENERGY STAR HVAC Quality Installation Guidelines. EPA estimates that more than one-half of all air conditioners in U.S. homes underperform by as much as 30 percent due to improper installation. Launched by EPA in 2008, ENERGY STAR HVAC Quality Installation uses guidelines approved by the American National Standards Institute (ANSI)—developed through the Air Conditioning Contractors of America (ACCA)—to help ensure that consumers receive a properly sized heating, ventilating, and air conditioning (HVAC) system with sealed ducts, proper refrigerant charge, and optimized air flow. EPA partnered with utilities to implement this program in four markets.

Offering Home Energy Online Assessment Tools. EPA updated its key home improvement assessment tools by making it easier than ever for homeowners to use the ENERGY STAR Home Energy Yardstick to assess the current efficiency of their home (on a scale of 1 to 10). The Home Energy Yardstick now links users directly to the ENERGY STAR Home Advisor, which offers customized recommendations on boosting a home's energy efficiency based on its location. Through 2008, the Home Energy Yardstick had about 200,000 visitor sessions and the Home Advisor was completed by nearly 70,000 users.

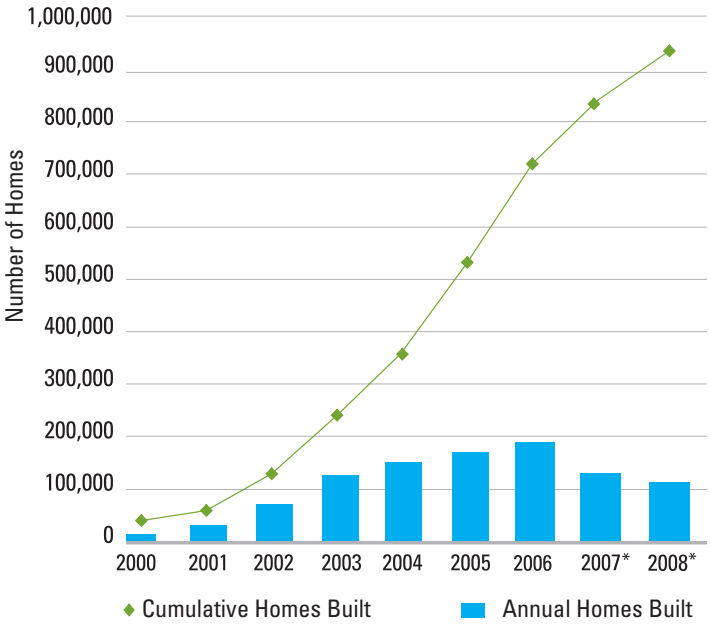
EPA also launched a new online quiz to educate homeowners about best practices for maintaining their home's HVAC system. Users are first asked how they currently maintain their system. Based on the answers, the interactive quiz encourages them to implement additional best practices to help keep the HVAC system operating efficiently. By acting on these recommendations, homeowners can save as much as 20 percent on their annual energy bills.

These online tools complement EPA's ENERGY STAR @ home interactive tool and two popular print resources: the *Guide to Energy Efficient Heating and Cooling* and the *Do-It-Yourself Guide to Sealing and Insulating* (downloadable from energystar.gov/publications)—giving consumers a variety of helpful, easy-to-use resources whenever they need them.

ENERGY STAR for New Homes

Building efficiency into homes when they are being constructed is one of the lowest cost options for improving residential building efficiency across the country. ENERGY STAR qualified homes offer buyers comfortable homes that are 20 to 30 percent more efficient than those built to code. The annual savings from lower energy bills can more than offset the slightly higher mortgage some buyers may have in order to pay for the built-in efficiency improvements.

FIGURE 10. More than 940,000 Homes Nationwide Bear the ENERGY STAR Label



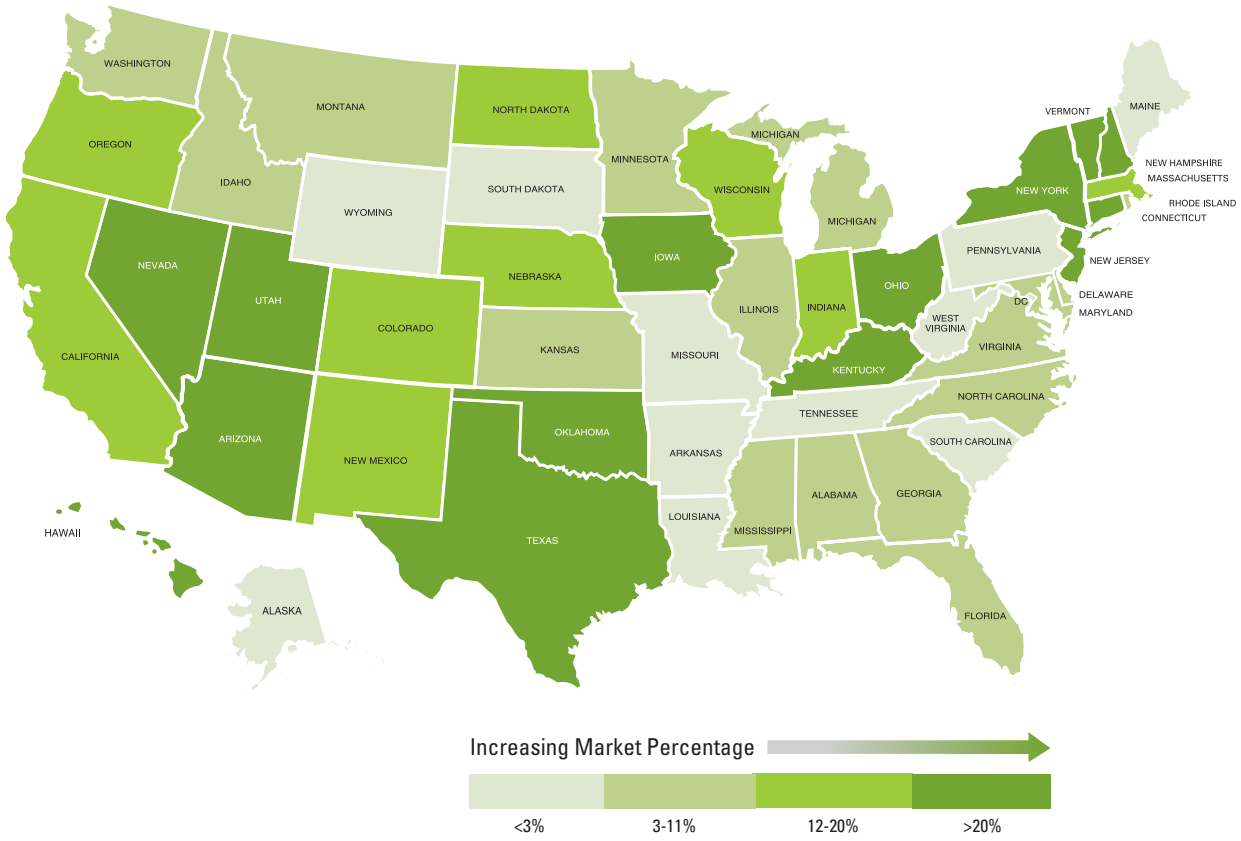
**Reflects transition to more stringent specification and slow down in U.S. housing starts.*

Success continued for ENERGY STAR for New Homes in 2008, despite the downturn in the new housing market, as described below and shown in Figures 10 and 11.

Growing Outreach Partnerships. Through the Outreach Partnership, ENERGY STAR partners pool their advertising resources to increase consumer demand for ENERGY STAR qualified homes in their market and enable participating builders to distinguish themselves as environmental and energy efficiency leaders. EPA, in turn, offers a host of materials and support to help these partners implement a robust advertising campaign. In 2008, Outreach Partnership activities were organized in nearly 40 markets, with more than 1,000 participating partners—a record number. Across all markets, partners contributed more than $2 million to support outreach efforts.

Partnering with Affordable Housing Stakeholders. As part of its ongoing efforts to improve access to energy-efficient new homes for lower income families, EPA has formed partnerships with affordable housing stakeholders at the federal, state, and local levels:

FIGURE 11. ENERGY STAR Qualified New Homes Gaining Market Share



- **Housing Finance Agencies.** In 2008, EPA's ENERGY STAR program provided 28 state housing finance agencies (HFAs) with recommendations and cost/benefit analyses to help them include energy efficiency measures in their criteria for competitively allocating low-income housing tax credits (LIHTC) to affordable housing developers. By the end of 2008, at least seven state HFAs—Connecticut, Delaware, Nevada, New Jersey, Pennsylvania, Utah, and Washington—required that all new homes funded via LIHTC programs meet or exceed ENERGY STAR qualified home guidelines. This represents the annual construction of more than 7,500 new affordable housing units.
- **Federal Agencies.** EPA partnered with DOE and the U.S. Department of Housing and Urban Development (HUD) to implement an Energy Action Plan that will reduce energy consumption in HUD-funded and HUD-insured housing. HUD promotes the construction of ENERGY STAR qualified homes in its various grant programs, including its Community Development Block Grant (CDBG) and HOME programs. In 2008, more than 6,000 ENERGY STAR qualified homes were built using CDBG or HOME funds. Of all the homes constructed using HOME funds, 35 percent earned the ENERGY STAR.
- **Habitat for Humanity International.** Habitat for Humanity (HFH) International has made the ENERGY STAR guidelines for new homes part of its recommended construction specifications for all HFH affiliates. Together, more than 300 HFH affiliates constructed over 1,100 ENERGY STAR qualified homes in 2008.

Piloting an ENERGY STAR Mortgage Program. In 2008, EPA launched the ENERGY STAR Mortgage Program in Maine and Colorado, a pilot study to offer financing for the purchase of a new home or for making energy efficiency improvements in existing homes. EPA's ENERGY STAR Mortgage Program—developed in collaboration with DOE, the Energy Programs Consortium, state energy and housing agencies, and the Ford and Surdna Foundations—allows qualified borrowers to incorporate the cost of energy efficiency improvements as part of their mortgage, while providing them with reduced borrowing costs such as a lower interest rate or reduced

closing costs. To qualify, borrowers must be in the process of purchasing an ENERGY STAR qualified home or making energy efficiency improvements to their home via an HPwES program or a Weatherization Assistance Program. Lenders are required to undergo a third-party review, approval, and oversight process to participate.

What To Expect in 2009 and Beyond

Home Improvement

- ARRA provides over $18 billion in energy efficiency funding. HPwES can help recipients of ARRA funding create jobs, save energy, and build energy efficiency infrastructure for the long term through the expansion of job opportunities for contractors. This capital, coupled with new federal tax credits for homeowner energy efficiency investments, creates an environment that can help HPwES expand its reach in 2009 and beyond.
- EPA forecasts that more than 20,000 additional homes will be improved through HPwES in 2009, bringing the total number of retrofitted homes nationwide to nearly 70,000.
- EPA expects to launch seven new HPwES programs in California, Delaware, Iowa, New Hampshire, North Carolina, Texas, and Virginia.
- EPA will pilot a new approach to implementing HPwES by partnering directly with home performance contractors. The proposed pilot market will be the northern Virginia suburbs of Washington, DC. If successful, the pilot program will allow HPwES to tap the private sector and expand to meet market demand instead of relying heavily on public funding.

New Homes

- EPA forecasts that market share for ENERGY STAR qualified homes will approach 20 percent in 2009 and that the one millionth ENERGY STAR home will be constructed in 2009.
- To ensure that ENERGY STAR continues to represent a meaningful improvement in efficiency over homes that are built to code and standard practices, EPA will finalize new, more rigorous guidelines for ENERGY STAR qualified new homes in 2009. These third-generation guidelines will become fully effective in January 2011.
- EPA will continue to explore more stringent versions of an ENERGY STAR qualified home as a roadmap to future specifications.

ENERGY STAR IN THE COMMERCIAL SECTOR

Commercial buildings now have a lead role in the nation's urgent effort to reduce energy consumption, create new jobs, and fight global climate change because commercial buildings use nearly 20 percent of the total energy consumed in the United States and add almost the same proportion of GHG emissions to the atmosphere. Through the ENERGY STAR program, EPA is establishing a new paradigm for building owners to reduce building energy use, save money, and protect the environment. EPA also offers recognition opportunities to showcase their energy efficiency achievements.

In 2008, with the help of ENERGY STAR, partners in the commercial building sector made great strides in improving energy efficiency. These gains contributed directly to reducing the nation's GHG emissions. Key program highlights included:

- More than 500 new commercial and public organizations joined ENERGY STAR, for a total of almost 2,500 partners.
- Nearly 3,300 buildings met EPA's high-efficiency criteria and earned the ENERGY STAR, for a total of more than 6,200.
- More than 25 partners earned ENERGY STAR recognition for achieving important energy-saving milestones of 10, 20, or 30 percent across their entire portfolio of buildings, bringing the total to 65.
- More than 75 new building projects achieved Designed to Earn the ENERGY STAR, for a total of 130.

Achievements in 2008

Growing National Commitment to Energy Efficiency

More commercial and industrial organizations than ever before chose to partner with EPA in 2008 as an important step toward improving energy efficiency and lowering energy costs.

- Over 500 commercial and public organizations joined ENERGY STAR—about triple the new partners in any previous year—committing more than 2 billion square feet of floor space to be assessed and improved.
- More than 25 utilities or other energy efficiency program sponsors (EEPS) joined ENERGY STAR, bringing the total to about 120. These EEPS, along with more than 1,900 Service and Product Providers (SPPs), offered their customers valuable energy efficiency services that incorporate ENERGY STAR tools and resources. SPPs assisted more than 1,200 client buildings in earning the ENERGY STAR and supported almost 1,100 client buildings in making at least a 10-point energy performance improvement during the year.
- Nearly 1,800 new participants joined either the ENERGY STAR Congregations or Small Business Networks, bringing total participation to more than 5,000 members in both networks.

Energy Performance Ratings: Driving Improvement

Benchmarking energy use is an important first step in assessing a building's energy performance for a given year and measuring the results of ongoing efforts to improve energy efficiency. EPA's online energy management tool, Portfolio Manager, enables building owners and managers to measure and benchmark the energy use of individual commercial buildings, rate all eligible buildings' energy efficiency on a scale of 1 to 100 against a database of similar buildings nationwide, track energy performance over time as improvements are made, and target investments in

FIGURE 12. Amount of Rated Floor Space by State

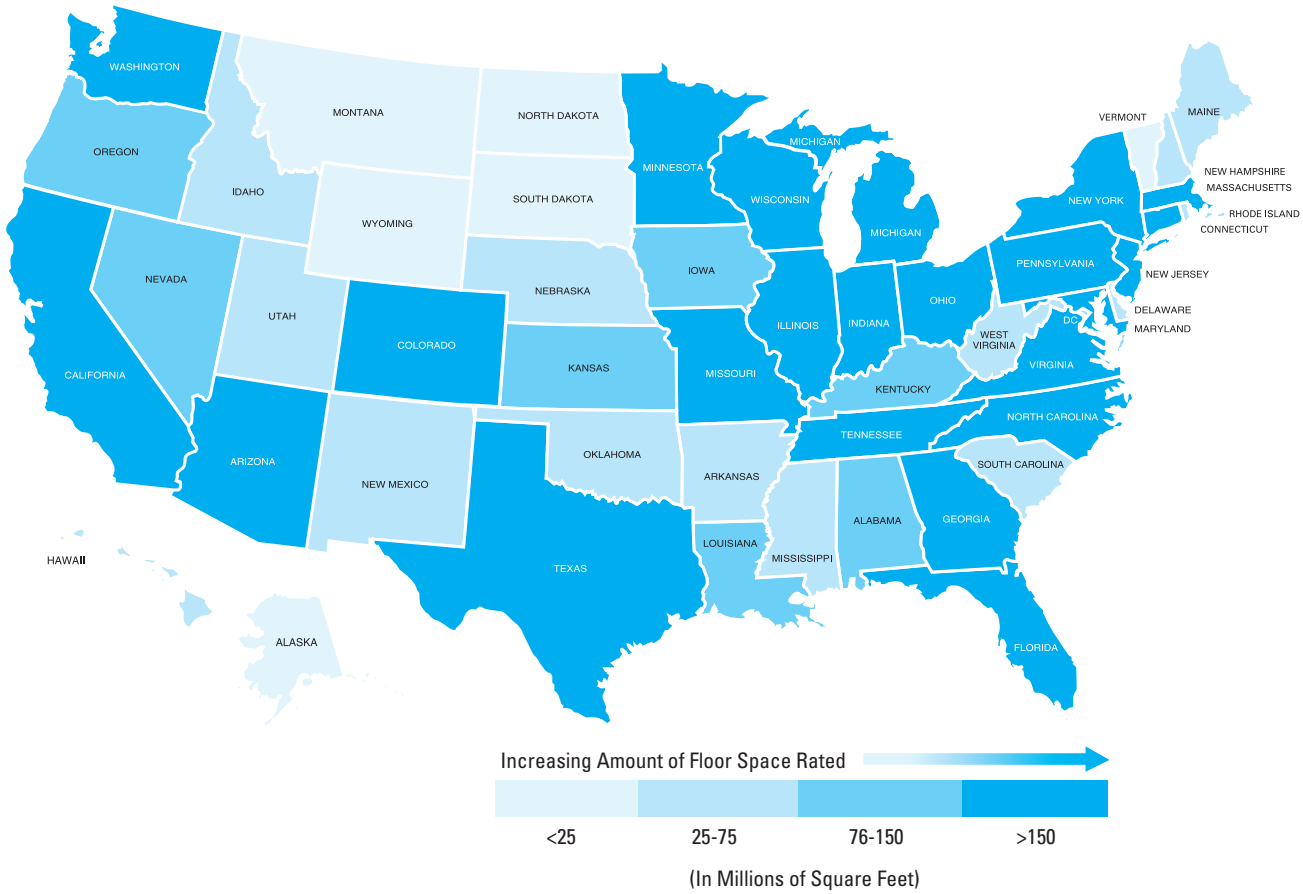
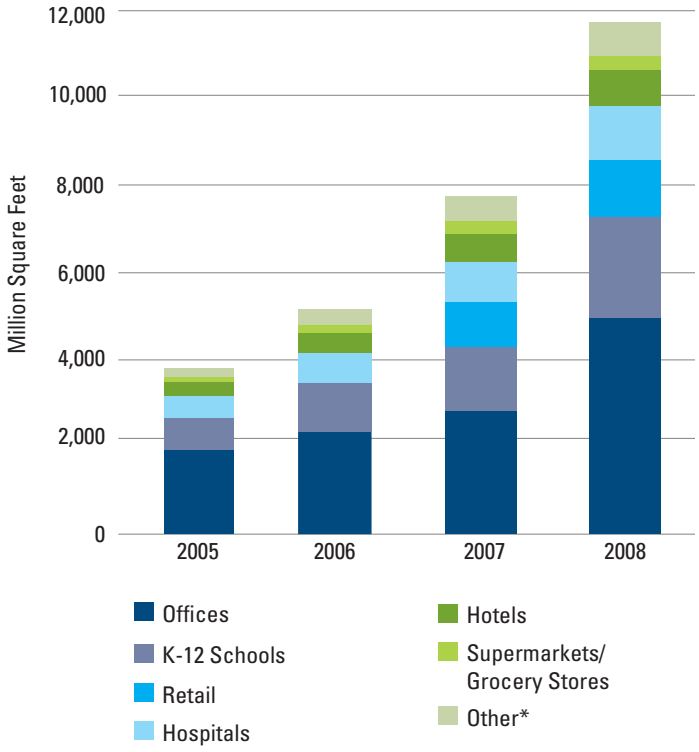


FIGURE 13. 16 Percent of Commercial Square Footage Rated in 2008



*Includes Bank/Financial Institutions, Warehouses/Storage, Courthouses, Medical Offices, and Residence Halls.

energy efficiency. Increasingly, state and local government agencies, professional associations, and vendors are using Portfolio Manager and ENERGY STAR resources to help their constituents, members, and clients reduce energy use in buildings. Cumulative efforts of all partners have resulted in:

- **More Floor Space Rated.** More than 80,000 buildings have been rated, which represents more than 11.5 billion square feet and 16 percent of total U.S. floor space (see Figures 12 and 14, p. 32). This cumulative total includes nearly 65 percent of acute care hospitals, more than 40 percent of offices (including banks), almost 25 percent of schools, 25 percent of supermarkets, over 15 percent of retailers, and almost 20 percent of hotels/motels and residence halls.[11]
- **Two Sectors Leading the Way.** Offices and schools led the way in 2008 by nearly doubling the square footage rated the previous year (see Figure 13).
- **Water Utilities Getting on Board.** Managers of almost 200 wastewater facilities have benchmarked their energy use. Many building owners have taken the extra step of tracking building water use along with energy use. As a result, data from more than 19,000 water meters were being tracked in Portfolio Manager by the end of 2008.

Spreading the Word

Since 2005, more than 2,400 organizations and individuals have joined EPA's ENERGY STAR Challenge to improve the efficiency of the nation's buildings by 10 percent or more as measured by EPA's energy performance rating system. In 2008, over 1,600 organizations and individuals took EPA's ENERGY STAR Challenge. Many organizations worked with their members and constituents to help benchmark building energy use, set savings goals, and track energy performance reductions over time. State and local governments, which represent the largest group of Challenge participants, staged a variety of campaigns and started programs to incentivize the use of ENERGY STAR tools in 2008. Examples include:

- The City of Louisville's Kilowatt Crackdown
- The City of Chicago's Green Office Challenge
- The Wisconsin Lieutenant Governor's ENERGY STAR School Challenge
- The District of Columbia's Clean and Affordable Energy Act of 2008, which mandates ENERGY STAR benchmarking and public disclosure of the results

Recognizing Top Performing Buildings

Almost 3,300 top performing buildings earned the ENERGY STAR in 2008—for a cumulative total of more than 6,200 qualified buildings nationwide (see Figure 15, p. 32). For the first time, more than one billion square feet of building space carried the ENERGY STAR. These 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. Typically, they use 35 percent less energy than average buildings. In 2008:

- **Top U.S. Cities for Qualified Buildings.** EPA unveiled its first list of U.S. metropolitan areas with the highest number of buildings that have earned the ENERGY STAR. The list was topped by Los Angeles, San Francisco, Houston, Washington, DC, Dallas-Fort Worth, Chicago, Denver, Minneapolis-St. Paul, Atlanta, and Seattle.

[11] *Calculated using CBECS 2003, see EIA 2006.*

- **Top Performing Sectors.** Offices and schools accounted for more than 70 percent of the buildings that earned the ENERGY STAR in 2008. Schools more than tripled, while offices more than doubled. Retail companies also made gains in qualifying for the ENERGY STAR with Kohl's, JC Penney, and Verizon Wireless stores leading the way.
- **Showcasing ENERGY STAR Qualified Buildings.** Orbitz began highlighting ENERGY STAR qualified hotels in its listing services, with Travelocity and AAA planning to do the same in 2009. CoStar continued to identify ENERGY STAR labeled buildings on its listing service.

Honoring Partners' Milestones in Improving Energy Efficiency

EPA recognizes partner organizations when they reach significant energy efficiency milestones by distinguishing them as ENERGY STAR Leaders or honoring them with an annual ENERGY STAR award.

- **ENERGY STAR Leaders.** More than 25 partners were recognized as ENERGY STAR Leaders in 2008—with about 60 percent of them meeting their milestones for the first time. ENERGY STAR Leaders have reduced the energy use across their building portfolios by 10, 20, or 30 percent

FIGURE 14. Steady Growth in Building Space Benchmarked and Labeled (Sq. Ft. in Billions)

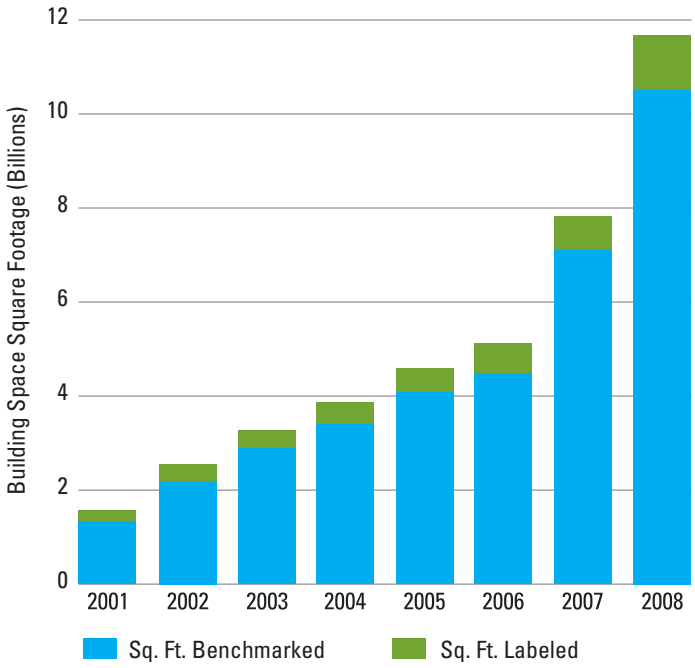
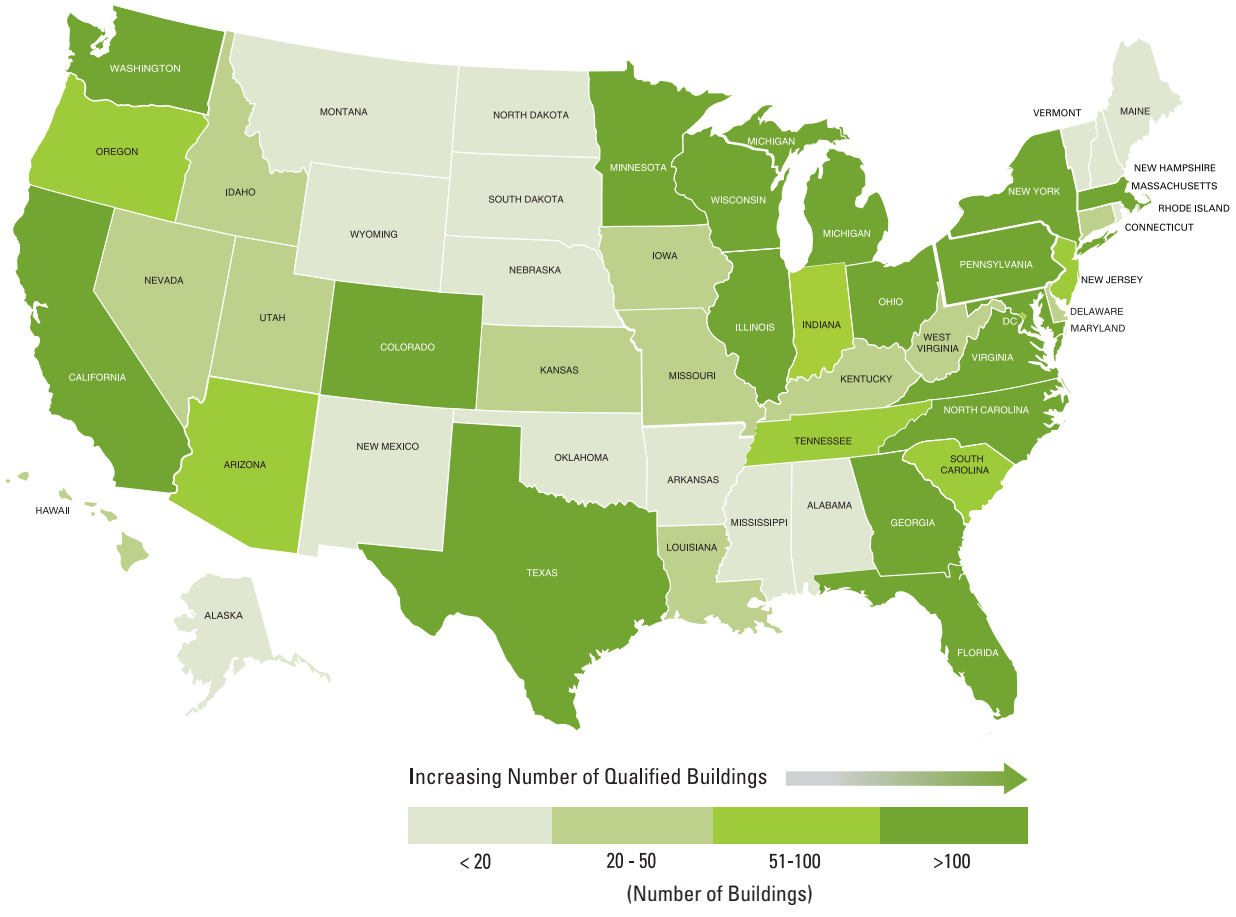


FIGURE 15. More Than 6,200 Buildings Have Earned the ENERGY STAR



or have top performing portfolios, as verified through EPA's energy performance rating system. School districts account for two-thirds of the total 65 Leaders that manage nearly 325 million square feet across almost 4,900 facilities.

- **ENERGY STAR Awards.** EPA recognized 11 commercial organizations for Sustained Excellence, nine for ENERGY STAR Partner of the Year, and one for Excellence in Promotion.

Delivering Cost-Effective Services

EPA advanced its work with utilities in 2008, helping them deliver energy efficiency programs and incentives more cost-effectively to their customers. For example:

- **Transferring Utility Bill Data Easily.** For the first time, utilities were able to exchange and download their customers' utility bill data directly into EPA's Portfolio Manager. Led by PG&E, which added the Automated Benchmarking Services (ABS) page to its Web site, California utilities benchmarked about 2,100 buildings through ABS.
- **Creating New Applications.** ComEd developed a new, Web-based application—Whole Building Energy Data System—to overcome the persistent barrier of accessing tenant energy data to enable whole-building energy performance ratings.
- **Launching New Promotions.** Xcel Energy in Minnesota offered an ENERGY STAR Building Assessment to customers and launched the "Your ENERGY STAR, Our Expertise" outreach campaign.

Acknowledging Architects for Designing To Save Energy

EPA continues to work in partnership with the American Institute of Architects (AIA) to help its members reach the 2030 goal by designing buildings to use at least 50 percent less fossil fuel than average buildings. In 2008, more than 75 projects achieved Designed to Earn the ENERGY STAR, for a cumulative total of 130. Each of these future buildings was designed with the intent of earning the ENERGY STAR after occupation when sufficient energy-use verification data are available.

What To Expect in 2009 and Beyond

Energy Performance Rating

- Expand the energy performance rating system to add a new Religious Worship model and continue efforts to develop a Data Center model. EPA will update the existing models for K-12, Hotel/Motel, and Warehouse, as well as add a tracking capability for Multi-Family Housing.
- Enhance Portfolio Manager capabilities to incorporate onsite and offsite renewable energy into the emissions inventory and rating. EPA will also add a reporting feature that will enable users to access and customize reports on the information they are tracking in the tool.
- Foster and support automated utility data transfer pilots in several areas outside California.

ENERGY STAR Challenge

- Help replicate energy efficiency competitions, like the Kilowatt Crackdown, in several other cities.
- Promote Wisconsin's ENERGY STAR Challenge model to encourage more K-12 school districts to partner with ENERGY STAR and benchmark their schools' energy use. EPA will continue to leverage the activities of key service providers in the K-12 sector to recruit more school districts and support their efficiency efforts.

State and Local Legislative Support

- Provide support to state and local governments drafting legislation mandating building benchmarking and disclosure of results.
- Promote ENERGY STAR as a platform for governments receiving ARRA stimulus support. EPA will provide resources—including Webinars and a Benchmarking Starter Kit—to inform recipients about the benefits of ENERGY STAR and help them start using EPA tools.

Partnerships

- Introduce and expand ENERGY STAR into the entertainment sector by working with Major League Baseball, convention center groups, and museums to identify best practice energy management strategies and benchmarks.
- Work with the National Restaurant Association to support its launch of a tailored ENERGY STAR Challenge campaign.

ENERGY STAR IN THE INDUSTRIAL SECTOR

In recent years, a confluence of three events has led to the strong increase in corporate participation in EPA's ENERGY STAR program for industry. The growing national emphasis on GHG emissions reporting, highly volatile energy markets, and a difficult economy have all motivated manufacturers to improve industrial energy efficiency.

Companies are partnering with EPA to learn how to build EPA- and industry-recommended strategies into their corporate energy management programs and ramp up their plant-level implementation of best practices. The industrial sector is responsible for about one-third of U.S. GHG emissions, and manufacturers are more aware than ever that energy efficiency is the first and most cost-effective step for minimizing energy risks and reducing the emissions that contribute to global climate change.

Through ENERGY STAR, EPA helps industrial companies develop robust energy programs that create the necessary infrastructure for cost-effective GHG management. Key accomplishments in 2008 included:

- Expanded ENERGY STAR Industrial Focuses to include a Steelmaking Focus, for a total of 16 Focuses.
- Increased participation in the ENERGY STAR peer exchange network by 30 percent.
- Awarded the ENERGY STAR to 28 plants—including eight for the first time—bringing the total to 45.

Achievements in 2008

Positioning Industries To Succeed

EPA's Industrial Focuses directly address barriers to energy efficiency by providing industry-specific energy management tools and resources. In 2008, EPA worked closely with specific sectors to (1) identify energy-saving practices and technologies, (2) develop the first-ever national plant energy performance benchmarks for many sectors, and (3) encourage energy management leaders within each industry to participate in the network of companies that share successful energy management strategies.

As of 2008, 16 major industries were actively participating in EPA's Industrial Focuses (see Table 9). Highlights include:

- **Steel Industry.** EPA engaged 95 percent of integrated steel production companies in the U.S. steel industry. This first Industrial Focus for steel concentrated on the feasibility of developing a plant energy performance indicator (EPI) for integrated mills.
- **Pharmaceutical Industry.** EPA, in cooperation with the pharmaceutical industry, produced a final pharmaceutical manufacturing plant EPI. As a result, the energy efficiency of individual pharmaceutical manufacturing plants can be measured, tracked, and rated on a national level. Companies can use the EPI to set meaningful improvement goals and measure progress over time.
- **Petrochemical Industry.** Working with U.S. petrochemical producers, EPA finalized a new guide on energy efficiency opportunities in petrochemical plants. It presents energy efficiency practices and technologies that can be immediately implemented in petrochemical plants, without requiring long-term research. This guide will help

Table 9. Summary of EPA ENERGY STAR Industrial Focuses

FOCUS	YEARS ACTIVE	SCOPE	PEER EXCHANGE OPPORTUNITY	INDUSTRY ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR
Cement Manufacturing	5	75% of U.S.-based clinker[1]* production capacity	●	Published	Released
Corn Refining	6	95% of U.S.-based refining capacity	●	Published	Released
Food Processing • Cookies & Crackers • Juice • Potato Products • Tomato Products	3	80% of U.S. processed fruit, vegetable, and grain sales	●	Published	Draft
Glass Manufacturing • Fiberglass • Flat Glass Products • Container Glass Products	3	50% of U.S. flat, container, and fiberglass sales	●	Published	Draft
Motor Vehicle Manufacturing	7	95% of the industry with U.S.-based production	●	Published	2nd version released
Petrochemical Manufacturing	2	83% of U.S. ethylene production capacity	●	Published	Draft
Petroleum Industry	4	64% of U.S.-based refining capacity	●	Published	Private system recognized by EPA
Pharmaceuticals	4	Over 50% of the global and U.S. manufacturing capacity	●	Published	Released
Pulp & Paper	2	70% of U.S.-based companies' global sales	●	In process	Draft
Steel	New	95% of integrated production	●	In process	Exploring options
Water/Wastewater	3	40% of the total U.S. population represented	●	In process	Portfolio Manager

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

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

overcome what has been an adoption barrier—lack of information.

- **Other Industrial EPIs.** EPA moved forward with seven industries—flat glass, container glass, juice, frozen potato products, tomato products, fiberglass, and integrated paper mills—to revise draft versions of plant EPIs based on industry reviews. EPA collaborates closely with all focus industries on EPI development and testing prior to finalization.
- **Food Industry.** Responding to requests from the food industry, EPA released an initial EPI for baked cookies and crackers plants for industry testing and review.
- **Laboratory Rating.** At the request of the pharmaceutical industry, EPA launched a new initiative under the Laboratories for the 21st Century program to develop an EPI for laboratories.

Incorporating Advanced Strategies into Energy Management

U.S. industry looks to EPA's ENERGY STAR program for guidance on implementing corporate energy management programs. As manufacturers expand and improve their own capabilities to govern energy use internally, EPA works with them to develop the long-term strategies needed to comprehensively change the efficiency of their entire energy value chain (the external factors). These strategies will influence the continuous improvement of energy performance upstream of, within, and downstream of their business. Advances in 2008 included:

- **Supply Chain Working Group.** EPA initiated a workgroup of partners interested in influencing the energy efficiency of their suppliers. The Supply Chain Working Group (SCWG) identifies new energy management strategies, promotes best practices, and enables partners to share supply-side experiences. The potential reach of SCWG is considerable; for some partners, suppliers can number into the tens of thousands.
- **Cement Industry Suppliers.** EPA expanded the existing Cement Focus to address upstream energy use in the industry because cement manufacturing equipment uses vast amounts of energy. Through its ENERGY STAR Focus, the cement industry formulated a set of equipment efficiency metrics, which companies may request their suppliers to aim for in the future.
- **Suppliers and Customers.** EPA informed ENERGY STAR industrial partners about ways of engaging their suppliers to start influencing and reducing the embedded energy of products coming into their businesses, and encouraged the partners to inform their customers of methods and techniques for managing energy in their businesses. As a result, major manufacturers have added new dimensions to their corporate energy programs to address the impacts of their energy value chain.
- **The Climate Disclosure Project.** EPA collaborated with the Climate Disclosure Project to hold two workshops for companies and investors, focusing on best practices in carbon disclosure and analysis.

Expanding and Leveraging a Powerful Network of Manufacturing Partners

All ENERGY STAR partners make a commitment to continuously improve energy efficiency, use ENERGY STAR tools and resources, and communicate the value of energy efficiency. A key set of industrial partners has demonstrated advanced strategies in their corporate energy management systems and form the base of support for the industrial

TABLE 10. EPA Expands ENERGY STAR for Superior Energy Management of Industrial Plants

SECTOR FACILITY	LABELS EARNED IN 2008	TOTAL PLANTS EARNING LABELS
Cement Plants	15	19
Auto Assembly Plants	9	15
Petroleum Refineries	4	8
Wet Corn Mills	0	3
Total Plants Labeled	**28**	**45**
Total Estimated Energy Savings (Compared with Average Plants)	**39,800,000 mmBtu**	**117,400,000 mmBtu***

**Represents cumulative savings for labels earned since 2006.*

program. EPA leverages these leading partners to reach out to more manufacturers and to support newer participants with the aid of mature ones. Key accomplishments in 2008 included:

- **Partnerships.** The number of ENERGY STAR industrial partners grew to more than 550.
- **Peer Exchange Network.** EPA's peer exchange network increased by 30 percent; the 800 participants represented nearly 300 organizations. Topics discussed within the network included engaging employees in energy management, project financing strategies, and saving energy through water efficiency.
- **Annual Meeting.** An annual meeting of ENERGY STAR industrial partners and focus industries was held in October 2008. Eight focus industries held in-person meetings, and more than 80 companies were represented.
- **Mentoring.** EPA coordinated 18 mentoring relationships between industrial partners through which more experienced partners shared best energy management techniques to improve efficiency across sectors and strengthen the partnership.

Recognizing Leaders in Industrial Energy Management

Continuous improvement of energy efficiency is achieved through high-level organizational commitment and the dedication of energy managers, resulting in the enhanced quality of corporate energy management. Recognition of successful programs and plants is a major motivating force for positive change. A number of organizations received ENERGY STAR recognition for their 2008 accomplishments:

- **ENERGY STAR Awards.** EPA honored seven industrial partners for Sustained Excellence in Energy Management and six as ENERGY STAR Partner of the Year (see Figure 6, p. 17).
- **Plant-level Recognition for Excellence.** Twenty-eight industrial plants earned the ENERGY STAR in 2008, including eight plants for the first time. A total of 45 plants have earned the label since 2006 (see Table 10).

Increasing Outreach Through Strategic Alliances

EPA's relationships with key not-for-profit organizations allowed EPA access to more channels for disseminating information about ENERGY STAR tools and resources to a wider group of manufacturers in 2008.

- **National Association of Manufacturers.** EPA signed a memorandum of understanding (MOU) with the National Association of Manufacturers (NAM) to promote energy management among NAM members. NAM membership includes nearly 14,000 industrial companies and associations.
- **Association of Energy Engineers.** EPA partnered with the Association of Energy Engineers (AEE) to organize sessions specifically tailored to the needs of industry at the AEE annual World Energy Engineering Congress.
- **Consortium for Energy Efficiency.** EPA and the Consortium for Energy Efficiency (CEE) Industrial Energy Management Committee worked together with member utilities to promote energy management best practices among manufacturers.

What To Expect in 2009 and Beyond

Partnerships

- Continue to reach small- and medium-sized manufacturers by working with NAM to engage its membership in energy efficiency and ENERGY STAR.
- Continue to support peer exchange forums for the Industrial Focus sectors and convene meetings as new Focuses are created.
- Recognize excellence in industrial energy management through the annual Partner of the Year Awards.

Tools and Resources

- Continue the Industrial Focuses with the 16 participating sectors and subsectors and finalize four EPIs in 2009—two in food processing and two in glass production.
- Finalize an energy guide for the pulp and paper industry.
- Continue collaboration with EPA's Laboratories for the 21st Century program to develop a laboratory benchmark.
- Expand the program for labeling energy-efficient U.S. plants with the ENERGY STAR. EPA expects that certain plants in the food processing and glass industries will be eligible to earn the ENERGY STAR by the end of 2009.
- Customize online and print energy efficiency guidance for small- and medium-sized manufacturers.

CLIMATE LEADERS

EPA's Climate Leaders program is an industry-government partnership that reduces GHG emissions by developing standardized GHG emissions management practices among industry and providing incentives and technical assistance to companies so they take corporate-level action on climate change. For example, EPA recognizes partners when they set and achieve their climate protection goals. Climate Leaders partners represent a broad range of industrial and commercial sectors—including manufacturing, cement, forest products, pharmaceuticals, utilities, information technology, and retail (see Figure 16). They operate in all 50 states, and many are global companies. In partnering with Climate Leaders, companies commit to reducing their impact on the global environment by:

- Completing a corporate-wide inventory of their GHG emissions
- Setting aggressive emissions reduction goals
- Annually reporting their progress to EPA

Climate Leaders partners use EPA's wide range of tools, expertise, and resources to make informed decisions about cost-effective strategies, investments, and clean energy options to reduce GHG emissions. In addition to tracking partners' progress toward their GHG emissions goals, EPA ensures the credibility of reported data by performing detailed reviews and making site visits. By participating in the program, companies create a lasting record of their accomplishments and identify themselves as corporate environmental leaders.

Since its launch in 2002, Climate Leaders has reached a number of significant milestones while working to reduce GHG emissions and is poised to expand on this success in years to come (see Table 11, p. 40). In aggregate, Climate Leaders partners are projected to reduce emissions by 13.6 MMTCE per year.

Achievements in 2008

- The addition of 96 new corporate partners brought the number of Climate Leaders partners to 251, an increase of over 60 percent in just one year. The GHG emissions of the partners represent more than 8 percent of total U.S. emissions.
- Six additional partners successfully achieved their initial Climate Leaders GHG reduction goals: 3M, Exelon Corporation, FPL Group, Mack Trucks, Public Service Enterprise Group (PSEG), and Raytheon. Of the 21 companies that have met their initial goals in the program, 16 thus far have committed to a second round of reduction goals.
- Twenty-seven partners announced corporate GHG reduction goals in 2008, bringing the total number of partners that have announced corporate GHG goals through 2008 to 113. Almost half of the companies in the partnership have publicly announced GHG goals.
- EPA estimates Climate Leaders partners will prevent approximately 13.6 MMTCE per year relative to business-as-usual scenarios. These reductions are equivalent to preventing the annual GHG emissions from more than 9 million vehicles.
- EPA received initial GHG inventories from 42 partners in 2008, bringing the cumulative total to 153. These inventories are a necessary step for all partners before establishing an emissions reduction goal. EPA technical experts performed 24 site visits in 2008 to review partner GHG inventories and Inventory Management Plans and to recommend improvements.
- EPA finalized offsets protocols, updated cross sector guidance, and released a calculator and guide for small businesses to reduce their carbon footprint. These tools join the suite of existing Climate Leaders resources that help companies manage and reduce their GHG emissions. All of these resources can be downloaded from the Climate Leaders Web site at www.epa.gov/climateleaders.

FIGURE 16. The 251 Climate Leaders by Sector

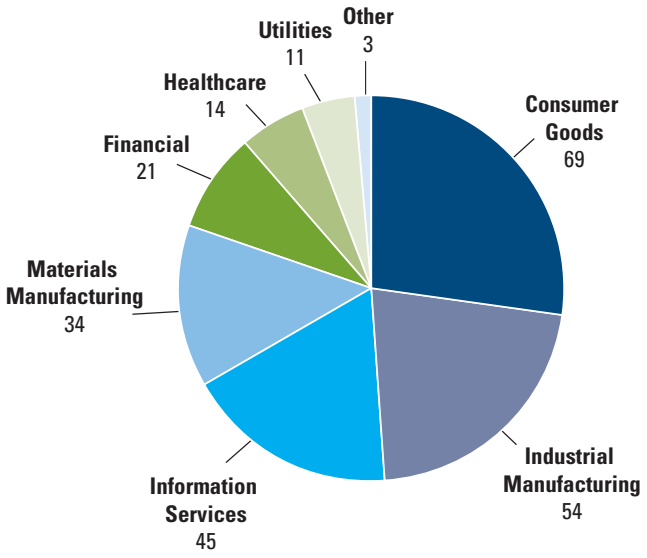


TABLE 11. Climate Leaders Key Program Indicators for 2004–2008 (Cumulative)

CLIMATE LEADERS INDICATOR	2004	2005	2006	2007	2008
Partners	64	78	107	155	251
Initial Inventories Submitted	45	60	75	111	153
Site Visits	9	30	42	81	105
Goals Announced	25	38	59	86	113
Goals Achieved	0	5	8	15	21

What To Expect in 2009 and Beyond

- Continue to support corporate partners that are working toward achieving their GHG reduction goals and recruit additional companies from diverse sectors that are performing leading work on climate change.
- Expect 25 current partners to announce new corporate GHG emissions reduction goals.
- Begin approving Climate Leaders GHG emissions offsets using EPA-specific protocols for partners.
- Release emissions guidance for production of aluminum, cement, and pulp and paper as well as updated versions of EPA sector-specific guidance on iron and steel production, hydrofluorocarbon (HFC) and perfluorocarbon (PFC) emissions from manufacturing refrigeration and air conditioning equipment, and municipal solid waste landfills. Guidance for optional sources, such as emissions associated with corporate meetings and conferences, will also be released.
- Participate in the development of an international protocol for measuring supply chain and product-related GHG emissions.
- Incorporate the tenets of Climate Leaders program protocols and lessons from partners' experiences into the development of future climate policy.

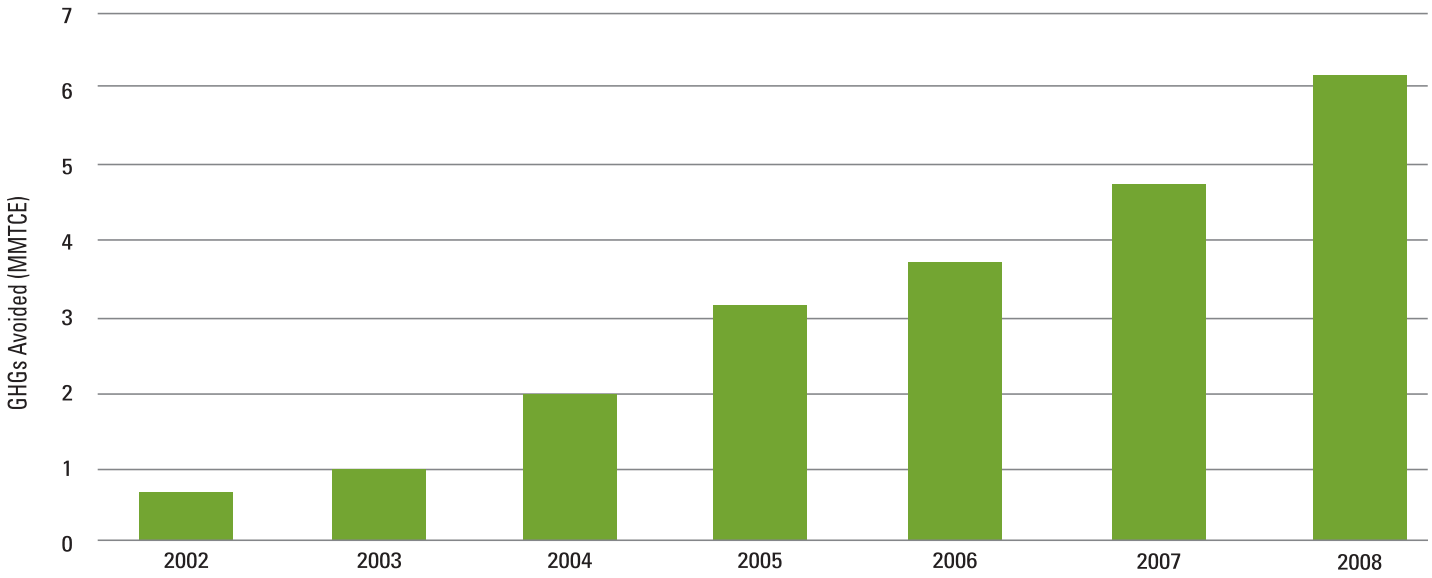
CLEAN ENERGY SUPPLY PROGRAMS

In 2001, EPA launched the Clean Energy Supply Programs, which include the Green Power Partnership and the Combined Heat and Power (CHP) Partnership, to increase the adoption of clean energy supply technologies across the United States. In the past 7 years, both of these partnership programs facilitated the enormous growth of green electricity generation and environmentally beneficial CHP nationwide. These programs work to transform the clean energy marketplace by breaking down remaining market barriers, while providing partners with cost-effective solutions through:

- Technical resources
- Credible benchmarks
- Access to expertise
- Recognition for environmental leadership

By encouraging partners to invest in clean energy, the Green Power and CHP Partnerships help reduce GHG emissions and criteria pollutants as well as help build demand for clean energy supply technologies. The accomplishments of both programs are impressive. In 2008 alone, EPA's Clean Energy Supply programs reduced GHG emissions by 6.1 MMTCE (see Figure 17, p. 42).

FIGURE 17. GHG Emissions Avoided by EPA's Clean Energy Supply Programs



GREEN POWER PARTNERSHIP

EPA's Green Power Partnership is a voluntary program that encourages organizations to buy green power as an easy, sensible management choice to:

- Reduce the environmental impacts associated with purchased electricity use.
- Hedge against volatile energy prices.
- Demonstrate environmental leadership.

Partners include a wide variety of leading organizations, such as Fortune 500 companies; small- and medium-sized businesses; local, state, and federal government agencies; and colleges and universities. The commitments of new and existing program partners made 2008 an exceptionally successful year for EPA's Green Power Partnership.

Achievements in 2008

- Added 294 new partners, bringing the total to more than 1,000. These organizations have committed to buying more than 16 billion kWh annually of green power, which is enough energy to run more than 1.6 million average American homes for one year (see Figure 18).
- Launched EPA's Fortune 500 Green Power 2008–2009 Challenge, a 2-year initiative focused on doubling the collective green power purchases of eligible Fortune 500 corporations to exceed 10 billion kWh annually (see sidebar, p. 44). By the end of 2008, 59 Fortune 500 companies had taken the Challenge and stepped up their commitment to environmental stewardship by collectively purchasing nearly 7.5 billion kWh.
- Acknowledged 40 participating partners in EPA's College & University 2007–2008 Green Power Challenge, which concluded in April 2008. EPA ranked the green power purchases of individual schools against others within their athletic conference and calculated cumulative purchase amounts among competing athletic conferences.

- Presented 16 Green Power Leadership Awards to top purchasers of green power and onsite renewable power systems (see Table 12).
- Expanded the Green Power Communities initiative, which recognizes the collective action of local government, business, and citizens in buying green power through community-organized campaigns. In 2008, 11 additional communities across the nation met EPA Green Power Community purchase requirements, bringing the total number of outstanding communities to 21.

Table 12. EPA Recognizes 16 Leading Green Power Partners in 2008

ONSITE GENERATION

• Kohl's Department Stores	*Menomonee Falls, WI*
• Lundberg Family Farms	*Richvale, CA*

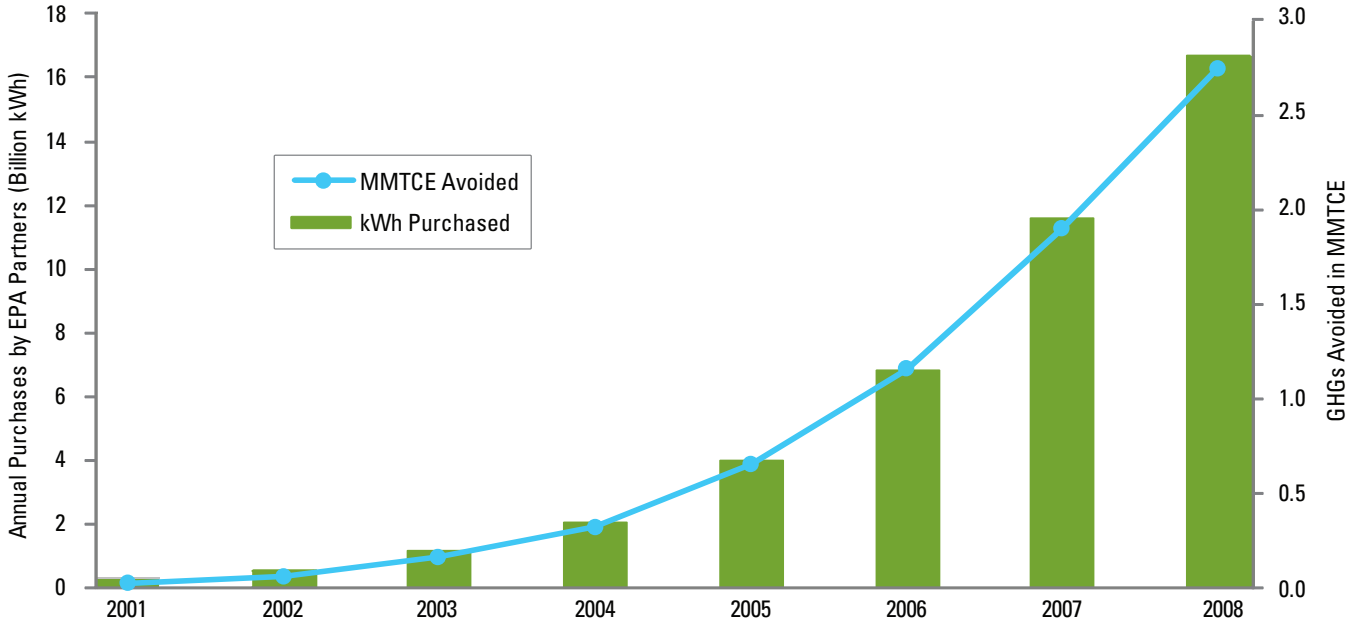
GREEN POWER PURCHASING

• City of Houston, TX	*Houston, TX*
• The Estée Lauder Companies, Inc. / Operations	*New York, NY*
• ING	*West Chester, PA*
• Merritt 7 Venture, LLC	*Norwalk, CT*
• Oregon State University	*Corvallis, OR*
• PepsiCo, Inc.	*Purchase, NY*
• The Philadelphia Phillies	*Philadelphia, PA*
• Powdr Resorts	*Park City, UT*
• U.S. Air Force	*Washington, DC*

PARTNER OF THE YEAR

• Bellingham, Washington Community	*Bellingham, WA*
• Cisco Systems, Inc.	*San Jose, CA*
• Intel Corporation	*Santa Clara, CA*
• University of Pennsylvania	*Philadelphia, PA*
• WhiteWave Foods Company	*Boulder, CO*

FIGURE 18. Green Power Purchases and Avoided GHG Emissions



What To Expect in 2009 and Beyond

- Continue to dismantle the market barriers that can stifle investment in clean electricity generation.
- Continue to support and recognize partners' green power purchases 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 third College & University Green Power Challenge.

Fortune 500 Companies Meet the Green Power Challenge

In January 2008, EPA challenged Fortune 500 companies to increase their green power purchases to more than 10 billion kWh annually through the Fortune 500 Challenge, launched by EPA's Green Power Partnership. By the end of 2008, 59 Fortune 500 companies had stepped up their commitment to environmental stewardship by collectively purchasing nearly 7.5 billion kWh. These purchases made 2008 a banner year and helped avoid the GHG emissions equivalent to those from nearly one million vehicles.

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 Green Power partners, and it alone represents enough electricity to power nearly 130,000 average American homes each year. PepsiCo was second on EPA's list of Fortune 500 companies, followed by Dell Inc., Whole Foods Market, The Pepsi Bottling Group, Johnson & Johnson, Cisco Systems, Inc., Kohl's Department Stores, Kimberly-Clark Corporation, and Starbucks.

COMBINED HEAT AND POWER PARTNERSHIP

EPA's Combined Heat and Power (CHP) Partnership strives to reduce the environmental impact of power generation by promoting the use of CHP 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] To gain the energy, environmental, and economic benefits of CHP, EPA fosters cooperative relationships with the CHP industry, state and local governments, and other stakeholders to develop new CHP projects.

Since 2002, the CHP Partnership has made an important impact on U.S. CHP capacity (see Table 13), assisting between 39 and 78 percent of the new CHP capacity additions in each of the past 5 years.

TABLE 13. CHP Capacity Market Share

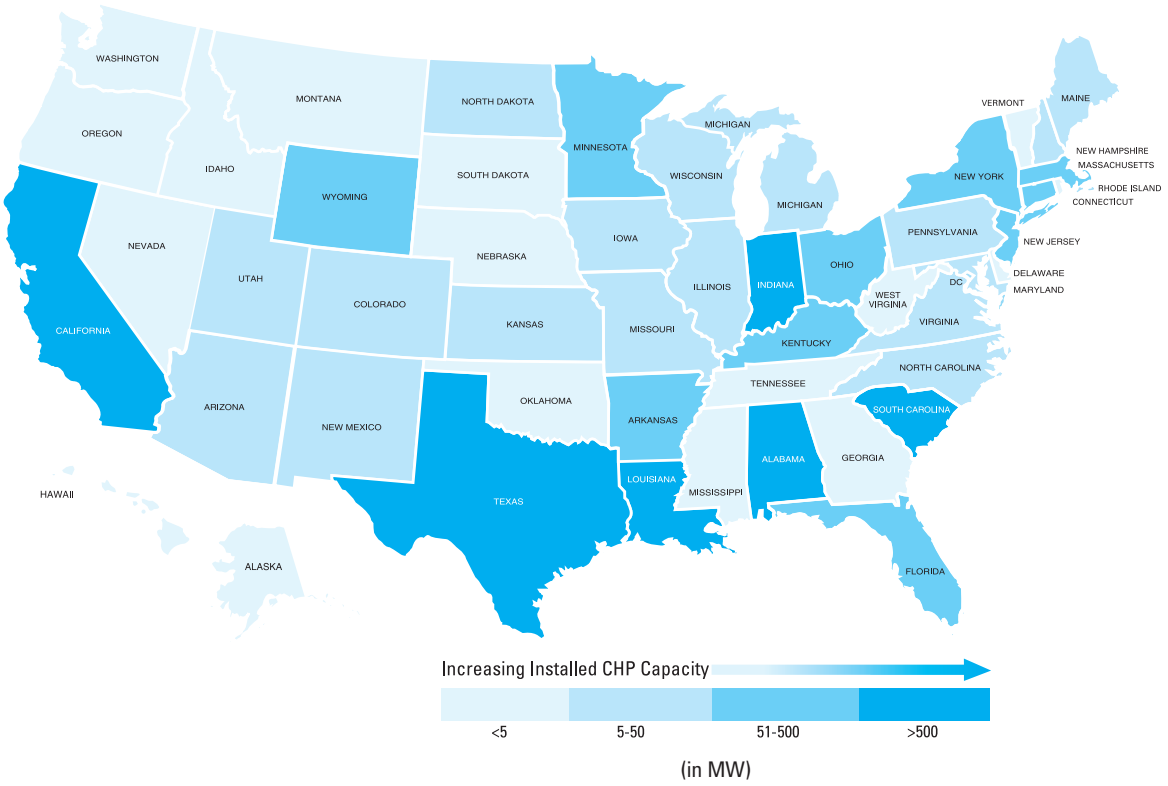
YEAR	TOTAL NEW CHP CAPACITY (MW)	NEW CHP CAPACITY CREDITABLE TO THE CHP PARTNERSHIP (MW)	MARKET SHARE
2002	5,214	620	12%
2003	3,576	512	14%
2004	3,340	2,008	60%
2005	1,600	821	51%
2006	353	138	39%
2007	478	373	78%
2008	259	132	51%

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

Achievements in 2008

- Welcomed 44 new partners, bringing the total to 268.
- Assisted in the deployment of more than 130 MW of new CHP nationwide (total nationwide capacity of 258 MW), bringing the cumulative impact of the program to over 4,700 MW of new CHP (see Figure 19).
- Provided technical assistance to 20 candidate sites across the country, including those in the municipal, utility, biofuels, industrial, and commercial sectors.
- Recognized 10 highly efficient CHP projects and provided public recognition to those projects through the ENERGY STAR CHP Awards. These systems range from a 0.14 MW system at a YMCA facility to a 500 MW facility that supports a large plastics manufacturing plant (see Table 14, p. 46).
- Continued to raise awareness of the benefits of biomass CHP by expanding work to the ethanol industry and reviewing potential benefits from CHP systems at four facilities' project development stage.
- Embarked on a formal collaboration with EPA's Office of Water to raise awareness of the benefits of biogas CHP applications particularly at wastewater treatment plants using anaerobic digestion.
- Updated a market study analysis on CHP applications at hotels and casinos, which was originally prepared in 2005, to reflect additional CHP installations. The Partnership provided technical support and a third-party review for a proposed biomass CHP system at a casino in Las Vegas.
- Created and provided educational and outreach tools for the first time to utilities, a sector that has historically faced significant barriers. The tools examine in detail the market and policy challenges for CHP in this sector. EPA conducted a CHP training workshop for a wholesale utility partner and ethanol industry partners to demonstrate the potential of their collaborative success. In addition, technical analyses were provided to other utilities to meet their objectives in considering CHP systems.
- 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.
- Began the rule development process to fulfill the Agency's requirements under the Energy Independence and Security Act of 2007 (EISA). Title IV, Subtitle D, Section 451, Part E on Industrial Energy Efficiency delineates all the requirements. One requirement is for EPA to publish a rule within 270 days of EISA enactment that establishes the criteria by which sources or sites will be listed in a Registry of Recoverable Waste Energy Sources (Registry).

FIGURE 19. Combined Heat and Power Capacity by State as of 2008



What To Expect in 2009 and Beyond

- Identify and implement outreach activities to address changes in the CHP market as reflected in the federal Energy Improvement and Extension Act of 2008 (EIEA), ARRA, and other federal and state legislation.
- Support activities related to the CHP initiatives identified in the 2008 EISA Act and the 2009 ARRA, such as the review of CHP-related grants and regional outreach to educate the public about CHP and promote its benefits. Expand work in strategic sectors, which include municipal and cooperative utilities and wastewater treatment facilities. The engagement plan will build and support regional collaborations that provide CHP outreach and technical support in these market sectors. In addition, key conferences within these market sectors will be identified as another means to reach CHP end-users and demonstrate the benefits of CHP to them.
- Initiate outreach activities to other sectors such as tribal casinos and data centers to identify CHP opportunities, building upon initial assessments for CHP in these sectors.
- Foster partnerships among government entities working on biomass and CHP.
- Publish the proposed and final rule for public comment, as required under Title IV, Subtitle D, Part E of EISA, in the Federal Register to establish the criteria by which sources or sites will be listed in the Registry.

Table 14. 2008 ENERGY STAR Combined Heat and Power Awards

CHP PROJECT	PARTNER	LOCATION
• Missouri Joint Municipal Electric Utility Commission (MJMEUC) Cogeneration System	POET Biorefining – Laddonia	*Laddonia, MO*
• One Market Plaza Cogeneration System	One Market Plaza	*San Francisco, CA*
• East Kansas Agri-Energy CHP System	ICM, Inc.	*Garnett, KS*
• POET Biorefining Ashton CHP System	POET Biorefining	*Ashton, IA*
• Clinton Hill Apartments CHP System	Clinton Hill Apartment Owners Corporation	*Brooklyn, NY*
• Red Hook Fairway Market CHP System	Red Hook Green Power, LLC	*Brooklyn, NY*
• Columbia Energy Center	Calpine Corporation	*Gaston, SC*
• Verizon Garden City Fuel Cell Project	Verizon Communications	*Garden City, NY*
• Formosa Plastics Corporation–Louisiana CHP System	Formosa Plastics Corporation	*Baton Rouge, LA*
• Westfield YMCA CHP System	American DG NY, LLC	*Westfield, NJ*

STATE AND LOCAL PROGRAMS AND INITIATIVES

Clean energy offers states and localities a cost-effective way to address the ongoing challenges of rising energy demand, rising energy prices, air quality concerns, and global climate change. EPA supports state and local governments in their development and deployment of emerging technologies, and helps them achieve energy cost savings through greater end-use efficiency in residential and commercial buildings and municipal facilities.

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 would 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 GHG emissions equivalent to those from 80 million vehicles.

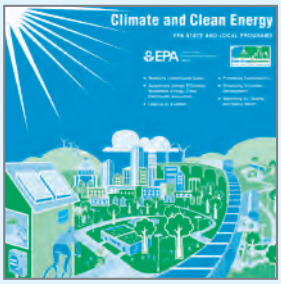
EPA's Clean Energy-Environment state and local programs assist state and local governments in their clean energy efforts by providing best practice strategies, technical assistance, analytical tools, and peer exchange opportunities. Specific assistance includes:

- 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 20, p. 48).
- Offering a suite of national voluntary programs that provide partners with resources, technical 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 in their states.

FIGURE 20. New and Updated Tools and Resources for States and Local Governments

In 2008, EPA started a Local Climate and Energy Webcast Series and held three Webcasts with expert and local government presenters. Topics were: Navigating the Grant Process for Local Governments, Energy-Efficient Product Procurement, and Green Power Procurement. The series will continue in 2009.



The Local Climate and Energy Program completed five new Local Government Climate and Energy Strategy Guides, which provide a comprehensive, user-friendly overview of local government GHG emissions reduction strategies, along with project benefits, policy mechanisms, up-front investments, key stakeholders, and other implementation considerations. The Guides are:

- Energy-Efficient Product Procurement
- Green Power Procurement
- Onsite Renewable Energy
- Combined Heat and Power
- Landfill Gas to Energy

Additional Guides are under development.

eGRID, a comprehensive source of data on the environmental characteristics of U.S. power generation, was updated in 2008 to include 2005 data. Methane and nitrous oxide emissions and emission rates were also added to the data set.

EPA's Greenhouse Gas Equivalency Calculator, which allows users to quickly and easily translate GHG reductions from units typically calculated into terms that are easier to conceptualize (e.g., passenger vehicles not driven for one year), was updated.

EPA held nine Webcasts as part of its State Technical Forum series, which explores analytical questions and key issues surrounding state climate and energy efforts by facilitating monthly peer exchanges and expert presentations among state energy, environmental, and utility officials.

EPA released the technical assistance document, *Reducing Urban Heat Islands: Compendium of Strategies*. The compendium describes the causes and impacts of summertime urban heat islands and promotes key mitigation strategies for lowering temperatures within a community's microclimate. For each mitigation strategy—green roofs, reflective roofs, cool pavements, and trees and vegetation—the compendium covers basic background, benefits and investments, factors to consider, and additional examples.

CLEAN ENERGY-ENVIRONMENT STATE PARTNERSHIP

Achievements in 2008

- Welcomed Virginia to the State Partnership program—bringing the total to 16 partners—and continued to expand as a nationwide program to help all states learn from the experiences of partner states.

State Climate and Energy Program

- Held a conference for partners to exchange best practices and identify issues of emerging importance.
- Supported states as they analyzed clean energy options, prioritized policies to meet air quality and climate goals, developed and implemented outreach and education programs, and identified additional guidance and technical assistance from EPA that would be helpful in the coming years (see Table 15).
- Conducted nine peer exchange sessions through the EPA Clean Energy-Environment Technical Forum—involving a total of more than 700 state environmental, energy, and utility regulatory officials from 45 states—to examine best practices on topics such as renewable energy credits, state energy planning, advanced metering technologies, and clean distributed generation.
- Assisted in the development of the EPA video *Climate and Air Quality: Applications for Air Quality Professionals*

– *October 22, 2008,* a 3-hour training program for state, local, and tribal air quality personnel about the interactions between climate change and air quality programs.

- Enhanced the Greenhouse Gas Equivalency Calculator—a communications tool that translates GHG emissions reductions into more commonplace equivalencies, such as number of passenger vehicles, acres of forest, and household electricity use by homes.

TABLE 15. Clean Energy-Environment State Partnership Grows to 16 Partners in 2008

STATE CLEAN ENERGY-ENVIRONMENT ACTIONS	PARTNERS WITH NEW PROGRAMS IN 2008	TOTAL PARTNERS WITH PROGRAMS
Energy Efficiency Savings Goals in Public Facilities	3	15
Energy-Efficient Appliance and Equipment Purchase Requirements for Public Facilities	1	12
Renewable Energy Goals for Public Facilities	1	10
State & Regional Energy Planning	5	16
Energy Efficiency Portfolio Standards	5	13
Public Benefit Funds for Energy Efficiency	0	10
Commercial Energy Efficiency Building Codes	2	13
Residential Energy Efficiency Building Codes	2	13
State Appliance Energy Efficiency Standards	0	5
Renewable Portfolio Standards	3	13
Public Benefit Funds for Renewable Energy	0	9
Output-based Environmental Regulation To Support Clean Energy	0	7
Clean Distributed Generation	0	13
Net Metering	0	16

CLEAN ENERGY-ENVIRONMENT LOCAL NETWORK

Achievements in 2008

- Facilitated access to the world of federal programs and resources that target local governments through a "one-stop shop" Web site that offers links to and explanations of available resources.

- Expanded an online, searchable database of resources to help local governments assess clean energy policies and programs.
- Provided support for urban heat island efforts through Webcast training sessions on topics such as program implementation, climate and air quality impacts, and scientific modeling tools.
- Released a comprehensive heat island mitigation strategies guidance document and a user-friendly heat island Web site.
- Held three Webcasts for local government officials—viewed 400 times each—on federal funding opportunities, clean energy best practices (such as energy-efficient product procurement), and green power.
- Issued five chapters of a best practices guide for local governments on clean energy topics including energy-efficient product procurement, green power procurement, onsite renewable energy generation, combined heat and power, and landfill methane utilization.

What To Expect in 2009 and Beyond

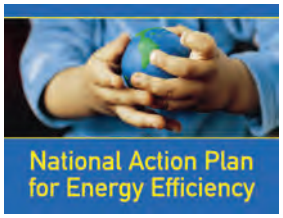
- Transition from the Clean Energy-Environment State Partnership of 16 states to an online Climate and Energy State Partner Network. This will expand access so that all states can learn from each other about energy and climate change initiatives and directly exchange questions, information, and ideas about those initiatives.
- Launch a $10 million Climate Showcase Communities grant program for local and tribal government climate change initiatives.
- Introduce a comprehensive, new Web site for states and communities that will enable efficient access to updated climate and energy information, tools, reporting, and peer exchange.

CLEAN ENERGY AND UTILITY POLICY PROGRAMS

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, state policy makers, 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.

Achievements in 2008

- 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. The Leadership Group has released a set of policy recommendations that serve as a foundation for the Action Plan's Vision to achieve all cost-effective energy efficiency by 2025. The Action Plan offers resources and tools to help states lower the growth in energy demand by more than 50 percent, help reduce annual GHG emissions equivalent to those from 90 million vehicles, and help provide customers more than $500 billion in net savings over the next 20 years. More than 120 organizations have endorsed the Action Plan recommendations and made public commitments to advance energy efficiency.



- Released *Vision for 2025: Framework for Change*, which outlines a complete framework for state-specific policies and programs to overcome barriers and enable the acquisition of all cost-effective energy efficiency potential. In its 2008 release, the Vision reports the significant progress states have made toward creating the long-term policy framework for energy efficiency. The Vision also identifies areas for additional progress. Table 16 shows the status of states that made progress between 2007 and 2008.
- Released new resources to help committed organizations implement the *Vision for 2025* recommendations. Three of the new resources are papers that share best practices for removing key barriers to energy efficiency: *Understanding Cost-Effectiveness of Energy Efficiency Programs, Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Information,* and *Sector Collaborative on Energy Efficiency*.
- Continued to provide technical assistance to state utility commissions on energy efficiency, including New Mexico, Florida, and Maryland.
- Expanded policy assistance to Maryland and California to help them accelerate the deployment of customer-sited clean distributed generation.

Table 16. State Progress Toward Meeting the Action Plan Vision for 2025*

GOAL AND POLICY IMPLEMENTATION STEP	ELECTRICITY	NATURAL GAS
ESTABLISHING COST-EFFECTIVE ENERGY EFFICIENCY AS A HIGH-PRIORITY RESOURCE		
Process in place, such as a state and/or regional collaborative, to pursue energy efficiency as a high-priority resource.	17 additional states completed	No state progress
Policy established to recognize energy efficiency as high-priority resource.	9 additional states completed	8 additional states completed
Potential identified for cost-effective, achievable energy efficiency over the long term.	9 additional states completed	4 additional states completed
Energy efficiency savings goals or expected energy savings targets established consistent with cost-effective potential.	9 additional states completed	4 additional states completed
Energy efficiency savings goals and targets integrated into state energy resource plan, with provisions for regular updates.	No state progress	8 additional states partially completed
DEVELOPING PROCESSES TO ALIGN UTILITY AND OTHER PROGRAM ADMINISTRATOR INCENTIVES SUCH THAT EFFICIENCY AND SUPPLY RESOURCES ARE ON A LEVEL PLAYING FIELD		
Utility and other program administrator disincentives are removed.	6 additional states completed	6 additional states completed
Utility and other program administrator incentives for energy efficiency savings reviewed and established as necessary.	13 additional states completed	8 additional states completed
ESTABLISHING COST-EFFECTIVENESS TESTS		
Cost-effectiveness tests adopted that reflect the long-term resource value of energy efficiency.	9 additional states completed	12 additional states completed
ESTABLISHING EVALUATION, MEASUREMENT, AND VERIFICATION MECHANISMS		
Robust, transparent EM&V procedures established.	4 additional states completed	2 additional states completed
ESTABLISHING EFFECTIVE ENERGY EFFICIENCY DELIVERY MECHANISMS		
Administrator(s) for energy efficiency programs clearly established.	9 additional states completed	6 additional states completed
Stable (multi-year) and sufficient funding in place consistent with energy efficiency goals.	3 additional states completed	4 additional states completed
Programs established to deliver energy efficiency to key customer classes and meet energy efficiency goals and targets.	8 additional states completed	11 additional states completed
Strong public education programs on energy efficiency in place.	13 additional states completed	11 additional states completed
Energy efficiency program administrator engaged in developing and sharing program best practices at the regional and/or national level.	2 additional states completed	5 additional states completed
DEVELOPING STATE POLICIES TO ENSURE ROBUST ENERGY EFFICIENCY PRACTICES		
State appliance standards in place.	28 additional states completed	27 additional states completed
ALIGNING CUSTOMER PRICING AND INCENTIVES TO ENCOURAGE INVESTMENT IN EFFICIENCY		
Rates examined and modified considering impact on customer incentives to pursue energy efficiency.	2 additional states completed	3 additional states completed
Mechanisms in place to reduce consumer disincentives for energy efficiency (e.g., including financing mechanisms).	2 additional states completed	No state progress
IMPLEMENTING ADVANCED TECHNOLOGIES		
Policies in place to remove barriers to combined heat and power.	6 additional states completed	—

—: Not applicable

** For more information on the Vision Measuring Progress methodology, see* http://www.epa.gov/eeactionplan.

What To Expect in 2009 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 fourth year, the Action Plan will continue to support the creation of a long-term energy efficiency program and policy infrastructure, including energy efficiency efforts funded through economic stimulus efforts. Key to supporting stimulus efforts will be the creation of a Rapid Deployment Energy Efficiency (RDEE) Toolkit. The RDEE Toolkit will provide detailed program design and implementation guides to help states and local governments make effective use of ARRA stimulus funding. EPA will provide comprehensive technical assistance to parties advancing RDEE programs.

In addition, the Action Plan will continue its efforts to measure progress toward the Vision for 2025, develop key informational materials, and spread the word on the need for aggressive action to improve energy efficiency. New resources will address:

- The role of energy efficiency as a low-cost strategy for reducing carbon emissions.
- An assessment framework for understanding the options for becoming the most energy-efficient economy in the world.
- Ways to provide customers with incentives to save energy through rate design.
- Coordination of demand response and energy efficiency policies and programs.
- Future approaches to evaluation, measurement, and verification.

METHANE PROGRAMS

Methane (CH_4) is a potent GHG that is 25 times more effective than CO_2 at trapping heat in the earth's atmosphere, thus contributing to climate change. Methane also has a relatively short lifetime in the atmosphere, ranging from 9 to 15 years, that when coupled with its potency makes methane an excellent candidate to mitigate climate change in the near term. Methane offers a unique opportunity for cost-effective GHG emissions reductions because when recovered and used properly, it is a valuable energy resource.

Methane is emitted from a variety of natural and human-influenced sources. The latter include landfills, natural gas and petroleum systems, coal mining, livestock farms, wastewater treatment, and certain industrial processes. Methane emissions from these sources currently represent about 8 percent of total U.S. GHG emissions. For the most significant emissions sources, EPA has established partnership programs with industry—working together to reduce methane losses and capture methane, whenever feasible, for use as an energy source. EPA's suite of programs, described in more detail in the following pages, strives to remove market barriers and increase investment in methane recovery and use.

- In 2008, the combined efforts of EPA's methane programs resulted in GHG emissions reductions of 20.3 MMTCE, which is 115 percent more than the total for 2000 (see Table 17, p. 54).
- Combined with a regulatory program to limit air emissions from the nation's largest landfills, the methane partnerships have reduced national methane emissions from targeted sources to 14 percent below 1990 levels. They are projected to remain below 1990 levels through at least 2012 (see Figure 21, p. 54).
- Promoted recovery and use of methane worldwide with a growing number of governments and organizations through the Methane to Markets Partnership.

TABLE 17. EPA's Methane Programs Meet and Surpass Goals

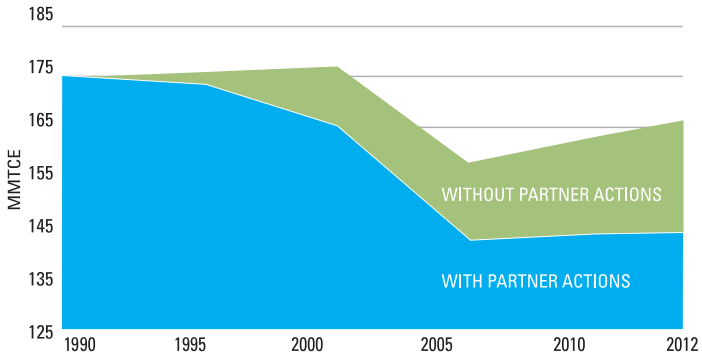
PROGRAM	2008 GOAL	2008 ACHIEVEMENT	2009 GOAL
NATURAL GAS STAR			
Industry Participation (% in program)	60%	62%	62%
Annual Gas Savings (MMTCE)	7.0	12.6	7.2
COALBED METHANE OUTREACH PROGRAM			
Annual Methane Reductions (MMTCE)	2.2	2.2	2.5
LANDFILL METHANE OUTREACH PROGRAM			
Number of Projects	349	360	369
Annual Methane Reductions (MMTCE)	5.5	5.5	5.8
TOTAL REDUCTIONS (MMTCE)	**14.7**	**20.3**	**15.5**

EPA's domestic methane programs—Natural Gas STAR, AgSTAR, the Coalbed Methane Outreach Program, and the Landfill Methane Outreach Program—have all succeeded by following a sound strategy. They provide reliable and comprehensive technical, economic, and policy information to facilitate the adoption of cost-effective emissions reduction technologies and practices.

Each program supports methane reductions, recovery, and use by offering tools and technical assistance to public and private sector partners so they can expand the implementation of methane projects. Experience has shown that in addition to reducing or capturing emissions for sale, active partners often gain a competitive advantage because the methane projects are a catalyst for improving their overall operating efficiency.

For the past 4 years, EPA has leveraged its experience, expertise, and success in the United States to achieve economic and environmental results on a global scale. The Methane to Markets Partnership works to accelerate the recovery and use of methane as a clean energy source with 31 partner governments and more than 900 public and private sector organizations around the world (see Figure 25, p. 60).

FIGURE 21. Partner Actions Are Projected To Maintain Methane Emissions Below 1990 Levels Through 2012



NATURAL GAS STAR PROGRAM

Natural Gas STAR is a collaborative partnership between EPA and the U.S. natural gas industry that is designed to further the adoption of cost-effective technologies and practices that reduce methane emissions. By working with companies from the oil production sector and all sectors of the natural gas supply chain, Natural Gas STAR helps reduce gas losses, improve system efficiency, and ensure that more gas gets to market. A variety of useful tools and resources—including technology transfer workshops, one-on-one technical assistance, and peer networking—assists partners in implementing a wide range of cost-effective methane reduction best management practices and technologies.

Achievements in 2008

- Reduced methane emissions by 12.6 MMTCE, achieving cumulative reductions of more than 90 MMTCE since 1990 (see Figure 22).
- Maintained 60 percent industry participation across all major sectors—production, processing, transmission, and distribution.
- Expanded the program by 10 new partner companies, bringing the total to more than 130.
- Welcomed one new Natural Gas STAR International partner and worked with all existing partners to further identify and implement methane mitigation opportunities.
- Continued to expand onsite technical assistance by conducting five onsite and two online technology transfer workshops, covering all four major gas sectors.
- Recognized 15 partner companies at the 15th Annual Implementation Workshop in San Antonio, TX, for their significant corporate achievements in reducing methane emissions from oil and gas systems (see Table 18).

FIGURE 22. Natural Gas STAR Cumulative GHG Emissions Reductions and Gas Savings

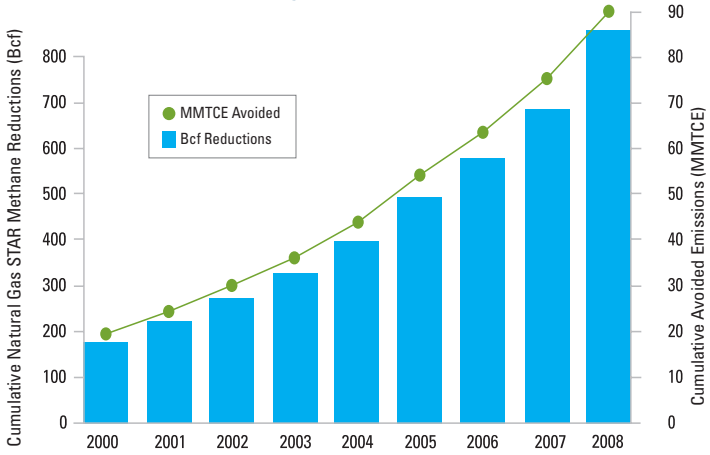


TABLE 18. 2008 Natural Gas STAR Awards

PRODUCTION PARTNER OF THE YEAR
- Occidental Oil and Gas Corporation - *Los Angeles, CA*

GATHERING AND PROCESSING PARTNER OF THE YEAR
- ONEOK Partners - *Tulsa, OK*

TRANSMISSION PARTNER OF THE YEAR
- El Paso Pipeline Group - *Houston, TX*

DISTRIBUTION PARTNER OF THE YEAR
- Consolidated Edison Company of New York - *New York, NY*

CONTINUING EXCELLENCE–5 YEARS
- Devon Energy Corporation - *Oklahoma City, OK*
- Newfield Exploration Company - *Houston, TX*
- Puget Sound Energy - *Bellevue, WA*
- Shell Exploration and Production - *Houston, TX*

CONTINUING EXCELLENCE–7 YEARS
- Atmos Energy Corporation - *Franklin, TN*

CONTINUING EXCELLENCE–12 YEARS
- Anadarko Petroleum Corporation - *Houston, TX*
- Iroquois Gas Transmission - *Shelton, CT*
- PECO Energy Company - *Philadelphia, PA*

CONTINUING EXCELLENCE–15 YEARS
- Consolidated Edison Company of New York - *New York, NY*
- Williams Gas Pipeline - *Houston, TX*

IMPLEMENTATION MANAGER OF THE YEAR
- Aaron Hutchison (Marathon Oil Company) - *Houston, TX*

ROOKIE OF THE YEAR
- Laclede Gas Company - *St. Louis, MO*

What To Expect in 2009 and Beyond

- Update existing materials and develop new tools and resources that highlight the environmental and economic benefits of methane reductions to facilitate and accelerate company implementation of emissions reduction projects.
- Provide partners with one-on-one assistance in identifying and prioritizing new, cost-effective opportunities to further reduce methane emissions.
- Conduct two targeted study tours, two onsite technology transfer workshops, and two Web-based technology transfer workshops.
- Expand the Annual Implementation Workshop to include a broader international focus.
- Perform measurement studies and technology transfer workshops at oil and gas operations globally to assess key emissions sources and identify potential mitigation measures, in addition to providing vital technical training in leak detection and quantification methods.

AGSTAR PROGRAM

Through the AgSTAR Program, EPA—along with its partners the U.S. Department of Agriculture (USDA) and DOE—collaborates with the nation's agriculture industry to reduce methane emissions by promoting the use of anaerobic (without oxygen) digesters and biogas recovery systems to manage animal wastes. EPA offers an array of tools and information designed to assist livestock producers in evaluating and implementing methane recovery systems. The technologies and practices encouraged through AgSTAR help avoid GHG emissions, as well as reduce local water and air pollution. These methane recovery systems also become a source of renewable energy and generate other value-added products that improve farm revenues. Currently, there are more than 220 manure digester systems operating, under construction, or planned in the United States.

Achievements in 2008

- Provided technical support to USDA in selecting 10 anaerobic digester projects for grant and loan funding through the Farm Bill, bringing the total disbursement of funds to digester projects through the Farm Bill to more than $35 million since 2003.
- Supported digester-to-energy projects that produced more than 275 million kWh of renewable energy from farms capturing methane.
- Assisted in the formation and development of Dairy Power, a nationwide initiative aimed at reducing the GHG footprint of the milk industry.
- Launched the AgSTAR state partner program to more effectively leverage expertise and resources within state energy and environmental organizations to accelerate the adoption of digester systems.
- Updated and expanded the AgSTAR national digester database to include 135 operating digesters and 140 digester projects that are planned, under construction, or shutdown.

What To Expect in 2009 and Beyond

- Provide technical expertise to enable the distribution of state and federal grant and loan funds to anaerobic digester projects through the USDA Rural Energy for America Program and other sources.
- Revise and expand the AgSTAR program Web site to provide enhanced tools and resources targeted to livestock producers, project developers, and policy makers.

- Inform nationwide initiatives aimed at overcoming the remaining technical, economic, and policy hurdles that prevent broad adoption of anaerobic digestion systems.
- Plan the fifth annual AgSTAR national conference, as well as regional events, to provide environmental, program, market, state-of-the-art technical, and funding information on anaerobic digestion systems.
- Continue to expand the AgSTAR national digester database to house the latest information on the deployment of anaerobic digestion systems in the United States.

COALBED METHANE OUTREACH PROGRAM

The Coalbed Methane Outreach Program (CMOP) strives to reduce methane emissions from coal mining activities. CMOP works in cooperative partnerships with coal companies and related industries to reduce methane emissions through the development of environmentally beneficial, cost-effective coal mine methane (CMM) recovery and utilization projects. With partners, CMOP helps address the barriers associated with recovering and using CMM.

The program primarily focuses on mitigating emissions from degasification systems at underground coal mines and underground mine ventilation systems, although EPA is also exploring other areas for methane recovery and utilization. CMOP provides high-quality, project-specific information and technical assistance to the coal mining industry and project developers, including:

- Analyses of technologies and potential projects.
- Technology demonstrations.
- Mine-specific project feasibility assessments.
- State-specific analyses of project potential.
- Market evaluations.
- Guides to state, local, and federal assistance programs.

Achievements in 2008

- Increased the percentage of drained CMM that is recovered and used to more than 80 percent—up from 25 percent in the early 1990s.
- Reduced emissions of methane by an estimated 2.2 MMTCE. These results include reductions from 14 active underground coal mines and reductions from about 20 projects that captured and used methane from some 30 closed U.S. coal mines.
- Supported the successful operation and conclusion of a technology demonstration project (the first of its kind in the country) to mitigate methane emissions from diluted mine ventilation air—in cooperation with CONSOL Energy and DOE.
- Created a database of candidate mines and prepared case studies of successful projects to promote CMM recovery and utilization at closed underground mines and active surface mines.
- Organized the 2008 U.S. Coal Mine Methane Annual Conference to address the opportunities and challenges of CMM project development in the United States, including site visits to the EPA-funded ventilation air methane technology demonstration project and a coalbed methane gas upgrade site.
- Hosted a roundtable event to engage officials from leading coal mining and end-use application companies to discuss barriers to project development, particularly financing.
- Launched tools to assist potential CMM project developers, including an online model for project finance and economics.

What To Expect in 2009 and Beyond

- Disseminate results from the conclusion of the demonstration project on mine ventilation air methane mitigation in the United States.
- Update technical reports to provide the latest information on how to recover coal mine methane and use it effectively.
- Directly engage project developers, investors, technology vendors, and the mining community through tailored outreach events, including a conference in the western United States.
- Evaluate opportunities for new coal mine methane recovery and utilization projects, particularly in the western United States.

LANDFILL METHANE OUTREACH PROGRAM

Landfills accounted for about one-quarter of the total U.S. methane emissions in 2008. As one of the largest anthropogenic (human-influenced) sources of methane, many landfills are required by EPA regulations to collect and combust their landfill gas. EPA established the Landfill Methane Outreach Program (LMOP) to provide technical assistance to the smaller landfills not covered by EPA regulations, as well as the larger, regulated operations that are combusting their gas but not yet using it as a clean energy source.

Through LMOP, EPA provides landfill owners and operators a suite of tools and technical resources to help them overcome the obstacles to landfill gas energy (LFGE) project development. This support includes feasibility analyses, decision-making software for evaluating project economics, a database of more than 520 candidate landfills, an online project development handbook, and energy end-user analyses. The benefit of LFGE projects is that they not only prevent direct methane emissions from landfills, but also reduce indirect CO_2 emissions by displacing the electricity generated from the burning of fossil fuels (see Figure 23).

Over the past 14 years, LMOP has assisted approximately 410 projects (see Figure 24) that collectively reduced methane emissions from landfills and avoided CO_2 emissions totaling about 42 MMTCE. These efforts are partially responsible for the approximately 11-percent decrease in methane emissions from landfills since 1990.

FIGURE 23. Direct Use and Electric Capacity of LMOP-assisted Projects

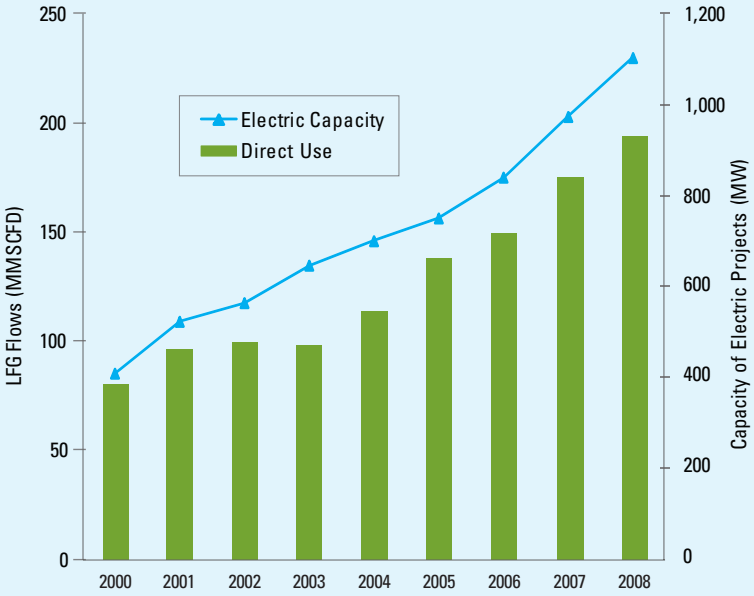
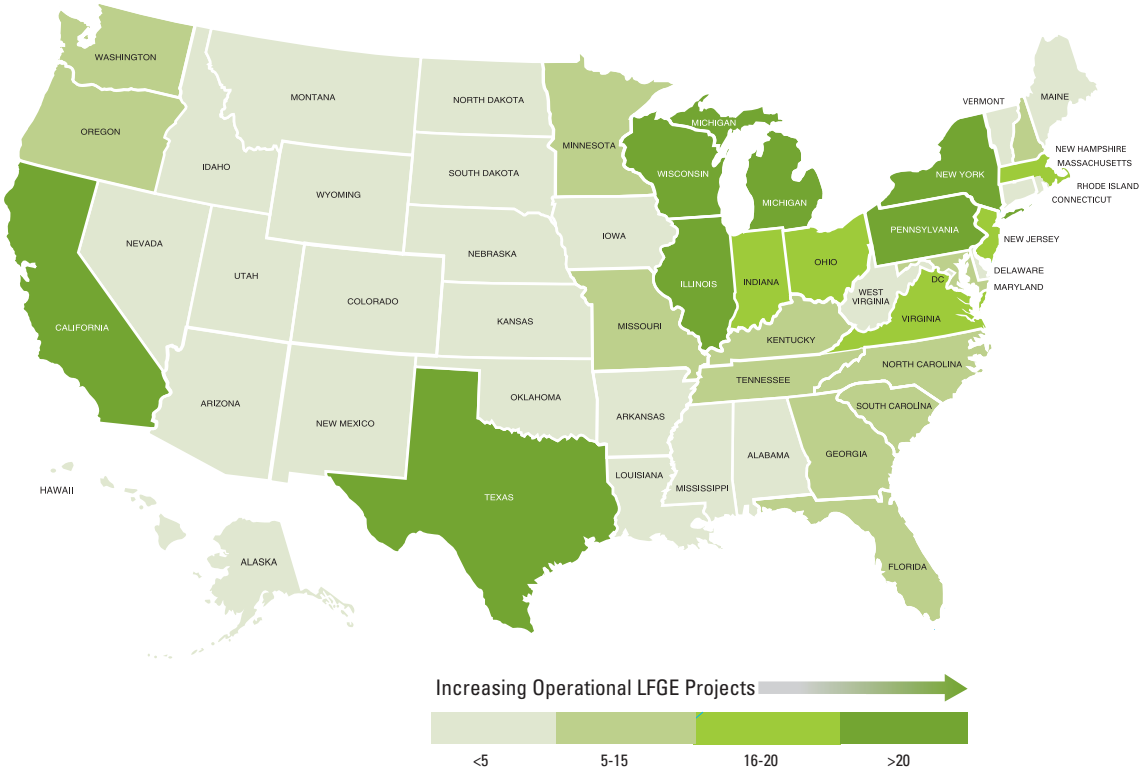


FIGURE 24. Landfill Gas Energy Projects Across the Country



Achievements in 2008

- Reduced methane emissions by 5.5 MMTCE, as a result of helping to develop 48 new LFGE projects and expand 13 projects.
- Welcomed 97 new partners, increasing participation by 14 percent and bringing the total to almost 800 LMOP partners.
- Provided stakeholders technical assistance that included performing more than 100 cost analyses, conducting 80 locator searches to match end-users with landfills, and running models for 50 LFGE projects.
- Drew record attendance—over 500 attendees—at the 12th Annual LMOP Conference and Project Expo, where eight landfills were showcased to attract investors and project developers.
- Garnered public attention for LMOP partners and LFGE projects, which were featured by numerous media outlets, including West Virginia Public Radio, *The Wall Street Journal*, and *The New York Times*. In addition, LFGE end-user SC Johnson and LMOP partner Waste Management produced their own television commercials highlighting their LFGE projects.
- Launched a new Web version of the Project Development Handbook to provide the latest financing and project information to partners, and contributed a chapter on landfills to EPA's Clean Energy Guide.
- Recognized the outstanding accomplishments of four landfill methane partners and three exemplary projects at the 12th Annual LMOP Conference and Project Expo, including the first LMOP award to a vehicle fuel project (see Table 19, p. 60).

What To Expect in 2009 and Beyond

- Assist in the development of more than 40 new LFGE projects.
- Expand efforts to promote the benefits of LFGE to state and local economic development offices, emphasizing job creation and tax revenue opportunities.
- Host the 13th Annual LMOP Conference, Project Expo, and Awards Ceremony to showcase the top LMOP Partners and projects and discuss the latest industry trends.
- Continue to provide current information on incentives for LFGE through fact sheets and listserve announcements.

TABLE 19. 2008 Landfill Methane Outreach Program Awards

PROJECTS OF THE YEAR

- Granger, Conestoga Landfill Gas Utilization Project - *Morgantown, PA*
- Green Energy Center, High Btu Landfill Gas Energy Project - *Grove City, OH*
- Greenville Gas Producers, LLC and County of Greenville - *Greenville, SC*

INDUSTRY PARTNER OF THE YEAR

- Casella Waste Systems, Inc. - *Montpelier, VT*

COMMUNITY PARTNER OF THE YEAR

- Seward County Landfill - *Seward County, KS*

ENERGY PARTNERS OF THE YEAR

- Lansing Board of Water and Light - *Lansing, MI*
- Mars Snackfood US - *Waco, TX*

Methane to Markets

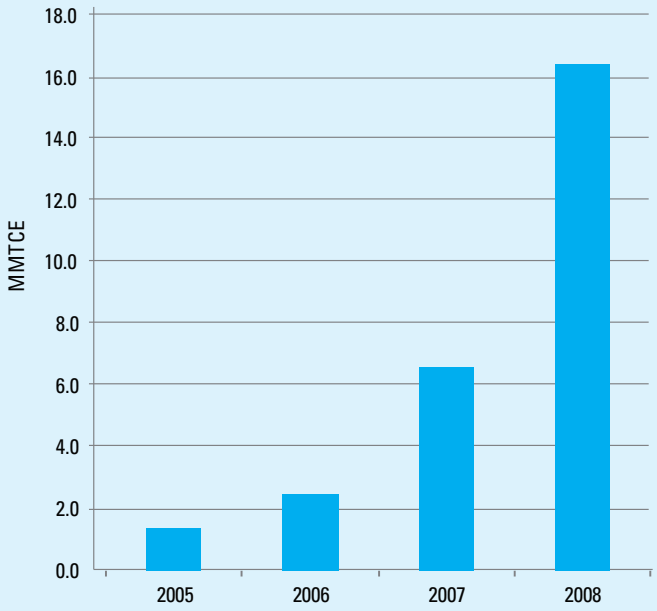
Launched in 2004, Methane to Markets (M2M) is an international initiative that has made tremendous progress in accelerating the development of methane emissions reduction projects around the world. The M2M Partnership has also demonstrated that countries and the private sector can work together cooperatively to reduce GHG emissions, stimulate economic growth, develop new sources of energy, and improve local environmental quality. Building off its domestic methane programs, EPA is working with M2M partners—30 national governments, including the European Union, and more than 900 private and public sector organizations (the Project Network)—to advance methane energy projects from four major sources: agricultural and food processing waste, landfills, underground coal mines, and natural gas and oil systems.

U.S. efforts under the M2M Partnership are led by EPA and involve the collective efforts of six agencies and departments across the federal government. Ongoing U.S.-supported projects are expected to result in estimated annual reductions of approximately 16.4 MMTCE (see Figure 25). U.S. contributions have also leveraged more than $278 million in investment from other partner countries, development banks, the private sector, and members of the Project Network.

As the Partnership looks toward the future, the science of climate change is revealing the critical importance of reducing methane emissions in order to mitigate climate impacts, especially in the near term. EPA and its partners are preparing to tackle this challenge in the years to come, and in 2009 will focus on:

- **Developing New Projects and Achieving Greater Reductions.** Subcommittees will be working to develop country-specific methane reduction action plans, engage new Project Network members, and identify projects for the 2010 India Partnership Expo.
- **Renewing the Partnership's Charter.** M2M partners will be negotiating a new Terms of Reference, potentially expanding the scope to include other methane sources beyond the four major ones mentioned above.
- **Organizing the 2010 India Partnership Expo.** M2M partners and Project Network members will be building on the success of the first Partnership Expo as they develop plans for the next one in New Delhi, India. The first Expo proved to be an effective means of matching project development opportunities with relevant skills and resources, identifying more than 90 project opportunities with an annual emissions reduction potential of 3.1 MMTCE.

FIGURE 25. GHG Reduction Potential of U.S.-supported Projects



FLUORINATED GREENHOUSE GAS PROGRAMS

EPA's fluorinated greenhouse gas (FGHG) partnerships work closely with key industries to manage the fluorinated gas (F-gas) emissions that occur as byproducts of U.S industrial operations. Many F-gases—such as perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), nitrogen trifluoride (NF_3), and sulfur hexafluoride (SF_6)—are potent GHGs, possessing very high global warming potentials (GWPs). These F-gases trap substantially more heat in the atmosphere than does CO_2 on a per mass basis, and some can have much longer atmospheric lifetimes than CO_2 (see Table 20, p. 62).

EPA's suite of partnership programs has helped partners maintain their emissions substantially below 1990 levels through cost-effective operational improvements and other emissions reduction strategies (see Figure 26, p. 62). Despite the potential for sizable growth in F-gas emissions, emissions are expected to stay at these levels through the year 2012. The combined efforts of the FGHG partnerships resulted in GHG emissions reductions of 14.8 MMTCE in 2008 (see Table 21, p. 62).

TABLE 20. Global Warming Potentials (GWPs) and Atmospheric Lifetimes of GHGs

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 HFC-134a	140-11,700 1,300	1.5-264 14
Perfluorocarbons	6,500-9,200	3,200-50,000
Sulfur Hexafluoride	23,900	3,200

Source: IPCC 1996

FIGURE 26. Partner Actions Are Projected To Maintain Emissions of Fluorinated Gases Below 1990 Levels Through 2012

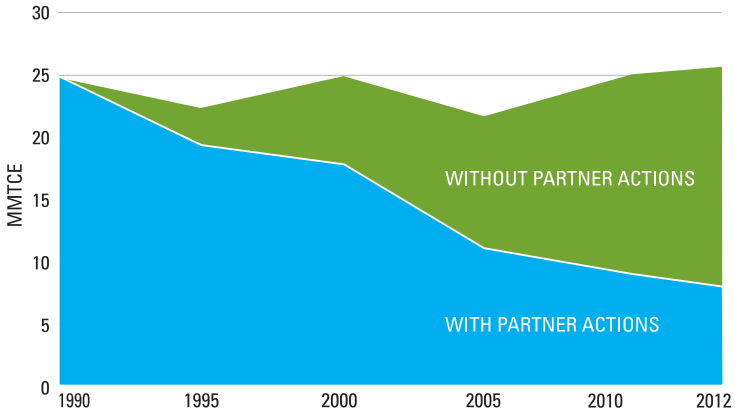


TABLE 21. Goals and Achievements of EPA's FGHG Programs

PROGRAM	2008 GOAL	2008 ACHIEVEMENT	2009 GOAL
VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)			
Industry Participation (% in program)	99%	99%	99%
Reductions (MMTCE)	2.7	2.5	2.8
HFC-23			
Industry Participation (% in program)*	100%	100%	100%
Reductions (MMTCE)	4.7	7.3	4.5
OTHER STEWARDSHIP PROGRAMS			
Industry Participation (% in program)	50-100%	50-100%	50-100%
Reductions (MMTCE)	5.8	5.0	7.3
TOTAL REDUCTIONS (MMTCE)	**13.2**	**14.8**	**14.6**

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

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. VAIP aims to reduce emissions of perfluoromethane (CF_4) and perfluoroethane (C_2F_6)—which are inadvertent byproducts of the smelting process—and emissions of CO_2 caused by the consumption of the carbon anode. This ambitious goal signifies an additional direct carbon intensity reduction of 25 percent beyond 2000 levels.

Achievements in 2008

- Reduced 2.5 MMTCE in direct GHG emissions, which represents reduced PFC emissions of more than 50 percent and reduced direct carbon emissions of more than 53 percent on a per-ton basis compared with the industry's 1990 baseline.
- Measured and analyzed PFC emissions during a pot-line start-up operation.
- Participated in TMS and Aluminum Association programs on PFC reductions.
- Shared information on U.S. progress toward reducing PFC emissions through training workshops at two companies in China. The workshops, presented under the Asia Pacific Partnership, included industry experts from the United States and Australia.
- Completed training for technical experts on using the *EPA/IAI PFC Measurement Protocol* and supported completion of PFC measurements at six smelters in China.

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 emissions intensity has dropped dramatically.[13]

Achievements in 2008

- Reduced emissions by 7.3 MMTCE below what they would have been had production continued at 1990 emissions intensity levels.

THE PFC REDUCTION/CLIMATE PARTNERSHIP FOR THE SEMICONDUCTOR INDUSTRY

Since its inception in 1996, EPA's FGHG Reduction/Climate Partnership for the Semiconductor Industry has been working with semiconductor manufacturers to identify and implement FGHG-reducing process changes and manufacturing tool improvements for the production of integrated circuits. Due to their persistant efforts, EPA's partners are on track to meet the 2010 global GHG emissions reduction target set by the World Semiconductor Council (WSC). In April 1999, WSC—whose members include the national semiconductor industry associations of Europe, Japan, Korea, Taiwan, and the United States—announced a challenging goal: to reduce FGHG emissions by at least 10 percent below the 1995 baseline level by the end of 2010.

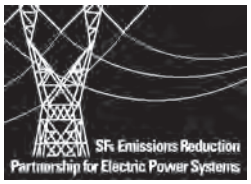
The aggressive goal set by WSC is the world's first industry-wide, global GHG emissions reduction target and demonstrates the semiconductor industry's comprehensive commitment to climate protection. The present challenge for WSC and EPA is to maintain flexibility and dynamic leadership to include emerging production centers in China, Malaysia, and Singapore, as well as expanding cooperation with related high-tech electronics manufactoring sectors.

[13] *HFC-23 emissions intensity is the amount of HFC-23 emitted per kilogram of HCFC-22 manufactured.*

Achievements in 2008

- Reduced absolute FGHG emissions by 2.9 MMTCE, or more than 16 percent below business-as-usual (BAU) levels, while U.S. manufacturing continued to expand.
- Completed the first draft of a standard method for characterizing destruction or removal efficiency (DRE) of FGHG-abatement technologies and initiated a peer review by holding a number of stakeholder meetings with the Japan Electronics and Information Technology Industries Association, U.S. experts, and the Taiwan Industrial Technology Research Institute.
- Worked with partner company IBM to evaluate installed F-gas abatement devices in full-scale production settings. EPA is working with electronics manufacturing partners to evaluate and validate its proposed standard measurement protocol and to help partners learn how their installed emissions control technologies operate between periodic maintenance. For the first time, EPA's collaborative study also evaluated using a non-dispersive infrared (NDIR) spectrometer as a potential low-cost continuous emissions monitoring technology for specific types of F-gases.
- Introduced a new cooperative global electronics industry framework for comprehensively addressing climate change. This expanded model of cooperation will facilitate information sharing among all major related electronics manufacturing sectors—such as semiconductors, liquid crystal displays (LCDs), microelectrical mechanical systems (MEMs), and photovoltaics—that are pursuing comparable climate protection goals.

SULFUR HEXAFLUORIDE (SF_6) EMISSIONS REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS



SF_6 is the most potent and persistent GHG. Used primarily by electric utilities, SF_6 is a gaseous dielectric for high-voltage circuit breakers and gas-insulated substations. The global warming potential of SF_6 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 CO_2.

Since 1999, EPA has partnered with several electric utilities through the SF_6 Emissions Reduction Partnership for Electric Power Systems, a voluntary program to reduce SF_6 emissions. In addition to providing a means to actively address climate change, this program has helped partner companies reap financial savings through reduced SF_6 gas purchases. Members of the partnership represent 42 percent of the total U.S. transmission system.

Achievements in 2008

- Reduced emissions by 1.8 MMTCE, bringing average SF_6 emissions rates down to 4.7 percent of the total equipment nameplate capacity.
- Welcomed two new partner companies: New York State Electric and Gas in Ithaca, New York, and VT Transco in Rutland, Vermont.
- Conducted a workshop on reducing SF_6 emissions with over 130 participants and 18 vendors. In addition, experts from fluorocarbon producers, equipment manufacturers, and the electric power, leak detection camera, and recycling industries participated. The 2-day event included a site visit to a substation where SF_6 reduction techniques were demonstrated.
- Continued to work with partners to update SF_6 reduction goals through the year 2012.
- Recognized two partners—Consolidated Edison Company of New York and Arizona Public Service—for their significant emissions reductions and their exemplary participation in the partnership.

SF_6 EMISSION REDUCTION PARTNERSHIP FOR THE MAGNESIUM INDUSTRY

The U.S. magnesium industry and the International Magnesium Association (IMA) are working with EPA through the SF_6 Emission Reduction Partnership for the Magnesium Industry to identify and adopt best management practices for reducing and eliminating emissions of SF_6. Launched in 1999, this partnership works to reduce SF_6 emissions from magnesium production and casting operations, and currently includes more than 80 percent of the U.S. magnesium industry. In 2003, partner companies and the IMA committed to completely eliminating their firms' SF_6 emissions by the end of 2010.

Achievements in 2008

- Reduced SF_6 emissions equivalent to .39 MMTCE. 2008 was the ninth year in which EPA collected annual SF_6 emissions reports from magnesium industry partners.
- Organized and led the 4th Annual Global Magnesium Industry Climate Protection Workshop in conjunction with the 2008 Annual World Magnesium Conference in Warsaw, Poland. International industry and government officials participated in exchanging technical information on phasing out SF_6-based melt protection.[14]
- Completed the fifth study of alternative melt protection technologies and associated air emissions. Partner company AMACOR 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.
- Partner company Meridian Magnesium Die Casting announced it has fully transitioned to alternative cover gases in its North American manufacturing facilities.

MOBILE AIR CONDITIONING CLIMATE PROTECTION PARTNERSHIP

Motor vehicle air conditioners contribute significantly to global GHG 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, equal to about 17 MMTCE.[15] Additionally, refrigerant leakage adds 30,000 to 40,000 kilograms of HFC-134 each year, equal to about 12 to 16 MMTCE.[16]

In 1998, the Society of Automotive Engineers (SAE) International, the Mobile Air Conditioning Society Worldwide, and EPA formed the Mobile Air Conditioning (MAC) Climate Protection Partnership—a global voluntary partnership to reduce the climate impacts of MAC systems. Membership has grown to include 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 (see Figure 27, p. 66).
- Communicate technical progress to policymakers and the public.

[14] *Full conference proceedings are available at: http://www.epa.gov/highgwp/magnesium-sf6/conf/conf_4thglobal.html.*

[15] *For more information, see Andersen, S., et al., 2004. Carbon dioxide equivalent calculated with EPA Greenhouse Gas Equivalencies Calculator: http://www.epa.gov/cleanenergy/energy-resources/refs.html.*

[16] *These figures are based on sales and official U.S. EPA estimates. According to industry sources, approximately 30,000 kilograms of HFC-134a were sold into the U.S. mobile air conditioning aftermarket in 2008. The U.S. GHG Inventory estimates that in 2007 approximately 40,000 kilograms of HFC-134a were released from mobile air conditioning. The GWP of HFC-134a is 1,430.*

- 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.

Achievements in 2008

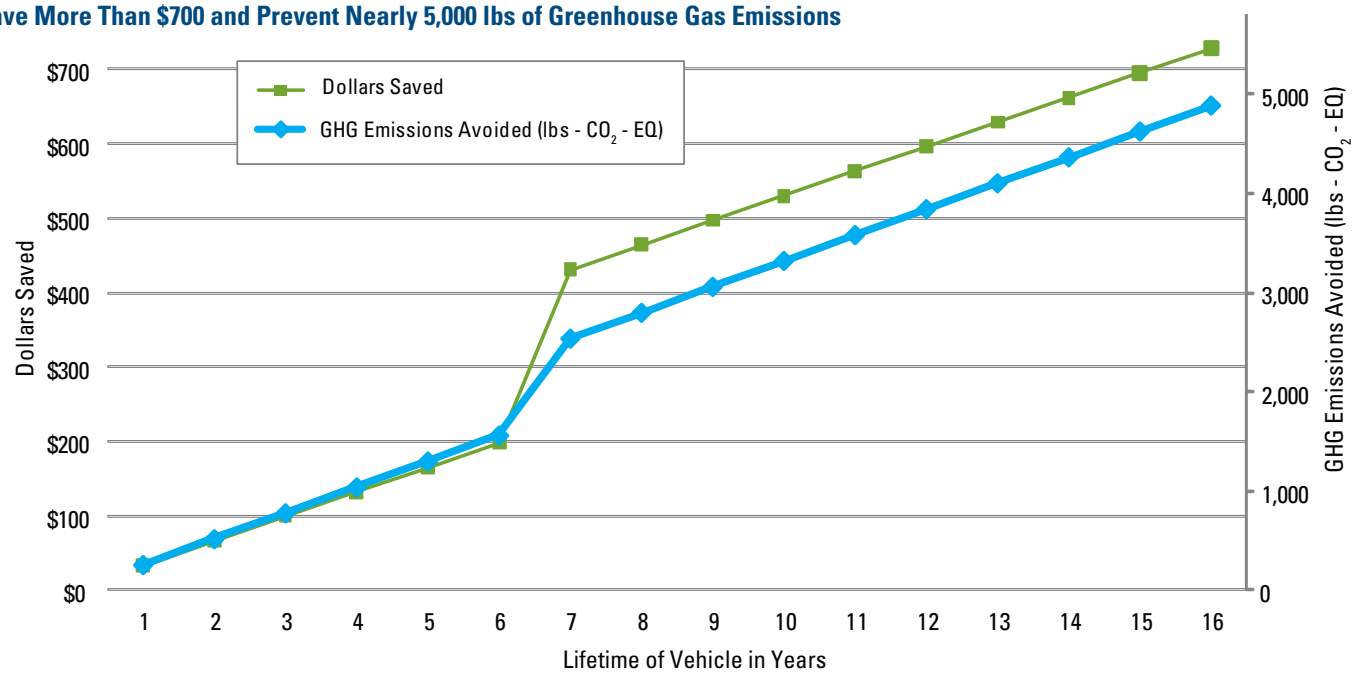
- Announced plans to introduce new air conditioning technology using refrigerants with low global warming potentials by 2011.
- Worked with international, national, state, and local partners to remove barriers to new refrigerants.
- Calculated the global lifecycle climate impact of the three major alternative refrigerants to determine which refrigerants have the best climate performance.

What To Expect in 2009 and Beyond for the FGHG Programs

The FGHG 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:

- Benchmark current emissions reduction options and costs across high F-gas industries to support partnership and policy-making activities.
- Complete a lifecycle analysis of SF_6 versus solid-state material in medium-voltage electric power equipment.
- Continue recruiting companies to participate in the SF_6 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 SF_6 by demonstrating alternative melt protection technologies for primary producers and secondary ingot casters.
- Maintain active partnerships with HCFC-22 chemical manufacturers to continue to reduce emissions of HFC-23.

FIGURE 27. Over the Lifetime of a Vehicle, an IMAC* System Will Save More Than $700 and Prevent Nearly 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.*

DEMONSTRATING PROGRESS

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. 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. 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 business-as-usual (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 2018 due to investments made through 2008. For this analysis, EPA assumes no new investments will be made through its programs in 2009 or beyond.
- Financial benefits are placed in present value terms.

Environmental and financial benefits for 2000 to 2008 are summarized in Table 1 on p. 3. The historical environmental benefits and cost effectiveness of these programs are summarized on pages 68 and 69 (see Table 22 and Figure 28). 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.

FIGURE 28. EPA Programs Are Highly Cost-Effective Mechanisms for Reducing GHG 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 study, "Reducing Greenhouse Gas Emissions: How Much at What Cost?" that there are still great untapped opportunities for these programs to capture—meaning they will continue to be cost-effective far into the future. Every federal dollar spent on these partnership programs through 2008 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.

ENERGY STAR

Through the ENERGY STAR program, EPA helps U.S. businesses and consumers save money and reduce GHG 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.[17] 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.
  - 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.

[17] *For more details on many aspects of this method, see Homan et al., 2009 and Weber et al., 2000.*

TABLE 22. Overview of EPA's Climate Partnership Programs Reviewed in This Annual Report With GHG Reductions Since 2000

PROGRAM	GHGS ADDRESSED	KEY SECTOR(S)	SCOPE OF PARTNERS AS OF 2008	GHG REDUCTIONS* (MMTCE)								
				2000	2001	2002	2003	2004	2005	2006	2007	2008
ENERGY STAR	CO_2	Residential, Commercial, Industrial	15,000	15.2	17.7	21.3	25.0	28.5	32.2	36.3	41.4	45.0
Climate Leaders	All	Commercial, Industrial	250	Climate Leaders' reductions are reflected in the data shown for other programs.								
Clean Energy-Environment State Partnership	CO_2	State Government	16						—	—	—	—
CLEAN ENERGY SUPPLY[1]												
Green Power Partnership	CO_2	State & Local Government, Commercial, Industrial	1,000	—	—	0.6	1.0	2.0	3.2	3.7	4.8	6.1
Combined Heat & Power Partnership	CO_2	Commercial, Industrial	250									
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	12.6
Coalbed Methane Outreach Program (CMOP)	CH_4	Coal Mining	—	2.1	2.3	1.7	1.7	2.0	2.0	2.5	2.2	2.2
Landfill Methane Outreach Program (LMOP)	CH_4	Waste Management	750	3.2	3.7	3.9	4.1	4.4	4.5	4.8	5.2	5.5
FGHG 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	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	7.3
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	3.9	4.3	5.0
Mobile Air Conditioning (MAC) Partnership	CO_2 HFCs	MAC Industry	—	Working toward technology improvement goals								

[1] *GHG reductions are for both the Green Power Partnership and Combined Heat & Power Partnership.*

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

—: Not applicable

- 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.[18] All energy bill calculations use national sector-specific fuel prices.
- Avoided emissions of GHGs for 2008 are determined using marginal emissions factors for CO_2 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.[19] For future years, EPA uses factors derived from energy efficiency scenario runs of the integrated utility dispatch model, Integrated Planning Model (IPM®).[20]

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.
- 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 GHGs 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.[21] 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 2008 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.[22]
- 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.
- 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 GHGs are determined using marginal emissions factors for CO_2 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.[23] 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). GHG emissions are calculated using marginal CO_2 emissions as with products.

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[18] *Calculated using a 7% discount rate and 2008 perspective.*
[19] *For more details on eGRID, see U.S. EPA, 2008.*
[20] *For more details on IPM, see U.S. EPA, 2006.*
[21] *For more details on many aspects of this method, see Horowitz, M.J., 2009, 2008, and 2007*
[22] *For more details on many aspects of this method, see Horowitz, M.J., 2009.*
[23] *For more details on many aspects of the previous methods, see Horowitz, M.J., 2004 and 2001.*

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 GHGs 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 GHGs are determined using marginal emissions factors for CO_2 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.

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 Program

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 Program

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, the Landfill Methane Outreach Program's (LMOP's) 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 Program

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 GREENHOUSE GAS PROGRAMS

Due to the small pool of potential partners for the FGHG 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 FGHG 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 GHG emissions and reductions that are a result of the program.

The aluminum industry began making significant efforts to reduce FGHG 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 GHG emissions and reductions that are a consequence of 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 SF_6 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 GHG 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.

Figures

Tables

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