



# ENERGY STAR® and Other Climate Protection Partnerships

ENERGY STAR

2010 Annual Report



# ENERGY STAR® AND OTHER CLIMATE PROTECTION PARTNERSHIPS

## 2010 ANNUAL REPORT

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For information, please visit our programs at [www.epa.gov/cppd](http://www.epa.gov/cppd), [www.energystar.gov](http://www.energystar.gov), [www.epa.gov/greenpower](http://www.epa.gov/greenpower), [www.epa.gov/chp](http://www.epa.gov/chp), [www.epa.gov/cleanenergy/stateandlocal/index.htm](http://www.epa.gov/cleanenergy/stateandlocal/index.htm), [www.epa.gov/methane](http://www.epa.gov/methane), and [www.epa.gov/highgwp](http://www.epa.gov/highgwp).

*NOTE: The data source for all figures and tables in this 2010 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 2011

Global challenges like climate change demand strong partnerships and innovative solutions. For more than 18 years, EPA has partnered with organizations across America to help deliver those innovative, cost-effective solutions and fight against climate change.

Through cutting-edge investments in energy-efficient and clean energy technologies and practices, EPA's ENERGY STAR and climate protection partners are tackling the challenges of climate change while improving our health and strengthening our economy. The 2010 accomplishments include:

- Americans saved \$20 billion in 2010 on their utility bills with the help of ENERGY STAR, and prevented the equivalent of greenhouse gas emissions from 38 million vehicles.
- Since the Green Power Partnership was introduced in 2001, more than 1,300 organizations have committed to use more than 18 billion kilowatt-hours of green power each year.
- More than 400 partners have installed over 5,000 megawatts of new combined heat and power since the Combined Heat and Power Partnership launched in 2001.
- Through its partnerships in 2010, EPA's methane and fluorinated greenhouse gas programs used EPA tools and resources to avoid the equivalent of emissions from more than 24 million vehicles.

EPA's ENERGY STAR and climate protection partners are saving consumers money, while improving our health and securing lasting prosperity. EPA will continue to build on the success of these partnerships to address climate change through comprehensive, common-sense solutions that benefit all Americans and the world.

Sincerely,



Lisa P. Jackson

Administrator

U.S. Environmental Protection Agency

# EXECUTIVE SUMMARY



The U.S. Environmental Protection Agency's (EPA's) climate protection partnership programs are taking bold steps to address climate change, one of our nation's most pressing environmental problems. For the past 18 years, these partnerships have implemented practical, proven, cost-effective solutions for reducing greenhouse gas (GHG) emissions with outstanding environmental and financial success. However, certain market barriers persist and continue to limit the widespread investment in and adoption of energy efficiency, clean energy supply options, and other climate-friendly policies and technologies (see Table 1).

EPA's partnership programs work to dismantle those barriers across the residential, commercial, and industrial sectors by developing tools, offering technical assistance, and sharing best practices. That support combined with voluntary standards, objective information, and public recognition has consolidated EPA's partnership programs as valuable resources for the many households, businesses, and organizations ready to change the way they use energy.

Strong results for 2010 continued the programs' impressive achievements of the past 18 years.<sup>1</sup> More than 23,000 partners across the country have joined EPA in its efforts to reduce GHG emissions. Together, EPA's partners and millions of American consumers have realized significant environmental and economic benefits (see Table 2, p. 5):

- Preventing more than 345 million metric tons (in  $\text{MMTCO}_2\text{e}$ )<sup>2</sup> of GHG emissions—equivalent to the emissions from 81 million vehicles (see Figure 4, p. 6)—with net savings to consumers and businesses of about \$21 billion in 2010 alone.
- Preventing more than 5,400  $\text{MMTCO}_2\text{e}$  of GHG emissions cumulatively and providing net savings to consumers and businesses of more than \$314 billion over the lifetime of their investments.
- Investing about \$102 billion in energy-efficient, climate-friendly technologies.

<sup>1</sup> 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 the reduction in greenhouse gas emissions across the entire set of climate programs to be about 470 million metric tons of carbon dioxide equivalent ( $\text{MMTCO}_2\text{e}$ ) in 2010.

<sup>2</sup> All reductions in annual greenhouse gas emissions are reported in million metric tons of carbon dioxide equivalent ( $\text{MMTCO}_2\text{e}$ ).

TABLE 1. Market Barriers Addressed by EPA's Climate Partnership Programs

AUDIENCE OR TARGET MARKET	MARKET BARRIERS ADDRESSED	CLIMATE PROTECTION PARTNERSHIP PROGRAM								
		ENERGY STAR	Climate Leaders	Green Power Partnership	Combined Heat & Power Partnership	State Climate and Energy Program	Local Climate and Energy Program	State and Local Energy Efficiency Action Network	Methane Programs	Fluorinated Greenhouse Gas Programs
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 efficiency program costs and benefits	●			●			●		●
	Disincentives for energy efficiency in existing regulations and energy planning processes							●		
Industries with High Global Warming Potential (GWP) Emissions*	Lack of objective measurement tools									●
	High investment costs									●
	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.

## Highlights of 2010

### Promoting Energy Efficiency Through ENERGY STAR®

Since 1992, the ENERGY STAR program has served as a trusted source for voluntary standards and unbiased information to help consumers and organizations across the country adopt energy-efficient products and practices as cost-effective strategies for reducing GHGs and protecting our climate. Through ENERGY STAR, EPA continues to promote energy efficiency across the residential, commercial, and industrial sectors (see Figure 2). In 2010, EPA's ENERGY STAR efforts helped Americans:

- Save more than 240 billion kilowatt-hours (kWh)—about 5 percent of U.S. electricity demand.
- Prevent 195 million metric tons of GHGs—equivalent to the annual emissions from 38 million vehicles.
- Save more than \$20 billion on their energy bills.

These benefits are more than three times those in 2000 (see Figure 1). Additional ENERGY STAR program highlights, with notable achievements for 2010 and cumulatively, include:

#### ENERGY STAR Qualified Products

- More than 40,000 individual product models, produced by over 1,600 manufacturing partners, have earned the ENERGY STAR across more than 60 product categories.
- Americans purchased some 200 million ENERGY STAR qualified products in 2010, bringing the total to about 3.5 billion since 2000.<sup>3</sup>
- EPA finalized third-party certification and enhanced product testing and verification procedures.

### New Home Construction

- More than 126,000 ENERGY STAR qualified new homes were constructed in 2010 alone—representing over 25 percent of housing starts in the United States. Since the program's launch, nearly 1.2 million homes have been built to ENERGY STAR guidelines.

### Home Improvement

- Over 35,000 existing homes were retrofitted through Home Performance with ENERGY STAR in 2010—for a total of more than 110,000 retrofits—with the help of more than 1,300 participating contractors across some 30 markets.

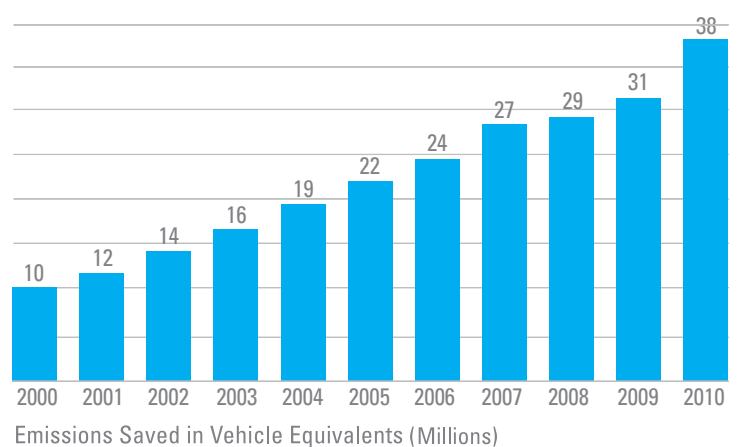
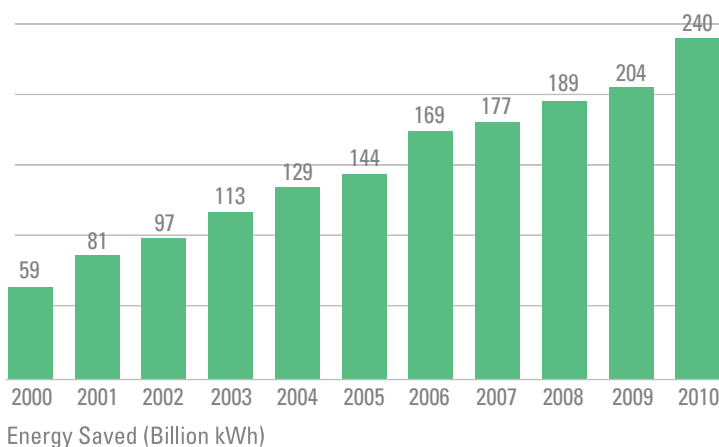
### Commercial Buildings

- More than 6,200 buildings earned the ENERGY STAR in 2010 for a cumulative total of over 12,600 buildings—representing in excess of 2 billion square feet of U.S. building space.
- Over 200,000 buildings, representing more than 18 billion square feet of space and more than 25 percent of the total market, were assessed for energy efficiency using Portfolio Manager, EPA's ENERGY STAR measurement and tracking tool.

### Industrial Sector

- After nearly a decade of energy efficiency work with the cement sector, EPA re-benchmarked the energy performance of U.S. cement plants, revealing dramatic improvements in energy efficiency across the industry, which included a 13-percent improvement in energy intensity.

**FIGURE 1. Since 2000, ENERGY STAR Benefits Have More Than Tripled**



<sup>3</sup> Does not include purchases of compact fluorescent bulbs.

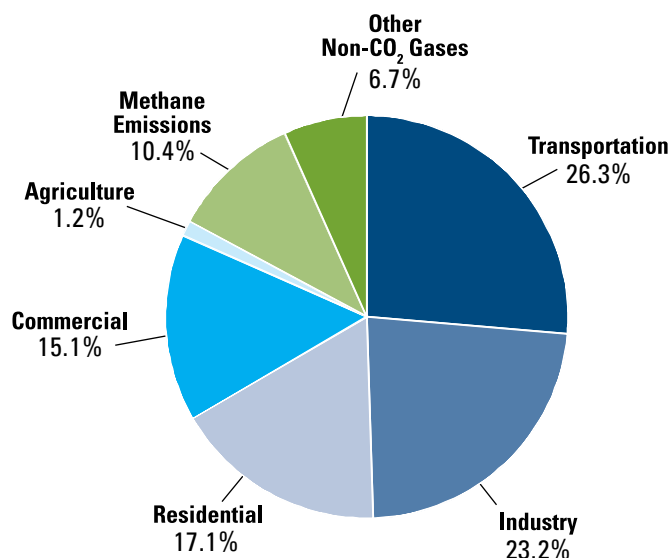
## Recognizing Corporate Environmental Leadership

Partners in EPA's Climate Leaders program are Fortune 500 and other leading corporations that have committed to aggressively reducing their GHG emissions. In 2010, nine additional partners achieved Climate Leaders GHG reduction goals, and 32 partners announced new corporate GHG reduction goals. During 9 years of activity, the Climate Leaders program achieved a number of significant milestones while working to reduce GHG emissions. In 2010, EPA announced the program would phase down the services offered in the coming year with an official end date for the program of September 30, 2011.

## Transforming the Clean Energy Marketplace

EPA's Clean Energy Supply programs—the Green Power Partnership and the Combined Heat and Power (CHP) Partnership—are designed to increase the nation's supply of clean energy and accelerate the adoption of clean energy supply technologies throughout the United States (see Figure 3, p. 6). Since 2001, both programs have provided technical assistance and recognized significant leadership in end-use efficiency and use of renewable energy. By engaging over 1,300 partners in the purchase of more than 18 billion kWh of green power annually and 409 partners in the installation of more than 210 megawatts (MW) of new CHP capacity, the Clean Energy Supply programs reduced GHG emissions by 26.4 MMTCO<sub>2</sub>e in 2010 alone.

FIGURE 2. U.S. CO<sub>2</sub> Emissions by Sector and Non-CO<sub>2</sub> Gases by Percent of Total GHGs



Source: EPA 2011b.

TABLE 2. Annual and Cumulative Benefits From Partner Actions Through 2010 (in Billions of 2010 Dollars and MMTCO<sub>2</sub>e)

PROGRAM	BENEFITS FOR 2010		CUMULATIVE BENEFITS 1993 – 2020			
	NET SAVINGS (BILLION \$)	EMISSIONS AVOIDED (MMTCO <sub>2</sub> e)	PV OF BILL SAVINGS (BILLION \$)	PV OF TECHNOLOGY EXPENDITURES (BILLION \$)	PV OF NET SAVINGS (BILLION \$)	EMISSIONS AVOIDED (MMTCO <sub>2</sub> e)
<b>ENERGY STAR Total</b>	<b>\$20.3</b>	<b>195.8</b>	<b>\$402.1</b>	<b>\$96.4</b>	<b>\$305.7</b>	<b>2,980</b>
Qualified Products and Homes	\$11.2	83.8	\$195.1	\$29.7	\$165.4	1,276
Buildings	\$7.1	81.2	\$168.4	\$57.4	\$111.0	1,261
Industry	\$2.0	30.8	\$38.6	\$9.3	\$29.3	443
Clean Energy Programs	—	26.4	—	N/A	—	393
Methane Programs	\$0.7	71.0	\$15.1	\$6.2	\$8.9	1,019
FGHG Programs	—	52.0	—	N/A	—	1,034
<b>TOTAL</b>	<b>\$21.0</b>	<b>345.2</b>	<b>\$417.2</b>	<b>\$102.6</b>	<b>\$314.6</b>	<b>5,426</b>

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 53.

—: Not applicable

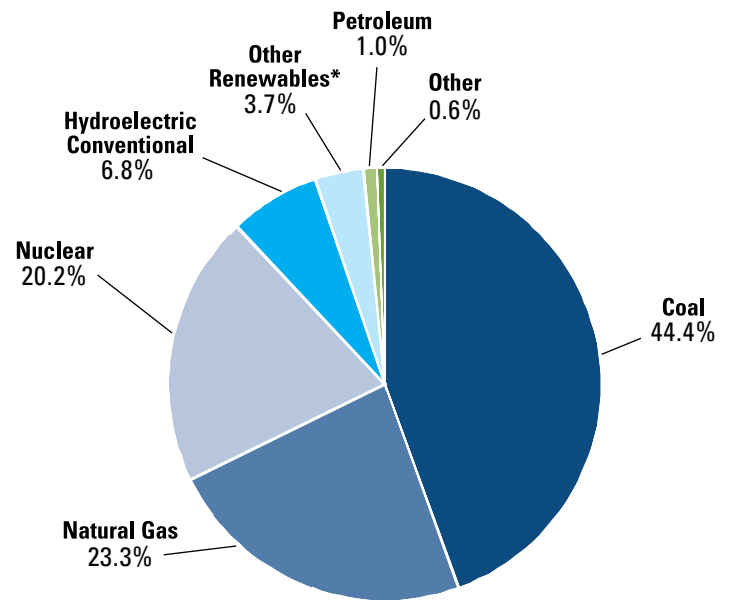
N/A: Not available

## Expanding Clean Energy Opportunities for State and Local Governments

EPA works with state and local governments to overcome the informational and institutional barriers that can limit development of energy efficiency and clean energy policies. In 2010, EPA made important progress assisting state and local governments in taking advantage of clean energy funding available through the American Recovery and Reinvestment Act of 2009 (ARRA).

- EPA introduced a comprehensive website that offers states and communities information on climate and energy tools, reporting, and peer exchange opportunities.
- EPA launched the first 25 Climate Showcase Communities projects and announced the second application period, with a goal of creating replicable models of sustainable community action.
- EPA and the U.S. Department of Energy (DOE) jointly released the new State and Local Energy Efficiency Action Network that provides guidance on policies and practices to bring energy efficiency to scale.

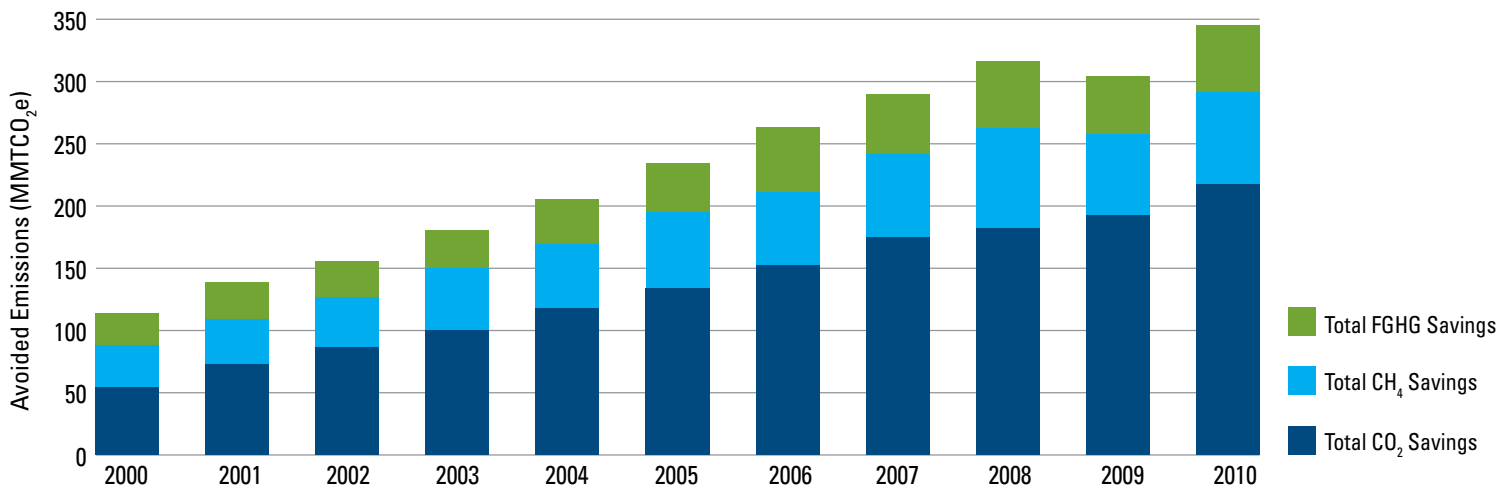
FIGURE 3. U.S. Electricity Generation by Fuel Type



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

Source: EIA 2011.

FIGURE 4. GHG Emissions Reductions Exceed 345 MMTCO<sub>2</sub>e—Equivalent to Emissions From 81 Million Vehicles



NOTE: For Total FGHG Savings, 2007, 2008, 2009, and 2010 include savings from GreenChill. 2009 and 2010 also include savings from RAD.



## Reducing Methane Emissions and Recovering an Energy Resource

Methane (CH<sub>4</sub>) is both a potent GHG and a highly desirable clean fuel. EPA's methane programs continued to reduce emissions—from landfills, agriculture (manure management), oil and natural gas systems, and coal mines—and to develop projects to recover and use the methane whenever feasible. In 2010, the programs avoided GHG emissions of 71.0 MMTCO<sub>2</sub>e, exceeding their reduction goals and maintaining national methane emissions from these target sources 15 percent below 1990 levels.

## Reducing Fluorinated GHG (FGHG) Emissions

Many of the fluorinated gases—including chloro-fluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>)—are extremely powerful and persistent GHGs. Together, these programs avoided 52.0 MMTCO<sub>2</sub>e of GHG emissions in 2010.

## Honoring Partner Accomplishments

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

- ENERGY STAR Award Winners (see Table 6, p. 12)
- Green Power Leadership Awards (see Table 12, p. 33)
- ENERGY STAR CHP Awards (see Table 14, p. 35)
- Natural Gas STAR Awards (see Table 16, p. 41)
- Landfill Methane Outreach Program Awards (see Table 17, p. 45)

## The 2010 Annual Report

EPA's programs continue to advance GHG reduction goals and deliver greater benefits each year. These benefits can only grow as more businesses, public sector institutions, households, and others adopt the practices promoted by the climate protection partnerships (see Table 3). This annual report presents detailed information on EPA's 2010 efforts within each of the partnerships mentioned in this Executive Summary. Each individual program section includes:

- Program overview and accomplishments.
- Environmental and economic benefits achieved in 2010.
- Summaries of the major tools and resources offered by the program.
- Goals for the future.

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 Demonstrating Progress section of the report, p. 53). For each program, EPA addresses common issues that arise when estimating program benefits, such as data quality, double counting, free-ridership, external promotion by third parties, and market effects, among others. The information presented in this annual report is similar to much of the information used in the U.S. Office of Management and Budget (OMB) Program Assessment Rating Tool (PART), which found these EPA programs to be achieving their goals.

**TABLE 3. Long-Term GHG Reduction Goals for EPA Climate Partnership Programs (MMTCO<sub>2</sub>e)**

PROGRAM	ACCOMPLISHMENTS		GOALS	
	2010	2012	2015	
ENERGY STAR	195.8	191	235	
Clean Energy Supply Programs	26.4	29	44	
Methane Programs	71.0	66	73	
Fluorinated Greenhouse Gas Programs	52.0	70	81	
<i>Responsible Appliance Disposal*</i>	0.1	0.3	0.5	
<i>GreenChill Partnership*</i>	2.4	3.1	4.6	
<b>TOTAL</b>	<b>345.2</b>	<b>356</b>	<b>433</b>	

\*The GHGs addressed by RAD and GreenChill includes HFCs. The numbers reflected do not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 0.9 – 2.3 MMTCO<sub>2</sub>e.



Tough economic times, coupled with volatile energy prices and energy security concerns, have made cost-effective solutions for reducing energy use and preventing GHG emissions more important than ever for businesses, consumers, and organizations. Despite being a proven strategy that can protect the environment while stimulating the economy and creating new jobs, many energy efficiency opportunities remain. Fortunately, a growing number of Americans across the country are leading by example and seizing this opportunity to protect the climate and reduce their utility bills by investing in energy-efficient technologies and practices.

In 1992, EPA launched the ENERGY STAR program. Since that time this innovative program has overcome market barriers and advanced the adoption of energy-efficient products, practices, and services across the residential, commercial, and industrial sectors. In 1996, DOE joined EPA in supporting specific ENERGY STAR program responsibilities. ENERGY STAR continues to be regarded as the trusted source of unbiased information that helps Americans identify reliable, cost-effective, energy-saving solutions that protect the environment by reducing GHG emissions.

Benefits have grown steadily since the program's inception and will continue to grow as consumers and businesses further leverage ENERGY STAR and take action to:

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

## Achievements in 2010

### National Benefits

The combined achievements across the entire ENERGY STAR program are impressive (see Table 4):

- **Financial Savings.** Americans saved more than \$20 billion on their utility bills across the residential, commercial, and industrial sectors.
- **Energy Savings.** Americans avoided the need for more than 240 billion kWh of electricity or about 5 percent of the total 2010 U.S. electricity demand.
- **GHG Emissions Prevented.** Americans prevented 195 million metric tons of GHG emissions, equivalent to the annual emissions from 38 million vehicles.

**TABLE 4. ENERGY STAR Program Achievements Exceed Goals in 2010**

	2010 ENERGY SAVED (BILLION kWh)	2010 EMISSIONS AVOIDED (MMTCO <sub>2</sub> e)		2011 EMISSIONS AVOIDED (MMTCO <sub>2</sub> e)
	ACHIEVED	GOAL	ACHIEVED	GOAL
All Qualified Products <sup>1</sup>	114.8	82.5	81.4	89.8
New Homes <sup>2</sup>	1.8	5.5	2.4	6.6
Commercial Building Improvements <sup>3</sup>	112.9	56.8	81.2	60.5
Industrial Improvements <sup>4</sup>	15.1	18.0	30.8	19.4
<b>PROGRAM TOTAL for ENERGY STAR</b>	<b>244.6<sup>5</sup></b>	<b>162.8</b>	<b>195.8</b>	<b>176.4</b>

<sup>1</sup>Results for qualified products from Homan et al., 2011. <sup>2</sup>Results for qualified homes from CPPD, 2010. <sup>3</sup>Results from building improvements based on methodology presented in Horowitz, 2011a.

<sup>4</sup>Electricity results from industrial improvements based on methodology presented in Horowitz, 2011b. <sup>5</sup>The kWh savings imply peak demand savings of more than 35 gigawatts (GW), based on conservation load factors developed by LBNL (Kooimey et al., 1990).

### Key Achievements by Program Focus

About 45 percent of the program benefits realized in 2010 can be attributed to the purchase and use of products and new homes that earned the ENERGY STAR. The use of energy management strategies by organizations in the commercial and industrial sectors accounted for the remaining 55 percent. Other key achievements in 2010 included (see Table 5, p. 11):

- **ENERGY STAR Awareness.** Public awareness of the ENERGY STAR label was greater than 80 percent. Additionally, about three-quarters of the households that knowingly purchased a product that had earned the ENERGY STAR credited the label as an important factor in their decision.
- **Products.** American consumers purchased about 200 million products that had earned the ENERGY STAR—despite the economic downturn—for a cumulative total of about 3.5 billion products purchased since 2000.<sup>4</sup>
- **Residential Buildings.** Since the program's launch, nearly 1.2 million ENERGY STAR qualified homes have been built in the United States. More than 126,000 new homes were constructed to meet ENERGY STAR guidelines in 2010 alone, representing over 25 percent of new home starts nationwide.<sup>5</sup>
- **Commercial Buildings.** Through 2010, more than 25 percent of the nation's building space was assessed for energy performance. Over 12,600 buildings have earned the ENERGY STAR, while more than 300 new building design projects have achieved Designed to Earn the ENERGY STAR.
- **Industrial Facilities.** EPA's ENERGY STAR Industrial Focuses expanded to include 20 sectors and subsectors with the launch of the concrete and dairy Focuses. EPA awarded the ENERGY STAR to 49 plants in 2010—including several for the first time in the cookie and cracker sector—bringing the cumulative total to nearly 80.

<sup>4</sup> Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.

<sup>5</sup> Single family site-built new homes.

## Partnership-Driven Change

More than 20,000 organizations across the United States have partnered with ENERGY STAR to realize significant environmental and economic benefits. These partners include:

- **Manufacturers.** More than 1,600 manufacturers using the ENERGY STAR label to differentiate over 40,000 individual product models across more than 60 product categories.
- **Retailers.** More than 1,400 retail partners bringing products that have earned the ENERGY STAR and educational information to their customers.
- **Builders.** More than 8,400 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.
- **Service and Product Providers.** Hundreds of service and product providers actively working with clients to adopt a whole-building approach to energy management and helping more than 8,300 client buildings improve their ENERGY STAR score by 10 points or more on EPA's ENERGY STAR energy performance scale.
- **Building and Facility Owners.** More than 5,800 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 700 utilities, states, and other energy efficiency program sponsors leveraging ENERGY STAR resources to improve the efficiency of commercial buildings, industrial facilities, and homes.
- **Industrial Partners.** More than 650 industrial program partners working within their industry to identify ways to manage energy strategically, minimize energy risks, and reduce emissions.
- **Other Partners.** Thousands of energy raters, financial institutions, architects, and building engineers making energy efficiency more widely available through ENERGY STAR, thus providing additional value to their customers.
- **Environmental Leaders.** EPA and DOE recognizing the outstanding commitments of 111 partners at the 2011 Partner of the Year Awards ceremony (see Table 6, p. 12).

TABLE 5. ENERGY STAR Key Program Indicators, 2000 and 2010

ENERGY STAR PROGRAM STRATEGY	KEY INDICATOR	YEAR OF RESULTS	
		2000	2010
<b>Efficient Products</b> (for more information, see p. 13)	Product Categories Eligible for ENERGY STAR	33	> 60
	Individual Product Models Qualifying	11,000	> 40,000
	Products Purchased <sup>1,2</sup>	600 million	~ 3.5 billion <sup>3</sup>
	Public Awareness	40%	> 80%
	Manufacturing Partners	1,600	> 1,600
	Retail Partners	550	> 1,400
	EE Program Administrator Partners	100	> 700
<b>New Homes</b> (for more information, see p. 19)	Number of Qualified New Homes Built <sup>1</sup>	25,000	~ 1,200,000
	Percent of National New Home Starts	< 1%	> 25%
	Markets with over 25% Market Share	0	16
	Builder Partners	1,600	8,400
<b>Home Improvement</b> (for more information, see p. 20)	Homes Improved through Home Performance with ENERGY STAR <sup>1</sup>	—	> 110,000
	EE Program Administrator Partners	—	> 35
	Homes Benchmarked using Yardstick <sup>1</sup>	—	410,000
<b>Existing Commercial Buildings</b> (for more information, see p. 23)	Number of Buildings with an ENERGY STAR Score <sup>1</sup>	4,200	> 200,000
	Building Square Footage with an ENERGY STAR Score <sup>1</sup>	800 million	> 18 billion
	Percent of Commercial Square Footage with an ENERGY STAR Score	1%	> 25%
	Building Types Eligible for the ENERGY STAR	2	13
	Number of Buildings Certified <sup>1</sup>	545	> 12,600
	Building Square Footage Certified <sup>1</sup>	128 million	2 billion
<b>New Commercial Buildings</b> (for more information, see p. 24)	Number of Buildings Designed to Earn the ENERGY STAR <sup>1</sup>	—	> 300
<b>Industrial Improvements</b> (for more information, see p. 27)	Industrial Partners	—	> 650
	Industrial Sectors (and subsectors)	0	20
	Facility Types Eligible for the ENERGY STAR	—	11
	Number of Facilities Certified <sup>1</sup>	—	79
<b>Annual Results</b> (for more information, see p. 53)	Energy Saved (kWh)	62 billion	244 billion
	Emissions Avoided (MMTCO <sub>2</sub> e)	15.8	195.8
	Net Savings (in U.S. Dollars)	\$5 billion	\$20 billion

<sup>1</sup> Results are cumulative.

<sup>2</sup> The cumulative total of product sales across the entire ENERGY STAR program from 1992 through 2010, 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.

<sup>3</sup> Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.

EE : Energy Efficiency

— : Not applicable

~ : About

**TABLE 6. ENERGY STAR Award Winners**

To learn more about these award winners and their great accomplishments, see *Profiles in Leadership: 2011 ENERGY STAR Award Winners*.\*

**SUSTAINED EXCELLENCE**

3M <i>St. Paul, MN</i>	Merck <i>Whitehouse Station, NJ</i>
Advantage IQ, Inc. <i>Spokane, WA</i>	Nashville Area Habitat for Humanity <i>Nashville, TN</i>
APS (Arizona Public Service) <i>Phoenix, AZ</i>	New York State Energy Research and Development Authority (NYSERDA) <i>Albany, NY</i>
ArcelorMittal <i>Chicago, IL</i>	New York-Presbyterian Hospital <i>New York, NY</i>
Austin Energy <i>Austin, TX</i>	Oncor <i>Dallas, TX</i>
Bentall Kennedy <i>Seattle, WA</i>	OSRAM SYLVANIA <i>Danvers, MA</i>
Bosch Home Appliances <i>Huntington Beach, CA</i>	Pacific Gas and Electric Company (PG&E) <i>San Francisco, CA</i>
CalPortland Company <i>Glendora, CA</i>	Pella Corporation <i>Pella, IA</i>
CB Richard Ellis <i>Los Angeles, CA</i>	PepsiCo, Inc. <i>Purchase, NY</i>
CenterPoint Energy <i>Houston, TX</i>	Raytheon Company <i>Waltham, MA</i>
Community Housing Partners <i>Christiansburg, VA</i>	Saint-Gobain <i>Valley Forge, PA</i>
Energy Education, Inc. <i>Dallas, TX</i>	Servidyne <i>Atlanta, GA</i>
Energy Inspectors <i>Las Vegas, NV</i>	Southern Energy Management <i>Morrisville, NC</i>
Energy Trust of Oregon <i>Portland, OR</i>	Sponsors of Northeast Energy Efficiency Partnerships, Inc. (NEEP) <i>Lexington, MA</i>
EnergyLogic <i>Berthoud, CO</i>	Sunoco, Inc. <i>Philadelphia, PA</i>
Food Lion Family, Bloom and Bottom Dollar Food <i>Salisbury, NC</i>	TIAA-CREF <i>New York, NY</i>
Ford Motor Company <i>Dearborn, MI</i>	Toyota Motor Engineering & Manufacturing North America, Inc. <i>Erlanger, KY</i>
GE Appliances & Lighting <i>Louisville, KY</i>	TRANSWESTERN <i>Houston, TX</i>
Gresham-Barlow School District <i>Gresham, OR</i>	USAA Real Estate Company <i>San Antonio, TX</i>
Hines <i>Houston, TX</i>	Whirlpool Corporation <i>Benton Harbor, MI</i>
ITW Food Equipment Group – North America <i>Troy, OH</i>	Wisconsin Focus on Energy <i>Madison, WI</i>
J. C. Penney Company, Inc. <i>Plano, TX</i>	
Joint Management Committee <i>Lexington, MA</i>	
KB Home <i>Los Angeles, CA</i>	
Lowe's Companies, Inc. <i>Mooresville, NC</i>	

**PARTNER OF THE YEAR**

Above and Beyond Energy <i>Wilmington, NC</i>	LG&E and KU <i>Louisville, KY</i>
AEP Texas <i>Corpus Christi, TX</i>	Loudoun County Public Schools <i>Broadlands, VA</i>
Andersen Corporation <i>Bayport, MN</i>	Manitowoc Foodservice <i>New Port Richey, FL</i>
Citi <i>New York, NY</i>	Meritage Homes <i>Scottsdale, AZ</i>
Cleveland Clinic <i>Cleveland, OH</i>	Momentum, LLC <i>Boise, ID</i>
Colgate-Palmolive Company <i>New York, NY</i>	New Jersey Board of Public Utilities <i>Trenton, NJ</i>
ComEd <i>Chicago, IL</i>	New Mexico Gas Company <i>Albuquerque, NM</i>
Constellation Energy/ Baltimore Gas and Electric Company (BGE) <i>Baltimore, MD</i>	Nissan North America, Inc. <i>Franklin, TN</i>
Continental Refrigerator <i>Bensalem, PA</i>	NVR, Inc. <i>Reston, VA</i>
Design Tech Homes <i>Spring, TX</i>	Panasonic Home & Environment Company <i>Secaucus, NJ</i>
Efficiency Vermont <i>Burlington, VT</i>	PNM <i>Albuquerque, NM</i>
Electrolux Major Appliances <i>Charlotte, NC</i>	Public Service Company of Oklahoma (PSO) <i>Tulsa, OK</i>
EnergyCAP, Inc. <i>State College, PA</i>	Questar Gas Company <i>Salt Lake City, UT</i>
Evergreen Public Schools <i>Vancouver, WA</i>	Samsung Electronics Co., Ltd. <i>Suwon, South Korea</i>
FSL Home Improvements dba FSL Home Energy Solutions <i>Phoenix, AZ</i>	Sears Holdings Corporation <i>Hoffman Estates, IL</i>
Gainesville Regional Utilities (GRU) <i>Gainesville, FL</i>	Staples, Inc. <i>Framingham, MA</i>
Hanesbrands Inc. <i>Winston-Salem, NC</i>	TexEnergy <i>Irving, TX</i>
HEI Hotels & Resorts <i>Norwalk, CT</i>	The Boeing Company <i>Chicago, IL</i>
Home Creations <i>Moore, OK</i>	The E Group, a Division of FirstEnergy Solutions Corp. <i>Akron, OH</i>
John B. Sanfilippo & Son, Inc. <i>Elgin, IL</i>	Wells Real Estate Funds <i>Norcross, GA</i>
Jones Lang LaSalle <i>Chicago, IL</i>	Xcel Energy <i>Minneapolis, MN</i>
Kohl's Department Stores, Inc. <i>Menomonee Falls, WI</i>	
KPPC – Kentucky Pollution Prevention Center <i>Louisville, KY</i>	

**AWARDS FOR EXCELLENCE****ENERGY STAR Promotion**

Long Island Power Authority (LIPA) <i>Uniondale, NY</i>
National Grid <i>Waltham, MA</i>
New Hampshire CORE Utilities <i>Manchester, NH</i>
Orange County Environmental Protection Division <i>Orlando, FL</i>
Southern California Edison Company <i>Rosemead, CA</i>
Utah Building Energy Efficiency Strategies <i>Salt Lake City, UT</i>

**Affordable Housing**

Coachella Valley Housing Coalition <i>Indio, CA</i>
Habitat for Humanity of Elkhart County <i>Goshen, IN</i>
Habitat for Humanity of Metro Denver <i>Denver, CO</i>
National Housing Trust <i>Washington, DC</i>
North Carolina Housing Finance Agency <i>Raleigh, NC</i>
San Antonio Housing Authority <i>San Antonio, TX</i>

**Energy Efficient Product Design**

ASUSTeK Computer Inc. <i>Taipei, Taiwan</i>
Canon U.S.A., Inc. <i>Lake Success, NY</i>
DIRECTV <i>El Segundo, CA</i>
Lennox Industries Inc. <i>Richardson, TX</i>
Scotsman Ice Systems <i>Vernon Hills, IL</i>
Sharp Electronics Corporation <i>Mahwah, NJ</i>

**Retailing**

Menards <i>Eau Claire, WI</i>
Metro Lighting <i>Brentwood, MO</i>
Nationwide Marketing Group <i>Winston-Salem, NC</i>

\* To read or download Profiles in Leadership, go to [http://www.energystar.gov/ia/partners/pt\\_awards/2011\\_profiles\\_in\\_leadership.pdf](http://www.energystar.gov/ia/partners/pt_awards/2011_profiles_in_leadership.pdf)

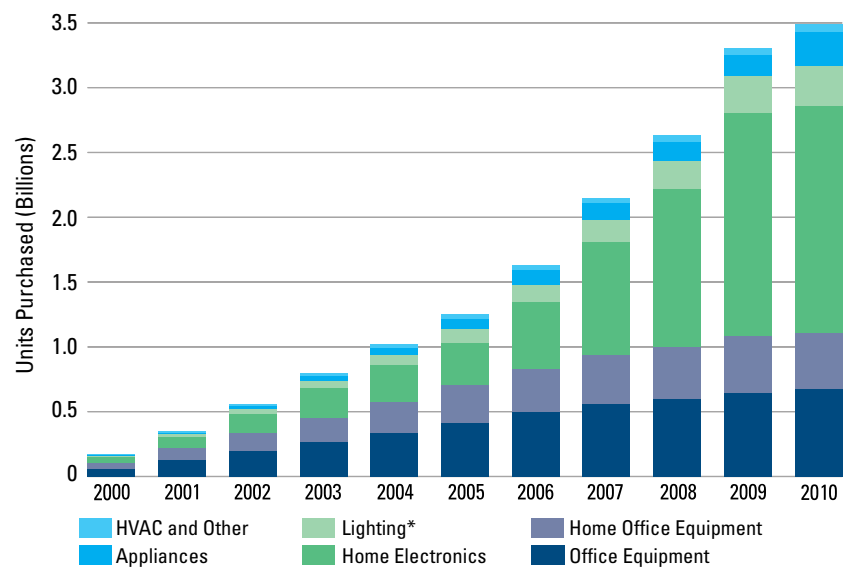
# ENERGY STAR QUALIFIED PRODUCTS



Year after year, the American public continues to look to ENERGY STAR as the national symbol for energy efficiency to inform purchasing choices, save money on utility bills, and protect the environment. In 2010, Americans purchased about 200 million products that had earned the ENERGY STAR across more than 60 product categories for a cumulative total of about 3.5 billion<sup>6</sup> ENERGY STAR qualified products purchased since 2000 (see Figure 5). Qualified products—including appliances, heating and cooling equipment, consumer electronics, office equipment, lighting, and more—offer consumers savings of as much as 65 percent relative to standard models while providing the features and functionality they expect. Key activities in 2010 included:

- Adding one new product category and updating the specifications for three product categories (see Table 7, p. 14).
- Maintaining the integrity of ENERGY STAR by monitoring and protecting the use of the label.
- Finalizing third-party certification and enhanced product verification procedures.

**FIGURE 5. About 3.5 Billion ENERGY STAR Qualified Products Purchased Since 2000**



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

<sup>6</sup> Compact fluorescent bulbs are not included in the number of ENERGY STAR qualified products purchased.

**TABLE 7. ENERGY STAR Product Specifications Added, Revised, and In Progress**

PRODUCT CATEGORY	YEAR INTRODUCED (AND REVISED)*	ENERGY SAVINGS	STATUS OF ACTIVITY IN 2010
<b>2010 NEW SPECIFICATIONS</b>			
Commercial Audio	2010	Up to 60%	New specification took effect July 30, 2010.
<b>2010 REVISIONS COMPLETED</b>			
All ENERGY STAR Specifications: Third-Party Certification	2011	—	Completed. Took effect January 1, 2011.
Hot Food Holding Cabinets	2003 (2011)	65%	Revised specification to take effect October 1, 2011.
Set-top Boxes	2001 (2005, 2008, 2011)	40%	Revised specification to take effect September 1, 2011.
Water Coolers	2000 (2004, 2010)	45%	Revised specification took effect January 22, 2010.
<b>2010 REVISIONS IN PROGRESS</b>			
Battery Charging Systems	2006	35%	In progress, expected to be complete in 2012.
Commercial Dishwashers	2007	25% energy; 25% water	In progress, expected to be complete in 2012.
Commercial Fryers	2003	10% energy; 35% gas	In progress, expected to be complete in 2011.
Computers	1992 (1995, 1999, 2004, 2008)	30 – 65%	In progress, expected to be complete in 2012.
Dehumidifiers	2001 (2005)	16%	In progress, expected to be complete in 2011.
Furnaces	1995 (2006)	12 – 14%	In progress, expected to be complete in 2011.
Luminaires (Residential Light Fixtures and Solid State Lighting)	2009	30%	In progress, expected to be complete in 2011.
Monitors/Displays	1992 (1995, 1998, 1999, 2005, 2006, 2009, 2010)	20%	In progress, expected to be complete in 2012.
Residential Dishwashers	1996 (2001, 2007)	17% energy; 35% water	In progress, expected to be complete in 2011.
Room Air Conditioners	1996 (2005)	9%	In progress, expected to be complete in 2011.
Servers	2009	27%	In progress, expected to be complete in 2012.
Windows, Doors, Skylights	1998 (2003, 2005, 2009)	15%	In progress, expected to be complete in 2013.
<b>NEW SPECIFICATIONS IN DEVELOPMENT</b>			
Climate Controls		TBD	New specification to be completed in 2012.
Data Center Storage Devices		TBD	New specification to be completed in 2012.
Laboratory Grade Refrigerators and Freezers		TBD	New specification to be completed in 2012.
Pre-rinse Spray Valves		TBD	New specification to be completed in 2012.
Small Network Equipment		TBD	New specification to be completed in 2012.
Uninterruptible Power Supplies		TBD	New specification to be completed in 2012.

\* The years listed reflect the date the specification went or will go into effect.



## Achievements in 2010

### Inspiring Consumer Action

EPA engages in public outreach that encourages Americans to make energy-efficient changes at home, at work, and in their communities. The ENERGY STAR program's approach highlights both the financial and environmental benefits of energy efficiency and provides a forum to drive behavior change through a variety of elements—reaching millions of people through print, broadcast, and social media channels, events nationwide, and grassroots-to-national partnerships.

- The national Change the World, Start with ENERGY STAR campaign continued to promote individual actions through the ENERGY STAR Pledge in 2010. Supported by participating organizations (pledge drivers), EPA asked people to take simple energy-saving steps at home that can make a big difference in protecting the climate, such as:
  - 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.
- More than 240,000 individuals took the ENERGY STAR Pledge in 2010, representing an estimated potential 3.7 billion pounds of GHG emissions prevented and more than 2 billion kWh saved. Additionally, the Change the World, Start with ENERGY STAR campaign generated more than 13 million media impressions as national and local media covered the overall campaign,

### Change the World, Start with ENERGY STAR Campaign

In 2010, EPA continued to build upon its successful Change the World, Start with ENERGY STAR youth partnerships. Starting on Earth Day 2010, EPA Administrator Lisa P. Jackson hosted Earth Day Live! with ENERGY STAR, a live webinar at the Sarah Heinz House, a Boys & Girls Club in Pittsburgh, PA, which allowed kids—both in the audience and across the country—to ask the Administrator their questions on energy efficiency and the environment. At this event, the Administrator announced another strategic youth partnership with DoSomething.org, which joins the flourishing partnerships with Boys & Girls Clubs of America (BGCA) and Parent-Teacher Organizations (PTO) Today. Through the combined initiatives of these partnerships, EPA has helped equip the youth of America with the information and interactive tools they need to help protect the climate.

Through these collaborations in 2010, EPA helped:

- Activate more than 330,000 American youth and their families by supporting energy efficiency projects in their communities, schools, and homes through campaign partnerships with BGCA, PTO Today, and DoSomething.org.
- Host 40 community service projects related to energy efficiency at BGCA Clubs across the country—ranging from home energy check-ups to community energy fairs.
- Launch a first-of-its-kind Facebook game, eMission, which inspires real world action. Facebook users must build and save their online habitat by completing offline energy-efficient and environmentally friendly actions that reduce GHG emissions. Each offline action gives users a snapshot of their carbon savings and increases their points in-game.
- Provide K-8 schools nationwide a series of activities, educational prompts, and resources in the form of event-planning kits, co-developed with PTO Today, to help schools host “Go Green Nights,” which teach kids and their families about energy efficiency and empower them to take practical steps to reduce their own energy use.

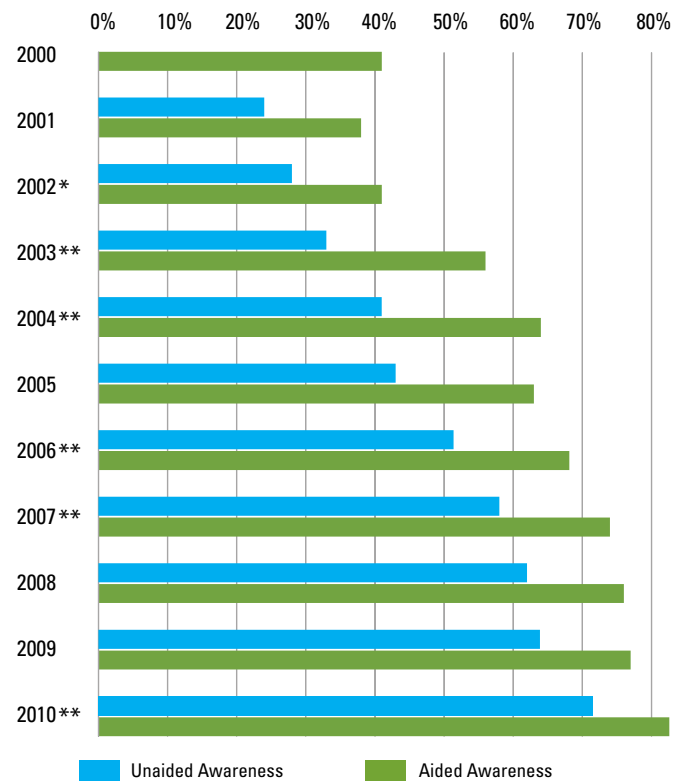
The 2010 Change the World, Start with ENERGY STAR campaign built on the success of previous years and incorporated new elements to further engage youth and connect personally with consumers. The combined efforts of the national campaigns since 2006 have generated more than 2.8 million pledges of individual actions that could prevent over 9 billion pounds of GHG emissions.



youth partnerships, heating and cooling seasonal energy-saving tips, and other product-related program developments throughout the year.

- The more than 430 Change the World, Start with ENERGY STAR pledge drivers took advantage of exciting new campaign tools in 2010—an Event Toolkit and the Change the World Campaign Event Booth. The toolkit and booth are turnkey solutions for holding an educational ENERGY STAR-themed event.
- Sears, Georgia Power Company, Ameren Illinois, Lockheed Martin, and Nissan North America were the leading pledge drivers in 2010; all participating companies and organizations continued to boost the campaign’s momentum by encouraging their employees, members, constituents, and others to make energy-saving changes at home and at work.
- In 2010, EPA debuted a new youth partnership with DoSomething.org that leverages the Web and pop culture to drive teenagers to make long-lasting, energy-efficient changes at home and in their communities. As part of this initiative, DoSomething.org launched eMission, a unique Facebook game that requires users to take real world action to protect the climate online *and* offline. In less than half a year, more than 50,000 Facebook users took steps through eMission to make sustained, energy-efficient changes in their lives that could prevent over 2.8 million pounds of GHG emissions.
- In St. Paul, MN, and Salt Lake City, UT, a combined total of more than 33,000 visitors toured the ENERGY STAR Exhibit House during the 2010 campaign. The house featured interactive displays and gave visitors the opportunity to learn about energy efficiency room by room. Additionally, Utah Governor Gary R. Herbert toured the ENERGY STAR Exhibit House with EPA staff, making him the first governor to experience the exhibit house.
- The ENERGY STAR website experienced impressive growth; visitor sessions reached more than 21 million in 2010, a 32-percent increase over 2009.
- More than 80 percent of American households recognized the ENERGY STAR label (see Figure 6). Additionally, more than 80 percent of households had a high or general understanding of the label.<sup>7</sup>

**FIGURE 6. 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.

- More than 40 percent of American households knowingly purchased an ENERGY STAR qualified product. Of those households, over 75 percent reported being favorably influenced by the ENERGY STAR label and about 80 percent reported they are likely to recommend ENERGY STAR products to their friends.<sup>8</sup>

## Maintaining the Integrity of ENERGY STAR

**Monitoring the ENERGY STAR Brand.** To participate in the ENERGY STAR program, product manufacturers and retailers enter into formal partnership agreements with the government and agree to adhere to the ENERGY STAR Identity Guidelines, which describe how the ENERGY STAR name and mark may be used. EPA continually monitors the use of the brand in trade media, advertisements, and stores and on the Internet. The Agency also conducts biannual onsite store-level assessments of ENERGY STAR qualified products on the stores’ shelves to ensure the products are presented properly to consumers.

<sup>7</sup> For more information, see U.S. EPA 2011c.

<sup>8</sup> For more information, see U.S. EPA 2011c.

**Implementing Third-Party Certification.** To ensure that ENERGY STAR remains a trusted symbol for environmental protection through superior efficiency, EPA completed comprehensive enhancements of the product qualification and verification processes. Third-party certification of ENERGY STAR products went into effect, as scheduled, on January 1, 2011. Before a product can be labeled with the ENERGY STAR under the new requirements, its performance must be certified by an EPA-recognized third party based on testing in an EPA-recognized lab. In addition, ENERGY STAR manufacturer partners must participate in verification testing programs run by the approved certification bodies. By the end of 2010, EPA had recognized 21 accreditation bodies, 132 laboratories, and 15 certification bodies.

**Enforcing Program Requirements.** Enforcing proper use of the ENERGY STAR mark is essential to maintaining the integrity of the program. As the result of multiple off-the-shelf testing efforts, EPA disqualified 17 products from the ENERGY STAR program in 2010 for failure to meet performance standards. Manufacturers of those products were required to discontinue use of the label and take additional steps to limit product exposure in the market. In an effort to ensure fair and consistent commitment among ENERGY STAR partners, EPA also took steps this year to suspend the partner status of manufacturers failing to comply with program requirements.

### **EPA Implements Third-Party Certification**

<i>March 2010</i>	EPA announced its intention to transition the ENERGY STAR product labeling program from a self-certification approach to one that requires all products to be third-party certified and subject to verification testing by the end of 2010.
<i>June 2010</i>	After seeking input from stakeholders, EPA finalized the requirements that accreditation bodies and laboratories would have to meet to receive EPA recognition. These requirements leveraged existing international standards, such as ISO/IEC 17011 and ISO/IEC 17025, which are commonly cited in product safety programs.
<i>August 2010</i>	Also with input from stakeholders, EPA finalized the requirements that certification bodies would have to meet to receive EPA recognition. Among other things, they must provide evidence of technical competence, strong quality management processes, and impartiality toward test results.
<i>October 2010</i>	EPA finalized changes to the ENERGY STAR Partner Commitments across all 60 product categories, instituting the new qualification and verification requirements.
<i>November 2010</i>	EPA asked ENERGY STAR manufacturer partners to recommit to the program under the new terms. The vast majority of active ENERGY STAR partners recommitted, including industry leaders in every product category.

### 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 reflective of the performance of the most efficient products on the market. For a product to qualify for the ENERGY STAR label, it must meet a strict set of specifications designed to ensure that the product:

- Is energy-efficient.
- Is cost-effective to the purchaser.
- Maintains product performance or features.

### Revising ENERGY STAR Specifications

While EPA continues to expand its suite of labeled products, it also revises specifications on an ongoing basis 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 165 Product Specifications and Revisions**

PRODUCT TYPE	NUMBER OF PRODUCT CATEGORIES	TOTAL NUMBER OF SPECIFICATIONS (NEW AND REVISED)	SPECIFICATION UPDATES IN THE LAST 3 YEARS*	SPECIFICATIONS THAT WENT INTO EFFECT IN 2010
Consumer Electronics	12	34	9	2
Office Equipment	10	37	4	1
HVAC	9	28	4	1
Commercial Food Service Equipment	9	11	6	2
Lighting	6	19	4	1
Building Envelope	3	9	1	1
Appliances	7	19	4	—
Other	3	8	1	1

\* Reflects those specifications that took effect through 2010.

## What To Expect in 2011 and Beyond

- Review and update ENERGY STAR specifications for more than 10 product categories, making sure the label remains a meaningful symbol of highly efficient products in the market.
- Expand the suite of ENERGY STAR product categories by adding climate controls, small network equipment, data center storage devices, uninterruptible power supplies, pre-rinse spray valves, and laboratory grade refrigerators and freezers.
- Pilot a new program targeted at early-adopters to increase demand for the most efficient ENERGY STAR products.
- Actively support the ramp up of third-party certification and verification testing of products across the more than 60 product categories.

# ENERGY STAR IN THE RESIDENTIAL SECTOR



About 17 percent of the GHGs emitted in the United States are attributed to the energy we use to heat, cool, and light our homes, as well as power the appliances and electronics in them. By making energy-efficient choices in the construction of new homes and the improvement of existing homes, American homeowners, renters, homebuilders, and home remodelers can lower household utility bills while helping to protect the environment. Through ENERGY STAR, EPA offers an array of useful tools and resources to households and the housing industry to increase the energy efficiency of the nation's housing stock. Program highlights for 2010 included:

- Reaching the milestone of nearly 1.2 million ENERGY STAR qualified new homes constructed since the program's launch.
- Partnering with 8,400 builder partners, who collectively constructed more than 126,000 ENERGY STAR qualified homes in 2010, which represents more than 25 percent of new home starts (see Figure 7, p. 20).
- Surpassing the mark of more than 35,000 homes improved through Home Performance with ENERGY STAR in 2010, for a total of more than 110,000 homes across the United States.
- Expanding the Home Performance with ENERGY STAR program across the country to include more than 1,300 participating contractors.

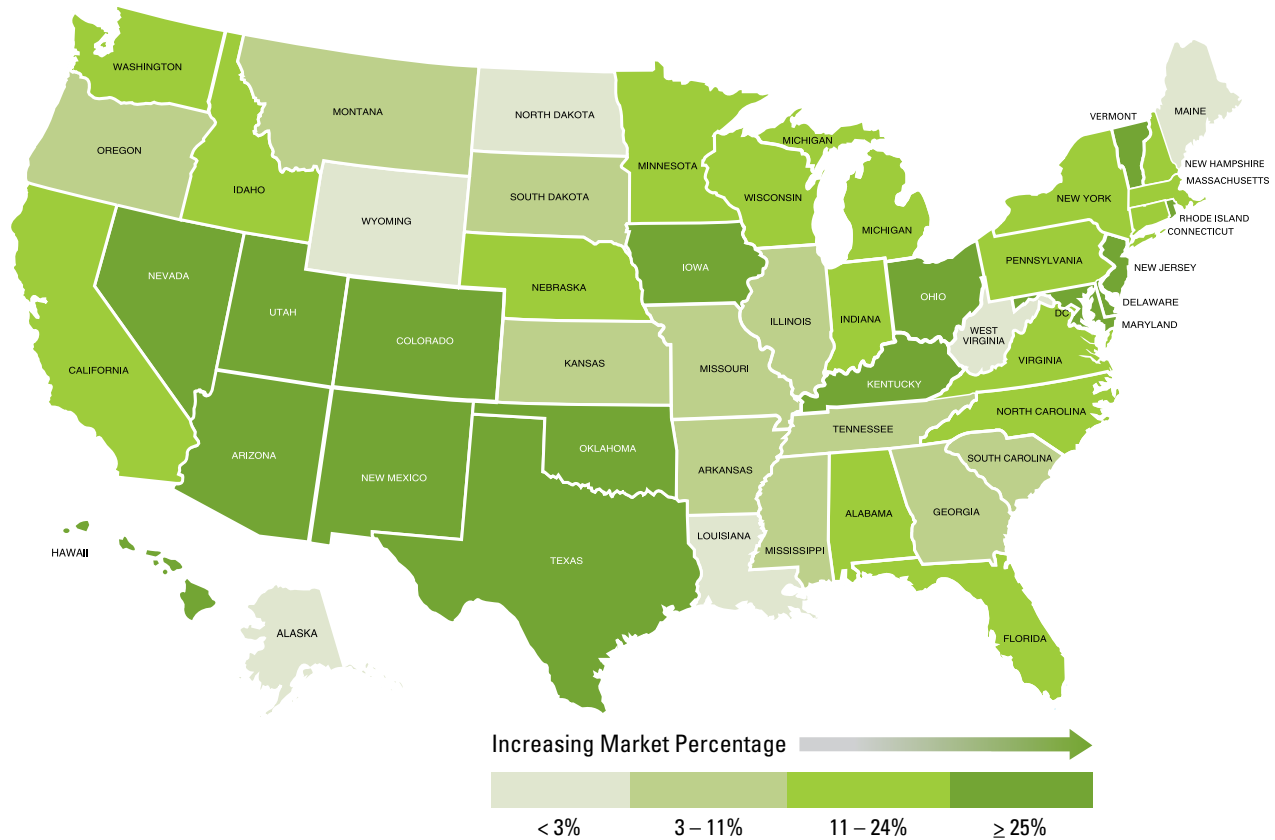
## Achievements in 2010

### ENERGY STAR for New Homes

**Nearly 1.2 Million New Homes Have Earned the ENERGY STAR.** More than 126,000 new homes were constructed to meet ENERGY STAR guidelines in 2010 (see Figure 8, p. 21), bringing the total number of ENERGY STAR qualified homes to nearly 1.2 million by year end. Since EPA began labeling new homes in 1995, American homeowners have saved \$1.6 billion on their energy bills and reduced GHG emissions by more than 27 billion pounds. In 2010 alone, families living

in ENERGY STAR qualified homes saved nearly \$350 million on their utility bills, while avoiding GHG emissions equivalent to those from about 450,000 vehicles.

**Coordinating Attractive Energy Efficiency Financing.** EPA continued its collaboration with the Energy Programs Consortium, as well as with state energy offices and housing finance agencies (HFAs), to implement the ENERGY STAR Mortgage program launched in 2008. The program offers homeowners, including those with low incomes, a way

**FIGURE 7. ENERGY STAR Qualified New Homes Gaining Market Share**

to purchase energy-efficient homes or finance efficiency improvements to their existing homes while receiving a financial benefit from the lender—typically in the form of a closing cost discount or reduced interest rate. The value of the ENERGY STAR mortgages closed by participating lenders during 2010 totaled almost \$12 million. In that same period, EPA provided marketing support to participating lenders and contractors to help with customer recruitment, and continued its efforts to engage new stakeholders and look for opportunities to expand the program by meeting with several regional and national lenders, including Fannie Mae.

**Making Affordable Housing More Energy Efficient.** EPA continues to provide outreach and analytical support to state HFAs, helping them incorporate ENERGY STAR measures as part of the evaluation criteria for applications that request public funds to develop affordable rental housing for low-income families. At the end of 2010, 49 of 50 state HFAs were promoting ENERGY STAR qualified products and/or homes in their Low-Income Housing Tax Credit Program’s Qualified Allocation Plans. Based on data from the U.S. Department of Housing and Urban Development (HUD), more than 5,200 ENERGY STAR qualified homes were built in FY10 using public funding from HUD’s HOME program, a 13-percent increase over FY09. HUD and EPA also collaborated on

developing an energy efficiency roadmap to help owners and developers improve the energy efficiency of housing for the elderly and the disabled, two groups that are particularly vulnerable to high energy costs. EPA also partners with Habitat for Humanity’s U.S. affiliates to promote the construction of ENERGY STAR qualified homes. In 2010, more than 300 Habitat affiliates nationwide built over 1,600 homes to ENERGY STAR specifications. As a result of EPA’s outreach to the manufactured homes industry (also part of the affordable housing market), more than 4,300 ENERGY STAR qualified manufactured homes were built in the United States in 2010 for a cumulative total of more than 41,000.

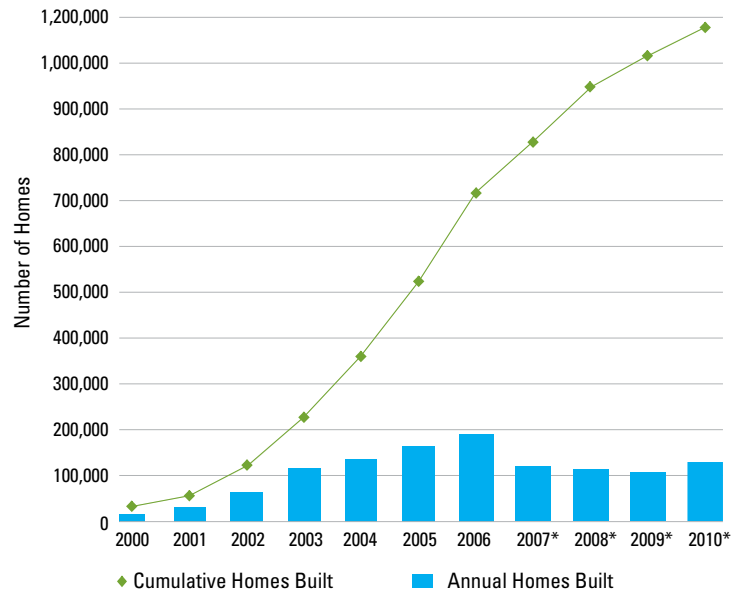
## ENERGY STAR Home Improvement

**Expanding Home Performance with ENERGY STAR.** Home Performance with ENERGY STAR (HPwES) offers homeowners a comprehensive, whole-house approach to energy efficiency improvements through a network of contractors trained to perform energy assessments and retrofits. Through regional HPwES sponsors, a third party conducts quality reviews of the contractors’ work. Over the past 9 years, EPA has worked with sponsoring partners such as state and local governments, utilities, and nonprofit

organizations to implement HPwES in more than 30 markets (see Figure 9). As a result of their efforts, by the end of 2010, over 110,000 homes had been retrofitted through HPwES programs. In 2010, EPA recognized 52 participating contractors with the ENERGY STAR Century Club Award for improving more than 100 homes each—up from 36 contractors in 2009.

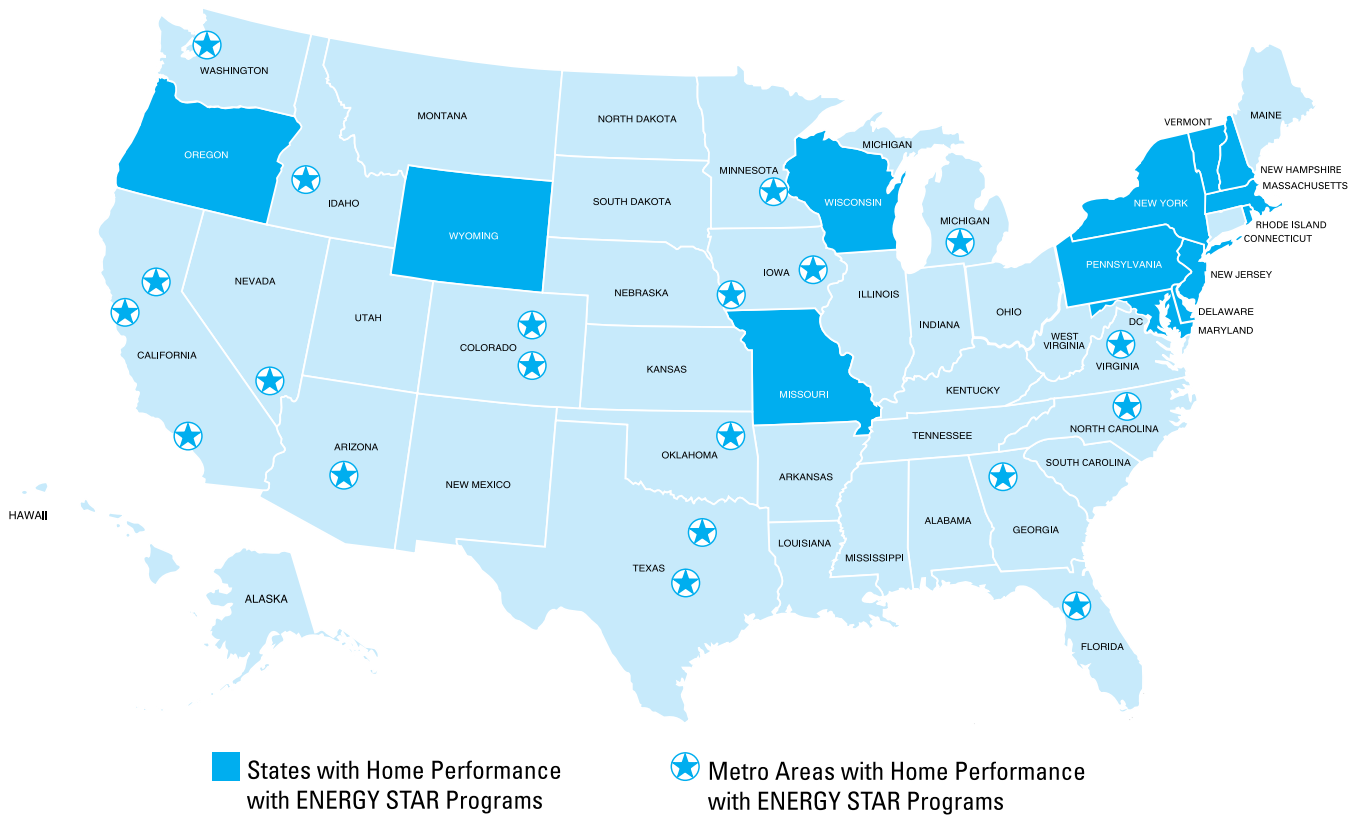
**Continuing Growth for ENERGY STAR HVAC Quality Installation Guidelines.** EPA partnered with five utilities across the country in 2010 to offer the ENERGY STAR heating, ventilation, and air conditioning (HVAC) Quality Installation (QI) program, which helps utility partners go beyond product incentives to deliver additional KW and kWh savings by improving installation procedures. The HVAC QI program blends an American National Standards Institute (ANSI)-recognized, industry-accepted set of installation guidelines with the endorsement of EPA’s ENERGY STAR program to help consumers obtain high-quality installations. Partnering utilities helped homeowners save more than 690,000 kWh in 2010.

**FIGURE 8. Nearly 1.2 Million Homes Nationwide Have Earned the ENERGY STAR Label**



\*The decrease in the number of homes qualified reflects the overall decrease in the total number of homes built.

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



**Offering Home Energy Performance Tools.** Nearly 100,000 consumers used EPA's online Home Energy Yardstick in 2010 to compare their home's energy use to that of others across the country. The tool lets homeowners set an energy reduction goal and see how their home stacks up if they reduce energy use by a certain percentage. In addition to

the Yardstick, EPA offers the online Home Energy Advisor to help Americans improve home efficiency. In 2010, more than 55,000 owners used the interactive tool to find customized recommendations for increasing the energy efficiency of their homes.

## What To Expect in 2011 and Beyond

### New Homes

- Begin phasing in new, more rigorous guidelines for homes to earn the ENERGY STAR. When fully implemented in 2012, homes built to the new ENERGY STAR for Homes Version 3 requirements will be at least 15 percent more energy efficient than those built to the 2009 International Energy Conservation Code (IECC), and they will include additional measures that make them 20 to 30 percent more efficient than typical new construction.
- Work with stakeholders to address barriers in the real estate transaction process so the market recognizes the value and risk reduction associated with high-performance homes earning the ENERGY STAR. The effort will include

initiatives that can expand the current ENERGY STAR Mortgage program and facilitate policies that formally recognize the value of high-performance homes in the appraisal process.

### Existing Homes

- Take steps to transfer the management of the HPwES program to DOE. This transition is intended to help the federal government achieve greater management and resource efficiency in its effort to increase market adoption of home energy upgrades.
- Recruit at least three new sponsors for the HVAC QI program in 2011.



# ENERGY STAR IN THE COMMERCIAL SECTOR



President Obama's vision for "winning the future by investing in innovative, clean energy technologies" includes new efforts to improve energy efficiency in commercial buildings across the country by 20 percent over the next decade.<sup>9</sup> Through the ENERGY STAR program, EPA is already helping the commercial building sector improve energy efficiency in the places where consumers work, play, and learn. In turn, these efforts will help create jobs, save money, reduce dependence on foreign oil, and contribute to cleaner air and the protection of people's health. These and future efficiency efforts are of critical importance, as commercial buildings are responsible for approximately 20 percent of all energy consumption in the United States.

Thousands of American business owners—including retailers, hoteliers, and grocers—along with heads of major organizations such as state and local governments, school districts, universities, hospitals, and congregations, are already using ENERGY STAR tools and resources to help realize significant energy savings that prevent GHG emissions and contribute to meeting the President's ambitious goals (see Figure 12, p. 25).

## Achievements in 2010

### Reaching Key Program Milestones

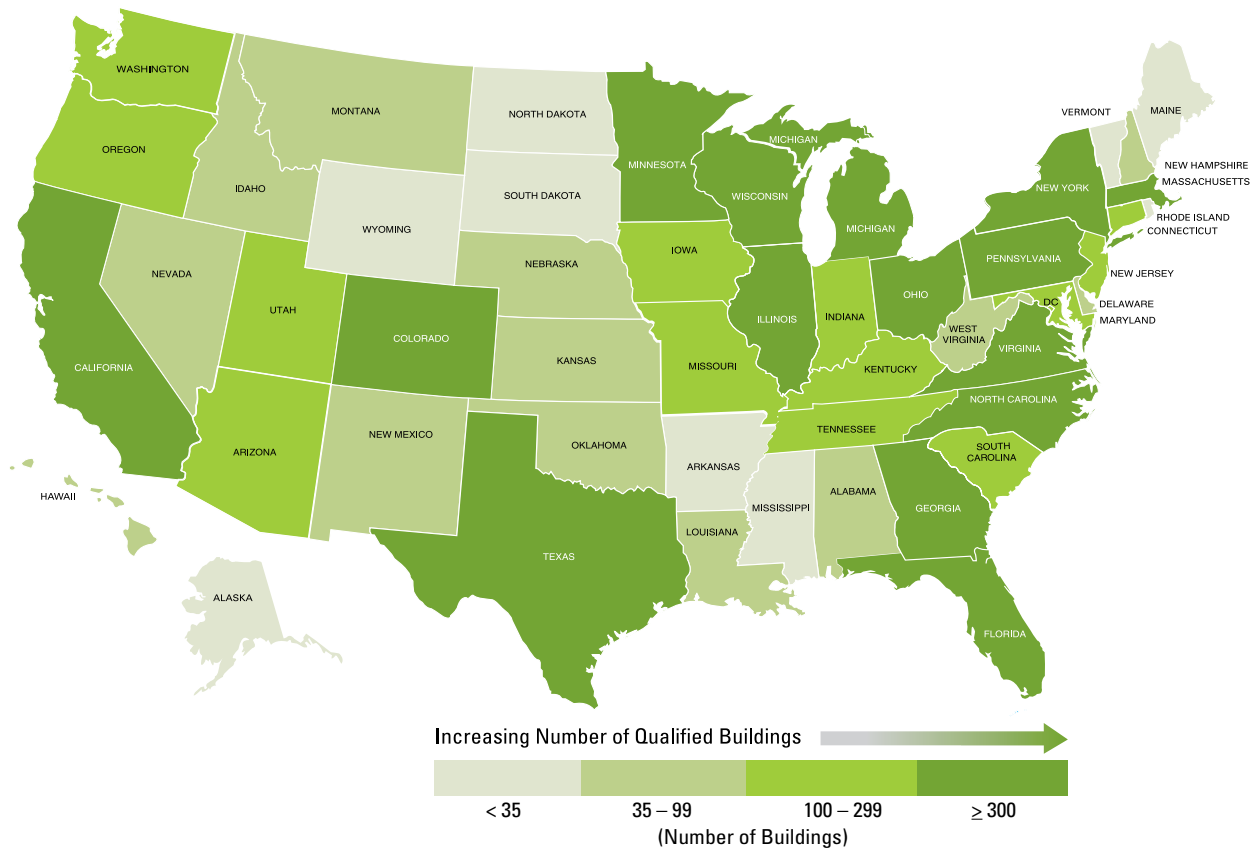
With the help of ENERGY STAR, partners in the commercial sector made great strides in improving energy efficiency in 2010. Major milestones involved:

**Sustaining Top Performance Through ENERGY STAR.** More than 6,200 buildings earned the ENERGY STAR in 2010 alone, a nearly 60-percent increase from the 2009 total. Of these buildings, approximately 40 percent had earned the ENERGY STAR in previous years, demonstrating consistency in energy savings. In total, more than 12,600 buildings, representing over 2 billion square feet of space, and nearly 50 plants, had

earned the ENERGY STAR by year end (see Figure 10, p. 24). While all certified buildings use less energy than typical buildings, about 10 percent of all ENERGY STAR certified buildings use 50 percent less energy than similar buildings nationwide.

**Demonstrating Significant and Continuous Improvement.** EPA recognized 150 partner organizations as ENERGY STAR Leaders for making portfolio-wide improvements in energy efficiency and, in some cases, achieving top performance (an ENERGY STAR score of 75 or higher) across their entire portfolio of buildings. Demonstrating sustained reductions,

<sup>9</sup> For more information, see *The White House 2011*.

**FIGURE 10. More Than 12,600 Buildings Have Earned the ENERGY STAR**

60 percent of these Leaders have reached multiple improvement milestones over the years. In 2010, for the first time, two organizations achieved a 50-percent portfolio-wide improvement milestone. Additionally, ENERGY STAR service and product provider partners have helped more than 8,300 client buildings improve their ENERGY STAR score by 10 points or more on EPA's ENERGY STAR energy performance scale.

#### **Managing Energy Through Widespread Measurement and Tracking.**

The energy performance of more than 200,000 buildings—representing over 18 billion square feet of space and more than 25 percent of the total market—has been assessed using EPA's ENERGY STAR measurement and tracking tool, Portfolio Manager (see Figure 13, p. 26).<sup>10</sup>

**Designing More Buildings To Earn the ENERGY STAR.** Despite the downturn in the economy, more than 75 commercial building design projects achieved Designed to Earn the ENERGY STAR in 2010, bringing the total number of buildings intended to operate at ENERGY STAR performance levels when built to more than 300.

#### **Strategizing for Success**

EPA's ENERGY STAR Guidelines for Energy Management have become an important roadmap for instituting a

corporate culture of environmental protection and financial value. Implementing comprehensive energy retrofits in buildings and ensuring newly constructed buildings deliver on their high-performance intent requires organizations to commit to a superior energy management strategy at the top levels of management. Through ENERGY STAR, EPA packages actionable guidance for all types of companies and organizations to achieve success and helps them tap into expert knowledge to deliver concrete energy solutions through smart practices and technologies.

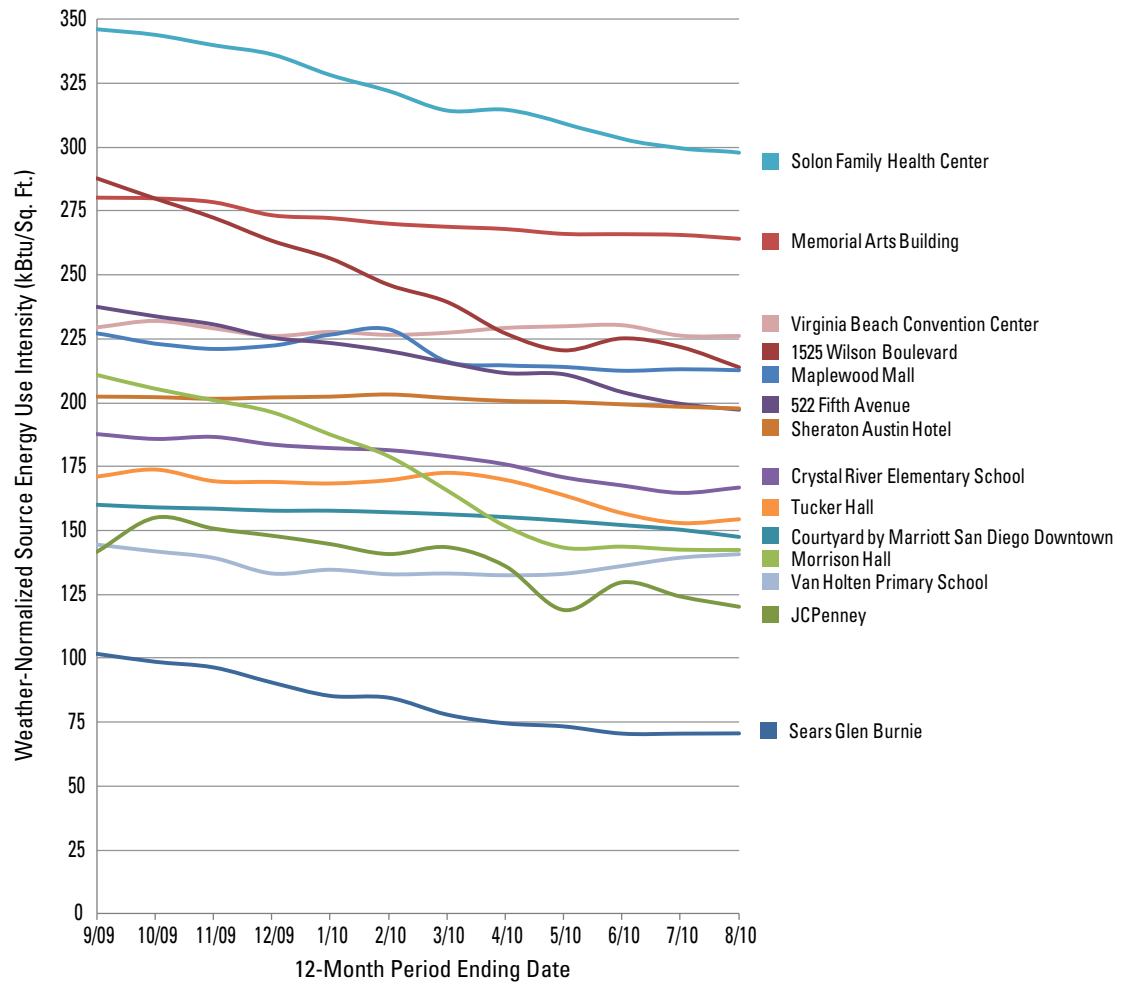
#### **Competing Nationally To Work Off the Waste with ENERGY STAR.**

In 2010, EPA launched the first annual National Building Competition. Teams from 14 buildings of all shapes and sizes from across the country went head-to-head to see who could reduce their energy use the most. The greatest successes occurred in buildings whose teams raised awareness, engaged occupants, and used ENERGY STAR guidance in energy-saving efforts. The winning building, Morrison Residence Hall at the University of North Carolina, Chapel Hill, achieved an almost 36-percent energy use reduction in just one year.

Together, the 14 contestants reduced their energy consumption by more than 44 million KBtu a year, saved over \$950,000, and reduced GHG emissions equal to those emitted

<sup>10</sup> Calculated using CBECS 2003, see EIA 2006.

**FIGURE 11. 2010 National Building Competition Progress Over Time**

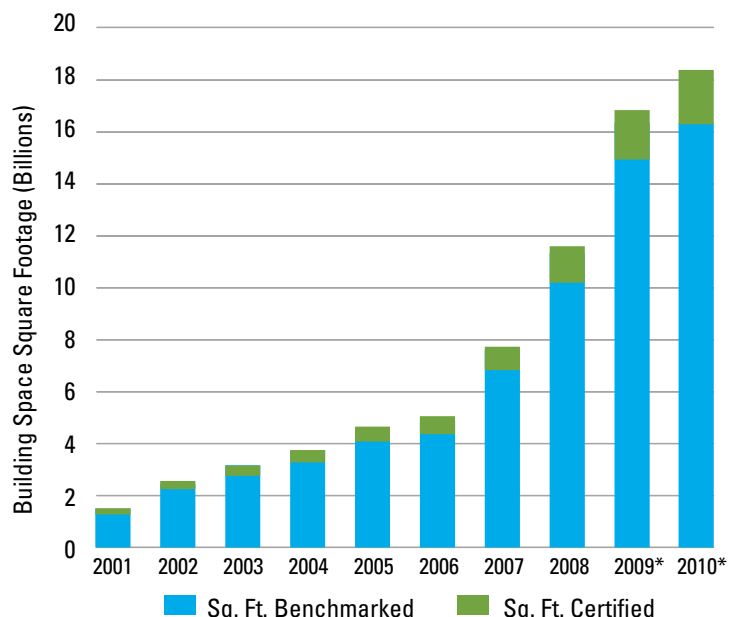


by the annual electricity use of nearly 600 homes (see Figure 11). Because these innovative competitors embedded energy efficiency in daily operations, they changed the landscape for energy efficiency in their buildings and communities and set a great example for the nation.

**Supporting Innovative Energy Efficiency Initiatives.** In 2010, EPA’s strategic partnerships with state and local governments, industry associations, and other federal agencies continued to demonstrate nationally applicable models for new energy efficiency initiatives. These included projects funded through ARRA, mandates for energy disclosure in U.S. communities, and awareness-raising efforts about energy use and reductions in commercial buildings through innovative campaigns and competitions, which all relied on the ENERGY STAR platform.

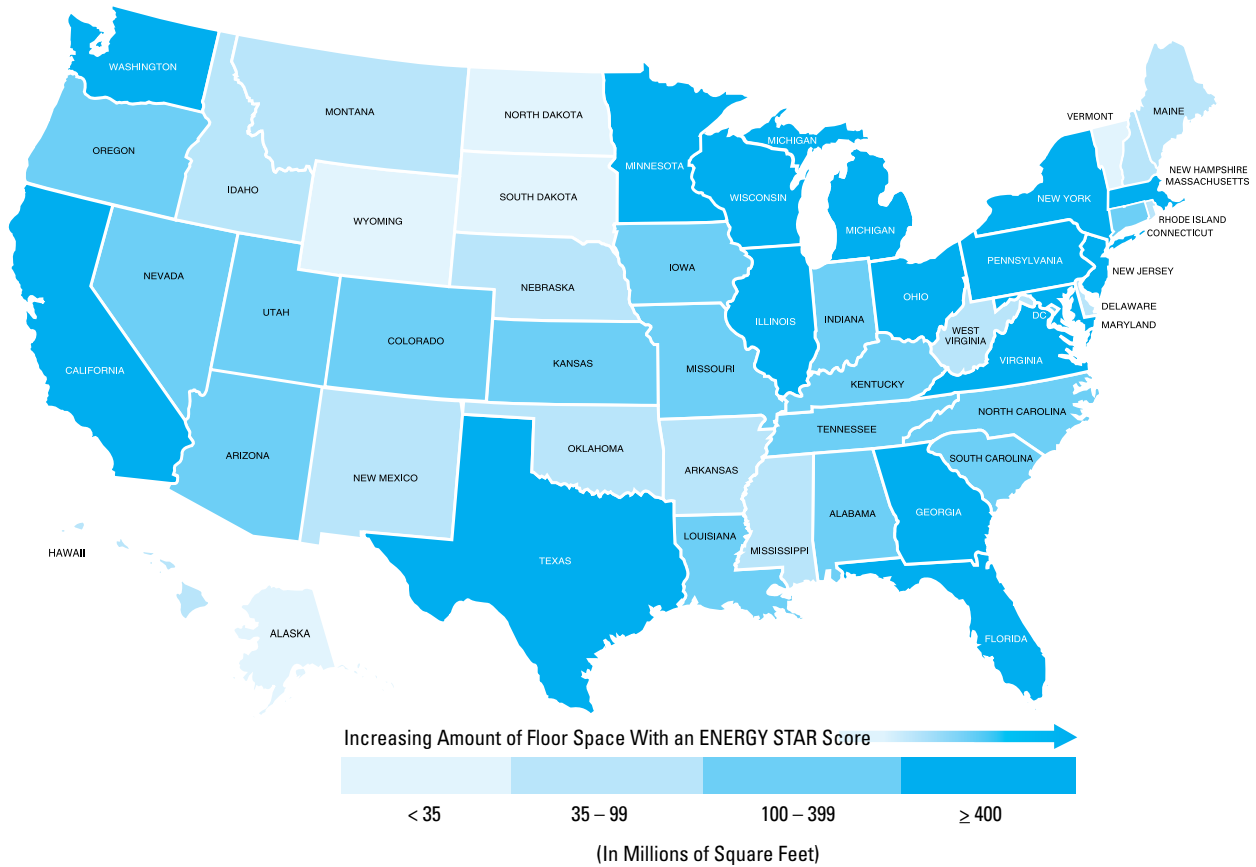
**Linking to Experts.** Service and product providers (SPPs), architects, engineers, state energy offices, and utilities offer valuable energy efficiency services and programs to help identify, prioritize, and implement quality projects in the

**FIGURE 12. Steady Growth in Building Space Benchmarked and Certified**



\*2001-2008 includes only buildings eligible to receive an ENERGY STAR performance score. 2009 and 2010 include those buildings as well as buildings eligible to receive an EUI (Energy Use Intensity).

**FIGURE 13. Amount of Floor Space With an ENERGY STAR Score by State**



commercial sector. In 2010, more organizations leveraged ENERGY STAR resources, which led to a 50-percent increase over the previous year in energy benchmarking through SPPs for their clients and assistance in certifying more than 3,200 buildings as ENERGY STAR.

In partnership with several states and utilities, EPA announced a pilot program in 2010 designed to deliver greater energy savings in commercial buildings. Building Performance with ENERGY STAR is assisting utilities and

state energy efficiency programs in achieving increased savings by strategically pursuing whole-building energy improvements with their business customers.

**Expanding Portfolio Manager.** Portfolio Manager was expanded to include data centers, a unique building space type now eligible to receive an ENERGY STAR score and certification. EPA also added more reporting features, including a custom template that allows users to send data directly from Portfolio Manager to outside stakeholders.

## What To Expect in 2011 and Beyond

- Extend the ENERGY STAR certification to senior care facilities and begin planning updates to the ENERGY STAR energy performance scale for hospitals, providing an assessment and recognition tool for a critical and growing source of the nation’s energy consumption.
- Launch the second annual ENERGY STAR National Building Competition: *Battle of the Buildings*, a coast-to-coast contest among commercial buildings to save energy and protect the climate. The competition will feature 245 competitors who will battle it out through improvements in

energy efficiency with support from EPA’s ENERGY STAR program and determine who can reduce their energy use the most, with a winner announced in November 2011.

- Complete the Building Performance with ENERGY STAR pilot and implement lessons learned in an enhanced rollout of the program.
- Initiate a process to expand and improve the functionality, usability, speed, and verification process of Portfolio Manager through a database upgrade.

# ENERGY STAR IN THE INDUSTRIAL SECTOR



The industrial sector is an important part of the U.S. economy: manufacturing goods valued at nearly \$5.5 trillion, contributing over 11 percent to the U.S. GDP, and providing more than 12.7 million jobs paying an average of \$47,500 annually.<sup>11</sup> It also generates more than a quarter of the nation's annual GHG emissions. Through ENERGY STAR, EPA enables the industrial sector to improve energy efficiency within its operations and cost-effectively reduce GHG emissions by removing energy management barriers.

One way EPA works with industry is through the ENERGY STAR Industrial Focuses—to share information, such as detailed guides on how to reduce energy use in manufacturing plants; to develop industry-specific ENERGY STAR plant energy performance indicators (EPIs) that enable plants to measure energy efficiency and set competitive improvement goals on a national basis; and to build a collective source of energy management expertise for specific industries. The success of the ENERGY STAR Focuses in improving energy performance validates that EPA's approach—performance measurement and recognition for top performance—helps industry maintain competitiveness by saving money and achieving positive results for the environment.

## Achievements in 2010

### Improving Performance—The ENERGY STAR Focus Industries

EPA works closely with specific industries to provide advanced tools that help companies manage energy for themselves and build long-term, productive energy programs (see Table 9, p. 28).

#### Landmark Gains Achieved in Cement Energy Performance.

After nearly a decade, EPA re-benchmarked the energy performance of U.S. cement plants as part of the regular update process for EPIs. This benchmarking revealed dramatic improvements in energy efficiency across the cement industry, including a 13-percent improvement in energy intensity. The energy performance of the industry's least efficient plants improved most dramatically: plants in

the 75<sup>th</sup>, 50<sup>th</sup>, and 25<sup>th</sup> percentiles improved by 0.34, 0.51, and 0.75 MMBtu per ton of clinker, respectively (see Figure 14, p. 28). The total source energy savings were 60.5 trillion Btu annually, equivalent to reducing energy-related carbon emissions in these plants by 5.5 MMTCO<sub>2</sub>e.

**New Plant EPIs Issued.** Many U.S. industrial companies are unable to objectively measure and assess the energy performance of their facilities. ENERGY STAR plant EPIs overcome this barrier by helping companies determine good energy performance for their plant, relative to others in their industry. In 2010, EPA added new tools for cookie and cracker plants and pulp mills to its available set of EPIs. Industry testing continued for drafts of the steel mini-mill and fiberglass EPIs, and EPA issued a revised cement EPI for final industry testing.

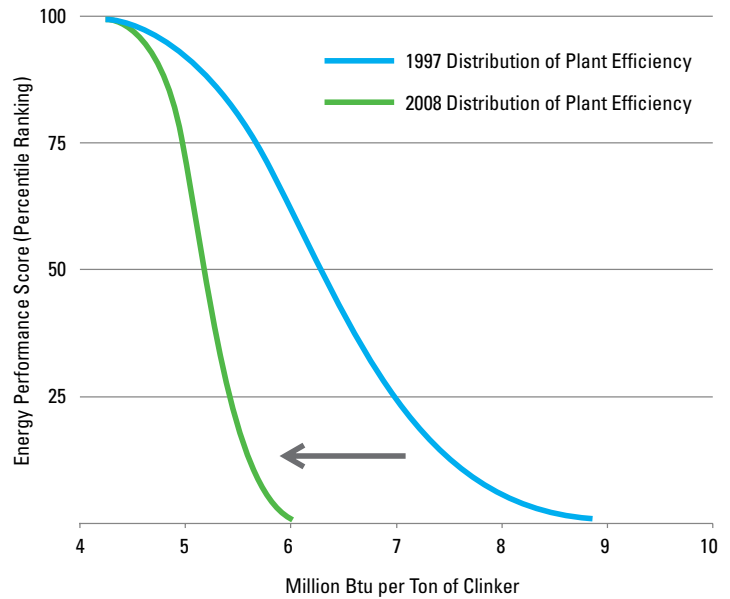
<sup>11</sup> For more information, see U.S. Census Bureau 2010.

**New Energy Guide Released.** EPA issued an energy guide that identifies energy efficiency opportunities for steel plants. The growing library of energy guides continued to help managers identify areas for improvement, develop action plans, and educate company employees.

**Best Practice Lighting Guide Released.** Working with the Motor Vehicle Focus, EPA facilitated a benchmarking study to identify the best practice lighting levels for motor vehicle manufacturing. The results of this groundbreaking study were published and used to inform new Illuminating Engineering Society of North America (IESNA) lighting standards.

**Number of Industrial Sector Focuses Grows to 20.** EPA signed a Memorandum of Understanding with the National Ready Mixed Concrete Association and the International Dairy Foods Association to enable more than 6,000 U.S. concrete plants and nearly 1,600 dairy processors to develop strategic energy management programs using ENERGY STAR resources.

**FIGURE 14. Improvement in U.S. Cement Plant Energy Performance, 1997 – 2008**



**TABLE 9. EPA ENERGY STAR Industrial Focuses on Energy**

FOCUS INDUSTRY	PEER EXCHANGE NETWORK	INDUSTRY ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR
<b>Cement Manufacturing</b>	●	Published	2 <sup>nd</sup> Version in Draft
<b>Concrete Manufacturing</b>	●	In Process	Exploring Options
<b>Corn Refining</b>	●	Published	Released
<b>Food Processing</b>			
• Cookies & Crackers			Released
• Dairy Processing	●	Published	Exploring Options
• Juice			Released
• Potato Products			Released
• Tomato Products			Draft
<b>Glass Manufacturing</b>			
• Fiberglass	●	Published	Draft
• Flat Glass Products			Released
• Container Glass Products			Released
<b>Metal Casting</b>	●	Under Study	Exploring Options
<b>Motor Vehicle Manufacturing</b>	●	Published	2 <sup>nd</sup> Version Released
<b>Petrochemical Manufacturing</b>	●	Published	Draft
<b>Petroleum Industry</b>	●	Published	Private System Recognized by EPA
<b>Pharmaceuticals</b>	●	Published	Released
<b>Pulp &amp; Paper</b>			
• Integrated	●	Published	Draft
• Pulp			Draft
<b>Steel</b>			
• Mini-mills	●	Published	Draft
<b>Water/Wastewater</b>	●	In Process	Released

## Building Capacity Enables Greater Industry Participation

Key alliances and tools help EPA and its partners build capacity in a cost-effective manner.

**ENERGY STAR Challenge for Industry Launched.** EPA created a new initiative to encourage manufacturers to improve the energy efficiency of their sites by 10 percent within 5 years or less. Through the ENERGY STAR Challenge for Industry, EPA engages a broader set of industrial facilities in the fundamental energy management practices of establishing baselines, setting reduction goals, and tracking and managing energy use over time. By the close of 2010, 192 sites had taken the Challenge, and 27 had achieved the goal, saving over 1.7 trillion Btu.

**New Guidance To Address Unique Needs of Small- and Medium-Sized Manufacturers.** EPA released guidance to help small- and medium-sized manufacturers to build energy programs that work for the reduced scale of their operations. Also, an ENERGY STAR energy guide that addresses common plant systems was completed for these manufacturers.

## Continuing To Earn ENERGY STAR Certification

EPA awarded the ENERGY STAR to 49 plants in 2010—including several cookie and cracker plants that earned the ENERGY STAR for the first time—bringing the total to 79 (see Table 10).

## Expanding Sustainable Strategies

EPA influenced energy management beyond its ENERGY STAR partners by promoting energy efficiency as part of the partners' broad sustainability initiatives.

**Supply Chain Engagement Reaches Beyond Partners.** EPA supported its ENERGY STAR industrial partners in the development of supplier energy management outreach programs. Partners assisted their suppliers by passing on the resources and best practices they received through their own partnership with ENERGY STAR.

**Downstream Industries.** The Cement Focus companies worked through ENERGY STAR to build concrete plant energy assessment programs to assist their downstream industry, concrete production.

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

SECTOR FACILITY	EARNED THE ENERGY STAR IN 2010	TOTAL PLANTS EARNING THE ENERGY STAR
Cement Manufacturing Plants	22	32
Auto Assembly Plants	7	15
Petroleum Refineries	3	8
Wet Corn Mills	4	7
Pharmaceutical Manufacturing Plants	6	7
Wet Corn Mills	2	2
Frozen Fried Potato Processing Plants	5	8
<b>Total Plants Certified</b>	<b>49</b>	<b>79</b>
<b>Total Estimated Energy Savings (Compared with Average Plants)</b>	<b>74,400,000 MMBtu</b>	<b>233,700,000 MMBtu*</b>

\*Represents cumulative savings for labels earned since 2006.

## What To Expect in 2011 and Beyond

- Build upon the foundation set by the cement industry to develop resources for concrete manufacturers.
- Formalize agreements with more U.S. industrial sectors, including the printing industry.
- Complete energy guides for concrete plants and dairy processing plants.
- Re-baseline wet corn mills.
- Collaborate with DOE on an ISO standard for energy management and support the joint DOE-EPA State and Local Energy Efficiency Action Network for industry.
- Help small and medium manufacturing plants set and achieve energy performance goals through the ENERGY STAR Challenge for Industry.

# CLIMATE LEADERS



EPA launched the Climate Leaders program in 2002 to assist leading companies across the country in developing comprehensive climate change strategies. After 9 years, Climate Leaders has achieved a number of significant milestones while working to reduce GHG emissions (see Table 11). Through the program, EPA has deployed standardized GHG emissions management practices for use among companies within an industry and has provided guidance and recognition to encourage companies to set and achieve corporate-level GHG emissions reduction goals.

Climate Leaders partners represented a variety of industries and sectors, from manufacturers and utilities to financial institutions and retailers—with operations in all 50 states (see Figures 15 and 16). When companies partnered with Climate Leaders, they voluntarily agreed to account for and reduce GHG emissions by submitting a corporate-wide inventory of their GHG emissions, setting a public GHG emissions reduction goal, and taking steps to meet that goal by the agreed-upon deadline.

On September 15, 2010, EPA announced the Climate Leaders program would phase down the services offered during the next year with an official program end date of September 30, 2011. EPA determined that states and nonprofits are now well-positioned to work with companies and other entities to continue their climate leadership, assisting them in GHG reporting that goes above and beyond mandatory requirements and establishing facility or corporate-level GHG reduction goals. EPA also announced its intent to stay involved in important initiatives related to corporate GHG accounting, to support companies' actions to reduce their GHG emissions through other climate protection partnership programs, and to join with nongovernment organizations to recognize climate leadership.

## Achievements in 2010

- Nine additional partners achieved Climate Leaders GHG reduction goals: Abbott; Best Buy; Green Mountain Energy; Frito-Lay, Inc.; Lockheed Martin Corporation; Merck & Co., Inc.; The National Renewable Energy Lab; Oracle Corporation; and Steelcase, Inc.
- Thirty-two partners announced new corporate GHG reduction goals in 2010, bringing the total number of corporate GHG goals set by Climate Leaders partners and Small Business Network members to 228.



FIGURE 15. The 183 Climate Leaders Partners by Sector

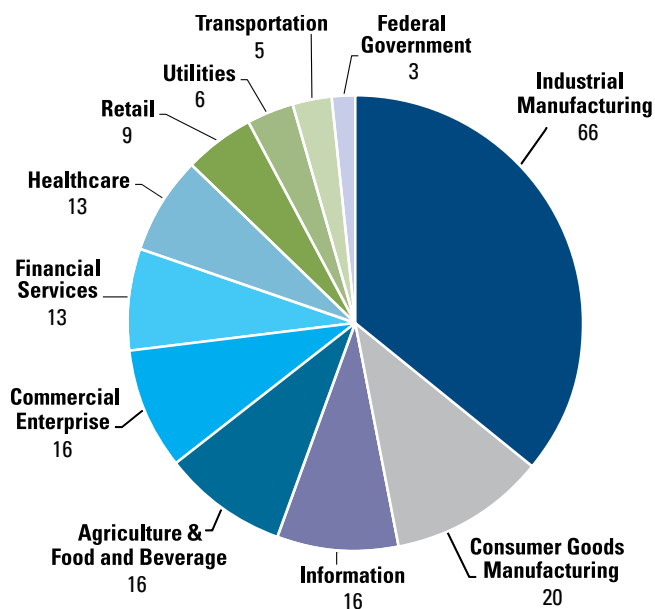


FIGURE 16. Climate Leaders Small Business Network Members

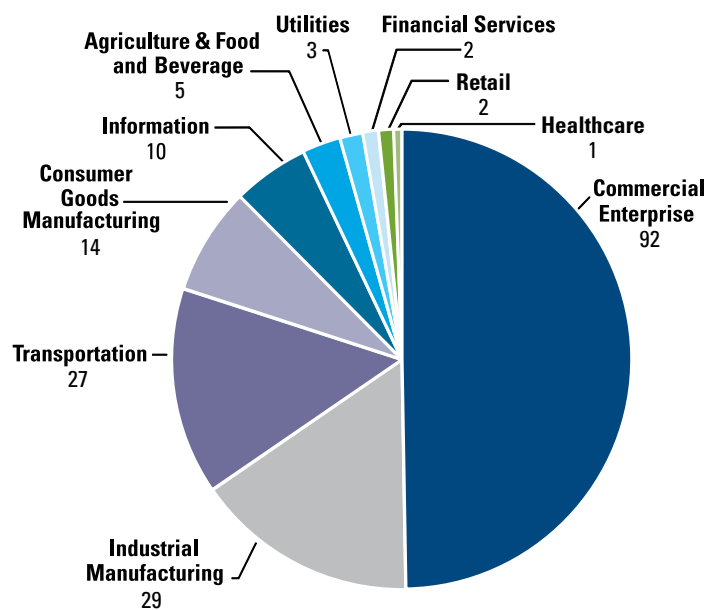


TABLE 11. Climate Leaders Key Program Indicators, 2004 – 2010 (Cumulative)

CLIMATE LEADERS INDICATOR	2004	2005	2006	2007	2008	2009	2010
Partners	64	78	107	155	251	183*	183**
Small Business Network Members	—	—	—	—	—	87*	185*
Total Partners and Members	—	—	—	—	—	270	368
Initial Inventories Submitted	42	58	78	115	161	201	227
Site Visits (Partners Only)	9	29	46	77	109	144	160
Goals Announced	20	31	55	88	115	154	228*
Goals Achieved	0	5	8	11	18	29	38

\*In late 2009, EPA approved development of the Climate Leaders Small Business Network to provide support to smaller companies. In previous years, the program numbers reflect participation from both small and large companies. Some organizations moved from Climate Leaders to the Small Business Network. Goals announced reflect the total from both programs.

\*\*In late 2010, EPA decided to phase down the Climate Leaders program over 2011. At that time, the program discontinued accepting new partners and some partners left the program.

## What To Expect in 2011 and Beyond

- Update, develop guidance for, and make publicly available the following tools:
  - Climate Leaders GHG Emissions Reduction Goal Model.
  - Climate Leaders Simplified GHG Calculator.
  - Climate Leaders Inventory Management Plan, as well as the GHG Inventory Summary and Goal Tracking Form.
- Facilitate recognition opportunities with nonprofit organizations to acknowledge corporate leaders in GHG management.
- Partner with the U.S. General Services Administration (GSA) in piloting the reporting of GHG inventories by small businesses under Executive Order 13514.

# CLEAN ENERGY SUPPLY PROGRAMS

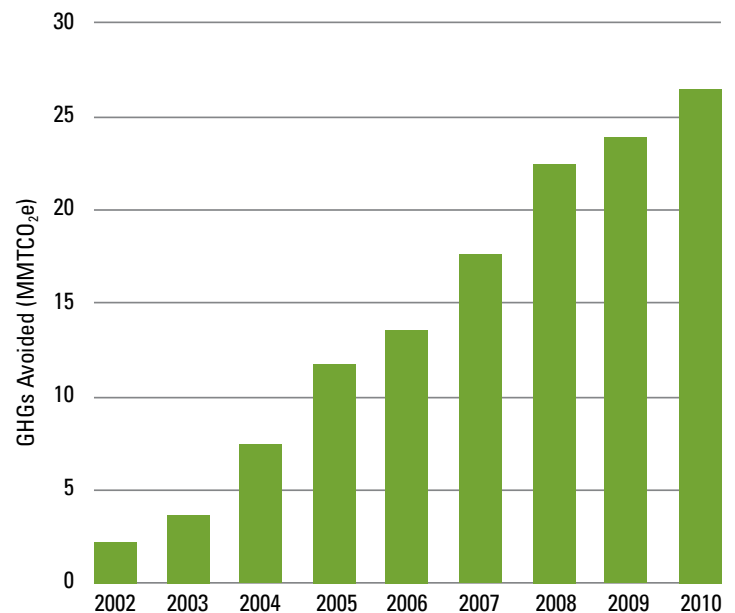


EPA's Clean Energy Supply Programs—the Green Power Partnership (GPP) and the Combined Heat and Power (CHP) Partnership—were launched in 2001 to facilitate the growth of green power generation and environmentally beneficial CHP across the nation.

For the past 10 years, both programs have made remarkable progress in dismantling market barriers to green power purchasing and CHP use by helping hundreds of partners find cost-effective solutions to meet their energy needs. By offering technical resources, developing nationally accepted standards, providing access to expertise, and recognizing environmental leadership, the Clean Energy Supply Programs continually bring value to partners.

In turn, partner investments in clean energy yield significant environmental benefits by reducing GHG emissions and other air pollutants. CHP and GPP partners are transforming the marketplace by increasing the local, regional, and national demand for clean energy supply technologies. The programs' achievements have been impressive. In 2010 alone, EPA's Clean Energy Supply programs reduced GHG emissions by 26.4 MMTCO<sub>2</sub>e (see Figure 17).

**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 a means to reducing the environmental impacts associated with purchased electricity use, while demonstrating environmental leadership. EPA's Green Power

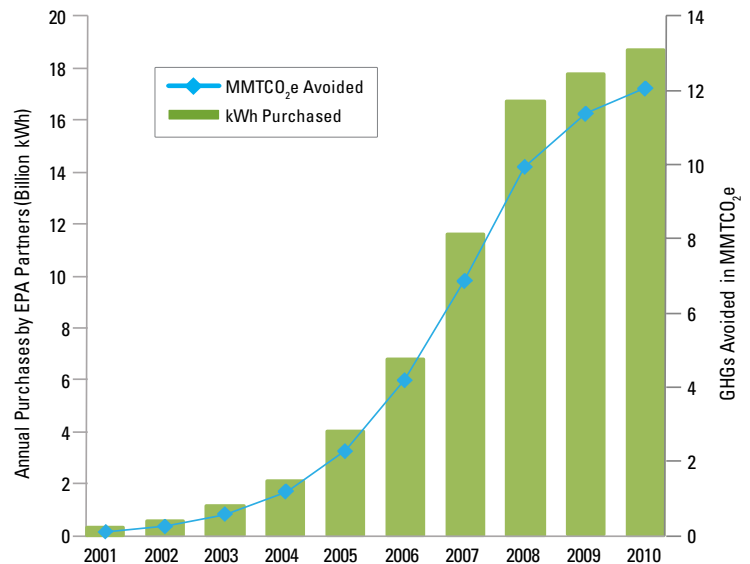


partners include a wide variety of forward-thinking organizations, such as Fortune 500 companies; small- and medium-sized businesses; local, state, and federal government agencies; and colleges and universities. The voluntary commitments of these partners to green power made 2010 an exceptional year for EPA's Green Power Partnership.

### Achievements in 2010

- Added over 200 new partners, bringing the total to more than 1,300. These organizations have committed to buying more than 18 billion kWh of green power annually, which is enough energy to run nearly 1.6 million average American homes for one year (see Figure 18).
- Expanded EPA's Fortune 500 Green Power Challenge, an initiative focused on increasing the collective green power purchases of eligible corporations. By the end of 2010, 67 Fortune 500 companies had taken the Challenge and stepped up their commitment to environmental stewardship by collectively purchasing nearly 9 billion kWh.
- Acknowledged 54 participating partners in EPA's College & University 2009 – 2010 Green Power Challenge. EPA ranked the green power purchases of individual schools against others within their athletic conferences, and subsequently calculated cumulative purchases among competing conferences. The Ivy League conference topped the list with the largest total purchase among all conferences, and earned EPA recognition as the 2009 – 2010 Collective Conference Champion.

**FIGURE 18. Green Power Purchases and Avoided GHG Emissions**



- Presented 18 Green Power Leadership Awards to top purchasers of green power and onsite renewable power systems (see Table 12).

**TABLE 12. 2010 EPA Green Power Leadership Awards**

Green Power Purchasing		Onsite Generation	
BD	<i>Franklin Lakes, NJ</i>	City of San Francisco	<i>San Francisco, CA</i>
BNY Mellon	<i>Pittsburgh, PA</i>	Phoenix Press, Inc.	<i>New Haven, CT</i>
Carnegie Mellon University	<i>Pittsburgh, PA</i>	<b>Green Power Partner of the Year</b>	
Chicago Public Schools	<i>Chicago, IL</i>	Kohl's Department Stores	<i>Menomonee Falls, WI</i>
Harris Bank	<i>Chicago, IL</i>	Motorola	<i>Libertyville, IL</i>
Indianapolis Zoo	<i>Indianapolis, IN</i>	TD Bank	<i>Cherry Hill, NJ</i>
Intel Corporation	<i>Santa Clara, CA</i>	Whole Foods Market	<i>Austin, TX</i>
Pearson	<i>Upper Saddle River, NJ</i>	<b>Green Power Community of the Year</b>	
Port of Portland	<i>Portland, OR</i>	Corvallis	<i>Corvallis, OR</i>
State of Illinois	<i>Springfield, IL</i>	Park City	<i>Park City, UT</i>

### Green Power—Energizing Communities Across the Country

Innovative municipalities across the country are partnering with EPA to become Green Power Communities (GPCs). Towns, villages, cities, counties, or Native American communities become GPCs when local government, businesses, and residents collectively buy green power in amounts that meet or exceed EPA's Green Power Partnership community purchase requirements. Between 2004 and 2010, 33 communities mobilized to reduce their carbon footprint by buying and using green power. Their purchases helped avoid annual CO<sub>2</sub> emissions equivalent to those from the electricity use of nearly 137,000 average American homes.

The Green Power Community Challenge aims to double the number of Green Power Communities nationwide. Over the span of a year, EPA GPCs will track and report their collective green power use and green power percentage of total electricity use. GPCs will be ranked according to these categories on EPA's website on a quarterly schedule. At the conclusion of the Challenge, the community that has the highest green power percentage and the community that uses the most kWh of green power will receive national recognition from EPA.

## What To Expect in 2011 and Beyond

- Expand community-level green power purchasing by designing and launching the Green Power Community Challenge to double the number of Green Power Communities nationwide (see sidebar).
- Explore innovative solutions that address the market barriers potentially impeding the deployment of onsite renewable energy systems by piloting the Clean Energy Collaborative Procurement Initiative within the Washington, DC, metro area.
- Continue to support and recognize partners' green power purchases while working with green power suppliers to increase the market supply of attractive green power products.
- Increase the number of new partners by 15 percent in 2011.

## COMBINED HEAT AND POWER PARTNERSHIP

EPA's CHP Partnership (CHPP) encourages the use of high-efficiency CHP technologies, which are cleaner than separately produced electrical and thermal energy. CHP projects are up to 60 percent more efficient than traditional separate heat and power generation,<sup>12</sup> and can also reduce reliance on grid-supplied electricity, increase the reliability of existing electricity supply systems, and help delay the need to build new capacity.



To promote increased use of CHP, EPA works closely with energy users, the CHP industry, state, local and tribal governments, and other stakeholders to develop new CHP projects and promote their environmental, economic, and other benefits. Since the program's inception, the CHP Partnership has made a significant impact on U.S. CHP capacity—particularly over the past 5 years, annually assisting up to 70 percent of the new CHP capacity additions (see Table 13).

## Achievements in 2010

- Welcomed 56 new partners, bringing the total to 409.
- Provided technical assistance to 19 candidate sites across the country, such as universities, wastewater treatment plants, biofuel refineries, federal facilities, and data centers.
- Assisted in the deployment of more than 210 MW of new CHP nationwide (out of more than 443 MW of total new nationwide capacity), bringing the cumulative impact of the program to over 5,000 MW of new CHP.

<sup>12</sup> For more information, see [www.epa.gov/chp/basic/efficiency.html](http://www.epa.gov/chp/basic/efficiency.html).

- Honored seven highly efficient CHP projects with the ENERGY STAR CHP Award. These systems range in size from 0.2 MW at a wastewater treatment facility to 66 MW serving a 40,000-person university campus (see Table 14).
- Included CHP as a Best Available Control Technology (BACT) in the EPA GHG BACT white papers released in December 2010. The white papers were developed for seven sectors: electric generating units; industrial, commercial, and institutional (ICI) boilers; pulp and paper; cement; iron and steel; refineries; and nitric acid plants. CHP’s capacity to increase energy efficiency and thereby reduce GHG emissions was essential to its inclusion in the white papers.

**TABLE 13. U.S. CHP Capacity and Partnership Market Share**

YEAR	TOTAL NEW CHP CAPACITY (MW)	NEW CHP CAPACITY CREDITABLE TO THE CHP PARTNERSHIP (MW)
2002	5,214	620 (12%)
2003	3,576	516 (14%)
2004	3,340	1,963 (59%)
2005	1,600	821 (51%)
2006	353	139 (39%)
2007	478	340 (71%)
2008	259	154 (59%)
2009	452	298 (66%)
2010	443	210 (47%)
<b>Total</b>	<b>15,715</b>	<b>5,061</b>

## What To Expect in 2011 and Beyond

- Publish a revised edition of a widely referenced report on the potential of CHP in wastewater treatment facilities.
- Continue to assure that the emissions reduction benefits of CHP are appropriately recognized in building performance rating systems, standards, and guidelines such as those developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and Leadership in Energy and Environmental Design (LEED®).
- Continue to advance the positive treatment of CHP in new or modified environmental policy and regulations.
- Work with EPA regions on the application of output-based standards, which recognize CHP’s energy efficiency attributes and its GHG emissions reduction capacity.
- Reach out to federal stakeholders and state energy agencies to facilitate including CHP in key climate and energy plans and policies.
- Develop a white paper to present a methodology for assessing CHP emissions impacts.
- Launch new online tools to help project developers and facility owners evaluate potential CHP projects.

**TABLE 14. 2010 ENERGY STAR Combined Heat and Power Awards**

CHP Project	Location	CHPP Partner(s)
Eastern Maine Medical Center	Bangor, ME	Solar Turbines, Vanderweil Engineers
Fairfield University	Fairfield, CT	Fairfield University, Nexant
Gainesville Regional Utilities South Energy Center	Gainesville, FL	Burns & McDonnell, Gainesville Regional Utilities, Solar Turbines
Landis Sewerage Authority	Vineland, NJ	Prodex
Port Arthur Steam Energy	Port Arthur, TX	Gas Technology Institute
UC San Diego	San Diego, CA	Jacobs Engineering Group, Solar Turbines
University of Missouri	Columbia, MO	GE Energy, University of Missouri, Siemens, Solar Turbines

# STATE AND LOCAL PROGRAMS AND INITIATIVES



EPA helps state and local governments use clean energy and other strategies to reduce GHG emissions and achieve other environmental, energy system, and economic benefits by providing technical assistance, analytical tools, and peer exchange opportunities.

In 2010, state and local governments faced the dual challenge of making full use of ARRA clean energy funding and preparing to comply with upcoming EPA regulations. To assist them, EPA:

- Introduced a comprehensive redesigned website for states and communities providing efficient access to current climate and energy information, tools, reporting, and peer exchange opportunities.
- Announced the second round of grant funding for a second group of 25 Climate Showcase Communities piloting local and tribal government climate change initiatives. The goal of the Showcase program is to create replicable models of sustainable community projects that result in cost-effective and sustained GHG reductions while improving the environmental, economic, human health, or social conditions in a community.
- Hosted an extensive suite of webinars and supported peer exchange among states, local governments, the heat island community, and energy efficiency practitioners. The most popular offering was a three-part webinar series for state and local government personnel on ways to help their communities adapt to climate change. The series covered risk analysis and communication to stakeholders; adaptation planning and implementation; and integration of these efforts into existing operations.

## STATE CLIMATE AND ENERGY PROGRAM

### Achievements in 2010

- Produced a draft paper that clarifies EPA guidance on accounting for the impacts of state energy efficiency and renewable energy policies and programs on air quality planning.



- Developed a schematic that highlights opportunities for states to factor in the effect of existing state energy efficiency and renewable energy policies on baseline emissions forecasts for their State Implementation Plans.

- Released *Assessing the Multiple Benefits of Clean Energy*, a new guide that explains the many energy, environmental, health, and economic benefits that clean energy can create and describes a range of methods and tools that states and local governments can use to estimate those benefits.

## LOCAL CLIMATE AND ENERGY PROGRAM

### Achievements in 2010

- Launched the first round of 25 projects under the Climate Showcase Communities program, hosted an intensive workshop for grantees, initiated a community of practice, and opened the second application period for the Climate Showcase Communities' \$10 million grant program, receiving more than 300 applications.



- Issued a new *Local Climate and Energy Strategy Guide on Smart Growth*, the latest installment in a series that provides comprehensive, straightforward overviews of GHG emissions reduction strategies that local governments can use.
- Increased connections with the reflective and green roofing sectors by developing and participating in four technical heat island forums.

### What To Expect in 2011 and Beyond for the State and Local Climate and Energy Programs

- Continue to provide technical assistance and support that helps state and local governments achieve low-cost emissions reductions and lays the groundwork for using clean energy strategies to improve air quality and secure other benefits.
- Hold a second intensive workshop for the pilot communities in the Climate Showcase Communities program, and publicize their project accomplishments; the combined grantee estimates across all 50 projects indicate that by 2014, approximately 350,000 metric tons of CO<sub>2</sub> equivalent emissions will be prevented annually.
- Encourage other governments to learn from and replicate the success of the Climate Showcase Communities.
- Release three additional installments of the Local Climate and Energy Strategy Series, including Transportation Control Measures, Energy Efficiency in K-12 Schools, and Energy Efficiency in Affordable Housing.

## CLEAN ENERGY AND UTILITY POLICY PROGRAMS

Despite the proven economic and environmental benefits of clean energy, a variety of barriers continues to deter utilities, as well as state and local governments, from making greater investments in cost-effective clean energy measures. During

2010, EPA provided information on existing program and policy options to state utility regulators and policymakers who were establishing and implementing cost-effective energy efficiency in their states.

### Achievements in 2010

- Continued co-facilitation of the National Action Plan for Energy Efficiency (Action Plan) with DOE. In 2010, the Action Plan continued to measure progress toward its Vision for 2025, and released two new issue papers for utility regulators on how programs can be designed to motivate customers to save energy.



- Partnered with DOE to release the new State and Local Energy Efficiency Action Network (SEE Action). SEE Action is the next phase of the Action Plan, assisting in the implementation of energy efficiency across a broader suite of state and local government policy and program options.

### What To Expect in 2011 and Beyond

- EPA will continue to co-chair the SEE Action Executive Group and share policy and program options with states working to remove persistent barriers to cost-effective energy efficiency and CHP.



# METHANE PROGRAMS



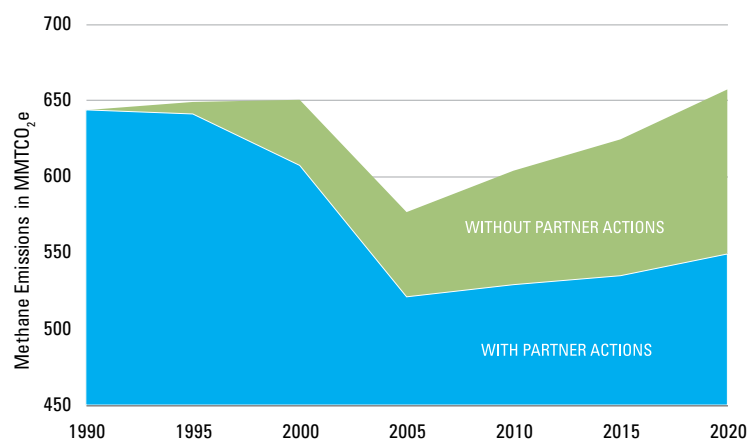
Methane ( $\text{CH}_4$ ) is an excellent candidate for reducing the concentration of GHGs in the atmosphere and providing a clean energy resource in the process. Methane is the second most important GHG behind carbon dioxide, and currently contributes one third of all anthropogenic (man-made) climate change. It also has a relatively short atmospheric lifetime of about 9 to 15 years, which means that reductions made today will yield positive results in the near term. And unlike other GHGs, methane is an important energy resource that allows for cost-effective mitigation of GHGs. There are many opportunities to recover methane from the agriculture (manure management), coal mining, oil and gas systems, and landfill sectors.

EPA has established partnership programs with industry to reduce methane emissions from some of the largest sources by encouraging the recovery and use of methane as energy. EPA's programs—Natural Gas STAR, AgSTAR, the Coalbed Methane Outreach Program, and the Landfill Methane Outreach Program—strive to remove market barriers and increase investment in cost-effective emissions reduction technologies and practices.

- In 2010, the combined efforts of EPA's methane programs resulted in GHG emissions reductions of 71.0 MMTCO<sub>2</sub>e, which is more than double the total for 2000 (see Table 15, p. 40).
- Combined with a regulatory program to limit air emissions from the nation's largest landfills, these partnerships have reduced emissions from targeted sources to 15 percent below 1990 levels. They are projected to remain below 1990 levels through at least 2020 (see Figure 19).

EPA is also achieving results on a global scale by sharing its experience, expertise, and success in the United States with partners around the world. The Global Methane Initiative (GMI), formerly known as the Methane to Markets Partnership, works with 38 partner governments and more than 1,000 public and private sector organizations internationally to accelerate the recovery and use of methane as a clean energy resource (see p. 46).

**FIGURE 19. Partner Actions Are Projected To Maintain Methane Emissions Below 1990 Levels Through 2020**



**TABLE 15. EPA's Methane Programs Meet and Surpass Goals**

PROGRAM	2010 GOAL	2010 ACHIEVEMENT	2011 GOAL
<b>NATURAL GAS STAR</b>			
Industry Participation (% in program)	62%	59%	58%
Annual Gas Savings (MMTCO <sub>2</sub> e)	27.5	38.0	27.9
<b>COALBED METHANE OUTREACH PROGRAM</b>			
Annual Methane Reductions (MMTCO <sub>2</sub> e)	9.9	9.9	10.1
<b>LANDFILL METHANE OUTREACH PROGRAM</b>			
Number of Projects	389	451	449
Annual Methane Reductions (MMTCO <sub>2</sub> e)	22.7	23.1	23.5
<b>TOTAL REDUCTIONS (MMTCO<sub>2</sub>e)</b>	<b>60.1</b>	<b>71.0</b>	<b>61.5</b>

## NATURAL GAS STAR PROGRAM

Natural Gas STAR is a flexible, collaborative partnership between EPA and oil and natural gas companies, designed to spur the adoption of cost-effective technologies and practices that reduce methane emissions. By working with both domestic and international companies from oil production and all sectors of the natural gas supply chain, Natural Gas STAR helps reduce methane emissions, improve operational



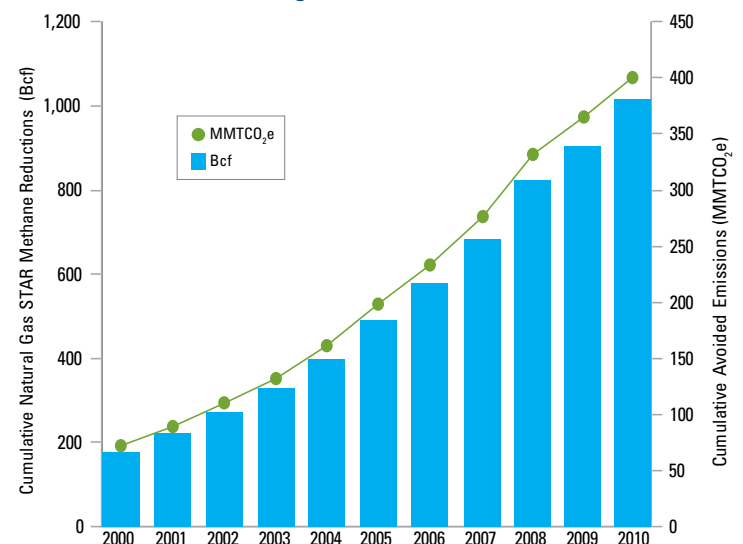
efficiency, increase natural gas supply, and contribute to a healthier global environment.

The program offers a full array of tools and resources—including technology transfer workshops, lessons learned studies, *Partner Reported Opportunities (PRO)* fact sheets, technical reports and studies, a quarterly newsletter, and peer networking forums—to assist companies in implementing a wide range of cost-effective best management practices and technologies to reduce methane emissions.

### Achievements in 2010

- Reduced U.S. methane emissions by 38.0 MMTCO<sub>2</sub>e through the efforts undertaken and reported by domestic partners for 2010, achieving cumulative program reductions of approximately 401 MMTCO<sub>2</sub>e since 1990 (see Figure 20).
- Continued to maintain about 60-percent industry participation across all major sectors—production, gathering and processing, transmission, and distribution.
- Welcomed four new partner companies, bringing the total to more than 140 domestic and international partners.
- Recognized 27 partner companies at the 17<sup>th</sup> Annual Implementation Workshop in New Orleans, LA, for their significant corporate achievements in reducing methane emissions from oil and gas systems (see Table 16).

**FIGURE 20. Natural Gas STAR Cumulative GHG Emissions Reductions and Gas Savings**



- Conducted two domestic and two international Production Sector Technology Transfer workshops.
- Hosted the combined Natural Gas STAR Annual Implementation Workshop and GMI Oil & Gas Subcommittee Meeting in November 2010, with the objective of reaching a broader audience.
- Performed several measurement studies to evaluate the feasibility of reducing methane emissions through

targeted technologies and practices. Provided training on the various data analysis techniques and software tools used in processing results from measurement studies.

- Worked with other federal agencies to encourage methane emissions reductions from production operations on federal lands, particularly in the western United States.

## What to Expect in 2011 and Beyond

- Update existing program materials and develop new tools that highlight the environmental and economic benefits of reducing methane emissions to facilitate the implementation of new projects.
- Engage and collaborate with the GMI Oil & Gas Subcommittee to leverage technical resources effectively.
- Advance international program efforts in new geographical areas, such as Indonesia and the Middle East.
- Continue progress made under Natural Gas STAR International with China, India, and Latin America to implement new methane emissions reduction projects through on-the-ground audits, project identification, and prefeasibility studies.
- Coordinate with federal and state agencies to address methane emissions from federal lands, focusing on activities in the western United States.

TABLE 16. 2010 Natural Gas STAR Awards

### Production Partner of the Year

El Paso E&P Company, L.P. *Houston, TX*

### Gathering and Processing Partner of the Year

ONEOK Partners *Tulsa, OK*

### Transmission Partner of the Year

Kinder Morgan (Natural Gas Pipelines) *Houston, TX*

### Distribution Partner of the Year

New Jersey Natural Gas Company *Wall, NJ*

### Implementation Manager of the Year

Mike Pontiff, Newfield Exploration Company *Houston, TX*

### Rookie of the Year

HighMount E&P LLC *Houston, TX*

### International Partner of the Year

Oil and Natural Gas Corporation Ltd. *New Delhi, India*

### Continuing Excellence – 17 Years

Consolidated Edison Company of New York, Inc. *New York, NY*  
 National Grid *Westborough, MA*  
 UGI Utilities, Inc. *Reading, PA*  
 Washington Gas *Washington, DC*  
 Williams Gas Pipeline *Tulsa, OK*

### Continuing Excellence – 15 Years

Central Hudson Gas & Electric Corporation *Poughkeepsie, NY*  
 Orange and Rockland Utilities, Inc. *Pearl River, NY*  
 Public Service Electric and Gas Company *Newark, NJ*

### Continuing Excellence – 10 Years

Hess Corporation's Americas Exploration and Production *New York, NY*

### Continuing Excellence – 7 Years

Devon Energy *Oklahoma City, OK*  
 Puget Sound Energy *Bellevue, WA*  
 Shell Exploration and Production Company *Houston, TX*

### Continuing Excellence – 5 Years

Alliance Pipeline LP *Eden Prairie, MN*  
 Consumers Energy *Jackson, MI*  
 Equitable Gas Co. *Pittsburgh, PA*  
 Marathon Oil Company *Houston, TX*  
 New Jersey Natural Gas Company *Wall, NJ*  
 New Mexico Gas Company *Albuquerque, NM*  
 Nicor Gas *Naperville, IL*  
 ONEOK Partners *Tulsa, OK*  
 Panhandle Eastern Pipe Line Company *Houston, TX*  
 Quicksilver Resources *Fort Worth, TX*

## AGSTAR PROGRAM

Biogas recovery systems help reduce GHG emissions by enabling the recovery and use of methane from animal manure and other organic wastes. A biogas recovery system is typically anchored by a manure digester that captures and combusts biogas to produce electricity, heat, or hot water. In addition to avoiding methane emissions, digester systems also reduce local water and air pollution, act as a source of renewable energy, provide rural economic development, better manage



nutrients, and generate other value-added products (e.g., manure fibers) that improve farm revenues.

Through the AgSTAR Program, EPA partners with the U.S. Department of Agriculture (USDA) to collaborate with the nation's agriculture industry to reduce methane emissions by promoting the use of biogas recovery systems to manage animal waste. EPA offers an array of tools and information designed to assist livestock producers in evaluating and implementing methane recovery systems. Currently, there are more than 200 manure digester systems operating or under construction in the United States.

### Achievements in 2010

- Provided technical support to USDA in selecting 19 anaerobic digester projects for grant and loan funding through the Farm Bill.
- Supported digester-to-energy projects that produced more than 450 million kWh of renewable energy from farms capturing methane.
- Expanded the AgSTAR State Partner program to nine states to more effectively leverage expertise and resources within state energy and environmental organizations, while accelerating the adoption of digester systems.
- Updated and expanded the AgSTAR national digester database to include 162 operating digesters and track the 79 digester projects that are under construction or shut down.

### What to Expect in 2011 and Beyond

- Provide technical expertise to enable the distribution of state and federal grant and loan funds to anaerobic digester projects through USDA and other funding sources.
- Expand outreach and education to livestock producers and other stakeholders through extension events, industry meetings, and renewable energy conferences.
- Evaluate emerging digester and biogas use technologies.
- Enhance the AgSTAR program website to provide improved tools and resources targeted to livestock producers, project developers, and policymakers.
- Hold the seventh AgSTAR National Conference, as well as regional events, to provide environmental, program, market, technical, and funding information on anaerobic digestion systems.
- Track the latest information on the deployment of anaerobic digestion systems in the United States through the AgSTAR national digester database.

## COALBED METHANE OUTREACH PROGRAM

The Coalbed Methane Outreach Program (CMOP) strives to reduce methane emissions from coal mining activities. Coal mine methane (CMM) is a potent GHG and can be an explosive hazard inside mines. But if CMM is recovered safely and used for energy, it is a valuable, clean-burning fuel source. CMOP collaborates with coal companies and related industries to reduce methane emissions through the development of environmentally beneficial, cost-effective CMM recovery and utilization projects.



The program primarily focuses on mitigating emissions from underground coal mines, both from degasification systems and from mine ventilation systems, as well as from abandoned (closed) underground mines and active surface mines. CMOP provides high-quality, project-specific information and technical assistance to the coal mining industry and project developers, including identifying project sites, analyzing and demonstrating technologies, conducting mine-specific project feasibility assessments and market evaluations, and analyzing financial incentives and regulatory hurdles.

### Achievements in 2010

- Increased the percentage of drained CMM that is recovered and used to approximately 83 percent—up from 25 percent in the early 1990s.
- Reduced emissions of methane by an estimated 9.9 MMTCO<sub>2</sub>e. These results include reductions from about 14 active underground coal mines, as well as reductions from around 25 projects that captured and used methane from approximately 38 closed underground U.S. coal mines.
- Announced two new ventilation air methane (VAM) mitigation projects at active U.S. coal mines and promoted the continued success of the first-ever VAM mitigation project that was launched in 2009. These projects were made possible by CMOP's extensive technical and outreach efforts over the years, including a successful VAM technology demonstration project cosponsored with DOE.
- Hosted the 2010 U.S. Coal Mine Methane Annual Conference, which attracted a record number of attendees and exhibitors. This conference is the only forum of its kind to address the opportunities and challenges of CMM project development in the United States.
- Refined tools to assist potential CMM project developers, including an online cash flow model to assess project finance and economics, as well as a map tool that indicates the locations and key attributes of U.S. CMM recovery and use projects, and potential sites.

### What to Expect in 2011 and Beyond

- Update technical reports and analytical tools to provide the latest information on how to recover CMM and use it effectively.
- Directly engage project developers, investors, technology vendors, and the mining community through tailored outreach events, including the 2011 U.S. Coal Mine Methane Annual Conference.
- Evaluate opportunities for new CMM recovery and utilization projects.
- Work with other federal agencies to address unique challenges and barriers to CMM recovery projects on federal lands, particularly in the western United States.

## LANDFILL METHANE OUTREACH PROGRAM

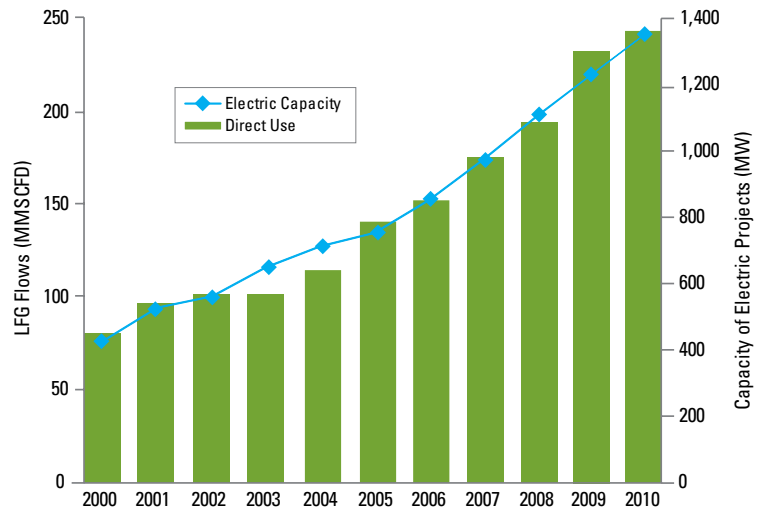
Landfill gas (LFG) energy projects prevent direct methane emissions from landfills and reduce indirect CO<sub>2</sub> emissions by displacing energy generated from the burning of fossil fuels with LFG, an alternative energy source (see Figure 21).



Through the Landfill Methane Outreach Program (LMOP), EPA provides landfill owners and operators a suite of tools and technical resources to help them overcome the obstacles to developing LFG energy projects. LMOP provides technical assistance to both smaller landfills not covered by EPA regulations and larger, regulated operations that are combusting their gas but not yet using it as a clean energy source.

Over the past 16 years, LMOP has celebrated assisting 502 LFG energy projects, and surpassing 550 operational projects nationally (see Figure 22). These LMOP-assisted projects have collectively reduced methane emissions from landfills and avoided emissions totaling 188.5 MMTCO<sub>2</sub>e; they are partially responsible for the approximately 20-percent decrease in methane emissions from landfills since 1990.

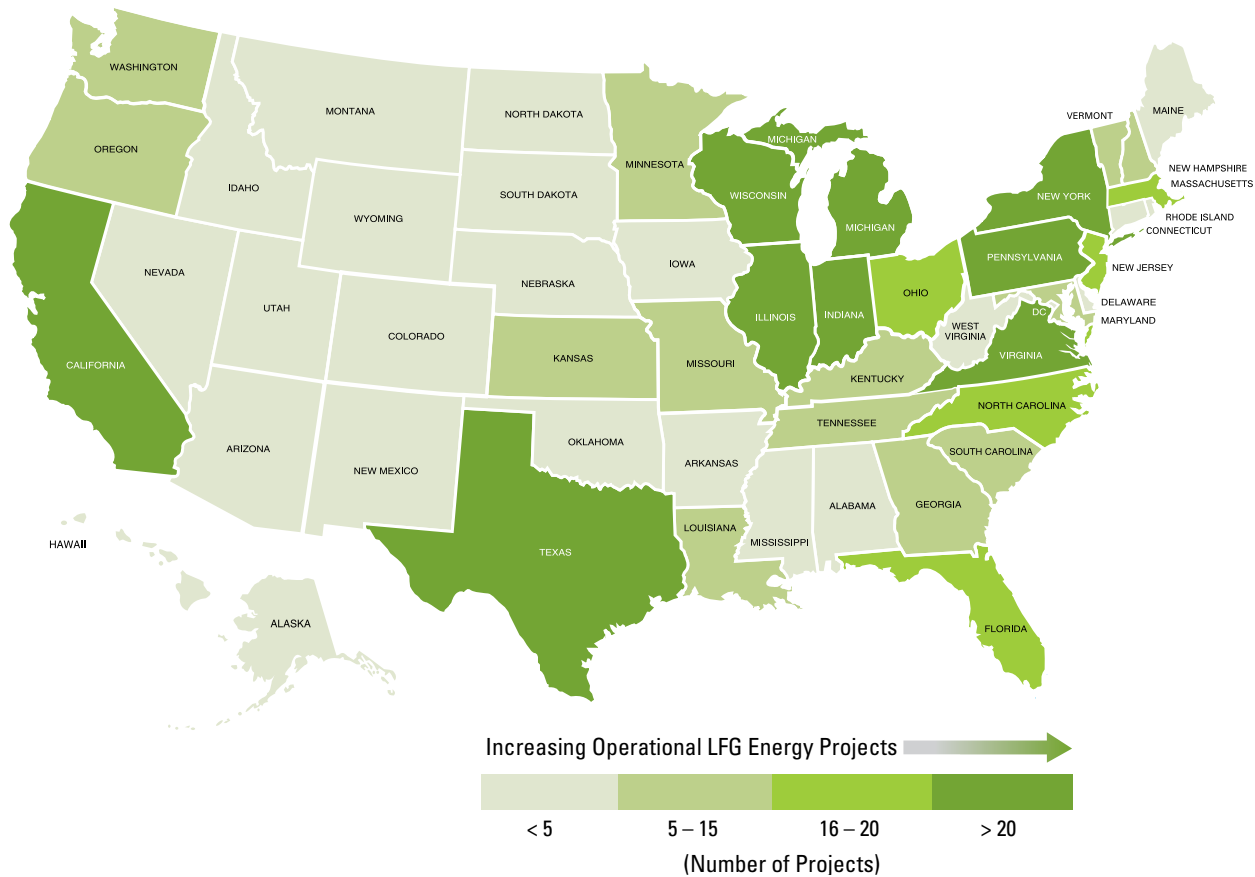
FIGURE 21. Direct Use and Electric Capacity of LMOP-Assisted Projects



### Achievements in 2010

- Reduced methane emissions by 23.1 MMTCO<sub>2</sub>e, partly as a result of helping to develop 36 new LFG energy projects and expand 10 existing projects.
- Welcomed 90 new partners, increasing participation by 10 percent and bringing the total to over 960.
- Provided stakeholders with technical assistance that included performing 83 cost analyses, conducting 29 locator searches to match end-users with landfills, and running gas generation models for 25 potential LFG energy projects.
- Garnered public attention for LMOP partners and LFG energy projects, which were featured by numerous media outlets, including the *Associated Press*, *Energy Today*, and *The Ledger Independent*. Supported four ribbon cuttings and one groundbreaking event with informational resources and materials.
- Recognized the outstanding accomplishments of one landfill methane partner and five exemplary projects at the 14<sup>th</sup> Annual LMOP Conference and Project Expo (see Table 17).

**FIGURE 22. Landfill Gas (LFG) Energy Projects Across the Country**



**What to Expect in 2011 and Beyond**

- Assist in the development of more than 35 new LFG energy projects.
- Expand efforts to promote the benefits of LFG energy to state and local economic development offices, emphasizing job creation and tax revenue opportunities.
- Host the 15<sup>th</sup> 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 LFG energy through fact sheets and list serve announcements.

**TABLE 17. 2010 Landfill Methane Outreach Program Awards**

<b>Projects of the Year</b>			
Frederick County Electricity Project	<i>Winchester, VA</i>	Crow Wing County Small On-site LFG Boiler Project	<i>Brainerd, MN</i>
Montgomery Regional Solid Waste Authority Small Engine Project	<i>Christiansburg, VA</i>	Hoffman Road LFG and Bay View WWTP Digester Gas 10-MW Project	<i>Toledo, OH</i>
Newton County Renewable Energy Business Park LFG Direct-Use Project	<i>Brook, IN</i>	<b>Community Partner of the Year</b>	
		Escambia County	<i>Pensacola, FL</i>

## Methane to Markets Partnership Becomes Global Methane Initiative



On October 1, 2010, in Mexico City, Mexico, 38 partner governments launched the Global Methane Initiative (GMI)

to urge stronger international action to protect the environment while developing clean energy and stronger economies. Through Methane to Markets (M2M), U.S.-supported projects have grown to nearly 600 sites around the world. From 2005 through 2010, the cumulative reduction from projects at those sites was more than 128 MMTCO<sub>2</sub>e (see Figure 23). U.S. contributions have leveraged nearly \$390 million in investments from other partner countries, development banks, and the private and public sectors.

GMI builds on the success and structure of M2M, but broadens the scope to include additional emissions sources and new approaches to methane abatement. The Initiative also advances the development of national action plans and brings new resources to increase international collaboration.

GMI will expand the efforts begun under the M2M Partnership in three key ways:

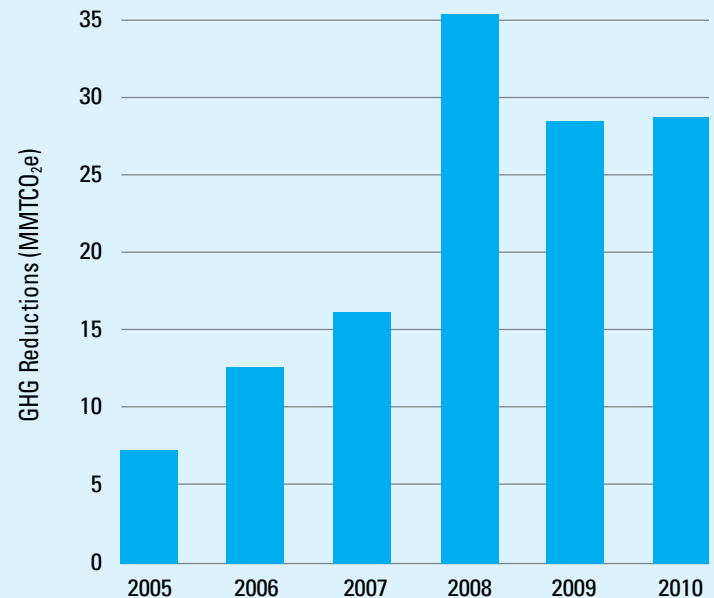
- **Wider Scope.** The Initiative broadens the scope from methane capture and use to methane abatement and destruction, and includes new sectors such as municipal wastewater.
- **GMI Partner Action Plans.** All partner countries will develop action plans for coordinating methane reduction efforts at home and abroad. These action plans will identify barriers to project implementation, target opportunities for comprehensive efforts to reduce methane emissions in partner countries, and help coordinate assistance efforts among partner countries.
- **New Resource Commitments.** M2M has demonstrated global methane mitigation successes, but with greater financial and human resource commitments, GMI will be able to realize even greater achievements.

With those important changes, GMI will serve to build capacity and identify needs and opportunities for advancing reduction efforts within partner countries, while providing a framework for ensuring coordination and leveraging the Initiative's collective resources.

EPA is leading other federal agencies in working with GMI partners—38 partner governments and more than 1,000 private and public sector organizations (the Project Network). The Initiative demonstrates how countries and the private sector can work cooperatively to reduce GHG emissions, stimulate economic growth, develop new sources of energy, and improve local environmental quality. In 2011, EPA and its GMI partners will:

- Seek to engage existing and new partners in developing new projects and achieving greater reductions.
- Work with all partners to develop country-level action plans on methane and explore new project opportunities in the wastewater sector.
- Begin planning for a GMI Expo that will be held in 2012 or 2013.

**FIGURE 23. GHG Reductions From U.S.-Supported GMI Projects**





# FLUORINATED GREENHOUSE GAS PROGRAMS



EPA's voluntary fluorinated greenhouse gas (FGHG) partnership programs continue to make significant reductions in potent GHG emissions. The fluorinated gases—including perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), nitrogen trifluoride ( $\text{NF}_3$ ), and sulfur hexafluoride ( $\text{SF}_6$ )—are in several cases a byproduct of some U.S. industrial operations. HFCs, on the other hand, are principally used as replacements for GHGs that also deplete the ozone layer. Ozone-depleting substances, including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), are used in refrigerators, air conditioners, insulating foams, and other products, but are being phased out globally under the *Montreal Protocol on Substances that Deplete the Ozone Layer*.

Through its partnership programs, EPA works closely with participating industries to identify cost-effective emissions reduction opportunities, recognize industry accomplishments, and facilitate the transition toward environmentally friendlier technologies and best environmental practices. Partners include aluminum producers, HCFC-22 producers, semiconductor manufacturers, electrical transmission and distribution system operators, magnesium producers and processors, supermarkets, utilities, and appliance retailers and manufacturers. Although FGHGs account for a small portion of total U.S. GHG emissions, they have very high global warming potentials (GWPs). FGHGs trap substantially more heat in the atmosphere than does  $\text{CO}_2$  on a per-mass basis, and some can have much longer atmospheric lifetimes than  $\text{CO}_2$  (see Table 18, p. 48).

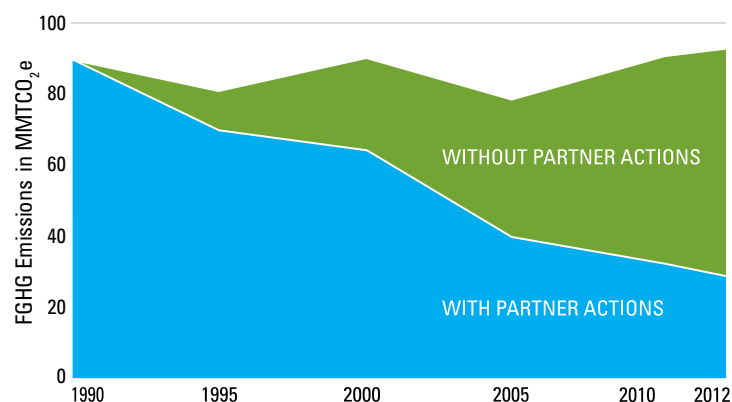
The combined efforts of the FGHG partnerships have helped partners maintain their emissions substantially below baseline levels—an impressive achievement given the potential for sizable growth in many of these industries. In 2010 alone, FGHG emissions reductions across the partnership programs totaled 52.0 MMT $\text{CO}_2\text{e}$  (see Table 19, p. 48).<sup>13</sup> Additionally, emissions are expected to stay at the levels shown in Figure 24, p. 48, as EPA continues to support partners in their efforts to improve industrial processes and share best practices.

<sup>13</sup> These are emissions reductions from voluntary programs and do not include reductions from regulatory programs such as the Significant New Alternatives Policy (SNAP) program.

**TABLE 18. 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	140 – 11,700	1.5 – 264
HFC-134a	1,300	14
Perfluorocarbons	6,500 – 9,200	3,200 – 50,000
Sulfur Hexafluoride	23,900	3,200

Source: IPCC 1996

**FIGURE 24. Partner Actions Are Projected To Maintain Emissions of Fluorinated Gases Below 1990 Levels Through 2012\***

\* Figure does not include data from RAD or GreenChill programs.

**TABLE 19. Goals and Achievements of EPA's FGHG Programs**

PROGRAM	2010 GOAL	2010 ACHIEVEMENT	2011 GOAL
<b>VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)</b>			
Industry Participation (% in program)	99%	99%	99%
Annual Reductions (MMTCO <sub>2</sub> e)	8.1	8.1*	8.1
<b>HFC-23</b>			
Industry Participation (% in program)	100%	100%	100%
Annual Reductions (MMTCO <sub>2</sub> e)*	23.1	18.3*	22.0
<b>OTHER STEWARDSHIP PROGRAMS</b>			
Industry Participation (% in program)**	50-100%	50-100%	50-100%
Annual Reductions (MMTCO <sub>2</sub> e)	25.3	23.1	27.5
<b>RESPONSIBLE APPLIANCE DISPOSAL (RAD)</b>			
Industry Participation (% in program)	—	7.8%	10.5%
Annual Reductions (MMTCO <sub>2</sub> e)	—	0.1	0.2
<b>GREENCHILL</b>			
Industry Participation (% in program)	—	16.0%	17.3%
Annual Reductions (MMTCO <sub>2</sub> e)	—	2.4	2.6
<b>TOTAL REDUCTIONS (MMTCO<sub>2</sub>e)</b>	<b>56.5</b>	<b>52.0***</b>	<b>60.4</b>

\*EPA estimate made prior to 2010 industry reporting under the Greenhouse Gas Reporting program.

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

\*\*\*Due to the global recession, lower production resulted in lower than forecast reductions.

## THE VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)

The Voluntary Aluminum Industrial Partnership (VAIP) met its goal of reducing direct carbon intensity by 53 percent from 1990



levels by 2010. The industry's successful strategy included optimizing the production process through technical and managerial improvements. Since 1995, EPA and the U.S. primary aluminum industry have worked together through VAIP, which now represents 98 percent of U.S. production

capacity, to reduce perfluorocarbon (PFC) emissions from aluminum production. PFC emissions of perfluoromethane (CF<sub>4</sub>) and perfluoroethane (C<sub>2</sub>F<sub>6</sub>) are inadvertent byproducts of the smelting process, and emissions of CO<sub>2</sub> are caused by the consumption of the carbon anode. EPA supports partners by providing technical assistance to evaluate the factors that influence PFC emissions, sharing best practices, and recognizing partners for their commitment to cutting emissions.

### Achievements in 2010

- Reduced direct GHG emissions by 8.1 MMTCO<sub>2</sub>e, which represents reduced PFC emissions of more than 60 percent, and reduced direct carbon emissions more than 53 percent on a per-ton basis compared with the industry's 1990 baseline.<sup>14</sup>
- Continued work with Australia, Canada, and China to implement PFC reduction strategies through training and a pilot project to demonstrate automated anode effect termination.
- Completed evaluation of non-anode effect PFC emissions.

## 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.<sup>15</sup>

### Achievements in 2010

- Reduced emissions by 18.3 MMTCO<sub>2</sub>e below what they would have been had production continued at 1990 emissions intensity levels.<sup>16</sup>

<sup>14</sup> EPA estimate in advance of 2010 mandatory reporting through the EPA Greenhouse Gas Reporting program.

<sup>15</sup> HFC-23 emissions intensity is the amount of HFC-23 emitted per kilogram of HCFC-22 manufactured.

<sup>16</sup> EPA estimate made prior to industry reporting under the EPA Greenhouse Gas Reporting program.

## THE FLUORINATED GREENHOUSE GAS REDUCTION/CLIMATE PARTNERSHIP FOR THE SEMICONDUCTOR INDUSTRY

In 2000, the World Semiconductor Council (WSC) set the first industry-wide global GHG emissions reduction target. In 2010, EPA's FGHG Reduction/Climate Partnership for the Semiconductor Industry met this goal by reducing aggregate emissions by at least 10 percent below the 1995 baseline level. EPA established its partnership with the semiconductor industry in 1996 and has supported partners in their efforts to identify and implement FGHG-reducing process changes and manufacturing tool



improvements for the production of integrated circuits. The industry has developed technological improvements in four key areas: process improvements/source reductions, alternative chemicals, capture and beneficial reuse, and destruction technologies.

The semiconductor industry remains committed to climate protection. The present challenges for WSC and EPA include maintaining flexibility and dynamic leadership that takes into account emerging production centers in China, Malaysia, and Singapore, as well as expanding cooperation with related high-tech electronics manufacturing sectors.

### Achievements in 2010

- Reduced absolute FGHG emissions by 12.8 MMTCO<sub>2</sub>e or more than 30 percent below 1995 levels, while U.S. manufacturing continued to expand.
- Achieved a 10-percent reduction in aggregate emissions by the end of 2010, meeting the objectives of the 2000 WSC memorandum of understanding.
- Promoted a new cooperative global electronics industry framework for comprehensively addressing climate

change at the 2010 International High Technology Environment, Safety, and Health (IHTESH) conference in Taiwan. This expanded model of cooperation will facilitate information sharing among the major related electronics manufacturing sectors—such as semiconductors, liquid crystal displays (LCDs), microelectrical mechanical systems (MEMs), and photovoltaics—all of which are pursuing comparable climate protection goals.

## SF<sub>6</sub> EMISSION REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS

SF<sub>6</sub> is the most potent and persistent GHG—it traps 23,900 times more infrared radiation than the equivalent amount of CO<sub>2</sub> (see Table 18, p. 48). Used primarily by electric utilities, SF<sub>6</sub> is a gaseous dielectric for high-voltage circuit breakers and gas-insulated substations. As such, utilities nationwide have the opportunity to make a big difference in the nation's emissions of SF<sub>6</sub>.



EPA partners with 83 electric power companies through the voluntary SF<sub>6</sub> Emission Reduction Partnership for Electric Power Systems. EPA works with the industry to share information about best management practices and cost-effective operational improvements, such as detecting and repairing leaks, using recycling equipment, and educating and training employees. In addition to providing a means to actively address climate change, this program has helped partner companies reap financial savings through reduced SF<sub>6</sub> gas purchases. Members of the partnership represent 47 percent of the total U.S. transmission system.

### Achievements in 2010

- Reduced emissions by 9.5 MMTCO<sub>2</sub>e, bringing average SF<sub>6</sub> emissions rates down to 4.4 percent of the total equipment nameplate capacity.
- Conducted a partners meeting on reducing SF<sub>6</sub> emissions in Dallas, TX. Guest speakers reviewed the evolving national and state legislative and regulatory programs

related to climate protection and GHG reductions. The 2-day event, hosted by partner company Oncon, included a site visit to a state-of-the-art substation where SF<sub>6</sub> reduction techniques were demonstrated.

- Continued to work with partners to update their SF<sub>6</sub> reduction goals.

## SF<sub>6</sub> EMISSION REDUCTION PARTNERSHIP FOR THE MAGNESIUM INDUSTRY

The SF<sub>6</sub> Emission Reduction Partnership for the Magnesium Industry brings EPA together with U.S. magnesium industry partners and the International Magnesium Association (IMA) to identify and adopt best management practices for reducing and eliminating emissions of SF<sub>6</sub>. Launched in 1999, this



partnership works to reduce SF<sub>6</sub> emissions from magnesium production and casting operations; more than 80 percent of the U.S. magnesium industry participates. The industry has made great progress in reducing emissions by optimizing equipment design and improving SF<sub>6</sub> gas management practices. Partners and IMA are working toward an ambitious goal, set in 2003, to completely eliminate their firms' SF<sub>6</sub> emissions.

### Achievements in 2010

- Reduced SF<sub>6</sub> emissions equivalent to 0.7 MMTCO<sub>2</sub>e. 2010 was the eleventh year in which EPA collected annual SF<sub>6</sub> emissions reports from magnesium industry partners.
- Maintained U.S. industry participation in the partnership, representing 100 percent of primary magnesium production and 80 percent of domestic casting and recycling capacity.
- Hosted a partnership webinar to review the status of the global reduction goal and discuss sector-specific climate protection options, including the challenges and benefits of switching to alternative melt protection technologies.

## RESPONSIBLE APPLIANCE DISPOSAL (RAD) PROGRAM

EPA launched the Responsible Appliance Disposal (RAD) Program in October 2006 to help protect the ozone layer and reduce GHG emissions. Partners go above and beyond the regulations to ensure the disposal of appliance foam and refrigerant from old refrigerators, freezers, window air conditioners, and dehumidifiers using the best environmental practices available. EPA also works with partners to prevent the release of hazardous materials like mercury and polychlorinated biphenyls (PCBs), as well



as save landfill space and energy by recycling durable materials—eliminating the need to produce virgin materials. The RAD Program invites utilities, retailers, manufacturers, state and local governments, universities, and other qualifying organizations to become partners.

EPA calculates stratospheric ozone benefits, climate benefits, and energy savings achieved by RAD partners. EPA also provides support for implementing and developing responsible appliance disposal programs and recognizes partners through press releases, brochures, and case studies on the RAD website.

### Achievements in 2010

- Avoided emissions of 0.1 MMTCO<sub>2</sub>e and over 400,000 pounds of ozone-depleting substances through the proper disposal of more than 735,000 refrigerant-containing appliances.
- Welcomed West Virginia as the first RAD state affiliate to help promote the RAD Program through information dissemination and strategic outreach.
- Worked with the tribal community of Yakama Nation to collect and recycle 192 refrigerators and freezers using best practices. In addition to achieving environmental benefits, the pilot program provided short-term employment, financial incentives in return for refrigerator disposal, and education about proper waste disposal to the Yakama Nation community.

## GREENCHILL PARTNERSHIP

EPA's GreenChill Partnership works with the supermarket industry to reduce refrigerant emissions that harm the ozone layer and contribute to climate change.

Supermarket refrigerant emissions are approximately 2,000 to 4,000 times more potent global warmers than carbon dioxide. Supermarkets leak about 35 million pounds of these refrigerants annually.

GreenChill has three programs: the Corporate Emissions Reduction Program, the Store Certification Program, and the Advanced Refrigeration Program. They help supermarkets



transition to environmentally friendlier refrigerants, reduce the amount of refrigerant used, eliminate refrigerant leaks, and adopt green refrigeration technologies and best environmental practices.

GreenChill's Corporate Emissions Reduction Program currently has 54 partners with 7,300 stores—over 20 percent of the supermarket industry. The Store Certification Program encourages emissions reductions by setting standards for individual stores' refrigerant leak rates, the types of refrigerant used, and the amount of refrigerant used. Stores that achieve GreenChill's certification emit at least 65 percent less refrigerant than a typical store.

### Achievements in 2010

- GreenChill partners have an average annual leak rate (13 percent) that is almost 50 percent lower than the national average annual leak rate (25 percent).
- Partners have reduced GHG refrigerant emissions by a cumulative 157,000 metric tons since 2007, GreenChill's baseline year.
- An average GreenChill store's climate impact due to refrigerant leaks (464 MTCO<sub>2</sub>e) was 55 percent lower than the national average store's (1,052 MTCO<sub>2</sub>e).

### What To Expect in 2011 and Beyond for the FGHG Programs

The FGHG partnership programs will continue to work closely with their partners and implement strategies to keep emissions below baseline levels. EPA plans to:

- Benchmark current emissions reduction options and costs for high FGHG emitters to support partnership and policymaking activities.
- Where required, facilitate partner efforts to transition from voluntary to the mandatory emissions reporting required for calendar year 2011.
- Host an International SF<sub>6</sub> Emissions Reduction Conference for Electric Power Systems.
- Support training programs to ensure electric power partners collect and report high-quality data.
- Support efforts of the magnesium industry to globally eliminate emissions of SF<sub>6</sub> by demonstrating alternative melt protection technologies for primary producers and secondary ingot casters.
- Maintain partnership efforts with HCFC-22 chemical manufacturers to continue to reduce emissions of HFC-23.
- Continue to recruit RAD partners and promote the disposal of refrigerant-containing appliances using the best available environmental practices.
- Continue to recruit additional GreenChill supermarket partners. Benchmark partner HFC and HCFC refrigerant emissions reductions. Facilitate partners' transition to environmentally friendlier refrigerants and advanced technologies and practices. Encourage store design improvements to prevent emissions, rather than repair them.

# 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 2020 due to investments made through 2010. For this analysis, EPA assumes no new investments will be made through its programs in 2011 or beyond.
- Financial benefits are placed in present value terms.

Environmental and financial benefits for 2010 and the cumulative benefits through 2020 are summarized in Table 2 on page 5. The historical environmental benefits and cost effectiveness of these programs are summarized on pages 54 and 55 (see Table 20, p. 55). 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.

### 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. GHG 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 2010 means:

- Reductions in greenhouse gas emissions of 3.6 metric tons of carbon dioxide 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.<sup>17</sup> 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 with industry reports on total annual product sales, as necessary. The 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 qualified products just meet the ENERGY STAR thresholds, even though there are some products that exceed this levels.
  - 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.

<sup>17</sup> For more details on many aspects of this method, see Homan et al. 2011 and Weber et al. 2000.



**TABLE 20. 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 2010	GHG REDUCTIONS <sup>1</sup> (MMTCO <sub>2</sub> e)											
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
ENERGY STAR	CO <sub>2</sub>	Residential, Commercial, Industrial	20,000	53.5	64.9	78.1	91.7	103.8	115.5	128.3	144.8	156.2	169.8	195.7	
Climate Leaders	All	Commercial, Industrial	360	Climate Leaders' reductions are reflected in the data shown for other programs.											
State Climate and Energy Program	CO <sub>2</sub>	State Government	—						—	—	—	—	—	—	
<b>CLEAN ENERGY SUPPLY<sup>2</sup></b>															
Green Power Partnership	CO <sub>2</sub>	State & Local Government, Commercial, Industrial	1,300		—	2.2	3.7	7.3	11.7	13.6	17.6	22.4	23.8	26.4	
Combined Heat & Power Partnership	CO <sub>2</sub>	Commercial, Industrial	400												
<b>METHANE PROGRAMS</b>															
Natural Gas STAR	CH <sub>4</sub>	Natural Gas	59% of industry	15.0	17.6	20.9	22.0	29.0	37.0	34.5	37.4	46.2	34.5	38.0	
Coalbed Methane Outreach Program (CMOP)	CH <sub>4</sub>	Coal Mining	—	7.7	8.4	6.2	6.2	7.3	7.3	9.2	8.1	8.1	8.8	9.9	
Landfill Methane Outreach Program (LMOP)	CH <sub>4</sub>	Waste Management	960	7.9	11.0	13.4	13.8	14.4	14.9	15.7	18.2	19.0	20.6	23.1	
<b>FLUORINATED GREENHOUSE GAS PROGRAMS</b>															
Voluntary Aluminum Industrial Partnership	PFCs	Aluminum Smelting	99% of industry	7.3	7.7	6.6	8.1	8.1	8.4	8.8	9.2	9.2	8.1	8.1	
HFC-23 Partnership	HFCs	Chemical Industry	100% of industry	17.2	18.7	16.5	22.4	23.5	22.7	25.7	25.7	26.8	18.3	18.3	
Stewardship Programs	SF <sub>6</sub> , PFCs	Magnesium Production, Semiconductor Manufacturing, Electric Power Systems	50% – 100% of industry	2.9	2.9	4.8	6.6	11.4	11.0	14.3	15.8	18.3	18.7	23.1	
Responsible Appliance Disposal (RAD) <sup>3</sup>	HFCs	Utility, Retail, Manufacturer, State & Local Government	34									0.0	0.0	0.1	0.1
GreenChill Partnership <sup>3</sup>	HFCs	Supermarket Industry	52									1.5	1.8	2.2	2.4

<sup>1</sup> These reductions reflect the most up-to-date data collected from EPA partners and may differ from reductions reported in previous annual reports.

<sup>2</sup> GHG reductions are for both the Green Power Partnership and Combined Heat and Power Partnership.

<sup>3</sup> Does not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 0.5 – 1.5 MMTCO<sub>2</sub>e.

—: 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 qualified product above a standard model over the product lifetimes discussed above.<sup>18</sup> All energy bill calculations use national sector-specific fuel prices.
- Avoided emissions of GHGs for 2010 are determined using marginal emissions factors for CO<sub>2</sub> equivalency 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.<sup>19</sup> For future years, EPA uses factors derived from energy efficiency scenario runs of the integrated utility dispatch model, Integrated Planning Model (IPM®).<sup>20</sup>

## 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.<sup>21</sup> 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 2010 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.<sup>22</sup>
- 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<sub>2</sub> equivalency 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.<sup>23</sup> 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<sub>2</sub> equivalency emissions as with products.

<sup>18</sup> Calculated using a 7% discount rate and 2010 perspective.

<sup>19</sup> For more details on eGRID, see U.S. EPA 2011a.

<sup>20</sup> For more details on IPM, see U.S. EPA 2010.

<sup>21</sup> For more details on many aspects of this method, see Horowitz, M.J. 2011a and 2007.

<sup>22</sup> For more details on many aspects of this method, see Horowitz, M.J. 2011a.

<sup>23</sup> For more details on many aspects of this method, see Horowitz, M.J. 2011b. For more details on 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. organizations purchase electricity from eligible renewable 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<sub>2</sub> 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 is already 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 are the result of 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 collaboration 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 CMM; such efforts are entirely voluntary. EPA estimates CMM 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 the proprietary information of program partners and are 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 FGHG Partnership for the Semiconductor Industry and the SF<sub>6</sub> Partnerships for Electric Power Systems and Magnesium Industries. 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.

### **Responsible Appliance Disposal (RAD) Program**

As a condition of partnership, RAD partners submit annual data to EPA on their achievements. Submitted data includes the number and type of appliances collected and processed as well as the quantity and fate of the individual components. GHG reductions are calculated by measuring the emissions avoided by recovering refrigerant, foam blowing agents, and recycling durable components in addition to the energy savings from early appliance retirement from utility programs.

### **GreenChill Partnership**

Partner emissions reductions are calculated both year-to-year and aggregate. Partners set annual refrigerant emissions reduction goals and submit refrigerant management plans to detail their reduction initiatives.

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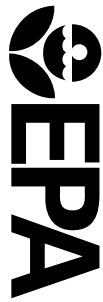
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