ENERGY STAR® and Other Climate Protection Partnerships

2011 Annual Report

EPA
United States
Environmental Protection
Agency

ENERGY STAR® AND OTHER CLIMATE PROTECTION PARTNERSHIPS
2011 ANNUAL REPORT

CONTENTS

Letter from the Administrator 1

Executive Summary 2

- Highlights of 2011 4

ENERGY STAR Overview 8

ENERGY STAR Certified Products 13

ENERGY STAR in the Residential Sector 19

ENERGY STAR in the Commercial Sector 23

ENERGY STAR in the Industrial Sector 27

Climate Leaders 30

Clean Energy Supply Programs 32

- Green Power Partnership 33
- Combined Heat and Power Partnership 34

State and Local Programs and Initiatives 36

- State Climate and Energy Program 37
- Local Climate and Energy Program 37
- Clean Energy and Utility Policy Programs 38

Methane Programs 39

- Natural Gas STAR Program 40
- AgSTAR Program 42
- Coalbed Methane Outreach Program 43
- Landfill Methane Outreach Program 44

Fluorinated Greenhouse Gas Programs 47

Demonstrating Progress 53

List of Figures 59

List of Tables 60

References 61

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

NOTE: The data source for all figures and tables in this 2011 Annual Report is EPA's Climate Protection Partnership Programs unless otherwise noted. Historical totals have been updated based on the most recent available data.

November 2012

For almost 20 years, the U.S. Environmental Protection Agency has partnered with organizations across America to help develop and deliver innovative, cost-effective solutions and approaches to help protect our climate.

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 accomplishments include:

- Americans saved more than $23 billion on their utility bills in 2011 with the help of ENERGY STAR and prevented an amount of greenhouse gas emissions equivalent to what 43 million vehicles would produce.
- Since the Green Power Partnership was introduced in 2001, nearly 1,300 organizations have committed to use about 25 billion kilowatt-hours of green power each year.
- More than 400 partners have installed more than 5,400 megawatts of new combined heat and power since the Combined Heat and Power Partnership launched in 2001.
- Through its partnerships in 2011, EPA's methane and fluorinated greenhouse gas programs used EPA tools and resources to avoid the equivalent of emissions from more than 23 million vehicles.

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

Sincerely,

Lisa P. Jackson

Administrator

U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

Climate change is one of the global community's most pressing environmental issues. Practical, cost-effective solutions exist for reducing greenhouse gas (GHG) emissions and protecting the environment through the adoption of energy efficiency, clean energy supply options, and other climate-friendly policies. But market barriers persist and limit widespread investment in those solutions. For the past 19 years, the United States Environmental Protection Agency's (EPA's) climate protection partnership programs have implemented innovative strategies and practices to overcome market barriers, with outstanding success (see Table 1).

EPA's partnership programs are dismantling 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 solidified EPA's partnership programs as valuable resources for the many households, businesses, and organizations that are changing the way they use energy.

In 2011, EPA's climate protection partnerships once again realized impressive results from their efforts to reduce GHG emissions.[1] The more than 23,000 organizations across the U.S. that have partnered with EPA in these programs, along with millions of American consumers, have achieved significant environmental and economic benefits (see Table 2, p. 5): [2]

- Preventing more than 368 million metric tons (in $MMTCO_2e$) of GHG emissions—equivalent to the emissions from 72 million vehicles (see Figure 4, p. 6)—with net savings to consumers and businesses of about $24 billion in 2011 alone.
- Preventing more than 3,160 $MMTCO_2e$ of GHG emissions cumulatively and providing net savings to consumers and businesses of more than $200 billion due to investments made through 2011.
- Investing about $113 billion in energy-efficient, climate-friendly technologies through 2011.

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[1] 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 584 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2011.

[2] Cumulative benefits from partnership activities through 2011 do not include the benefits that will persist beyond 2011, such as the benefits that will persist over the life of the investments already made and the potential to influence future investments. All reductions in annual greenhouse gas emissions are reported in million metric tons of carbon dioxide equivalent ($MMTCO_2e$).

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

AUDIENCE OR TARGET MARKET	MARKET BARRIERS ADDRESSED	CLIMATE PROTECTION PARTNERSHIP PROGRAM								
		ENERGY STAR	Center for Corporate Climate Leadership	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 efficency 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 2011

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 2011, EPA's ENERGY STAR efforts helped Americans:

- Save more than 277 billion kilowatt-hours (kWh)—about 5 percent of U.S. electricity demand.
- Prevent 221 million metric tons of GHGs—equivalent to the annual emissions from 43 million vehicles.
- Save more than $23 billion on their energy bills.

These benefits are more than four times those in 2000 (see Figure 1). Additional ENERGY STAR program highlights, with notable achievements for 2011 and cumulatively, include:

ENERGY STAR Certified Products

- More than 40,000 individual product models, produced by over 1,700 manufacturing partners, have earned the ENERGY STAR across more than 60 product categories.
- Americans purchased about 300 million ENERGY STAR certified products in 2011, bringing the total to about 3.8 billion since 2000.[3]

New Home Construction

- More than 130,000 ENERGY STAR certified new homes were constructed in 2011 alone—representing 26 percent of housing starts in the U.S. Since the program's launch, more than 1.3 million homes have been built to ENERGY STAR guidelines.

Home Improvement

- Over 50,000 existing homes were retrofitted through Home Performance with ENERGY STAR in 2011—for a total of more than 150,000 retrofits—with the help of more than 1,800 participating contractors in more than 30 states.

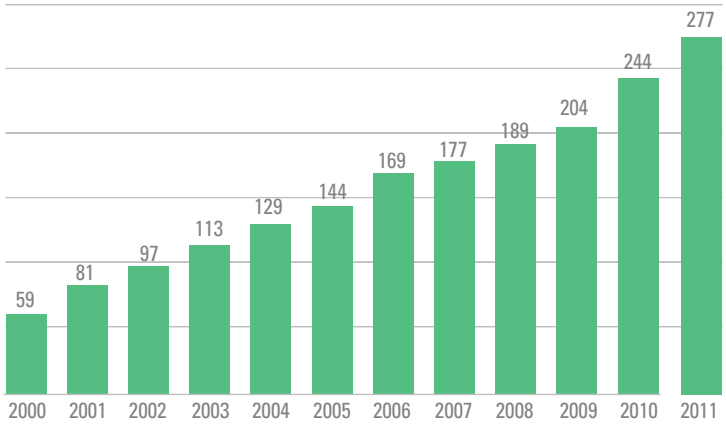
Commercial Buildings

- More than 7,500 buildings earned the ENERGY STAR in 2011 for a cumulative total of nearly 16,500 buildings—representing in excess of 2.5 billion square feet of U.S. building space.
- Over 260,000 buildings, representing more than 28 billion square feet of space and more than 40 percent of the total market, were assessed for energy efficiency using Portfolio Manager, EPA's ENERGY STAR measurement and tracking tool.

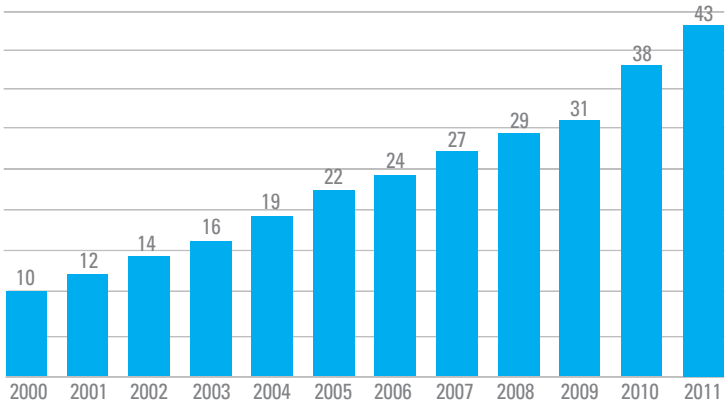
Industrial Sector

- The ENERGY STAR Challenge for Industry continued to grow and by the end of 2011, 416 sites had taken the challenge to improve their efficiency by 10 percent within 5 years. One hundred sites have achieved that goal, saving over 18.4 trillion British thermal unit (Btu) in energy.

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



Energy Saved (Billion kWh)



Emissions Saved in Vehicle Equivalents (Millions)

[3] *Does not include purchases of light bulbs.*

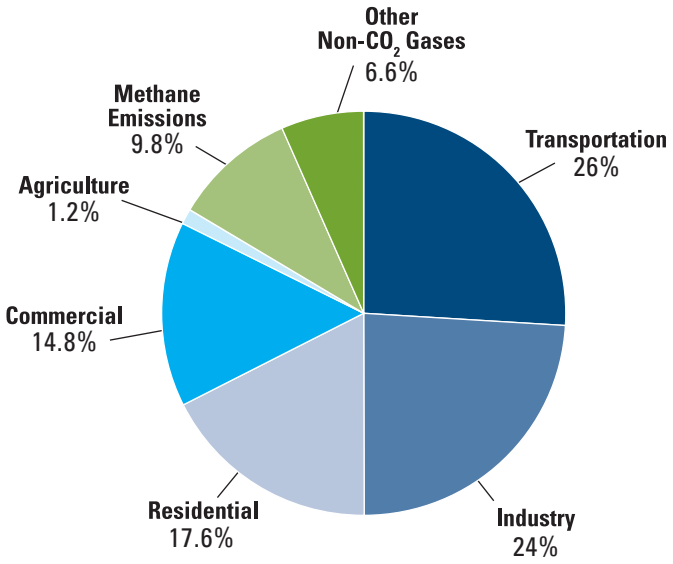
Recognizing Corporate Environmental Leadership

During its 10 years of activity, the Climate Leaders program achieved a number of significant milestones while working to reduce GHG emissions. Climate Leaders partners represented a variety of industries and sectors, from manufacturers and utilities to financial institutions and retailers, all of whom voluntarily agreed to account for and reduce GHG emissions. Recognizing however 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 in establishing facility or corporate-level GHG reduction goals, EPA phased out the program effective 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 U.S. (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 nearly 1,300 partners in the purchase of about 25 billion kWh of green power annually and 404 partners in the installation of more than 269 megawatts (MW) of new CHP capacity, the Clean Energy Supply programs reduced GHG emissions by 29.6 $MMTCO_2e$ in 2011 alone.

FIGURE 2. U.S. CO_2 Emissions by Sector and Non-CO_2 Gases by Percent of Total GHGs



Source: U.S. EPA 2012a.

TABLE 2. Annual and Cumulative Benefits From Partner Actions Through 2011 (in Billions of 2011 Dollars and $MMTCO_2e$)

PROGRAM	BENEFITS FOR 2011		CUMULATIVE BENEFITS 1993 – 2011			
	NET SAVINGS (BILLION $)	EMISSIONS AVOIDED ($MMTCO_2e$)	PV OF BILL SAVINGS (BILLION $)	PV OF TECHNOLOGY EXPENDITURES (BILLION $)	PV OF NET SAVINGS (BILLION $)	EMISSIONS AVOIDED ($MMTCO_2e$)
ENERGY STAR Total	**$23.4**	**221.2**	**$300.8**	**$106.8**	**$194.0**	**1,641**
Certified Products and Homes	$13.8	102.4	$140.5	$35.2	$105.3	665
Buildings	$7.8	86.6	$129.5	$58.8	$70.7	695
Industry	$1.8	32.2	$30.8	$12.8	$18.0	281
Clean Energy Programs	–	29.6	–	N/A	–	158
Methane Programs	$0.6	63.9	$13.9	$7.1	$6.8	774
FGHG Programs	–	53.9	–	N/A	–	594
TOTAL	**$24.0**	**368.6**	**$314.7**	**$113.9**	**$200.8**	**3,167**

PV: Present Value

NOTE: Technological 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. Cumulative benefits from partnership activities through 2011 do not include the benefits that will persist beyond 2011.

— : Not applicable

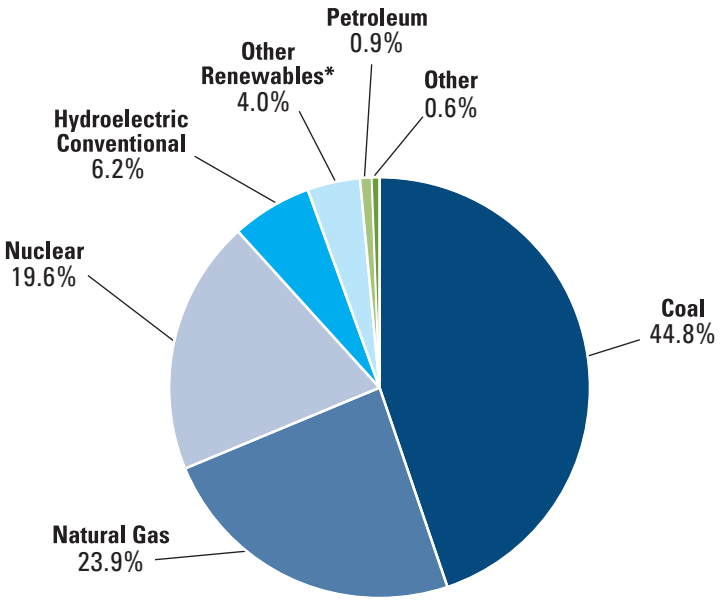
N/A: Not available

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. For example, in 2011:

- EPA held a workshop for the 50 Climate Showcase Communities that are piloting local and tribal government climate change initiatives and launched a new website for the program.
- EPA hosted an extensive suite of webinars and supported peer exchange among states, local governments, the heat island community, and energy efficiency practitioners.
- EPA and the U.S. Department of Energy (DOE) continued to facilitate the State and Local Energy Efficiency Action Network that provides guidance on policies and practices to bring energy efficiency to scale.

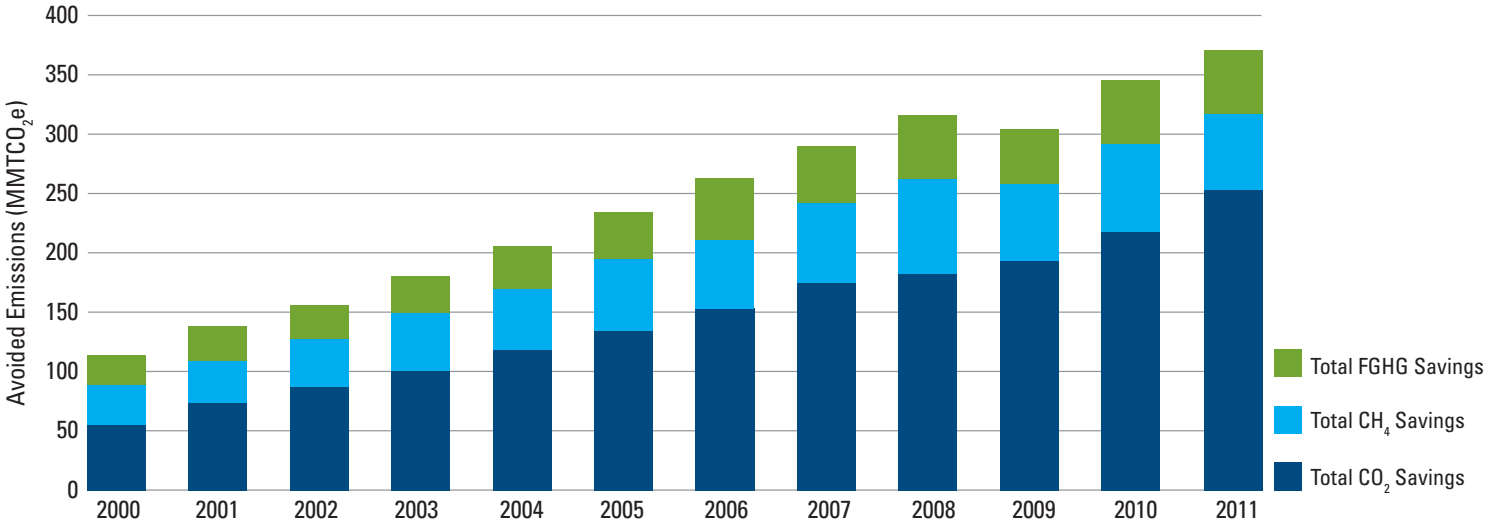
FIGURE 3. U.S. Electricity Generation by Fuel Type



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

Source: Energy Information Administration (EIA) 2011b.

FIGURE 4. GHG Emissions Reductions Exceed 368 MMTCO$_2$e—Equivalent to Emissions From 72 Million Vehicles



Note: For Total FGHG Savings 2007 – 2011 include savings from GreenChill. 2009 – 2011 include savings from RAD.

Reducing Methane Emissions and Recovering an Energy Resource

Methane (CH_4) 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. The programs avoided GHG emissions of 63.9 $MMTCO_2e$ in 2011, 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_6)—are extremely powerful and persistent GHGs. Together in 2011, these programs avoided 53.9 $MMTCO_2e$ of GHG emissions.

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 13, p. 33).
- ENERGY STAR CHP Awards (see Table 15, p. 35).
- Natural Gas STAR Awards (see Table 17, p. 41).
- Landfill Methane Outreach Program Awards (see Table 18, p. 45).

The 2011 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 2011 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 2011.
- 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 (in $MMTCO_2e$)

	ACCOMPLISHMENTS	GOALS	
PROGRAM	2011	2012	2015
ENERGY STAR	221.2	190	235
Clean Energy Supply Programs	29.6	29	44
Methane Programs	63.9	66	73
Fluorinated Greenhouse Gas Programs	53.9	69	79
*Responsible Appliance Disposal**	*0.3*	*0.5*	*0.6*
*GreenChill Partnership**	*4.1*	*4.5*	*6.0*
TOTAL	**368.6**	**354**	**431**

**The GHGs addressed by RAD and GreenChill include HFCs. The numbers reflected do not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 2.1 – 3.1 $MMTCO_2e$.*

ENERGY STAR OVERVIEW

As one of our nation's important environmental challenges, climate change demands practical, proven solutions that can be implemented today to protect us tomorrow. Under EPA's leadership, many consumers, businesses, and organizations have already taken action by investing in energy efficiency. Their investments are transforming the market for efficient products and practices, creating jobs, and stimulating the economy. Working together, we can accelerate the efficiency improvements at home, at work, and in our communities and continue to make positive impacts on human health and the environment.

The ENERGY STAR program has been instrumental in identifying cost-effective, innovative solutions for reducing GHG emissions since it was launched by EPA in 1992. The program has boosted the adoption of energy-efficient products, practices, and services through valuable partnerships, objective measurement tools, and consumer education. EPA will continue to dismantle barriers to widespread adoption of energy efficiency through ENERGY STAR by serving as a trusted source of unbiased information that helps Americans make choices that are good for the environment and the economy.

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.
- Purchase efficient new homes.
- Invest in home improvements to enhance efficiency.
- Enhance the efficiency of public and private commercial buildings.
- Design efficient buildings.
- Improve the efficiency of industrial facilities.

Achievements in 2011

National Benefits

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

- **Financial Savings.** Americans saved more than $23 billion on their utility bills across the residential, commercial, and industrial sectors.
- **Energy Savings.** Americans avoided the need for more than 277 billion kWh of electricity or about 5 percent of the total 2011 U.S. electricity demand.
- **GHG Emissions Prevented.** Americans prevented 221 million metric tons of GHG emissions, equivalent to the annual emissions from 43 million vehicles.

TABLE 4. ENERGY STAR Program Achievements Exceed Goals in 2011

	2011 ENERGY SAVED (BILLION kWH)	2011 EMISSIONS AVOIDED ($MMTCO_2e$)		2012 EMISSIONS AVOIDED ($MMTCO_2e$)
	ACHIEVED	GOAL	ACHIEVED	GOAL
All Certified Products [1]	136.0	89.8	99.7	97.2
New Homes [2]	2.1	6.6	2.7	7.3
Commercial Building Improvements [3]	119.7	60.5	86.6	64.2
Industrial Improvements [4]	19.9	19.4	32.2	21.3
PROGRAM TOTAL for ENERGY STAR	**277.7** [5]	**176.3**	**221.2**	**190**

[1]Results for certified products from DNV KEMA, 2012.[2] Results for certified homes from CPPD, 2011. [3]Results for commercial building improvements from Horowitz, 2012a. [4]Results from industrial sector improvements from Horowitz, 2012b.[5] The kWh savings imply peak demand savings of more than 35 gigawatts (GW), based on conservation load factors developed by LBNL (Koomey et al., 1990).

Key Achievements by Program Focus

About half of the program benefits realized in 2011 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 program benefits. Other key achievements in 2011 included (see Table 5, p. 11):

- **ENERGY STAR Awareness.** More than 80 percent of American households recognize the ENERGY STAR label. Additionally, more than three-quarters of the households that knowingly purchased an ENERGY STAR certified product credited the label as an important factor in their decision.
- **Products.** American consumers purchased about 300 million products that had earned the ENERGY STAR—despite the economic downturn—for a cumulative total of about 3.8 billion products purchased since 2000.[4]
- **Residential Buildings.** Since the program's launch, more than 1.3 million ENERGY STAR certified homes have been built in the U.S. More than 130,000 new homes were constructed to meet ENERGY STAR guidelines in 2011 alone, representing 26 percent of new home starts nationwide.[5]
- **Commercial Buildings.** Through 2011, more than 40 percent of the nation's building space was assessed for energy performance. Nearly 16,500 buildings have earned the ENERGY STAR, while more than 400 new building design projects have achieved Designed to Earn the ENERGY STAR.
- **Industrial Facilities.** EPA's ENERGY STAR Industrial Focuses expanded to include 23 sectors and subsectors with the launch of the printing Focus. EPA awarded the ENERGY STAR to over 70 plants in 2011—including three container glass plants for the first time—bringing the cumulative total to 110.

[4] Light bulbs are not included in the number of ENERGY STAR certified products purchased.

[5] Single family site-built new homes.

Partnership-Driven Change

Nearly 20,000 organizations across the U.S. have partnered with ENERGY STAR to realize significant environmental and economic benefits. These partners include:

- **Manufacturers.** More than 1,700 manufacturers using the ENERGY STAR label to differentiate over 40,000 individual product models across more than 60 product categories.
- **Retailers.** Some 2,500 retail partners bringing products that have earned the ENERGY STAR and educational information to their customers.
- **Builders.** More than 6,700 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 are actively working with clients to adopt a whole-building approach to energy management and helping more than 100,000 client buildings track their energy performance through Portfolio Manager, supporting more than 4,200 buildings, of the nearly 16,500, earn the ENERGY STAR in 2011.
- **Building and Facility Owners.** More than 5,500 private businesses, public sector organizations, and industrial facilities investing in energy efficiency and reducing energy use in their buildings and facilities.
- **Energy Efficiency Program Sponsors.** About 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 690 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 will recognize the outstanding commitments of 117 partners at the March 2012 Partner of the Year Awards ceremony (see Table 6, p. 12).

TABLE 5. ENERGY STAR Key Program Indicators, 2000 and 2011

ENERGY STAR PROGRAM STRATEGY	KEY INDICATOR	YEAR OF RESULTS	
		2000	2011
Efficient Products (for more information, see p. 13)	Product Categories Eligible for ENERGY STAR	33	> 60
	Individual Product Models Qualifying	11,000	> 40,000
	Products Purchased[1,2]	600 million	~ 3.8 billion[3]
	Public Awareness	40%	> 80%
	Manufacturing Partners	1,600	> 1,700
	Retail Partners	550	2,500
New Homes (for more information, see p. 19)	Number of Certified New Homes Built[1]	25,000	> 1,300,000
	Percent of National New Home Starts	< 1%	26%
	Markets with over 26% Market Share	0	15
	Builder Partners	1,600	> 6,700
Home Improvement (for more information, see p. 20)	Homes Improved through Home Performance with ENERGY STAR[1]	—	> 150,000
	Homes Benchmarked using Yardstick[1]	—	> 450,000
Existing Commercial Buildings (for more information, see p. 23)	Number of Buildings with an ENERGY STAR Score[1]	4,200	> 260,000
	Building Square Footage with an ENERGY STAR Score[1]	800 million	> 28 billion
	Percent of Commercial Square Footage with an ENERGY STAR Score	1%	> 40%
	Building Types Eligible for the ENERGY STAR	2	14
	Number of Buildings Certified[1]	545	~ 16,500
	Building Square Footage Certified[1]	128 million	> 2.5 billion
New Commercial Buildings (for more information, see p. 24)	Number of Buildings Designed to Earn the ENERGY STAR[1]	—	> 400
Industrial Improvements (for more information, see p. 27)	Industrial Partners	—	> 690
	Industrial Sectors (and Subsectors)	0	23
	Facility Types Eligible for the ENERGY STAR	—	9
	Number of Facilities Certified[1]	—	110
Annual Results (for more information, see p. 53)	EE Program Sponsors	100	~ 700
	Energy Saved (kWh)	62 billion	> 277 billion
	Emissions Avoided ($MMTCO_2e$)	15.8	221
	Net Savings (in U.S. Dollars)	$5 billion	> $23 billion

[1] Results are cumulative.

[2] The cumulative total of product sales across the entire ENERGY STAR program from 1992 through 2011, including those from the efforts of the U.S. Department of Energy. The results for energy saved and the resulting environmental and economic benefits represent EPA efforts alone.

[3] Light bulbs are not included in the number of ENERGY STAR certified products purchased.

EE : Energy Efficiency

— : Not applicable

~ : About or nearly

TABLE 6. 2012 ENERGY STAR Award Winners

To learn more about these award winners and their great accomplishments, see *Profiles in Leadership: 2012 ENERGY STAR Award Winners.**

CORPORATE COMMITMENT

Sears Holdings Corporation
Hoffman Estates, IL

SUSTAINED EXCELLENCE

3M
St. Paul, MN

Andersen Corporation
Bayport, MN

APS (Arizona Public Service)
Phoenix, AZ

ArcelorMittal USA
Chicago, IL

Austin Energy
Austin, TX

Bentall Kennedy (US)
Seattle, WA

Bosch Home Appliances
Irvine, CA

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

CalPortland Company
Glendora, CA

CBRE
Los Angeles, CA

CenterPoint Energy
Houston, TX

Ecova, Inc.
Spokane, WA

Energy Education, Inc.
Dallas, TX

Energy Inspectors
Las Vegas, NV

Energy Trust of Oregon
Portland, OR

EnergyLogic
Berthoud, CO

Evergreen Public Schools
Vancouver, WA

Focus on Energy
Middleton, WI

Food Lion Family, Bloom, and Bottom Dollar Food
Salisbury, NC

GE Appliances & Lighting
Louisville, KY

Gresham-Barlow School District
Gresham, OR

Habitat for Humanity of Greater Nashville
Nashville, TN

Hanesbrands Inc.
Winston-Salem, NC

HEI Hotels & Resorts
Norwalk, CT

Hines
Houston, TX

ITW Food Equipment Group LLC
Troy, OH

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

Joint Management Committee
West Dennis, MA

Jones Lang LaSalle
Chicago, IL

KB Home
Los Angeles, CA

Kohl's Department Stores, Inc.
Menomonee Falls, WI

Loudoun County Public Schools
Broadlands, VA

Lowe's Companies, Inc.
Mooresville, NC

Manitowoc Foodservice
New Port Richey, FL

Merck & Co., Inc.
Whitehouse Station, NJ

New Jersey Board of Public Utilities
Trenton, NJ

New Mexico Gas Company
Albuquerque, NM

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

New York-Presbyterian Hospital
New York, NY

Nissan North America, Inc.
Smyrna, TN

Oncor
Dallas, TX

Panasonic Home & Environment Company
Secaucus, NJ

PepsiCo, Inc.
Purchase, NY

PNM
Albuquerque, NM

Public Service Company of Oklahoma (PSO)
Tulsa, OK

Questar Gas Company
Salt Lake City, UT

Raytheon Company
Waltham, MA

Saint-Gobain
Valley Forge, PA

SCIenergy
Atlanta, GA

Southern California Edison Company
Rosemead, CA

Southern Energy Management
Morrisville, NC

Sponsors of Northeast Energy Efficiency Partnerships, Inc. (NEEP)
Lexington, MA

TIAA-CREF
New York, NY

Toyota Motor Engineering & Manufacturing North America, Inc.
Erlanger, KY

TRANSWESTERN
Houston, TX

USAA Real Estate Company
San Antonio, TX

Whirlpool Corporation
Benton Harbor, MI

Xcel Energy
Minneapolis, MN

PARTNER OF THE YEAR

AEP Ohio
Columbus, OH

AEP Texas Central
Corpus Christi, TX

Air-King, Ltd.
West Chester, PA

AVR Homebuilders
Yonkers, NY

Beacon Capital Partners, LLC
Boston, MA

Brown Printing Company
Waseca, MN

Cleveland Clinic
Cleveland, OH

Colgate-Palmolive Company
New York, NY

Columbia Gas of Ohio
Columbus, OH

ComEd
Chicago, IL

Commonwealth of Kentucky
Frankfort, KY

Constellation Energy/Baltimore Gas and Electric Company (BGE)
Baltimore, MD

Consumers Energy
Jackson, MI

D.R. Wastchak, LLC
Tempe, AZ

Des Moines Public Schools
Des Moines, IA

DuctTesters, Inc.
Modesto, CA

Eastman Chemical Company
Kingsport, TN

Efficiency Vermont
Burlington, VT

El Paso Electric
El Paso, TX

EnergyCAP, Inc.
State College, PA

Entergy Texas
Beaumont, TX

Fanning/Howey Associates, Inc.
Celina, OH

General Motors Company
Detroit, MI

Kentucky Housing Corporation
Frankfort, KY

KPPC – Kentucky Pollution Prevention Center
Louisville, KY

LG Electronics, Inc.
Englewood Cliffs, NJ

LG&E and KU
Louisville, KY

Liberty Property Trust
Malvern, PA

Long Island Power Authority (LIPA)
Uniondale, NY

Magic Valley Electric Cooperative, Inc
Mercedes, TX

NVR, Inc.
Reston, VA

PECO
Philadelphia, PA

ProVia
Sugarcreek, OH

Salt Lake City School District
Salt Lake City, UT

Samsung Electronics Co., Ltd.
Suwon, South Korea

Scotsman Ice Systems
Vernon Hills, IL

Southern Maryland Electric Cooperative (SMECO)
Hughesville, MD

Staples, Inc.
Framingham, MA

The Boeing Company
Chicago, IL

The E Group, a Division of FirstEnergy Solutions Corp.
Akron, OH

The Home Depot
Atlanta, GA

Utah Building Energy Efficiency Strategies
Salt Lake City, UT

Utah Home Performance
Salt Lake City, UT

Vermont Gas Systems
Burlington, VT

AWARDS FOR EXCELLENCE

ENERGY STAR Promotion

Central Florida Energy Efficiency Alliance
Orlando, FL

Design Tech Homes
Spring, TX

Good Earth Lighting, Inc.
Wheeling, IL

Hoshizaki America, Inc.
Peachtree City, GA

Meritage Homes
Scottsdale, AZ

National Grid
Waltham, MA

North Carolina Energy Efficiency Alliance
Boone, NC

Northwest Energy Efficiency Council
Seattle, WA

Sea Gull Lighting Products LLC
Riverside, NJ

Affordable Housing

Habitat for Humanity of Metro Denver
Denver, CO

Milford Housing Development Corporation
Milford, DE

Energy-Efficient Product Design

DIRECTV
El Segundo, CA

Sharp Electronics Corporation
Mahwah, NJ

Retailing

Nationwide Marketing Group
Winston-Salem, NC

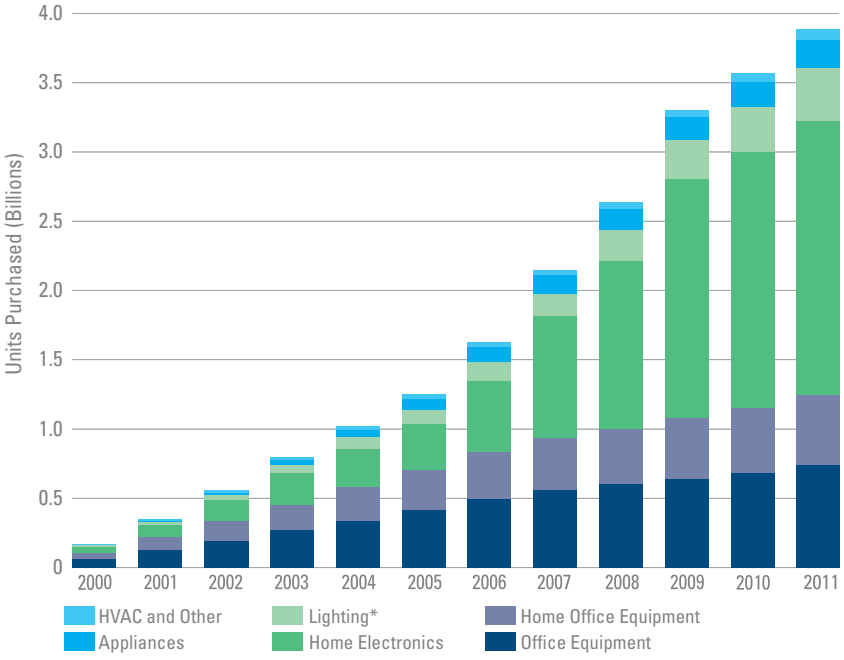
** To read or download Profiles in Leadership, go to http://www.energystar.gov/ia/partners/pt_awards/documents/2012_profiles_in_leadership.pdf?0521-f586*

ENERGY STAR CERTIFIED 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 2011, Americans purchased about 300 million products that had earned the ENERGY STAR across more than 60 product categories for a cumulative total of about 3.8 billion[6] ENERGY STAR certified products purchased since 2000 (see Figure 5). Certified products—including appliances, heating and cooling equipment, consumer electronics, office equipment, lighting, commercial food service and data center equipment, 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 2011 included:

- Adding one new product category, updating the specifications for eight product categories, and completing specification reviews for three categories (see Table 7, p. 14).
- Launching a recognition pilot of ENERGY STAR's Most Efficient.
- Implementing third-party certification of products, including enhanced product verification procedures.

FIGURE 5. About 3.8 Billion ENERGY STAR Certified Products Purchased Since 2000



**Lighting category does not include purchases of light bulbs.*

[6] *Light bulbs are not included in the number of ENERGY STAR certified 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 2011
2011 NEW SPECIFICATIONS			
Luminaires	2011	Up to 75%	Revised specification to take effect April 1, 2012.
2011 REVISIONS COMPLETED			
All ENERGY STAR Specifications: Third-Party Certification	2011	NA	Completed. Took effect January 1, 2011.
Televsions	1998 (2002, 2004, 2005, 2008, 2010, 2011)	40-60%	Revised specification took effect September 30, 2011.
Furnaces	1995 (2006, 2011)	12-16%	Revised specfication to take effect February 1, 2012.
Set-top Boxes	2001 (2005, 2008, 2011)	40%	Revised specification took effect September 1, 2011.
Residential Dishwashers	1992 (1995, 1998, 1999, 2005, 2006, 2009, 2010, 2011)	20%	Revised specification to take effect January 1, 2012.
Dehumidifiers	2001 (2005, 2011)	16%	Revised specfication to take effect October 1, 2012.
Commercial Fryers	2003 (2011)	Up to 35%	Revised specification took effect April 22, 2011.
Ceiling Fans	2001 (2003, 2006, 2009, 2011)	Up to 50% (with light kit)	Revised specification to take effect April 1, 2012.
Vent Fans	2001 (2003, 2009, 2011)	Up to 50% (with light kit)	Revised specification to take effect April 1, 2012.
Boilers	1996 (1998, 2002, review 2011)	6%	Review completed March 2011.
Decorative Light Strings	2007 (2011 review)	Up to 70%	Review completed November 2011.
Air Cleaners	2004 (2011 review)	Up to 40%	Review completed July 2011.
2011 REVISIONS IN PROGRESS			
Audio/Video Equipment	1999 (2003, 2009, 2010)	Up to 60%	In progress, expected to be complete in 2012.
Battery Charging Systems	2006	35%	In progress, expected to be complete in 2013.
Commercial Dishwashers	2007	25% energy, 25% water	In progress, expected to be complete in 2012.
Commercial Ice Makers	2008	15% energy, 10% water	In progress, expected to be complete in 2012.
Commercial Ovens	2009	Up to 14%	In progress, expected to be complete in 2013.
Computers	1992 (1995, 1999, 2004, 2008)	30-65%	In progress, expected to be complete in 2013.
Imaging Equipment	1993 (1995, 2000, 2001, 2007, 2009)	Up to 40%	In progress, expected to be complete in 2012.
Lamps	1999 (2002, 2008, 2009)	Up to 75%	In progress, expected to be complete in 2012.
Monitors/Displays	1992 (1995, 1998, 1999, 2005, 2006, 2009, 2010)	30%	In progress, expected to be complete in 2012.
Residential Refrigerators/Freezers	1996 (2004, 2008)	20%	In progress, expected to be complete in 2012.
Residential Water Heaters	2009	15%	In progress, expected to be complete in 2012.
Roofs	1998 (2001, 2003, 2007, 2009)	10-15% in cooling costs	In progress, expected to be complete in 2012.
Room Air Conditioning	1996 (2001, 2003, 2005)	10%	In progress, expected to be complete in 2012.
Televisions	1998 (2002, 2004, 2005, 2008, 2010, 2011)	40-60%	In progress, expected to be complete in 2012.
Servers	2009	27%	In progress, expected to be complete in 2012.
Vending	2004 (2006, 2007)	50%	In progress, expected to be complete in 2012.
Water Coolers	2000 (2010)	Up to 50%	In progress, expected to be complete in 2013.
Windows, Doors, Skylights	1998 (2003, 2005, 2009)	15%	In progress, expected to be complete in 2013.
NEW SPECIFICATIONS IN DEVELOPMENT			
Climate Controls		TBD	New specification to be completed in 2013.
Data Center Storage		TBD	New specification to be completed in 2013.
Laboratory Grade Refrigerators and Freezers		TBD	New specification to be completed in 2013.
Small Network Equipment		TBD	New specification to be completed in 2013.
Uninterruptible Power Supply		TBD	New specification to be completed in 2012.

Achievements in 2011

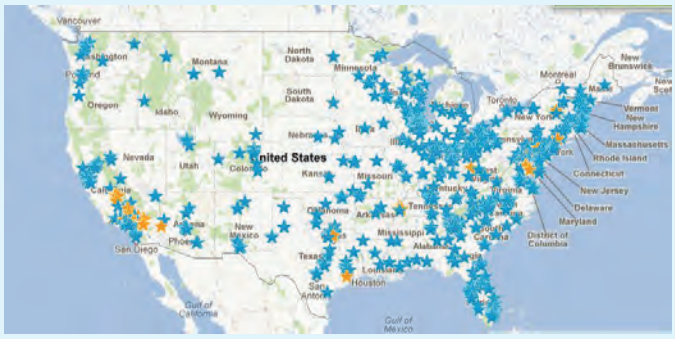
Inspiring Consumer Action

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 for others to help drive behavior change through a variety of ways—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 2011. 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 certified 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 437,000 individuals took the ENERGY STAR Pledge in 2011, representing an estimated 877 million potential pounds of GHG emissions prevented and more than 520 million kWh saved. Over 19 million Americans had the opportunity to read ENERGY STAR campaign information and messaging, and online coverage had a potential audience reach of more than 78.4 million. Those totals represent national and local media coverage of the overall campaign, youth partnerships, heating and cooling seasonal energy-saving tips, and other product-related program developments throughout the year.
- Leading pledge drivers—Georgia Power, Girl Scouts of the USA, Samsung Electronics, Ameren Illinois, and Nissan North America—and some 570 other 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.

ENERGY STARs Across America

Demonstrating the growing grassroots support across the country for saving energy and protecting our climate, more than 800 events were featured as part of ENERGY STARs Across America in 2011. Seventy different ENERGY STAR partners participated, and events included everything from in-store CFL giveaways to energy-saving flash mobs at metropolitan malls. The events were highlighted on the ENERGY STAR website as part of an interactive map allowing visitors the opportunity to find energy efficiency educational events in their own communities.



- Youth organizations were more engaged than ever, helping this important audience learn about the connection between energy savings and the environment and ways to help their families save energy. EPA worked closely with 20 Boys & Girls Clubs of America representing nearly 3,000 members. With support from ENERGY STAR, parent-teacher organizations across the country reached more than 4,100 schools and 400,000 kids through Go Green Nights.
- The ENERGY STAR website remained very popular; visitor sessions across the entire website totaled nearly 13 million in 2011.
- More than 80 percent of American households recognize the ENERGY STAR label, and more than 40 percent knowingly purchased an ENERGY STAR labeled product in the past year (see Figure 6, p. 16).[7] Of those purchasers, 75 percent reported the label as influential in their purchasing decision; about 80 percent reported they are likely to recommend products that have earned the ENERGY STAR to friends, and 32 percent of those households reported they were "extremely" likely to recommend ENERGY STAR labeled products.[7]

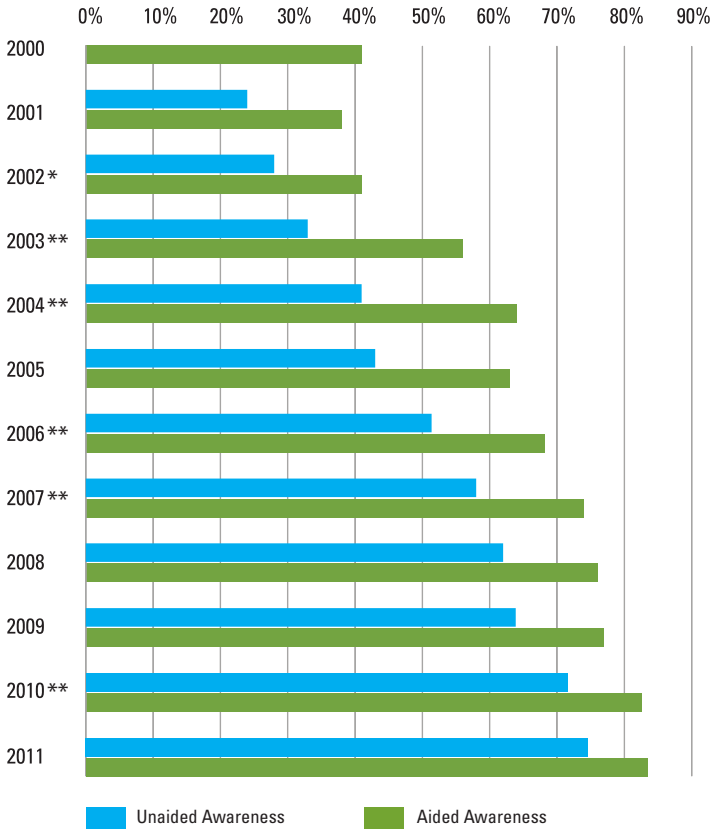
[7] *For more information, see U.S. EPA 2012b.*

ENERGY STAR Third-Party Certification and Compliance

The Value of Certification. After almost 20 years, the ENERGY STAR label has grown into an incredibly valuable asset—to the environment, to consumers, and to the product manufacturers who earn it. Independent certification of products that carry the label is important to maintaining consumer confidence and preserving that value. Similar to electrical product safety programs that have been in place for many years, the ENERGY STAR qualification process requires that products be tested in EPA-recognized laboratories, with the results reviewed by an independent, accredited certification organization. In addition to up-front testing, a percentage of all ENERGY STAR products are subject to "off-the-shelf" verification testing each year. The goal of this testing is to ensure that changes or variations in the manufacturing process do not lead to an unacceptable decrease in product performance.

Certification Program Results. In 2011, there were 400 laboratories and 21 certification bodies recognized by EPA to carry out ENERGY STAR testing, providing manufacturers a range of options and the ability to better manage testing timeframes (see Table 8). More than 15,000 products were certified across more than 60 product categories. Post-market verification testing administered by certification bodies began in the fall, and DOE conducted complimentary verification testing in some product categories. A total of 811 models underwent verification testing, with an overall compliance rate of 93 percent.

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*
Source: U.S. EPA, 2012b.

EPA maintained ongoing oversight of the process, issuing written guidance as needed to ensure that ENERGY STAR requirements were interpreted consistently.

ENERGY STAR Most Efficient

A new marketing designation, ENERGY STAR Most Efficient, debuted in store displays throughout the nation as part of a pilot effort to appeal to early adopters who want leading-edge products in terms of energy efficiency. The designation maintains a connection to the powerful ENERGY STAR brand, while offering an opportunity for special promotions around a subset of products recognized by EPA as the "best of the best" ENERGY STAR certified products for a given year.

During the first year of the pilot, six product categories were selected: TVs; refrigerators/freezers; clothes washers; central air conditioning; air source heat pumps; geothermal heat pumps; and furnaces. EPA recognized nearly 150 products from 16 manufacturers as ENERGY STAR Most Efficient in 2011 in the six eligible product categories. Efficiency program sponsors and retailers launched initial promotions expected to appear in 200 stores with messaging reaching 1.9 million consumers. Sears showed early strong support for highlighting ENERGY STAR Most Efficient clothes washers in its stores, and Natural Resources Canada launched a Canadian pilot of ENERGY STAR Most Efficient.

In the interest of allowing sufficient opportunity for testing, EPA extended the ENERGY STAR Most Efficient pilot into 2012. Contributing to this decision was strong utility support for a longer pilot, which would enable testing through broader efficiency program implementation.

Designated Agency personnel fielded a range of product category-specific questions from certifiers throughout the year. As a further check on the certification process, the Agency performs periodic audits of its recognized certification bodies to ensure these organizations thoroughly understand product specifications and are reporting complete and accurate data to EPA.

Updated Disqualification Procedures. In 2011, EPA developed and made publicly available updated disqualification procedures for ENERGY STAR products. The new disqualification procedures were designed to work in concert with the verification element of the ENERGY STAR third-party certification process, and they drew upon historic program experience, as well as lessons learned during the program's transition to third-party certification. The ENERGY STAR Disqualification Procedures provide for notice to the manufacturer of product failure, a technical review of test findings, an opportunity for the manufacturer to dispute test findings, and advanced notice of a product disqualification.

Logo Use Monitoring. As a part of program participation, product manufacturers enter into formal partnership agreements with EPA 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 compliance with the Identity Guidelines and for unauthorized uses of the brand in trade media, advertisements, and stores and on the Internet. In addition, the Agency conducts biannual onsite assessments of ENERGY STAR products on retail shelves to ensure the products are properly presented to consumers.

TABLE 8. EPA Recognizes More Than 400 Organizations To Support Certification Program

TYPE OF ORGANIZATION	TOTAL RECOGNIZED
Accreditation Bodies	30
Certification Bodies	21
Laboratories	400

COUNTRY	NUMBER OF LABORATORIES
Austria	1
Brazil	1
Canada	19
China	74
Germany	7
Guatemala	1
Hong Kong	2
Hungary	1
India	2
Italy	2
Japan	26
Malaysia	2
Mexico	9
Netherlands	1
New Zealand	2
Singapore	2
South Korea	21
Sweden	2
Taiwan	42
Turkey	2
United Kingdom	3
United States	178
Total	**400**

What To Expect in 2012 and Beyond

- Review and update ENERGY STAR specifications for nine 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 commercial water heaters and uninterruptible power supplies.
- Expand the ENERGY STAR Most Efficient recognition pilot targeted at early adopters to increase demand for products that demonstrate cutting-edge efficiency.
- Continue support for and oversight of third-party certification and verification testing of products across the more than 60 product categories.
- Refresh the *Vision and Guiding Principles for ENERGY STAR* and the *ENERGY STAR Identity Guidelines* documents.
-

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 certified 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 9). 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 those questions to decide which products warrant specification revisions.

TABLE 9. EPA Maintains Efficiency Standards With 176 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 2011
Consumer Electronics	12	36	9	2
Office Equipment	10	37	4	0
HVAC	9	30	4	2
Commercial Food Service Equipment	9	14	6	3
Lighting	6	21	4	2
Building Envelope	3	10	1	1
Appliances	7	20	4	1
Other	3	8	1	0

** Reflects those specifications that took effect through 2011.*

ENERGY STAR IN THE RESIDENTIAL SECTOR

More than 17 percent of the GHGs emitted in the U.S. 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 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 2011 included:

- Reaching the milestone of more than 1.3 million ENERGY STAR certified homes constructed since the program's launch.
- Partnering with more than 6,700 builder partners, who collectively constructed more than 130,000 ENERGY STAR certified homes in 2011, representing 26 percent of new home starts (see Figure 7, p. 20).
- Surpassing the mark of more than 50,000 homes improved through Home Performance with ENERGY STAR in 2011, for a total of more than 150,000 homes across the U.S.
- Expanding the Home Performance with ENERGY STAR program across the country to include more than 1,800 participating contractors.

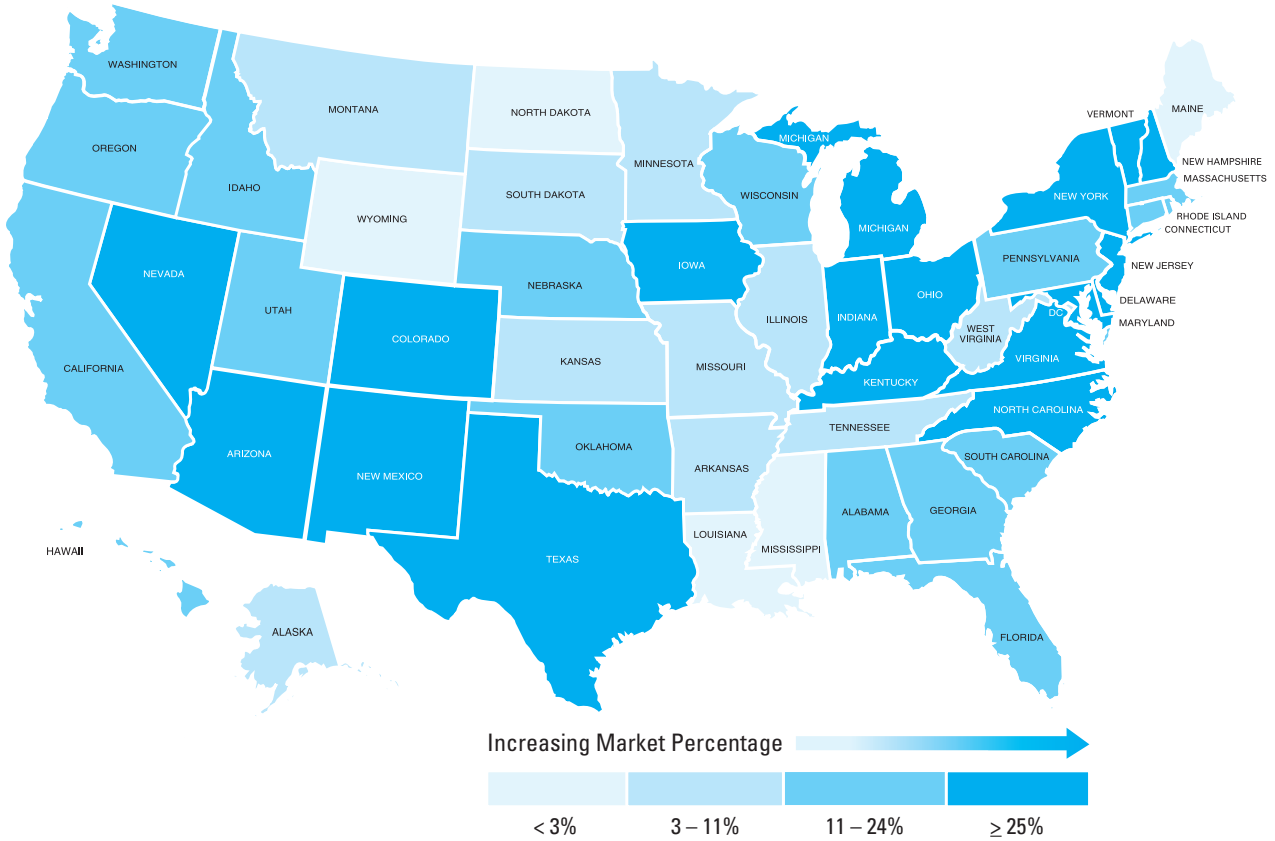
Achievements in 2011

ENERGY STAR for New Homes

More than 1.3 Million New Homes Have Earned the ENERGY STAR. More than 130,000 new homes were constructed to meet ENERGY STAR requirements in 2011 (see Figure 8, p. 21), bringing the total number of ENERGY STAR certified homes to more than 1.3 million by year end. Since EPA began labeling new homes in 1995, American homeowners have saved more than $2 billion on their energy bills and reduced GHG emissions by more than 33 billion pounds. In 2011 alone, families living in ENERGY STAR certified homes saved $493 million on their utility bills, while avoiding GHG emissions equivalent to those from more than 526,000 vehicles.

In 2011, EPA began to phase in more rigorous requirements for new homes to earn the ENERGY STAR label. Under the new requirements, which will become fully effective in 2012, homes that earn the ENERGY STAR label will be at least 15 percent more energy efficient than homes built to the 2009 International Energy Conservation Code. They will

FIGURE 7. ENERGY STAR Certified New Homes Gaining Market Share



also feature additional measures that deliver a total energy-efficiency improvement of up to 30 percent compared to typical new homes.

ENERGY STAR for New Multifamily High-Rise Buildings. New and substantially rehabilitated multifamily high-rise buildings became eligible to earn the ENERGY STAR for the first time in 2011, giving property owners the opportunity to increase asset value and offer tenants more efficient, comfortable homes. These high-rise buildings must meet EPA's energy-efficiency guidelines and be designed to be at least 15 percent more efficient than buildings that meet the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) energy use standard. Through 2011, more than 2,500 units were certified as ENERGY STAR through the Multifamily High-Rise program.

Making Affordable Housing More Energy Efficient. Together with its partners, EPA's ENERGY STAR program is working to increase the energy efficiency of the nation's new and existing affordable housing stock, while reducing the utility bills of families living in these homes and helping to protect the environment. Based on data from the U.S. Department of Housing and Urban Development (HUD), more than 5,600 ENERGY STAR certified homes were built in FY11 using public funding from HUD's HOME program, an almost 8-percent increase over FY10.[8] HUD and EPA began collaborating on developing alternate ENERGY STAR compliance guidance for housing projects undergoing gut rehabilitation, which typically face challenges unique to existing housing that make it difficult for those projects to meet all of EPA's ENERGY STAR requirements. EPA also partners with Habitat for Humanity's U.S. affiliates to promote the construction of ENERGY STAR certified homes. In 2011, more than 320 Habitat affiliates nationwide built over 1,700 homes to ENERGY STAR specifications, a 17-percent increase over 2010. In addition, as a result of EPA's outreach to the manufactured homes industry (also part of the affordable housing market), more than 5,400 ENERGY STAR certified manufactured homes were built in the U.S. in 2011, a 32-percent increase over 2010, for a cumulative total of more than 47,000.

ENERGY STAR Home Improvement

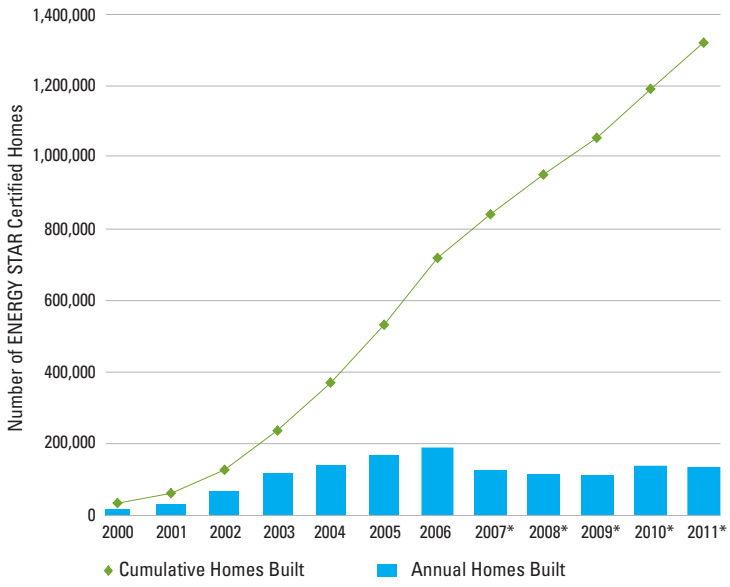
Home Performance with ENERGY STAR. Home Performance with ENERGY STAR (HPwES) offers homeowners a comprehensive, whole-house approach to energy efficiency improvements through a network of contractors trained to perform energy assessments and retrofits. Through regional HPwES sponsors, a third party conducts quality

[8] *Given in fiscal year (FY), not calendar year, due to data availability; fiscal year is from October 1 to September 30.*

reviews of the contractors' work. Over the past decade, EPA and DOE have worked with sponsoring partners such as state and local governments, utilities, and nonprofit organizations to implement HPwES in more than 30 states (see Figure 9). As a result of sponsors' efforts, by the end of 2011, more than 150,000 homes had been retrofitted through HPwES programs. In 2011, 87 participating contractors were recognized with the ENERGY STAR Century Club Award for improving more than 100 homes each—up from 53 contractors in 2010. On October 1, 2011, responsibility for management of the HPwES program was transferred to DOE.

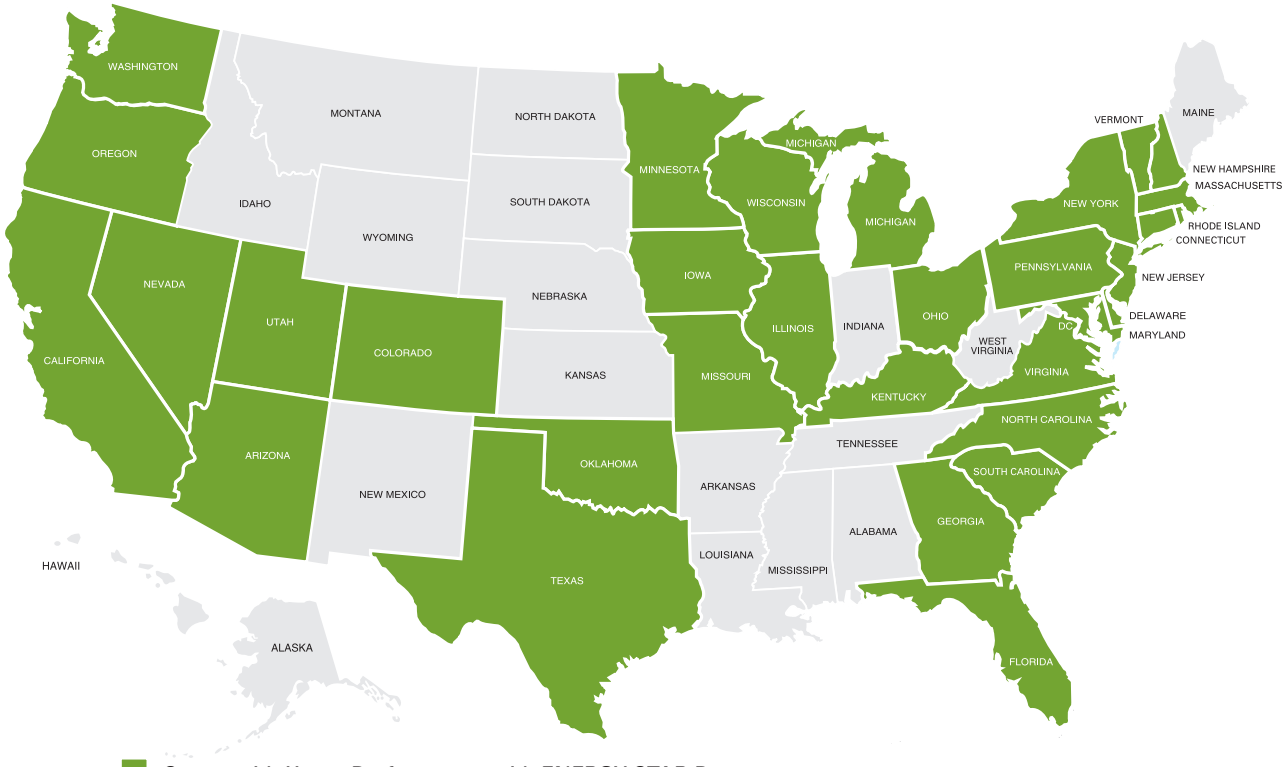
Offering Home Energy Performance Tools. More than 450,000 consumers have used EPA's online Home Energy Yardstick to compare their home energy use to others across the country and see how their home measures up. In addition to the Yardstick, EPA offers the online Home Energy Advisor to help Americans improve home efficiency. Through 2011, more than 230,000 website visitors had used the interactive tool to find customized recommendations for increasing the energy efficiency of their homes.

FIGURE 8. More Than 1.3 Million Homes Nationwide Have Earned the ENERGY STAR Label



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

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



States with Home Performance with ENERGY STAR Programs

**The green shaded states above have Home Performance with ENERGY STAR programs. However, the programs within each state may only operate within a certain region of that state.*

What To Expect in 2012 and Beyond

New Homes

- Complete the phase-in of new, more rigorous guidelines for homes to earn the ENERGY STAR.
- Develop ENERGY STAR certification solutions for unique housing types and geographic locations, as needed.
- Develop technical guidance materials and training for partners to help them successfully implement new program requirements.
- Promote the adoption of HVAC Quality Installation practices across the new home construction industry to support the latest ENERGY STAR requirements.

Existing Homes

- Continue coordinating with DOE to support the HPwES program.
- Evaluate opportunities to increase the adoption of quality installation of heating and cooling equipment in existing homes.
- Enhance and improve online consumer tools and website content to help homeowners assess their home energy performance and get recommendations for improvements.

ENERGY STAR IN THE COMMERCIAL SECTOR

Through the ENERGY STAR program, EPA has been helping the commercial building sector improve energy efficiency in the places where consumers work, play, and learn for close to two decades—helping save money 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 U.S.

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 energy efficiency goals (see Figure 12, p. 25).

Achievements in 2011

Reaching Key Program Milestones

With the help of ENERGY STAR, partners in the commercial sector made great strides in improving energy efficiency in 2011. Major milestones involved:

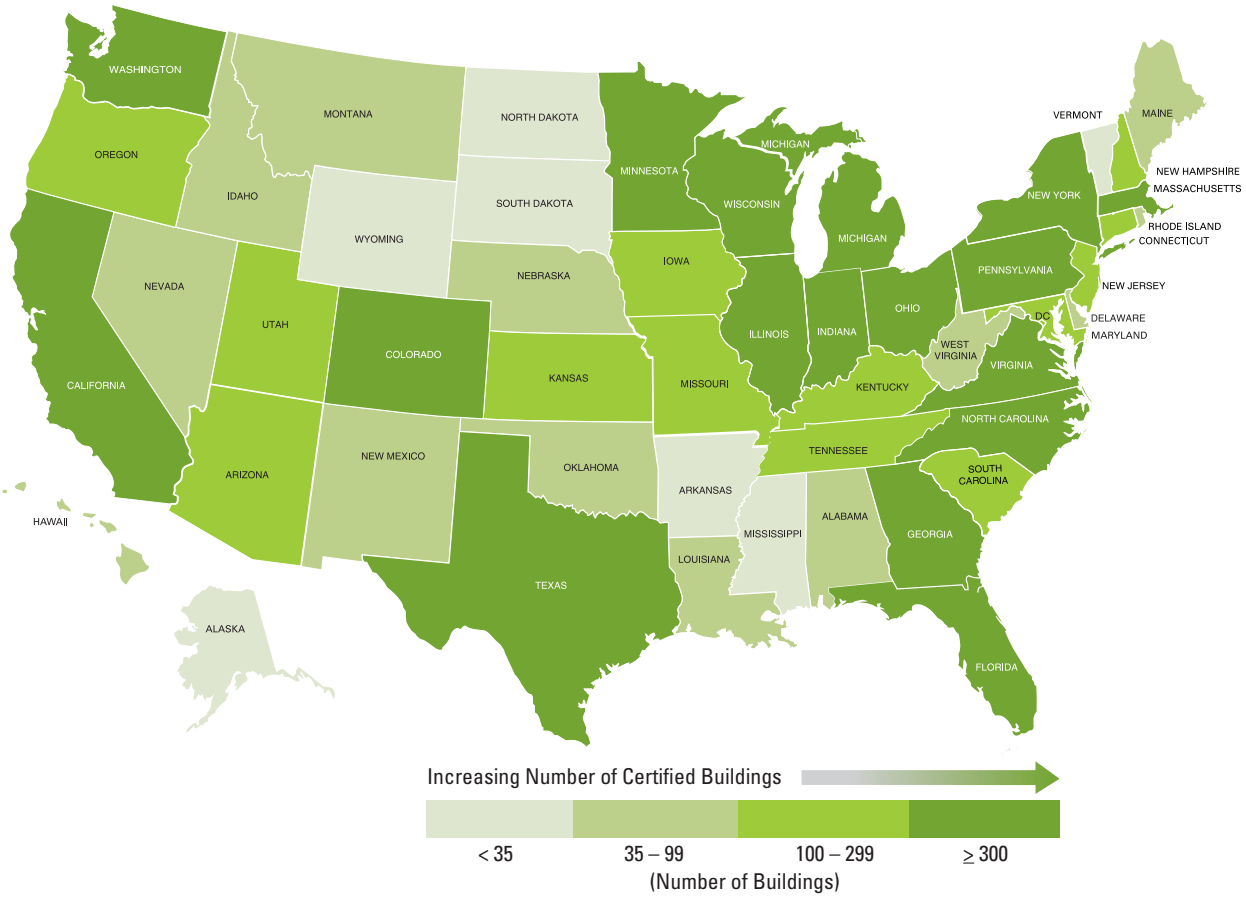
Sustaining Top Performance through ENERGY STAR. In another record-setting year, more than 7,500 buildings and plants were certified as ENERGY STAR, for a cumulative total of nearly 16,500 buildings (see Figure 10, p. 24). Verified by independent, licensed professional engineers or registered architects, ENERGY STAR certified buildings use 35 percent less energy and are responsible for 35 percent fewer GHG emissions than average buildings.

Achieving Significant Portfolio-Wide Savings. More than 200 leading companies and school districts were recognized in 2011 as ENERGY STAR Leaders for portfolio-wide energy savings. For the first time, an organization achieved a 60-percent portfolio-wide improvement milestone in 2011, and nearly half of the Leaders have reached a milestone of 20 percent or more. Energy management strategies—such as executive commitment; active involvement of staff, tenants or students; and investment in new technologies—were integral to their success.

Managing Energy through Widespread Measurement and Tracking. The energy performance of more than 260,000 buildings—representing over 28 billion square feet of space and more than 40 percent of the total market—has been assessed using EPA's ENERGY STAR measurement and tracking tool, Portfolio Manager (see Figure 13, p. 26).[9]

[9] *Calculated using CBECS 2003, see EIA 2008.*

FIGURE 10. Nearly 16,500 Buildings Have Earned the ENERGY STAR



Designing More Buildings to Earn the ENERGY STAR. Despite the downturn in the economy, 100 commercial building design projects achieved Designed to Earn the ENERGY STAR in 2011, bringing the total number of buildings intended to operate at ENERGY STAR performance levels when built to more than 400.

Strategizing for Success

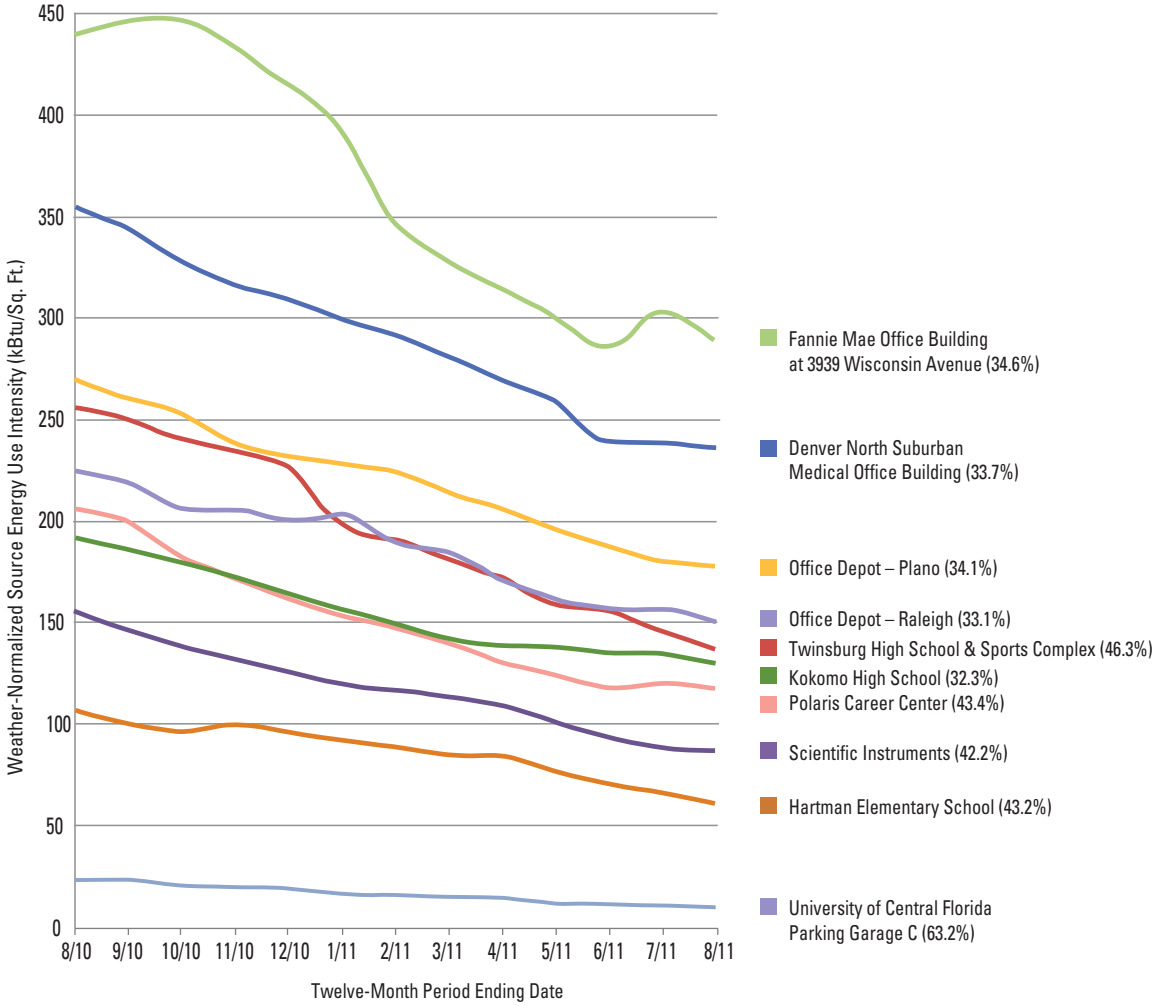
EPA's ENERGY STAR Guidelines for Energy Management have become an important roadmap for instituting a corporate culture of environmental protection and financial value. Implementing comprehensive energy retrofits in buildings and ensuring newly constructed buildings deliver on their high-performance 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. The 2011 Battle of the Buildings competition featured teams from 245 buildings across the country working to save the most energy in one year through team work, educational campaigns, operational changes, and equipment replacements. Collectively, the building teams saved $5.2 million on annual utility bills, with the top 10 contestants reducing energy use by at least 30 percent (see Figure 11). The winner achieved an impressive savings of 63 percent. Best practices implemented by the teams continue to accumulate and spread throughout each organization's portfolio of properties.

Supporting Innovative Energy Efficiency Initiatives. In 2011, 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 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 commercial sector. In 2011, an increased number of these organizations leveraged ENERGY STAR resources.

FIGURE 11. 2011 National Building Competition Progress Over Time

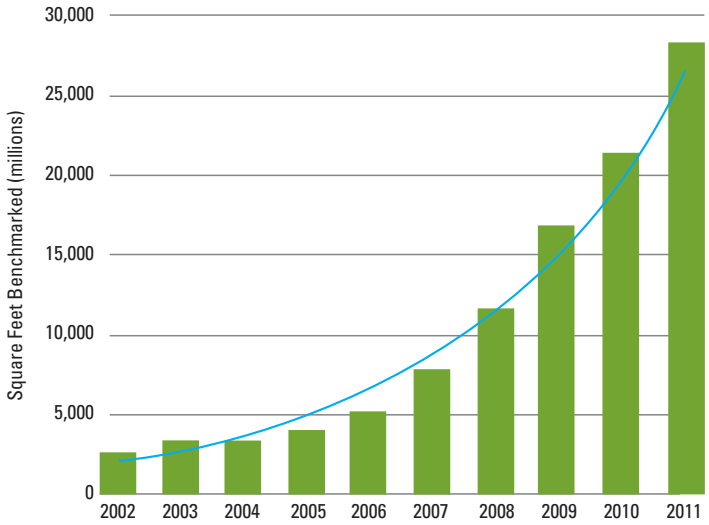


For example, SPPs helped their clients measure and track the energy performance of more than 100,000 buildings using Portfolio Manager and assisted in certifying more than 4,200 buildings as ENERGY STAR.

In partnership with several states and utilities, EPA reported on a pilot program 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.

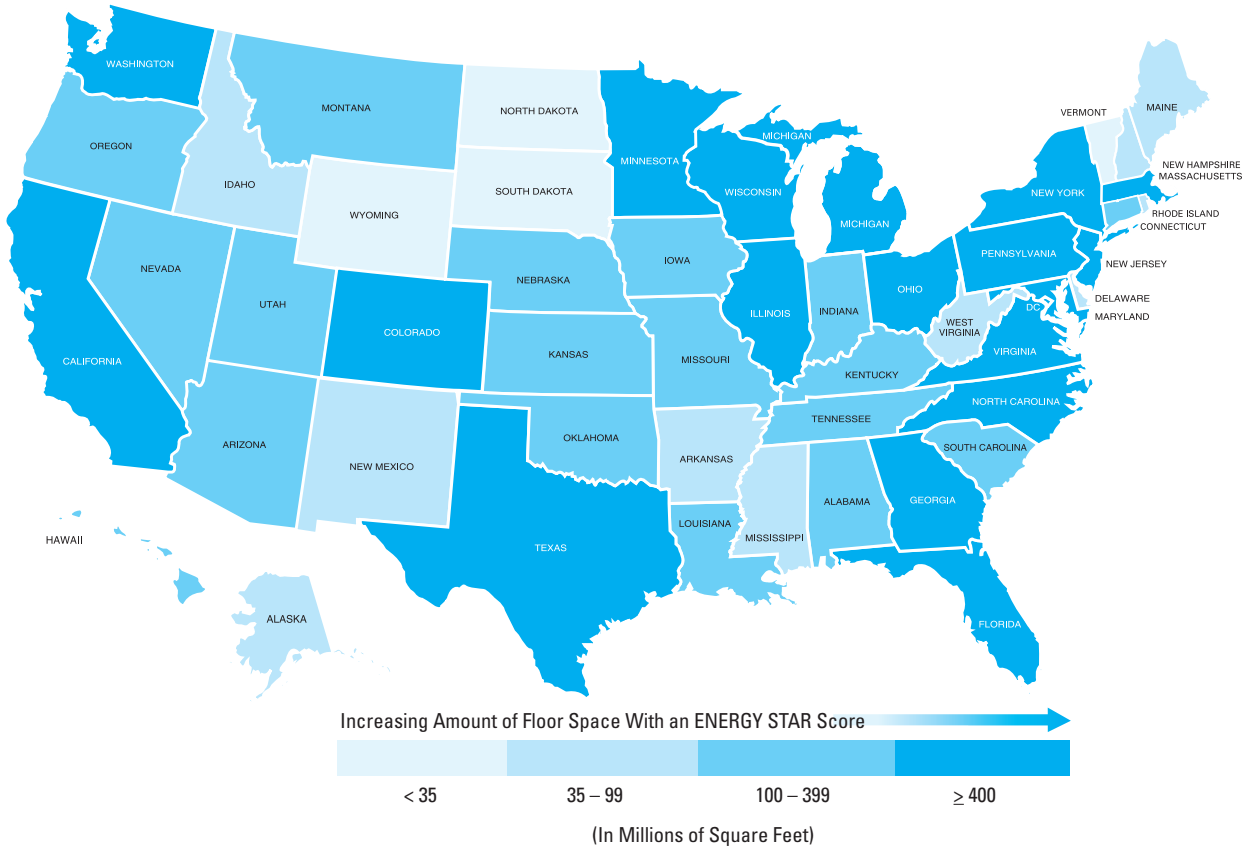
Expanding ENERGY STAR Portfolio Manager. Portfolio Manager was expanded to include senior care facilities, a unique building space type now eligible to receive an ENERGY STAR score and certification. EPA also continued efforts to upgrade Portfolio Manager to enhance the speed and usability of the tool for its growing list of users.

FIGURE 12. Cumulative Square Feet Benchmarked in Portfolio Manager



Note: Only buildings that can receive a 1-100 energy performance score are included in the data from 2001 to 2008. Beginning in 2009, buildings for which there is not yet a 1-100 score available were included in the count of total buildings benchmarked.

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



What To Expect in 2012 and Beyond

- Launch the third 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 teams who will battle it out through improvements in energy efficiency with support from EPA's ENERGY STAR program and determine which competitors can reduce their building's energy use the most.
- Continue the process to expand and improve the functionality, usability, speed, and verification process of Portfolio Manager through a database upgrade, and release new Web services modules in the fall of 2012.

ENERGY STAR IN THE INDUSTRIAL SECTOR

The industrial sector is an important part of the U.S. economy. Manufacturing goods are valued at nearly $5.5 trillion, contribute over 11 percent to the U.S. GDP, and provide more than 12.7 million jobs paying an average of $47,500 annually.[10] This sector 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 Industrial Focuses in improving energy performance validates that EPA's approach—performance measurement and recognition for top performance—helps industry maintain competitiveness by saving money while achieving positive results for the environment.

Achievements in 2011

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 10, p. 28).

New Draft Plant EPIs Issued for Testing. 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 2011, EPA released draft plant EPIs for integrated pulp and paper mills and wet corn mills to each industry for testing. Testing of the draft steel mini-mill EPI continued.

New Energy Guides Under Review. Energy guides identify energy efficiency opportunities in a specific industry. In 2011, EPA issued an energy guide for dairy processing plants. At the same time, draft guides for concrete plants and bakeries were released to industry for review. The growing library of energy guides continued to help industrial managers identify areas for improvement, develop action plans, and educate company employees.

Concrete Industry Trained to Manage Energy. Working with the National Ready Mixed Concrete Association, EPA organized a series of training classes for the U.S. concrete

[10] *For more information, see U.S. Census Bureau 2010.*

industry on how to manage energy. The first one, held in late 2011, instructed industry participants on how to build the business case for energy management and an energy program.

Number of Industrial Sector Focuses Grows to 23. EPA signed a Memorandum of Understanding with the American Baking Association to enable U.S. bakeries to develop strategic energy management programs using ENERGY STAR resources, and work began on a new focus with the printing industry.

Building Capacity To Enable Greater Industry Participation

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

ENERGY STAR Challenge for Industry Continues to Grow. EPA created the ENERGY STAR Challenge for Industry to encourage manufacturers to improve the energy efficiency of their sites by 10 percent within 5 years or less. The ENERGY STAR Challenge for Industry enables EPA to engage 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 2011, 416 sites had taken the Challenge, and 100 had achieved the goal, saving over 18.4 trillion Btu.

Continuing To Earn ENERGY STAR Certification

The number of plants that earned the ENERGY STAR by achieving energy performance in the top quartile nationally for their industry grew in 2011. EPA awarded the ENERGY STAR to over 70 plants—including three container glass plants that earned the ENERGY STAR for the first time—bringing the total to 110 (see Table 11).

TABLE 10. EPA ENERGY STAR Industrial Focuses on Energy

FOCUS INDUSTRY	PEER EXCHANGE NETWORK	INDUSTRY ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR
Cement Manufacturing	●	Published	2nd Version Released
Concrete Manufacturing	●	Published	Exploring Options
Corn Refining	●	Published	2nd Version in Draft
Dairy	●	Published	
• Fluid Milk			Draft
• Ice Cream			Draft
Food Processing	●	Published	
• Baked Goods			Exploring Options
• Cookies & Crackers			Released
• Juice			Released
• Frozen Fried Potato Products			Released
• Tomato Products			Draft
Glass Manufacturing	●	Published	
• Fiberglass			Draft
• Flat Glass Products			Released
• Container Glass Products			Released
Metal Casting	●	Under Study	Exploring Options
Motor Vehicle Manufacturing	●	Published	2nd Version Released
Petrochemical Manufacturing	●	Published	Draft
Petroleum Industry	●	Published	Private System Recognized by EPA
Printing	●	In Process	Exploring Options
Pharmaceuticals	●	Published	Released
Pulp & Paper	●	Published	
• Integrated			Draft
• Pulp			Draft
Steel • Mini-mills	●	Published	Exploring Options
Water/Wastewaster	●	In Process	Released

Expanding Sustainable Strategies

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

Benchmarking Study Reaches Further into Motor Vehicle Sector. Benchmarking enables industry to determine how well a plant is performing and set improvement goals. EPA supported its ENERGY STAR Focus on Energy Efficiency in Motor Vehicle Production by working with powertrain plants in the motor vehicle sector to benchmark energy and water resources.

Downstream Industries. The Cement Focus companies continued to work through ENERGY STAR to build concrete plant energy assessment programs to assist their downstream industry, concrete production. At the request of the printing industry, which is downstream of the pulp and paper industry, EPA established a new Printing Focus.

TABLE 11. EPA Expands ENERGY STAR for Superior Energy Management of Industrial Plants

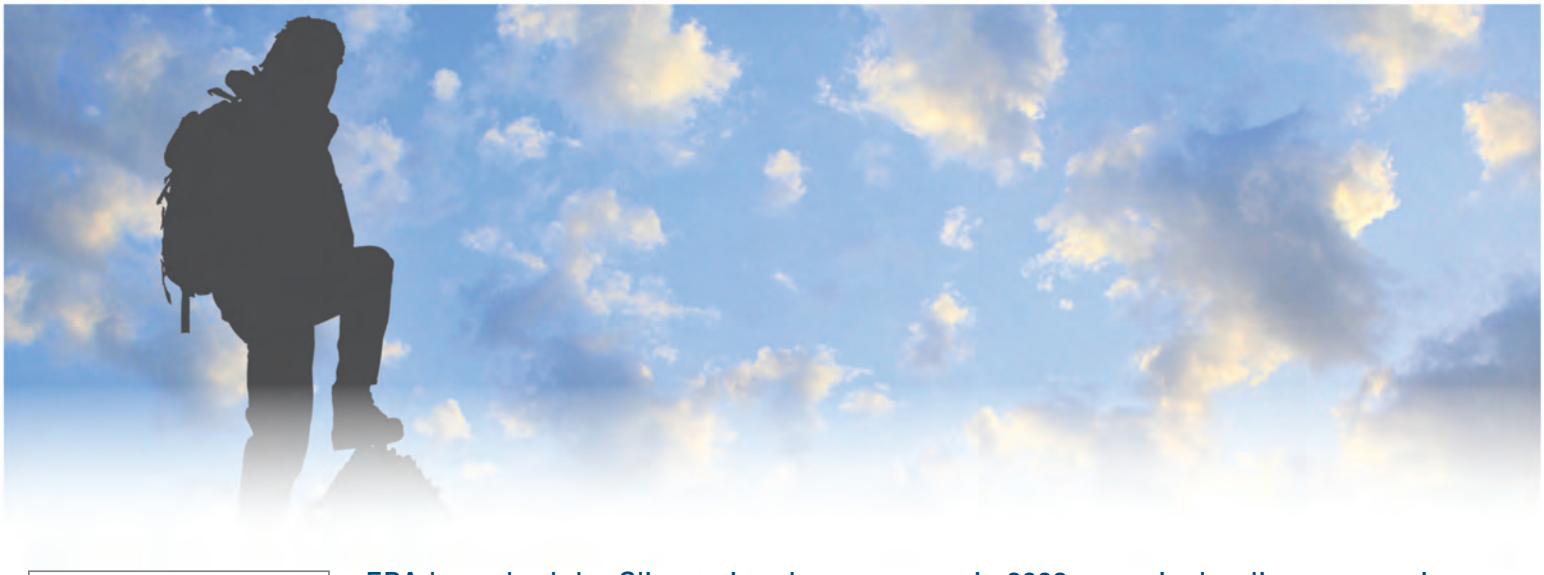
SECTOR FACILITY	EARNED THE ENERGY STAR IN 2011	TOTAL PLANTS EARNING THE ENERGY STAR
Cement Manufacturing Plants	20	39
Auto Assembly Plants	7	17
Petroleum Refineries	5	8
Wet Corn Mills	4	7
Pharmaceutical Manufacturing Plants	7	7
Cookie & Cracker Bakeries	15	17
Container Glass Plants	3	3
Frozen Fried Potato Processing Plants	11	12
Total Plants Certified	**72**	**110**
Total Estimated Energy Savings (Compared with Average Plants)	**61,955,703 MMBtu**	**314,190,357 MMBtu***

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

What To Expect in 2012 and Beyond

- Continue building upon the foundation set by the cement industry by providing training and resources for concrete manufacturers.
- Complete energy guides for concrete plants and dairy processing plants.
- Re-baseline wet corn mills and release an updated EPI.
- Release an EPI for integrated pulp and paper mills.
- Launch the ENERGY STAR Focus on Energy Efficiency in the Baking Industry.
- Release an energy guide on energy efficiency opportunities in bakeries.
- Produce draft EPIs for dairy processing, iron metalcasting, printing plants, and steel metalcasting.
- Establish new strategic partnerships with the utility industry to broaden the availability of ENERGY STAR resources for manufacturers.
- Seek partnerships with organizations that influence industrial energy performance to build upon the ENERGY STAR foundation.
- Continue to 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. During its 10 years, Climate Leaders achieved a number of significant milestones while working to reduce GHG emissions (see Table 12). Through the program, EPA deployed standardized GHG emissions management practices for use among companies and provided guidance and recognition to encourage companies to set and achieve corporate-level GHG emissions reduction goals.

Over the years, Climate Leaders partners represented a variety of industries and sectors, from manufacturers and utilities to financial institutions and retailers (see Figures 14 and 15)—with operations in all 50 states. 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.

During 2011, EPA recognized 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 in establishing facility or corporate-level GHG reduction goals and therefore, EPA phased out the Climate Leaders program effective September 30, 2011.

To maintain its support for companies' voluntary actions to reduce their GHG emissions, EPA continues to provide technical resources and tools through the online Center for Corporate Climate Leadership. EPA also helped launch the annual Climate Leadership Awards, a joint program with three nongovernmental organizations, to offer continued recognition for entities and individuals demonstrating climate leadership.

Achievements in 2011

- Twelve additional partners achieved Climate Leaders GHG reduction goals: American Electric Power; Campbell Soup Company; Casella Waste Systems; Cummins Inc.; Fairchild Semiconductor; Genzyme Corporation; Hasbro, Inc.; Intel Corporation; Interface, Inc.; International Paper; SC Johnson; and Staples, Inc.

FIGURE 14. The 183 Climate Leaders Partners by Sector

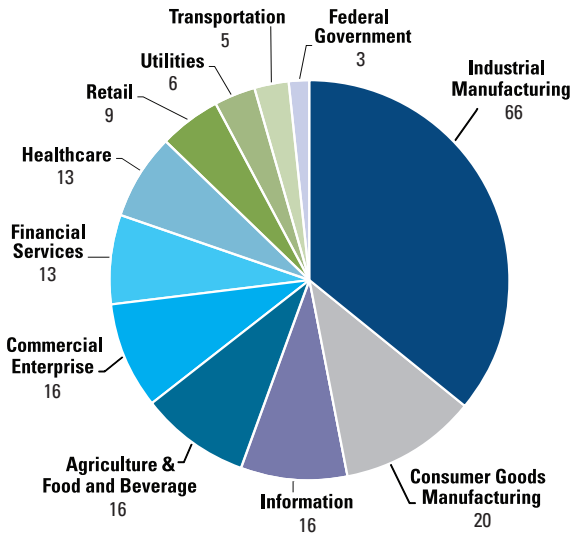


FIGURE 15. Climate Leaders Small Business Network Members

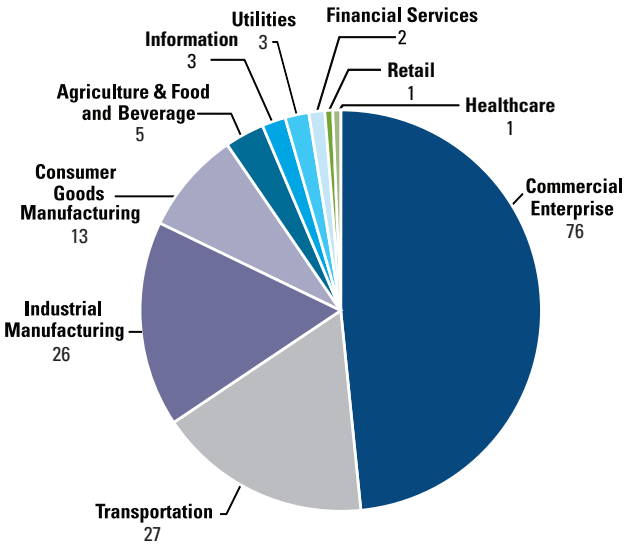


TABLE 12. Climate Leaders Key Program Indicators, 2004 – 2011 (Cumulative)

CLIMATE LEADERS INDICATOR	2004	2005	2006	2007	2008	2009	2010	2011
Partners	64	78	107	155	251	183 [1]	183 [2]	183
Small Business Network Members	—	—	—	—	—	87 [1]	185 [1]	157 [3]
Total Partners and Members	—	—	—	—	—	270	368	340 [4]
Initial Inventories Submitted	42	58	78	115	161	201	227	227
Site Visits (Partners Only)	9	29	46	77	109	144	160	160
Goals Announced	20	31	55	88	115	154	228 [1]	228
Goals Achieved	0	5	8	11	18	29	38	50

[1] 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 of both small and large companies. Some organizations moved from Climate Leaders to the Small Business Network. Goals announced reflect the total from both programs.

[2] 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.

[3] Small Business Network Members includes participants in the EPA and GSA Federal Supplier Greenhouse Gas Emissions Inventory Pilot for small businesses. In 2011, 28 of the pilot participants did not continue with the pilot.

[4] The change in the number of Total Partners and Members reflects the updated Small Business Network Members total.

What To Expect in 2012 and Beyond

- Continued partnership with the U.S. General Services Administration (GSA) in supporting the Federal Supplier GHG Inventory Pilot for small businesses.
- Ongoing activities under the EPA Center for Corporate Climate Leadership, a virtual resource center that:
  - Offers GHG management tools and technical resources, including the Corporate GHG Goal Evaluation Model, Simplified GHG Emissions Calculator, GHG Emission Factor Hub, and more.
  - Facilitates recognition opportunities through the Climate Leadership Awards, a national awards program to recognize exemplary corporate, organizational, and individual leadership in response to climate change. EPA co-sponsors these awards with The Climate Registry, the Center for Climate and Energy Solutions, and the Association of Climate Change Officers.
  - Provides learning opportunities and materials such as webinars and white papers.
  - Engages and assists nongovernmental organizations and others in developing sound and practical GHG accounting guidance for green power and supply chains.
  - Works with other federal agencies to help reduce the government's impact on the climate.

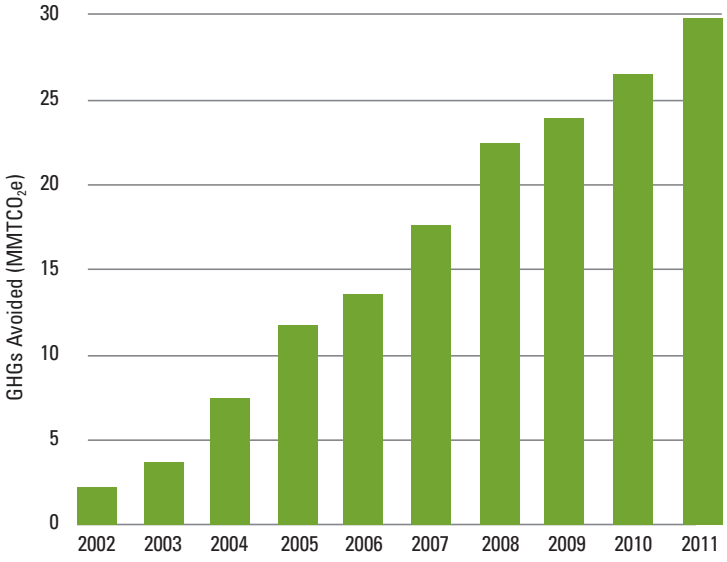
CLEAN ENERGY SUPPLY PROGRAMS

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 11 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, these 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 2011 alone, EPA's Clean Energy Supply programs reduced GHG emissions by 29.6 $MMTCO_2e$ (see Figure 16).

FIGURE 16. GHG Emissions Avoided by EPA's Clean Energy Supply Programs



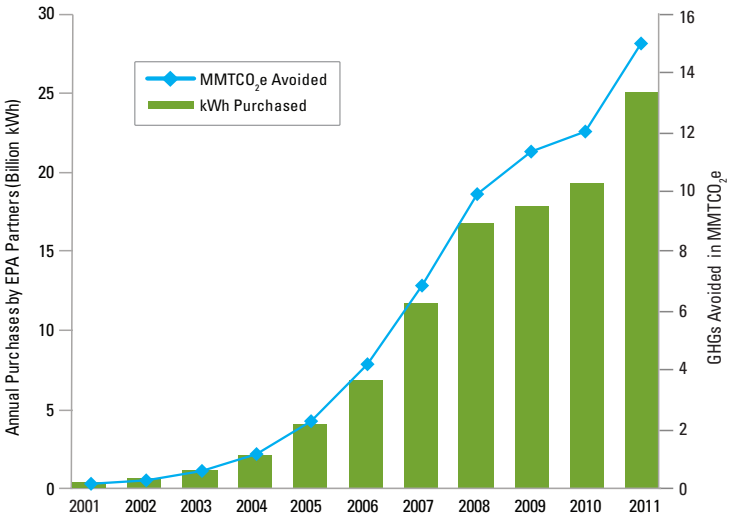
GREEN POWER PARTNERSHIP

EPA's Green Power Partnership is a voluntary program that encourages organizations to buy green power to reduce 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 promote green power made 2011 an exceptional year for EPA's Green Power Partnership.

Achievements in 2011

- Added 213 new partners, bringing the total to nearly 1,300. These organizations have committed to buying about 25 billion kWh of green power annually—enough electricity to run more than two million average American homes for one year (see Figure 17).
- Launched a pilot initiative to connect Green Power partners with new, not-yet-built renewable energy projects that may align with their energy, environmental, and financial objectives. From a total of 27 proposals submitted on behalf of 22 project developers, nine projects were presented to partners during a networking webinar.
- Acknowledged 68 partners in EPA's College & University 2010 – 2011 Green Power Challenge. EPA ranked the green power purchases of individual schools against others within their athletic conferences, and calculated cumulative purchases among competing conferences. The Big Ten conference topped the list with the largest total purchase and earned recognition as the 2010 – 2011 Collective Conference Champion.

FIGURE 17. Green Power Purchases and Avoided GHG Emissions



- Presented 19 Green Power Leadership Awards to top purchasers of green power and onsite renewable power systems (see Table 13).

TABLE 13. 2011 EPA Green Power Leadership Awards

Green Power Purchasing	
Adobe Systems Inc.	*San Jose, CA*
Allegheny College	*Meadville, PA*
Datapipe, Inc.	*Jersey City, NJ*
Franklin & Marshall College	*Lancaster, PA*
Jackson Family Wines	*Santa Rosa, CA*
Mercyhurst College	*Erie, PA*
MetLife	*New York, NY*
Santa Clara University	*Santa Clara, CA*
State Street Corporation	*Boston, MA*
University of Central Oklahoma	*Edmond, OK*

On-Site Generation	
City of San Francisco	*San Francisco, CA*
SC Johnson	*Racine, WI*

Green Power Partner of the Year	
Empire State Building	*New York, NY*
Google Inc.	*Mountain View, CA*
Intel Corporation	*Santa Clara, CA*
Kohl's Department Stores	*Menomonee Falls, WI*
Staples	*Framingham, MA*

Green Power Community of the Year
Portland, OR
Washington, D.C.

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 tribal governments become GPCs when local governments, businesses, and residents collectively buy green power in amounts that meet or exceed EPA's GPP community purchase requirements. Between 2004 and 2011, 34 communities mobilized to reduce their carbon footprints by buying and using green power. Their purchases helped avoid annual CO_2 emissions equivalent to those from the electricity used in more than 367,000 average American homes.

The 2010 – 2011 Green Power Community Challenge aimed to double the amount of green power used by GPCs nationwide to 1.8 billion kWh. The Challenge results far surpassed its goal—at its conclusion, EPA's GPCs were collectively using more than 3.3 billion kWh of green power annually. Washington, DC won the Challenge title by using the most green power annually, while Brookeville, MD had the highest green power percentage of total electricity use.

What To Expect in 2012 and Beyond

- Expand community-level green power purchasing by hosting the second annual campaign to encourage communities coast-to-coast to use renewable energy and fight climate change through the Green Power Community Challenge (see sidebar above).
- Facilitate innovative solutions that address the market barriers of clean energy procurement by implementing the Clean Energy Collaborative Procurement Initiative within the Washington, DC metro area.
- Engage with colleges and universities nationwide to accelerate the deployment of long-term clean energy strategies across the higher education portfolio.
- 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 2012.

COMBINED HEAT AND POWER PARTNERSHIP

EPA's CHP Partnership encourages the use of high-efficiency CHP technologies, which are cleaner than separately produced electrical and thermal energy. CHP projects are up to 80 percent more efficient than traditional separate heat and power generation,[11] 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 its inception, the CHP Partnership has made a significant impact on U.S. CHP capacity, annually assisting up to 55 percent of the new CHP capacity additions (see Table 14).

Achievements in 2011

- Assisted in the deployment of more than 269 MW of new CHP nationwide (out of 569 MW of total new nationwide capacity), bringing the cumulative impact of the program to over 5,400 MW of new CHP.
- Welcomed 64 new partners, bringing the total to 404.
- Responded to 35 technical assistance requests from organizations across the country such as universities, wastewater treatment plants, federal agencies, utilities, CHP project developers, and non-governmental organizations.

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

- Hosted an annual stakeholder meeting in collaboration with the U.S. Clean Heat and Power Association, featuring panels on industrial energy efficiency and communicating CHP benefits to policymakers.
- Revised a widely-referenced report on the potential of CHP in wastewater treatment facilities and presented its findings to stakeholders at two major conferences.
- Published a fact sheet on output-based air regulations, which recognize CHP's substantial environmental benefits.
- Honored six highly-efficient CHP projects with the ENERGY STAR CHP Award. These systems range in size from 0.2 MW at a gas pipeline compressor station to 46 MW serving a 35,000-person university campus (see Table 15).
- Presented a webinar on GHG permitting and CHP systems, in response to stakeholder interest.
- In support of the DOE-sponsored Hydrogen Student Design Contest, recommended methodologies to calculate the emissions reductions of students' CHP+hydrogen proposals.

TABLE 14. U.S. CHP Capacity and Partnership Market Share

YEAR	TOTAL NEW CHP CAPACITY (MW)	NEW CHP CAPACITY CREDITABLE TO THE CHP PARTNERSHIP (MW)
2002	5,580	620 (11%)
2003	3,953	516 (13%)
2004	3,556	1,963 (55%)
2005	1,667	821 (49%)
2006	477	140 (29%)
2007	628	342 (54%)
2008	417	185 (44%)
2009	710	365 (51%)
2010	628	274 (44%)
2011	569	269 (47%)
Total	**18,185**	**5,495**

What To Expect in 2012 and Beyond

- Launch new online tools and other resources for policymakers and project developers to facilitate increased adoption of CHP, including technology and policy white papers and a comprehensive database of CHP policies and incentives.
- Continue to advance the positive treatment of CHP in new or modified environmental regulations and documents, such as state and tribal air quality planning resources.
- Expand work with EPA regions on the application of output-based regulations.
- Assure that CHP is appropriately recognized in widely-accepted building performance rating systems and standards, such as those developed by ASHRAE and the U.S. Green Building Council certification in Leadership in Energy and Environmental Design (LEED®).
- Reach out to federal stakeholders and state energy agencies—e.g., through the State and Local Energy Efficiency Action Network (SEE Action) and the National Association of State Energy Officials (NASEO)—to facilitate including CHP in key climate and energy plans and policies.

TABLE 15. 2011 ENERGY STAR Combined Heat and Power Awards

CHP Project	Location	CHP Partner(s)
Cornell University	*Ithaca, NY*	Cornell University, NYSERDA, Solar Turbines
Dominion Transmission—Crayne Station	*Waynesburg, PA*	Capstone Turbine Corporation, E-Finity Distributed Generation
KPMG LLP	*Montvale, NJ*	Capstone Turbine Corporation, KPMG LLP, UTC Power
National Institutes of Health	*Bethesda, MD*	Pepco Energy Services, RMF Engineering
University of Cincinnati	*Cincinnati, OH*	Solar Turbines, University of Cincinnati
University of Massachusetts Amherst	*Amherst, MA*	Nexant, Inc., Solar Turbines, Turbosteam, TVC Systems, University of Massachusetts Amherst, Vanderweil Engineers

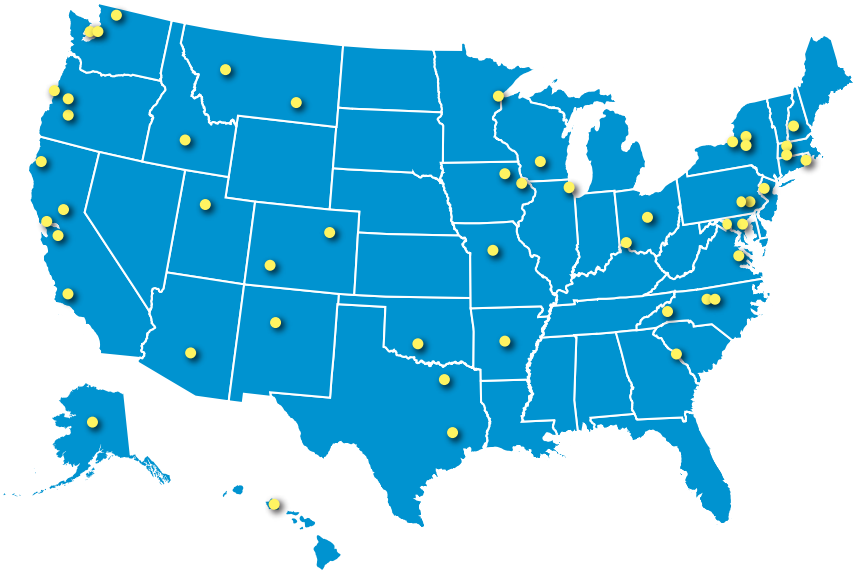
STATE AND LOCAL PROGRAMS AND INITIATIVES

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

In 2011, EPA:

- Held a workshop for the 50 Climate Showcase Communities that are piloting local and tribal government climate change initiatives (see Figure 18). 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 funding and financing clean energy programs. The series covered the answers to big picture funding questions, finding funding for climate and clean energy programs, and financing options for program implementation.

FIGURE 18. EPA Supports 50 Climate Showcase Communities



STATE CLIMATE AND ENERGY PROGRAM

Achievements in 2011

- Released an analysis of projected energy savings and demand impacts of existing state energy efficiency and renewable energy policies. This analysis will be useful to states when preparing State Implementation Plans and assessing the impacts of clean energy policies on their air quality management and GHG mitigation plans.
- Hosted a series of state technical forums on the *Assessing the Multiple Benefits of Clean Energy* guide, including the impact of clean energy investment on the electric system, on air quality, and on job creation.
- Released the *Financing Program Decision Guide and Tool*. The guide provides an in-depth look at issues and considerations for getting started with and choosing a clean energy financing program. The tool helps state and local government staff members identify clean energy financing programs suited to their target market and available resources.

LOCAL CLIMATE AND ENERGY PROGRAM

Achievements in 2011

- Launched the second round of 25 projects under the Climate Showcase Communities program, hosted an intensive workshop for grantees, and launched a new Web page featuring three online videos about the program.
- Issued three new *Local Climate and Energy Strategy Guides: Transportation Control Measures, Energy Efficiency in K-12 Schools, and Energy Efficiency in Affordable Housing.* These are the latest installments in a series that provides comprehensive, straightforward overviews of GHG emission reduction strategies for local governments.
- Launched an updated Heat Island Program website.

What To Expect in 2012 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 third 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 2015, approximately 350,000 metric tons of CO_2e emissions will be prevented annually.
- Encourage other governments to learn from and replicate the success of the Climate Showcase Communities.
- Release two additional installments of the Local Climate and Energy Strategy Series, including Energy Efficiency in Resource Conservation and Recovery, and Energy Efficiency in Water and Wastewater Facilities.

CLEAN ENERGY AND UTILITY POLICY PROGRAMS

Despite the proven economic and environmental benefits of clean energy, various barriers continue to deter utilities, as well as state and local governments, from making greater investments in cost-effective clean energy measures. During 2011, EPA and DOE continued to co-facilitate the State and Local Energy Efficiency Action Network (SEE Action). SEE Action offers information resources and technical assistance to state and local decisionmakers to support their efforts to provide cost-effective energy efficiency to their communities.

Scenario Illustrates Benefits of Energy Efficiency Policies in Mercury and Air Toxics Standards (MATS) Compliance

In the March 2011 MATS proposed rule, EPA presented an Illustrative Energy Efficiency Scenario to examine the impacts of integrating energy efficiency policies—including ratepayer-funded programs and appliance standards—into compliance strategies. The results demonstrate the following benefits of complementary energy efficiency policies:

Economic benefits:

- Reduced compliance costs
- Reduced impacts on electricity and natural gas prices

Reliability benefits:

- Reduced need for new generation
- Reduced need for new emissions controls

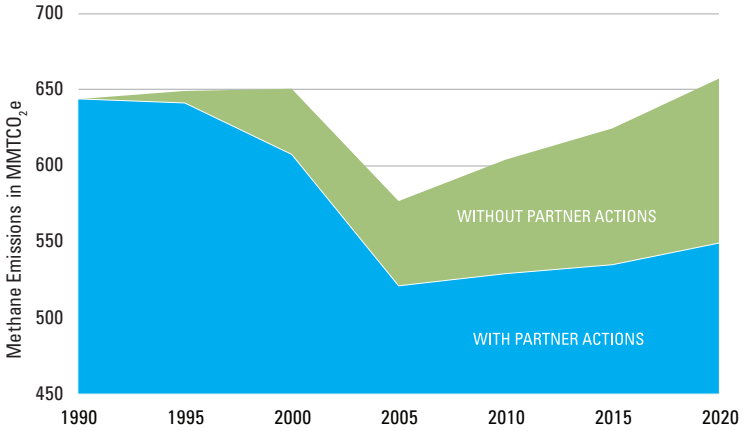
Source: U.S. EPA 2011b. Proposed MATS Rule (Regulatory Impact Analysis and Preamble).

METHANE PROGRAMS

Methane 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 significant GHG behind CO_2, and currently contributes one third of all anthropogenic (man-made) emissions to 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 and re-use or sell 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.

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



- In 2011, the combined efforts of EPA's methane programs resulted in GHG emissions reductions of 63.9 $MMTCO_2e$ (see Table 16, 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 U.S. with partners around the world. The Global Methane Initiative (GMI), formerly known as the Methane to Markets Partnership, works with 41 partner governments and more than 1,100 public and private sector organizations internationally to accelerate the recovery and use of methane as a clean energy resource (see sidebar p. 46).

TABLE 16. EPA's Methane Programs Meet and Surpass Goals

PROGRAM	2011 GOAL	2011 ACHIEVEMENT	2012 GOAL
NATURAL GAS STAR			
Annual Gas Savings ($MMTCO_2e$)	27.9	29.5	30.8
COALBED METHANE OUTREACH PROGRAM			
Annual Methane Reductions ($MMTCO_2e$)	10.1	10.1*	10.6
LANDFILL METHANE OUTREACH PROGRAM			
Number of Projects	449	545	485
Annual Methane Reductions ($MMTCO_2e$)	23.5	24.3	24.6
TOTAL REDUCTIONS ($MMTCO_2e$)	**61.5**	**63.9**	**66**

** Estimated. 2011 GHG emissions inventory data not available.*

NATURAL GAS STAR PROGRAM

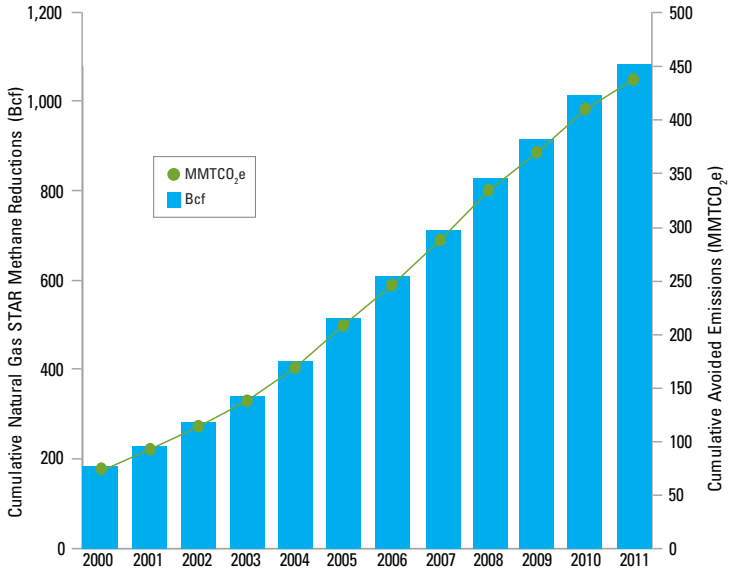
Natural Gas STAR is a flexible, collaborative partnership between EPA and oil and natural gas companies, designed to spur the adoption of cost-effective technologies and practices that reduce methane emissions. By working with both domestic and international companies involved in oil production and all 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* fact sheets, technical reports and studies, 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 2011

- Reduced U.S. methane emissions by 29.5 $MMTCO_2e$ through the efforts undertaken and reported by domestic partners for 2011, achieving cumulative program reductions of approximately 438 $MMTCO_2e$ 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 Star Energy of Indonesia, GAIL of India, Chevron Gulf of Mexico Business Unit, and Dominion Transmission to the program, bringing the total to 138 domestic and international partners.
- Recognized 18 partner companies for their significant corporate achievements in reducing methane emissions from oil and gas systems (see Table 17).

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



- Conducted five international Technology Transfer workshops.
- Performed measurement studies to evaluate the feasibility of reducing methane emissions through targeted technologies and practices both domestically and internationally in seven countries. Provided training on the various data analysis techniques and software tools used in processing results from measurement studies.
- Hosted with Oxy, Chevron, and ConocoPhillips, a GMI oil and gas sector study tour in Texas and New Mexico with partners from India, Russia, and Colombia.
- Revamped Natural Gas STAR technical documents, creating new, streamlined documents covering more than 60 methane emissions reduction activities that can be implemented in oil and natural gas production, and in natural gas processing, transmission, and distribution.

What to Expect in 2012 and Beyond

- Engage the U.S. oil and gas industry to address the largest remaining sources of methane emissions.
- 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.
- Advance GMI program efforts in new geographical areas, such as the Middle East and Gulf.
- Collaborate with the GMI Oil & Gas Subcommittee to leverage technical resources effectively.
- 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 U.S.

TABLE 17. 2011 Natural Gas STAR Awards

Production Partner of the Year	
Southwestern Energy Company	*Houston, TX*
Gathering and Processing Partner of the Year	
Targa Resources, Inc.	*Houston, TX*
Transmission Partner of the Year	
Iroquois Gas Transmission System	*Shelton, CT*
Distribution Partner of the Year	
SourceGas, LLC	*Lakewood, CO*
Implementation Manager of the Year	
Alena Jonas, ConocoPhillips	*Houston, TX*
International Partner of the Year	
GAZ-SYSTEM S.A.	*Warsaw, Poland*
Continuing Excellence – 17 Years	
AGL Resources	*Atlanta, GA*
Continuing Excellence – 15 Years	
Delmarva Power	*Willmington, DE*
Iroquois Gas Transmission System	*Shelton, CT*
PECO Energy Company	*Philadelphia, PA*
Continuing Excellence – 12 Years	
CenterPoint Energy Minnesota Gas	*Minneapolis, MN*
Rochester Gas & Electric Corporation	*Rochester, NY*
Continuing Excellence – 10 Years	
El Paso Pipeline Group	*Houston, TX*
Continuing Excellence – 7 Years	
Alliant Energy	*Madison, WI*
Energen Resources	*Birmingham, AL*
Gulf South Pipeline	*Houston, TX*
Continuing Excellence – 5 Years	
Carolina Gas Transmission	*Cayce, SC*
Constellation Energy/Baltimore Gas and Electric Company	*Baltimore, MD*
Southwestern Energy Company	*Houston, TX*
Trunkline Gas	*Houston, 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 U.S.

Achievements in 2011

- Provided technical support to USDA in selecting 15 anaerobic digester projects for grant and loan funding through the Farm Bill.
- Supported digester-to-energy projects that produced almost 550 million kWh of renewable energy from farms capturing methane.
- Updated and expanded the AgSTAR national digester database to include 176 operating digesters and to track approximately 100 digester projects that were under construction or shut down.

What to Expect in 2012 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.
- Collaborate with industry, state and federal agencies, and other stakeholders to address barriers to digester system implementation at a national level.
- Evaluate the application of ancillary digester and biogas use technologies to improve environmental performance and revenue potential from digester systems.
- 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 and participate in 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 U.S. 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 2011

- Increased the percentage of drained CMM that is recovered and used to approximately 84 percent—up from 25 percent in the early 1990s.
- Reduced emissions of methane by an estimated 10.1 $MMTCO_2e$.[12] These results include reductions from about 15 active underground coal mines, as well as reductions from around 26 projects that captured and used methane from approximately 36 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 2011 U.S. Coal Mine Methane Annual Conference, which attracted a large 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 U.S.
- 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 2012 and Beyond

- Use data from the Greenhouse Gas Reporting Program (Subpart FF Underground Coal Mines) to help target CMOP outreach activities.
- 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 and events, including the 2012 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 U.S.

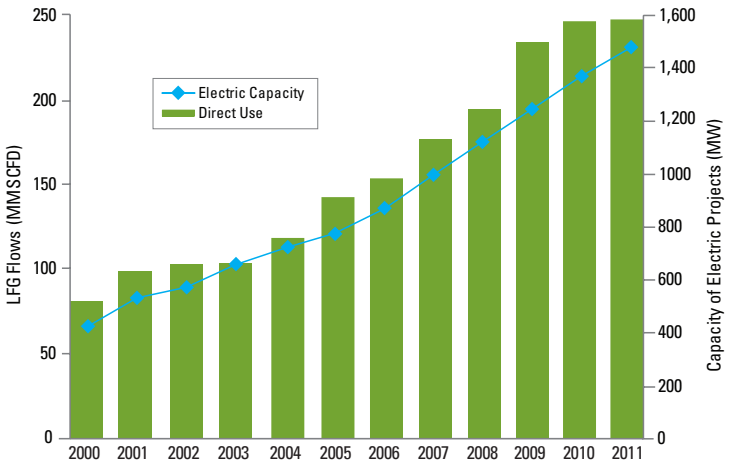
[12] *Estimate. 2011 emissions inventory data unavailable.*

LANDFILL METHANE OUTREACH PROGRAM

Landfill gas (LFG) energy projects prevent direct methane emissions from landfills and reduce indirect CO_2 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 17 years, LMOP has assisted 545 LFG energy projects and surpassed 580 operational projects nationally (see Figure 22). These LMOP-assisted projects have collectively reduced methane emissions from landfills and avoided emissions totaling 197.8 $MMTCO_2e$; they are partially responsible for the approximately 25-percent decrease in methane emissions from landfills since 1990.

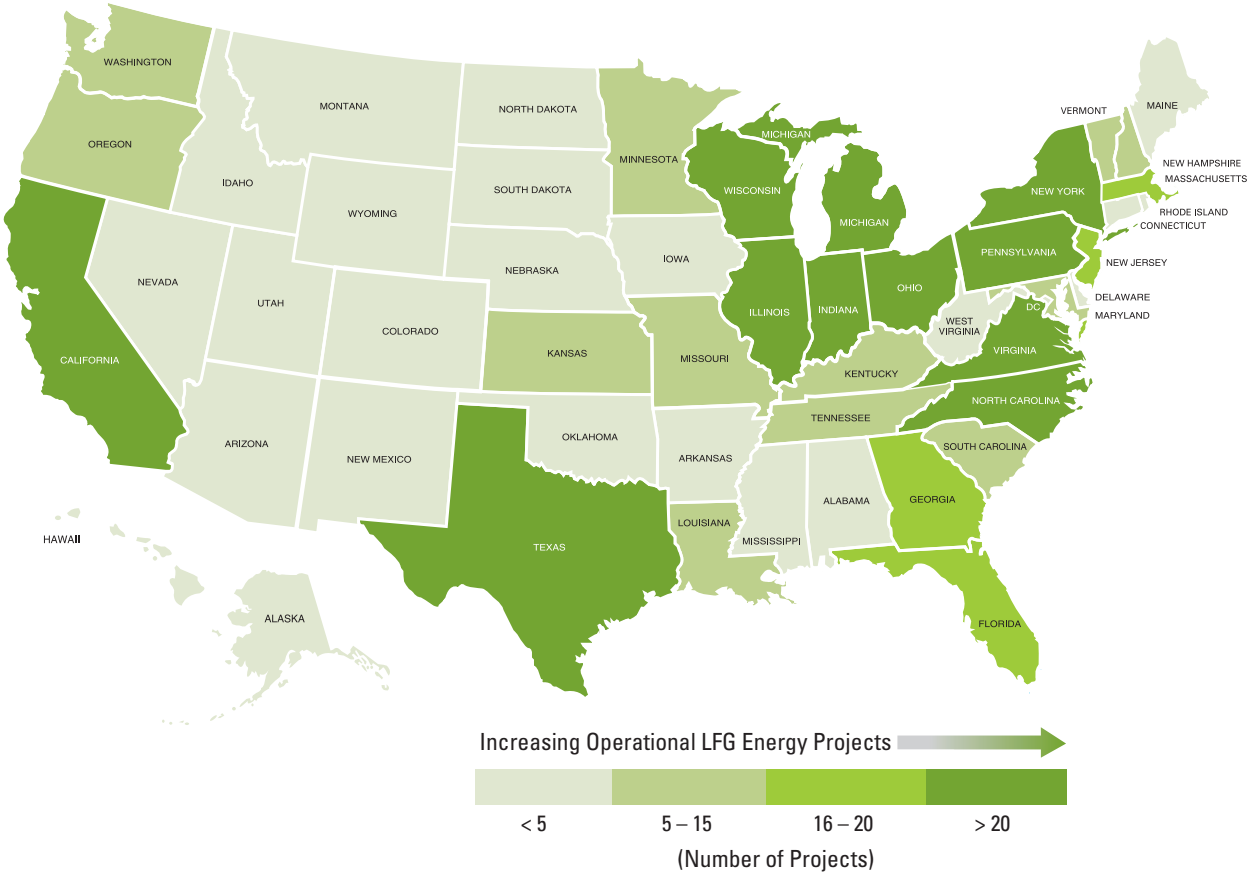
FIGURE 21. Direct Use and Electric Capacity of LMOP-Assisted Projects



Achievements in 2011

- Reduced methane emissions by 24.3 $MMTCO_2e$, partly as a result of helping to develop 39 new LFG energy projects and expand 17 existing projects.
- Welcomed 67 new partners, increasing participation by 7 percent and bringing the total to more than 1,010.
- Provided stakeholders with technical assistance that included performing 25 cost analyses, conducting 18 locator searches to match end-users with landfills, and running gas generation models for 19 potential LFG energy projects.
- Garnered public attention for LMOP partners and LFG energy projects, which were featured by numerous media outlets, including *The Environmental Magazine* and *PublicWorks*. Supported seven opening events and one groundbreaking event with informational resources and materials.
- Recognized the outstanding accomplishments of three landfill methane partners and three exemplary projects at the 15th Annual LMOP Conference and Project Expo (see Table 18).

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



What to Expect in 2012 and Beyond

- Assist in the development of 28 new LFG energy projects and the expansion of eight existing projects.
- Expand efforts to promote the benefits of LFG energy to municipal and small landfills in key states with the highest number of candidate landfills.
- Host the 16th Annual LMOP Conference, Project Expo, and Awards Ceremony to showcase the top LMOP partners and projects and discuss the latest industry trends.
- Provide streamlined technical assistance for LFG energy through website tools, resources, and an automated Contact Us feature.

TABLE 18. 2011 Landfill Methane Outreach Program Awards

Projects of the Year	
Dane County BioCNG™ Vehicle Fueling Project	*Madison, WI*
Golden Triangle Regional Solid Waste Management Authority Power Generation Project	*Starkville, MS*
Lime Energy Landfill Gas Energy Plant	*Punta Gorda, FL*

Industry Partners of the Year	
Enerdyne Power Systems, Inc.	*Charlotte, NC*
WM Renewable Energy	*Houston, TX*

Community Partner of the Year	
Decatur-Morgan County Landfill	*Trinity, AL*

Global Methane Initiative

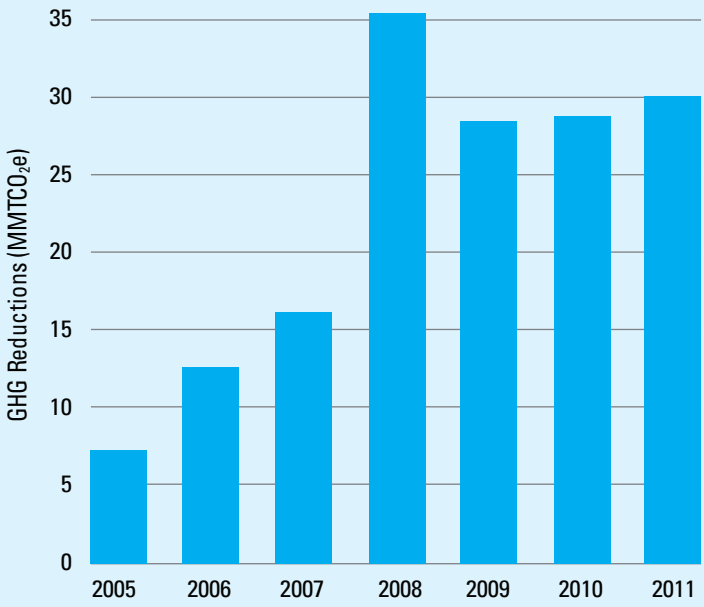
The Global Methane Initiative (GMI) is a voluntary, multilateral partnership that aims to reduce methane emissions and advance the recovery and use of methane as a valuable clean energy source. GMI created an international capacity building network to help develop strategies, transform markets, and remove barriers to methane reduction project development in partner countries. From the beginning, the U.S. has been a leader of GMI. The U.S. provides technical, financial, or capacity-building support to about 700 global projects and activities that reduced methane emissions by approximately 30 $MMTCO_2e$ in 2011 (see Figure 23). During the year, U.S. agencies held some 20 workshops and technical demonstrations in more than 10 partner countries, participated in more than a dozen site visits worldwide, and hosted three study tours for international delegates to U.S. facilities.

In October 2011, more than 160 GMI partner country representatives, government leaders, and technical experts from 31 countries gathered in Krakow, Poland, for a partnership-wide meeting that included site tours and technical and policy sessions. At that event, the GMI Steering Committee approved plans for a third Partnership Expo in March 2013 that Canada will host in Vancouver. Similar to past Expos held in China and India, Methane Expo 2013 will comprise plenary and concurrent sector-specific sessions, and is expected to attract up to 750 participants from more than 40 countries. As in years past, the U.S. is taking an active role in Expo planning and preparation.

Within the past year, renewed international interest in reducing emissions of certain air pollutants led to the development of the Climate and Clean Air Coalition (CCAC) that targets global emissions of short-lived climate pollutants (SLCPs) such as methane. Set to officially launch in February 2012, CCAC will provide an additional venue for the United States to share its methane reduction expertise and capacity building experience garnered through GMI. EPA is particularly interested in supporting additional efforts to reduce methane from the municipal solid waste and oil and gas sectors via the high-level political support that CCAC is attracting.

EPA is committed to maintaining its strong support for GMI, and continuing its work to expand methane project development opportunities around the globe through capacity building workshops, direct technical assistance, and grant programs that build local capacity. EPA will work with new initiatives such as CCAC to bring forward its GMI methane expertise and look for new ways to achieve additional global methane emissions reductions. EPA will also work closely with its counterpart Environment Canada to make the Methane Expo 2013 a major global event that provides a unique opportunity for the global methane community to share experiences and learn about new opportunities to mitigate climate change through the abatement and reduction of methane emissions.

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 (NF_3), and sulfur hexafluoride (SF_6)—are in several cases byproducts of certain 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); and emissions on a per-facility basis tend to be high. FGHGs trap substantially more heat in the atmosphere than does CO_2 on a per-mass basis, and some can have much longer atmospheric lifetimes than CO_2 (see Table 19, p. 48).[13]

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 2011, FGHG emissions reductions across the partnership programs totaled 53.9 $MMTCO_2e$ (see Table 20, p. 48). 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.

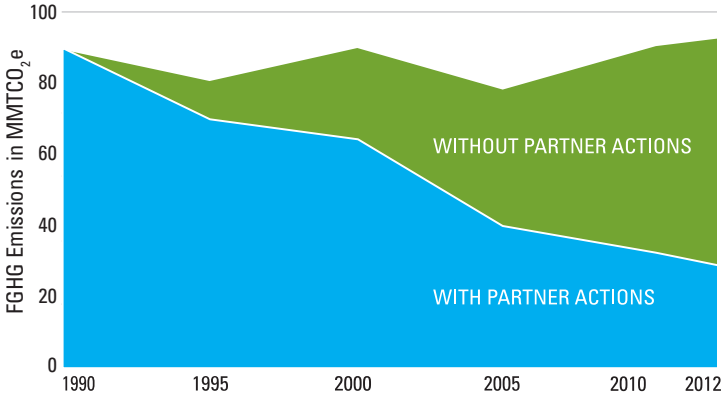
[13] *These are emissions reductions from voluntary programs and do not include reductions from regulatory programs such as the Significant New Alternatives Policy (SNAP) program.*

TABLE 19. 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	25	12
Nitrous Oxide	298	114
Hydrofluorocarbons	12 – 14,800	0.3 – 270
HFC-134a	1,430	14
HFC-245fa	1,030	7.6
Perfluorocarbons	7,390 – 12,200	2,600 – 50,000
Sulfur Hexafluoride	22,800	3,200

Source: IPCC 2007.

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 20. Goals and Achievements of EPA's FGHG Programs

PROGRAM	2011 GOAL	2011 ACHIEVEMENT	2012 GOAL
VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)			
Industry Participation (% in program)	99%	99%	99%
Annual Reductions ($MMTCO_2e$)	8.1	NA***	10.3
HFC-23			
Industry Participation (% in program)	100%	100%	100%
Annual Reductions ($MMTCO_2e$)*	22.0	22.0*	16.9
OTHER STEWARDSHIP PROGRAMS			
Industry Participation (% in program)**	50-100%	50-100%	50-100%
Annual Reductions ($MMTCO_2e$)*	27.5	27.5*	33.4
RESPONSIBLE APPLIANCE DISPOSAL (RAD)			
Industry Participation (% in program)	10.5%	9.4%	13.1%
Annual Reductions ($MMTCO_2e$)	0.2	0.3	0.5
GREENCHILL			
Industry Participation (% in program)	17.3%	20.6%	22.7%
Annual Reductions ($MMTCO_2e$)	2.6	4.1	4.5
TOTAL REDUCTIONS ($MMTCO_2e$)	**60.4**	**53.9****	**65.5**

** Estimate, awaiting 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.*

**** Reported data indicate no net emissions reductions from the partnership occurred in 2011.*

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

THE VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)

Since 1995, EPA and the U.S. primary aluminum industry have worked together through the Voluntary Aluminum Industrial Partnership (VAIP), which represents 98 percent of U.S. production capacity, to reduce perfluorocarbon (PFC) emissions from aluminum production. PFC emissions of perfluoromethane (CF_4) and perfluoroethane (C_2F_6) are inadvertent byproducts of the smelting process, and emissions of CO_2 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. All aluminum manufacturers now report through the Greenhouse Gas Reporting Program.

Achievements in 2011

- Continued work with China to evaluate the technical origin of non-anode effect PFC emissions.
- Worked with the International Aluminium Institute (IAI) to update the EPA/IAI Guidelines for PFC Measurement.
- Updated training materials for smelter workers on anode effect avoidance.

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. As a result, HFC-23 emissions intensity has dropped dramatically.[14] The partnership has successfully completed the development of GHG emissions inventory management tools, such as standardized inventory methods, audits of data collection, and reporting forms. In addition to process optimization, U.S. manufacturers are increasingly using thermal abatement to reduce emissions toward near zero levels.

All HCFC-22 manufacturers now report through the Greenhouse Gas Reporting Program. EPA will continue to encourage emissions reductions through voluntary action.

Achievements in 2011

- Reduced emissions by 22.0 $MMTCO_2e$ below what they would have been had production continued at 1990 emissions intensity levels.[15]

[14] *HFC-23 emissions intensity is the amount of HFC-23 emitted per kilogram of HCFC-22 manufactured.*
[15] *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 that 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 ever since 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 present challenges for global manufacturers 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. EPA remains committed to working with the semiconductor industry to continue to reduce FGHG emissions, and looks forward to exploring options for future voluntary collaboration with the electronics manufacturing sector.

SF_6 EMISSION REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS

SF_6 is the most potent and persistent GHG—it traps 23,900 times more infrared radiation than the equivalent amount of CO_2 (see Table 19, p. 48). Used primarily by electric utilities, SF_6 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_6.

EPA partners with 83 electric power companies through the voluntary SF_6 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_6 gas purchases. Partners represent 47 percent of the total U.S. transmission system.

Achievements in 2011

- Reduced emissions by 10 $MMTCO_2e$, bringing average SF_6 emissions rates down to 4 percent of the total equipment nameplate capacity.[16]
- Conducted a workshop in Atlanta, GA, for over 100 participants on reducing SF_6 emissions. Guest speakers reviewed a broad array of topics, including gas handling and tracking, best practices in gas management, training, and new and emerging measurement and monitoring techniques. The 2-day event, hosted by partner companies Southern Company and Georgia Power, included a site visit where SF_6 reduction techniques were demonstrated.
- Continued to work with partners to update their SF_6 reduction goals.
- Recognized four partner companies for outstanding achievement: Commonwealth Edison Company (ComEd) of Chicago, IL; MidAmerican Energy Company of Des Moines, IA; ITC Holdings Corp. of Novi, MI; and Consolidated Edison Company (ConEd) of New York, NY.

[16] *EPA estimate made prior to reporting under the Greenhouse Gas Reporting Program.*

SF_6 EMISSION REDUCTION PARTNERSHIP FOR THE MAGNESIUM INDUSTRY

The SF_6 Emission Reduction Partnership for the Magnesium Industry brought 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_6. Launched in 1999, this partnership works to reduce SF_6 emissions from magnesium production and casting operations; more than 80 percent of the U.S. magnesium industry participates. Successful collaboration with the magnesium industry for more than 10 years has led to a number of significant partnership achievements. Notably, measurement studies conducted by EPA and partner companies contributed to the identification of multiple technically proven alternatives to SF_6. EPA's partners in the magnesium industry made progress in improving their operational efficiencies and environmental performance by deploying alternative cover gas technologies; optimizing SF_6 cover gas concentrations, flow rates, and delivery mechanisms; as well as identifying and repairing leaks in SF_6 gas distribution systems.

EPA will continue to receive valuable data on GHG emissions from magnesium production and processing facilities in the U.S. through EPA's Greenhouse Gas Reporting Program. EPA remains committed to providing technical information to support the industry in eliminating SF_6 and adopting climate-friendly cover gases.

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 2011

- Avoided emissions of 0.3 $MMTCO_2e$ and over 948,000 pounds of ozone-depleting substances through the proper disposal of more than 890,000 refrigerant-containing appliances.
- Welcomed General Electric as the first RAD manufacturer partner and the country's first supplier of a fully automated UNTHA Recycling Technology (URT) System.
- Utility partnerships grew to represent increased capacity in the Northeast region, with 37 utility partners servicing 26 states. On average, refrigerators collected by RAD utility partners were over 20 years old. Replacing a 20-year old refrigerator with one that is ENERGY STAR certified will save a household roughly 550 kWh/year—or about $65/year.

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 CO_2. 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 7,693 partner 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 2011

- GreenChill partners have an average annual leak rate (12.2%) that is about 50 percent lower than the national average annual leak rate (25%).
- An average GreenChill store's climate impact due to refrigerant leaks (378 $MTCO_2e$) was 65 percent lower than the national average store's (1,077 $MTCO_2e$).
- Sixty-four GreenChill stores were certified in 2011 for advanced refrigeration technology that prevents refrigerant leaks—2 platinum, 28 gold, and 34 silver. Stores with a platinum, gold, or silver certification prevent at least 95 percent, 75 percent, or 65 percent, respectively, of the refrigerant leaks of a typical store.

What To Expect in 2012 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 2012.
- Participate in domestic and international conferences to support information sharing on technically feasible, cost-effective emissions reduction strategies.
- Support training programs to ensure partners collect and report high-quality data.
- Continue to recruit RAD partners and promote the disposal of refrigerant-containing appliances using the best available environmental practices.
- Continue to recruit 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 are generated through 2011 due to investments made through 2011. For this analysis, EPA assumes no new investments will be made through its programs in 2012 or beyond.
- Financial benefits are placed in present value terms.

Environmental and financial benefits for 2011 and the cumulative benefits 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 21, 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 Intergovernmental Panel on Climate Change'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 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 certfied are determined as those above and beyond BAU purchases of these products.[17] These sales are estimated by:
  - Collecting annual sales data on ENERGY STAR qualifying products from participating product manufacturers as a condition of partnership and supplementing these data with industry reports on total annual product sales, as necessary. The data are screened and issues resolved.
  - Establishing BAU baselines for annual product sales for each product category based on the benefit/cost ratio for the product and a characterization of the market barriers for the product. Any discrepancies between annual product sales and stock accounting are reconciled.
- 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 certified products just meet the ENERGY STAR thresholds, even though there are some products that exceed those levels.
  - Assumes the typically purchased product meets minimum efficiency standards where standards exist. If standards do not exist, assumes the average energy use of available products within a category prior to the introduction of an ENERGY STAR specification. EPA plans to review baseline assumptions for key products in 2012.
  - 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.
- Peak power savings are estimated using product-specific factors that reflect the contribution of the annual energy savings from a product to peak load savings.
  - Net energy bill savings is the present value (PV) of energy bill savings minus the PV of any incremental cost of purchasing an ENERGY STAR certified product above a standard model over the product lifetimes discussed above.[18] All energy bill calculations use national sector specific fuel prices.
- Avoided emissions of GHGs for 2011 are determined using marginal emissions factors for CO_2 equivalency based on factors established as part of the U.S. government's

[17] *For more details on many aspects of this method, see DNV KEMA 2012 and Weber et al. 2000.*

[18] *Calculated using a 7% discount rate and 2011 perspective.*

TABLE 21. 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 2011	GHG REDUCTIONS* ($MMTCO_2e$)											
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
ENERGY STAR	CO_2	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	195.8	221.2
Climate Leaders	All	Commercial, Industrial	360	Climate Leaders' reductions are reflected in the data shown for other programs.											
State Climate and Energy Program	CO_2	State Government	—						—	—	—	—	—	—	—
CLEAN ENERGY SUPPLY[1]															
Green Power Partnership	CO_2	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	29.6
Combined Heat & Power Partnership	CO_2	Commercial, Industrial	400												
METHANE PROGRAMS															
Natural Gas STAR	CH_4	Natural Gas	—	15.0	17.6	20.9	22.0	29.0	37.0	37.4	37.4	46.5	35.2	40.4	29.5
Coalbed Methane Outreach Program (CMOP)	CH_4	Coal Mining	—	7.7	8.4	6.2	6.2	7.3	7.3	9.0	8.1	8.3	8.9	9.9	10.1
Landfill Methane Outreach Program (LMOP)	CH_4	Waste Management	1,010	7.9	11.0	13.5	13.8	14.4	14.9	15.7	18.2	19.0	20.5	22.4	24.3
FLUORINATED GREENHOUSE GAS PROGRAMS															
Voluntary Aluminum Industrial Partnership***	PFCs	Aluminum Smelting	99% of industry	7.3	7.7	6.6	8.1	8.1	8.4	8.9	9.2	9.0	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	22.0
Stewardship Programs	SF_6 PFCs	Magnesium Production, Semiconductor Manufacturing, Electric Power Systems	50% – 100% of industry	2.9	2.9	4.8	6.6	11.4	11.0	14.0	15.8	18.7	18.7	23.1	27.5
Responsible Appliance Disposal (RAD)**	HFCs	Utility, Retail, Manufacturer, State & Local Government	44								0.0	0.1	0.3	0.3	0.3
GreenChill Partnership**	HFCs	Supermarket Industry	54								1.5	1.8	2.2	2.4	4.1

[1] GHG Reductions are for both the Green Power Partnership and Combined Heat and Power Partnership

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

*** Does not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 0.5 – 2.1 $MMTCO_2e$.*

**** Reported data indicate no net emissions reductions from the partnership occured in 2011.*

—: Not applicable

reporting process to the UN Framework Convention on Climate Change, as well as historical emissions data from EPA's eGRID database.[19]

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 Sector

Annual electricity and natural gas savings for the commercial buildings sector are estimated based on an updated, peer-reviewed methodology in which econometric models of state energy consumption are estimated.[20] They control for market factors such as energy prices, and non-market factors such as increases in energy efficiency due to ENERGY STAR products. Once the net change in national energy consumption due to publicly-funded commercial building energy efficiency programs is calculated, ENERGY STAR accomplishments are differentiated from the savings reported for other federal programs, demand-side management and public benefits charge programs, and building codes and standards initiatives.

Industrial Sector

Annual electricity, natural gas, and other fuels savings for the industrial sector are estimated based on a newly-developed methodology that is currently in the review process. It involves an econometric analysis of manufacturing industry electricity consumption and non-electricity energy expenditures that controls for market factors, including permanent shift in energy consumption trend and temporary shock due to the recent business cycle, and non-market factors such as public-program subsidized energy efficiency capital investments.[21] Once the net change in national energy consumption due to publicly-funded energy efficiency programs is calculated, ENERGY STAR accomplishments are differentiated for other federal programs and demand-side management and public benefits charge programs.

[19] *For more details on eGRID, see U.S. EPA 2012a.*

[20] *For more details on many aspects of this method, see Horowitz, M.J. 2001, 2007, and 2012a.*

[21] *For more details on many aspects of this method, see Horowitz 2001, 2007, and 2012b.*

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 for energy efficiency similar to other programs, 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_2 similar to other programs.

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 U.S. 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_6 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.

List of Figures

FIGURE 1. Since 2000, ENERGY STAR Benefits Have More Than Tripled 4

FIGURE 2. U.S. CO_2 Emissions by Sector and Non-CO_2 Gases by Percent of Total GHGs 5

FIGURE 3. U.S. Electricity Generation by Fuel Type 6

FIGURE 4. GHG Emissions Reductions Exceed 368 $MMTCO_2e$—Equivalent to Emissions From 72 Million Vehicles 6

FIGURE 5. About 3.8 Billion ENERGY STAR Certified Products Purchased Since 2000 13

FIGURE 6. Awareness of ENERGY STAR Growing in the United States 16

FIGURE 7. ENERGY STAR Certified New Homes Gaining Market Share 20

FIGURE 8. More Than 1.3 Million Homes Nationwide Have Earned the ENERGY STAR Label 21

FIGURE 9. Home Performance with ENERGY STAR Spreads Across the Country 21

FIGURE 10. Nearly 16,500 Buildings Have Earned the ENERGY STAR 24

FIGURE 11. 2011 National Building Competition Progress Over Time 25

FIGURE 12. Cumulative Square Feet Benchmarked in Portfolio Manager 25

FIGURE 13. Amount of Floor Space With an ENERGY STAR Score by State 26

FIGURE 14. The 183 Climate Leaders Partners by Sector 31

FIGURE 15. Climate Leaders Small Business Network Members 31

FIGURE 16. GHG Emissions Avoided by EPA's Clean Energy Supply Programs 32

FIGURE 17. Green Power Purchases and Avoided GHG Emissions 33

FIGURE 18. EPA Supports 50 Climate Showcase Communities 36

FIGURE 19. Partner Actions Are Projected To Maintain Methane Emissions Below 1990 Levels Through 2020 39

FIGURE 20. Natural Gas STAR Cumulative GHG Emissions Reductions and Gas Savings 40

FIGURE 21. Direct Use and Electric Capacity of LMOP-Assisted Projects 44

FIGURE 22. Landfill Gas (LFG) Energy Projects Across the Country 45

FIGURE 23. GHG Reductions From U.S.-Supported GMI Projects 46

FIGURE 24. Partner Actions Are Projected To Maintain Emissions of Fluorinated Gases Below 1990 Levels Through 2012 48

List of Tables

TABLE 1. Market Barriers Addressed by EPA's Climate Partnership Programs 3

TABLE 2. Annual and Cumulative Benefits From Partner Actions Through 2011 (in Billions of 2011 Dollars and $MMTCO_2e$) 5

TABLE 3. Long-Term GHG Reduction Goals for EPA Climate Partnership Programs ($MMTCO_2e$) 7

TABLE 4. ENERGY STAR Program Achievements Exceed Goals in 2011 9

TABLE 5. ENERGY STAR Key Program Indicators, 2000 and 2011 11

TABLE 6. ENERGY STAR Award Winners 12

TABLE 7. ENERGY STAR Product Specifications Added, Revised, and In Progress 14

TABLE 8. EPA Recognizes More Than 400 Organizations To Support Certification Program 17

TABLE 9. EPA Maintains Efficiency Standards With 176 Product Specifications and Revisions 18

TABLE 10. EPA ENERGY STAR Industrial Focuses on Energy 28

TABLE 11. EPA Expands ENERGY STAR for Superior Energy Management of Industrial Plants 29

TABLE 12. Climate Leaders Key Program Indicators, 2004 – 2011 (Cumulative) 31

TABLE 13. 2011 EPA Green Power Leadership Awards 33

TABLE 14. U.S. CHP Capacity and Partnership Market Share 35

TABLE 15. 2011 ENERGY STAR Combined Heat and Power Awards 35

TABLE 16. EPA's Methane Programs Meet and Surpass Goals 40

TABLE 17. 2011 Natural Gas STAR Awards 41

TABLE 18. 2011 Landfill Methane Outreach Program Awards 45

TABLE 19. Global Warming Potentials (GWPs) and Atmospheric Lifetimes of GHGs 48

TABLE 20. Goals and Achievements of EPA's FGHG Programs 48

TABLE 21. Overview of EPA's Climate Partnership Programs Reviewed in This Annual Report With GHG Reductions Since 2000 55

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