

Office of Atmospheric Programs: Climate Protection Partnerships

2012 ANNUAL REPORT



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REFLECTING ON 2012 CLIMATE PROTECTION PARTNERSHIP ACCOMPLISHMENTS



For more than 20 years the U.S. Environmental Protection Agency has collaborated with organizations across America to develop and deliver innovative, cost-effective solutions to protect our climate. The EPA's climate-protection partnerships include energy-efficiency and renewable programs such as ENERGY STAR®, Green Power Partnership, Combined Heat and Power Partnership and programs that address non-CO₂ greenhouse gases such as Natural Gas STAR, AgSTAR and the GreenChill Partnership, to name a few. Through investments in energy-efficient, clean, alternative technologies and practices, the EPA's climate protection partners are tackling the challenges of climate change while improving our health, saving consumers money, and strengthening our economy.

The urgency to act on climate change is clear. President Obama in June 2013 issued his Climate Action Plan, which calls on the federal government to work with all stakeholders to take action in three major ways: cut the harmful carbon pollution that fuels climate change, help our cities and towns build resilience to its impacts, and lead international efforts to combat and prepare for global climate change. The plan directs federal agencies to work together over the next 20 years to cut in half the energy wasted by our homes and businesses and to leverage new opportunities to reduce pollution from highly potent greenhouse gases like hydrofluorocarbons and methane. The good news is we can take these responsible steps to protect public health and the planet without sacrificing economic growth. In fact, we've been doing it for some time, as every dollar we've invested over the years to comply with the Clean Air Act has returned \$4 to \$8 dollars in economic benefits. A clean and healthy environment lays the foundation for a strong, sustainable economy.

As reflected in the Climate Action Plan, climate change isn't a distant threat; it threatens us today. And the public understands the urgency for climate action, the benefits of acting on the environment and the economy, and the need to enact regulations to limit carbon pollution. The global average temperature for every decade since the Industrial Revolution has been hotter than the previous decade, and the 12 hottest years on record have all been within the past 15 years. Scientists have observed changes in precipitation, rising sea level, melting ice and altered weather patterns, including more frequent and intense storms. And the science keeps getting stronger. These changes come with devastating consequences and real economic costs to Americans. Last year alone, the second costliest year ever recorded in terms of disasters, the U.S. endured 11 different weather and climate events with estimated losses exceeding \$1 billion each.

The Office of Atmospheric Programs' climate partnerships are making steady progress reducing greenhouse gas emissions, cutting wasted energy, and saving American families and businesses money. These accomplishments include:

- Americans saved more than \$26 billion on their utility bills in 2012 with the help of ENERGY STAR® and prevented greenhouse gas emissions equal to the annual electricity use of 35 million homes.
- Since the Green Power Partnership was introduced in 2001, more than 1,400 organizations have committed to using about 29 billion kilowatt-hours of green power each year.
- More than 450 partners have installed over 5,700 megawatts of new combined heat and power since the Combined Heat and Power Partnership launched in 2001.
- In 2012, EPA's methane and fluorinated greenhouse-gas-program partners used EPA tools and resources to prevent emissions equal to the annual electricity use from more than 10 million homes.
- In total, more than 21,000 organizations and millions of American consumers partnered with the EPA through the Office of Atmospheric Programs' climate partnerships and produced significant environmental benefits, including preventing more than 365 million metric tons of greenhouse gas emissions equal to the annual electricity use of over 50 million homes.

Together, with our climate protection partners, we have achieved meaningful reductions in greenhouse gas emissions. However, like so many of our environmental challenges, climate change cannot be addressed solely by the EPA's actions or even by the entire federal government. Everyone has a role to play in bringing about a healthier climate, a cleaner economy and a stronger future.

We look forward to building on the success of these partnerships to address climate change through comprehensive, common-sense actions that benefit the planet and all Americans today and for generations to come.

Sincerely,

Gina McCarthy

EXECUTIVE SUMMARY

Global climate change is a pressing national and international environmental problem. Addressing this challenge calls for both near- and long-term, proven, cost-effective solutions to reduce overall emissions of greenhouse gases (GHGs) and remove the barriers that hinder investment in low-cost energy efficiency and clean energy supply options. Consistent with the President's 2013 Climate Action Plan, the U.S. Environmental Protection Agency's (EPA's) climate protection partnership programs continue to implement a comprehensive set of policies and programs that complement regulatory efforts, successfully achieving outstanding environmental and financial benefits, as they have done for the last 20 years.

Opportunities exist to greatly reduce GHG emissions and many of these strategies are cost-beneficial. The challenge is to maximize access to these opportunities so that consumers and businesses can overcome the market barriers that persist across residential, commercial, and industrial sectors. Since 1992, EPA has worked with its climate protection partners to dismantle those barriers 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 partnerships as valuable resources to reduce GHG emissions.

The success of these programs is demonstrated by their continued annual emissions reductions and the increasing investment in energy efficiency, clean energy technologies, and other climate-friendly practices. Through these widespread investments and the adoption of innovative strategies, EPA and its partners promote long-term market transformation and GHG emissions reductions.

The climate protection partnerships represent one component of EPA's ongoing efforts to develop national programs, policies, and regulations for reducing air pollution. By coordinating across the Agency and with other federal programs, EPA can ensure these programs work effectively together to protect our health and the environment.

In 2012, EPA's climate protection partnerships produced impressive results.¹ Over 21,000 organizations across the United States partnered with EPA to reduce emissions and achieve significant environmental and economic benefits (see Table 1)²:

- Preventing more than 365 million metric tons of U.S. GHG emissions (in MMTCO₂e) (see Figure 2, pg. 5)—equivalent to the emissions from the annual electricity use of over 50 million homes—providing over \$13 billion in benefits to society due to reducing damages from climate change.³
- Reducing net energy bills by more than \$26 billion and mitigating methane emissions valued at \$4.6 billion in 2012 alone.
- Investing over \$125 billion in energy-efficient technologies and practices through 2012.
- Preventing more than 3,100 MMTCO₂e of GHG emissions cumulatively due to investments made through 2012.

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 regulatory programs, such as the Significant New Alternatives Policy Program, nor other voluntary climate programs operated by other EPA offices which are also part of EPA's comprehensive climate program. EPA estimates the reduction in greenhouse gas emissions across active programs in the buildings and industrial sectors to be approximately 600 million metric tons of carbon dioxide equivalent (MMTCO₂e) in 2012.

² Benefits include domestic GHG reductions only. In addition, Global Methane Initiative supported projects reduced international methane emissions by approximately 23 MMTCO₂e in 2012.

³ Societal benefits are based on the social cost of carbon which monetizes the damages associated with an incremental increase in carbon emissions in a given year, including (but not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services. \$10.5 billion and \$2.9 billion of the societal benefits are from CO₂ and non-CO₂ emissions, respectively. The non-CO₂ emissions were converted to CO₂-equivalents assuming global warming potentials from the IPCC Second Assessment Report before applying the social cost of CO₂. Interagency Working Group on Social Cost of Carbon, United States Government. 2013.

TABLE 1. Summary of OAP Climate Protection Partnership Programs' Benefits and Goals (in Billions of 2012 Dollars and MMTCO₂e)

PROGRAM	ECONOMIC BENEFITS (BILLION \$) ¹		ENVIRONMENTAL BENEFITS GHG EMISSIONS REDUCTIONS (MMTCO ₂ e)		ANNUAL GOALS	
	ANNUAL BENEFITS FOR 2012	CUMULATIVE BENEFITS (1993-2012)	ANNUAL BENEFITS FOR 2012	CUMULATIVE BENEFITS (1993-2012)	2015 GHG EMISSIONS REDUCTIONS (MMTCO ₂ e)	2020 GHG EMISSIONS REDUCTIONS (MMTCO ₂ e)
ENERGY STAR Program Total	\$26.5	\$239.3	254.7	1,903.8	217.4	275.1
Products and Homes	\$17.4	\$134.1	132.1	805.1	116.8	145.0
Buildings	\$7.5	\$84.4	89.8	784.9	75.0	93.5
Industrial	\$1.6	\$20.8	32.7	313.7	25.6	36.6
Energy Supply Programs	—	—	31.6	189.9	44.0	73.3
Methane Programs²	\$4.6	\$169.9	63.2	856.0	45.1	48.1
FGHG Programs	—	—	16.1	181.2	15.2	19.1
TOTAL	—	—	365.6	3,130.9	321.7	415.6

Note: See the Measuring Results chapter (pg. 30) for the methodologies used to calculate annual and cumulative benefits and goals.

¹ The economic benefits for the ENERGY STAR Program represent the present value of the estimated net energy bill savings for consumers and businesses. Net energy bill savings are the difference between total consumer energy bill savings and the incremental additional investment in energy efficient technologies and services. The economic benefits for the Methane Programs represent the present value of the estimated value of gas mitigated.

² Program goals include only direct GHG emissions reductions. In 2012, Methane programs reduced 53.7 MMTCO₂e of direct GHG emissions.

—: Not applicable

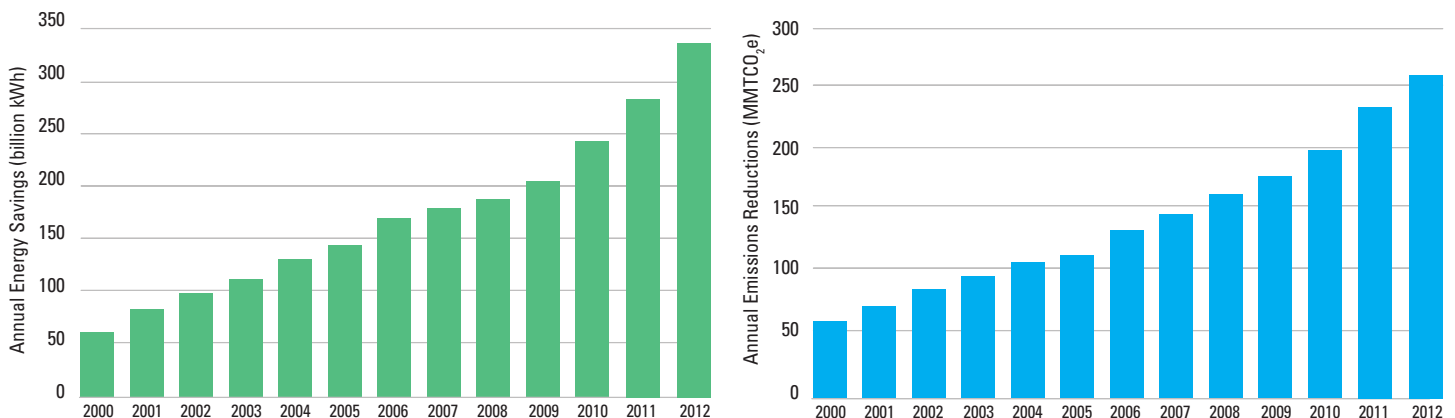
HIGHLIGHTS OF 2012

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 GHG emissions and protecting our climate. Through ENERGY STAR, EPA continues to promote energy efficiency across the residential, commercial, and industrial sectors. In 2012, EPA's ENERGY STAR efforts helped Americans:

- Save more than 337 billion kilowatt-hours (kWh)—over 5 percent of U.S. electricity demand.
- Prevent more than 254 million metric tons of GHGs—equivalent to the annual electricity use of 35 million homes.
- Save more than \$26 billion on their energy bills.

These benefits have more than quadrupled since 2000 (see Figure 1, pg. 4).

FIGURE 1. ENERGY STAR Annual Benefits Have More Than Quadrupled Since 2000

Transforming the Energy Supply Marketplace

EPA's Carbon Dioxide Reducing Energy Supply Programs—the Green Power Partnership and the Combined Heat and Power (CHP) Partnership—are designed to increase the nation's supply of clean energy and accelerate the adoption of clean energy supply technologies throughout the United States. Since 2001, both programs have provided technical assistance and recognized significant leadership in end-use efficiency and use of renewable energy. By engaging more than 1,400 partners in the purchase of about 29 billion kWh of green power annually and more than 450 partners in the installation of more than 5,700 megawatts (MW) of new CHP capacity, the energy supply programs reduced GHG emissions by over 31 MMTCO₂e in 2012 alone.

Reducing Methane Emissions and Recovering an Energy Resource

Methane (CH₄) 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 develop projects to recover and use the methane whenever feasible. The programs avoided GHG emissions of 63.2 MMTCO₂e in 2012, exceeding their reduction goals.

Reducing Fluorinated GHG Emissions

Many of the fluorinated gases—including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—are extremely powerful and persistent GHGs. The combined efforts of the fluorinated GHG partnerships have helped partners maintain their emissions below baseline levels. Together in 2012, these programs avoided 16.1 MMTCO₂e of GHG emissions.

Facilitating Cross-Cutting Emissions Reductions Programs

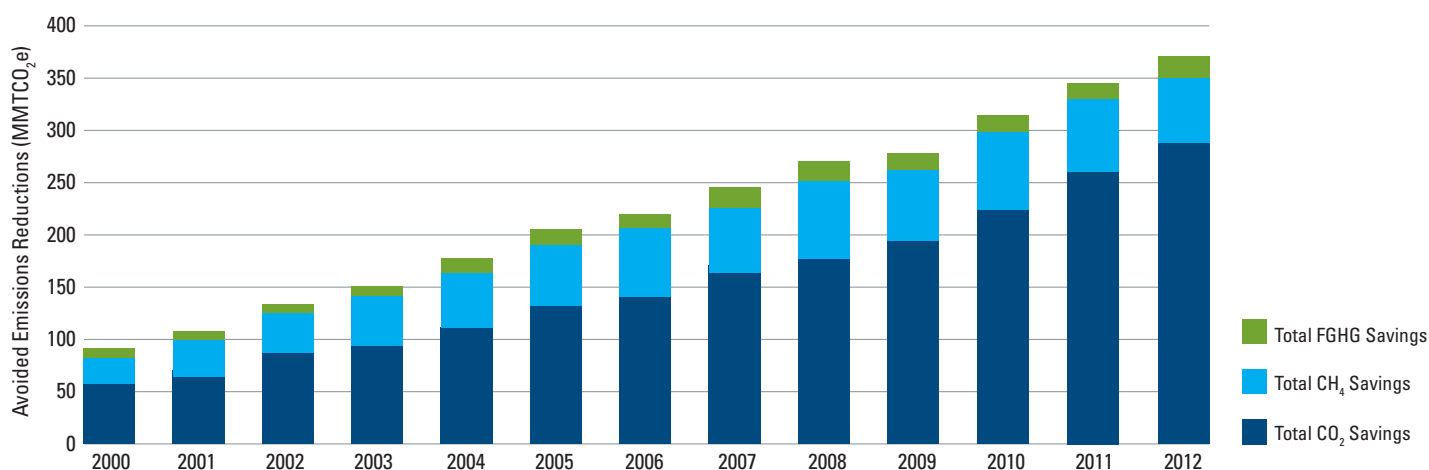
In 2012, EPA launched the Center for Corporate Climate Leadership. The Center serves as a resource for all organizations interested in measuring and managing their GHG emissions, and works with NGO partners to recognize superior climate achievements through the Climate Leadership Awards. EPA also works with state and local governments to overcome barriers that can limit the development of energy efficiency and clean energy policies. In 2012, EPA continued to support the 50 Climate Showcase Communities and promote the lessons learned from pilot projects to other communities.

Honoring Partner Accomplishments

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

- ENERGY STAR Awards
- Green Power Leadership Awards
- ENERGY STAR CHP Awards
- Landfill Methane Outreach Program Awards
- GreenChill Achievement Awards

A list of the 2012 award winners can be found in Appendix A on page 38.

FIGURE 2. Annual GHG Emissions Reductions from OAP Climate Partnerships Exceed 365 MMTCO₂e in 2012

The 2012 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. This annual report presents detailed information on EPA's 2012 efforts within each of the partnerships mentioned in Table 2, pg. 6. Each individual program section includes a program overview, environmental and economic benefits achieved in 2012, and summaries of the major tools and resources offered by the program.

EPA is committed to documenting quantifiable program results and using well-established methods to estimate the benefits of its climate partnerships. Specific approaches vary by program strategy, sector, availability of data, and market characteristics. These methods are documented in the Measuring Results section of the report on page 30.

TABLE 2. Summary of OAP Climate Protection Partnership Programs

PROGRAM	DESCRIPTION	START DATE	NUMBER OF PARTNERS	2012 EMISSIONS REDUCTIONS (MMTCO _{2e})	WEBSITE
ENERGY STAR	Helps businesses and individuals save money and protect our climate through superior energy efficiency in the residential, commercial, and industrial sectors.	1992	18,000	254.7	www.energystar.gov
Green Power Partnership (GPP)	Encourages organizations to use green power as a way to reduce the environmental impacts associated with conventional electricity use.	2001	1,414	31.6	www.epa.gov/greenpower
Combined Heat & Power Partnership (CHP)	Promotes increased use of CHP, a cleaner and more efficient alternative to separately produced electricity and thermal energy, such as steam and hot water.	2001	457		www.epa.gov/chp
Natural Gas STAR	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.	1993	121	26.8	www.epa.gov/gasstar
AgSTAR	Provides tools and information to the nation's agriculture industry to reduce methane emissions by promoting the use of biogas recovery systems to manage animal waste.	1994	—	1.8	www.epa.gov/agstar
Landfill Methane Outreach Program (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.	1994	1,054 ¹	26.3	www.epa.gov/lmop
Coalbed Methane Outreach Program (CMOP)	Works cooperatively with the coal mining industry to reduce methane emissions from coal mining activities.	1994	—	8.4	www.epa.gov/cmop
Voluntary Aluminum Industrial Partnership (VAIP)	Platform for the U.S. primary aluminum industry and EPA to reduce perfluorocarbon (PFC) emissions from aluminum production. The partnership represents 98% of U.S. production capacity.	1995	3	6.2	www.epa.gov/highgwp/aluminum-pfc
SF ₆ Reduction Partnership for Electric Power Systems (EPS)	Shares information with electric power companies regarding best practices and cost-effective operational improvements to actively address climate change.	1999	83	5.6	www.epa.gov/highgwp/electricpower-sf6
Responsible Appliance Disposal Program (RAD)	Partners with utilities, retailers, and manufacturers to help protect the ozone layer and reduce emissions of greenhouse gases through environmentally-conscious recycling practices. ²	2006	50	0.2	www.epa.gov/rad
GreenChill Partnership	Collaborates with the supermarket industry to transition to environmentally friendlier refrigerants and adopt green refrigeration technologies and best practices. ²	2007	54	4.1	www.epa.gov/greenchill
State and Local Climate and Energy Program	Assists states in developing policies and programs that can reduce greenhouse gas emissions, lower energy costs, improve air quality and public health, and help achieve economic development goals.	1990	—	—	www.epa.gov/statelocalclimate
Center for Corporate Climate Leadership	Serves as a resource center for all organizations looking to expand their work in the area of GHG measurement and management.	2012	—	—	www.epa.gov/climateleadership

¹ Includes partners and endorsers.² 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 1.6 MMTCO_{2e} for each program.

ENERGY STAR®



For the past 20 years, EPA has effectively captured and channeled the ingenuity of the marketplace through ENERGY STAR®, an energy efficiency partnership program. Climate change continues to be one of the nation's most important environmental challenges, and improving energy efficiency is one of the easiest, fastest, and most cost-effective solutions for reducing GHG emissions. Since 1992, the ENERGY STAR program has boosted the adoption of energy-efficient products, practices, and services, contributing to important health and environmental benefits while strengthening our economy.

By identifying innovative solutions and expanding consumer education, EPA and its partners help protect the climate while making energy efficiency accessible to customers, the public, and their own organizations. These committed partners and individuals across the country have tapped the value of ENERGY STAR to achieve dramatic energy savings while cumulatively preventing more than 1.9 billion metric tons of GHG emissions and saving consumers over \$239 billion on utility bills. EPA recognized more than 100 partners for their commitment to energy efficiency (see Appendix A, pg. 38).

In 2012 alone, Americans, with the help of ENERGY STAR, prevented more than 254 million metric tons of GHG emissions—providing over \$9 billion in benefits to society due to reducing damages from climate change. Consumers and businesses also reduced their utility bills by more than \$26 billion, due to investments in energy-efficient technologies and practices that will provide savings for years to come. EPA will continue to dismantle barriers to widespread energy efficiency through ENERGY STAR by serving as a trusted source of information that helps consumers and businesses make choices that are good for the environment and the economy (see Table 3, pg. 8).

ENERGY STAR® Certified Products

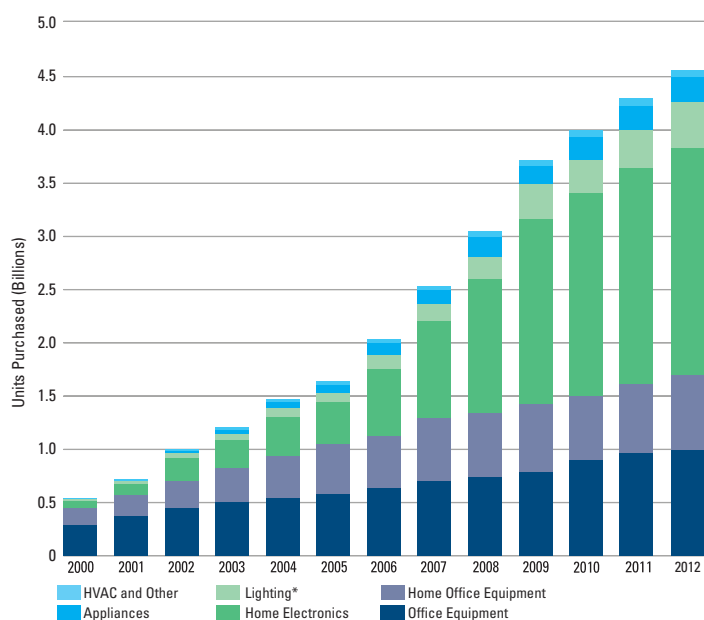
The national symbol for energy efficiency, ENERGY STAR® helps Americans make informed purchasing choices, save money on utility bills, and protect the environment. In 2012, Americans purchased about 280 million products that earned the ENERGY STAR label across more than 65 product categories for a cumulative total of more than 4.5 billion⁴ ENERGY STAR certified products purchased over the past 20 years (see Figure 3). Certified products—including appliances, heating and cooling equipment, consumer electronics, office equipment, lighting, commercial food service, data center equipment, and more—offer consumers savings of as much as 70 percent relative to standard models while providing the features and functionality they expect.

Achievements in 2012

Keeping ENERGY STAR Requirements Up To Date

EPA added new ENERGY STAR requirements for uninterruptible power supplies to the program and finalized updates to nine product specifications, including televisions, audio/video, displays, room air conditioners, water heaters, vending machines, and commercial clothes washers, dishwashers and ice makers (see Tables 4 and 5).

FIGURE 3. More Than 4.5 Billion ENERGY STAR Certified Products Purchased Over the Past 20 Years (Cumulative by Year)



*Lighting category does not include purchases of light bulbs.

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

TABLE 3. ENERGY STAR Key Program Indicators, 2000 and 2012

KEY INDICATORS	YEAR OF RESULTS	
	2000	2012
Annual Emissions Reductions (MMTCO ₂ e)	54	> 254
Cumulative Emissions Reductions (MMTCO ₂ e)	> 160 million	> 1.9 billion
Annual Net Energy Bill Savings ¹	\$10 billion	> \$26 billion
Cumulative Utility Bill Savings ¹	\$19 billion	> \$239 billion
Annual Societal Benefits ¹	—	> \$9 billion
Electricity Savings as % of Total Annual Electricity Demand	> 1%	> 5%
Brand Awareness	40%	> 85%
Cumulative Individuals Taken ENERGY STAR Pledge	—	> 3 million
ENERGY STAR CERTIFIED PRODUCTS		
Cumulative Certified Products Sold ²	600 million	> 4.5 billion ³
Annual Certified Products Sold	171 million	~ 280 million
Individual Certified Product Models	11,000	> 40,000
Product Categories Eligible for ENERGY STAR	33	> 65
Manufacturing Partners	1,600	> 1,800
Retail Partners	550	> 2,600
ENERGY STAR RESIDENTIAL		
Home Builder Partners	1,600	> 3,200
Cumulative Number of Certified New Homes Built	25,000	> 1.4 million
Annual Certified New Homes Built	> 13,000	> 100,000
Annual Certified Homes Built as Percent of New U.S. Home Starts	< 1%	16%
Cumulative Number of Certified Manufactured Homes	—	> 50,000
Cumulative Completion of Certified New Multifamily High-Rise Units	—	> 3,800
Percent Energy Savings Over IECC 2009 Code	—	at least 15%
Percent Energy Savings Over Typical New Home	—	20-30%
Cumulative Number of Home Energy Yardstick Users	—	> 760,000
Cumulative Number of Home Energy Advisor Users	—	> 420,000
ENERGY STAR COMMERCIAL		
Cumulative Number of Certified Buildings	4,200	> 20,000
Annual Certified Buildings (includes re-labels)	—	> 8,200
Building Types Eligible for the ENERGY STAR	2	16
Cumulative Number of Buildings Benchmarked in Portfolio Manager	> 4,000	> 300,000
Cumulative Square Footage Benchmarked	> 400 million	> 30 billion
Number of Buildings in Battle of the Buildings	—	> 3,200
Cumulative Number of Buildings Designed to Earn the ENERGY STAR	—	500
ENERGY STAR INDUSTRIAL		
Cumulative Number of Facilities Certified	—	122
Industrial Sectors & Subsectors	0	24
Facility Types Eligible for the ENERGY STAR	—	12
Number of Industrial Challenge Sites Achieving 10% Reduction in Energy Intensity in 5 Years or Less	—	175

¹ Financial benefits are presented in 2012 dollars and present value terms.

² The cumulative total of product sales across the entire ENERGY STAR Program from 1992, 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.

— : Not applicable as metric reflects a new element of the program that did not exist in 2000.

TABLE 4. EPA Maintains Efficiency Standards with Product Specifications and Revisions

PRODUCT TYPE	NUMBER OF PRODUCT TYPES	NUMBER OF SPECIFICATIONS COVERING THESE PRODUCTS	NUMBER OF SPECIFICATION CHANGES EFFECTIVE OVER LAST 3 YEARS (REVISED AND NEW)	NUMBER OF SPECIFICATIONS COMPLETED IN 2012 (REVISED AND NEW)
Consumer Electronics	20	7	6	2
Office Equipment	11	5	2	2
HVAC	9	7	7	—
Commercial Food Service Equipment	9	8	4	2
Lighting	4	3	3	—
Building Envelope	5	3	1	—
Appliances	8	7	4	3
Other	2	2	1	1

Inspiring Consumer Action

EPA engages in public outreach to encourage 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 platform for others to help drive behavior change. Three major initiatives reached 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*—supported by hundreds of participating organizations (pledge drivers)—continued to ask people to take simple energy-saving steps at home that can make a big difference in protecting the climate. More than 200,500 individuals took the ENERGY STAR Pledge in 2012, representing 1.2 million energy-saving actions, 1.6 billion potential pounds of GHG emissions prevented, and about 960 million kWh saved. Increased use of social (Facebook and Twitter) and online media, along with traditional media, spread the ENERGY STAR message to more than 77 million people.
- The 2012 *ENERGY STARs Across America* initiative spurred more than 1,000 ENERGY STAR events (e.g., community and retail), engaging millions of Americans in ways to save energy and protect the climate.
- 2012 marked the launch of the *Team ENERGY STAR* youth education initiative, leveraging themes from Dr. Seuss' *The Lorax* movie to empower young people to help their families save energy at home. Working with the Boys & Girls Clubs of America (BGCA) and DoSomething.org, EPA engaged tens of thousands of families with Team ENERGY STAR education, including more than 150 BGCA

clubs. The initiative also reached millions of others through media coverage, e-blasts, and partner events across the country, including kids' events at The Home Depot, Lowe's, and Sears.

- Along with ENERGY STARs Across America, events promoting Team ENERGY STAR reached some 500,000 participants.
- Social media results totaled nearly 100 million impressions.
- Fifty Team ENERGY STAR print public service announcements (PSAs) garnered placements representing a total circulation of more than 28.5 million potential readers.

Today, over 85 percent of American households recognize the ENERGY STAR label, and about 40 percent knowingly purchased an ENERGY STAR labeled product in the past year (see Figure 4, pg. 10).⁵ Of those purchasers, more than 70 percent reported the label as influential in their purchasing decision; 75 percent reported they are likely to recommend products that have earned the ENERGY STAR to friends.

Increasing Stakeholder Engagement

EPA worked with partners to review the current program and evaluate ways to continue to strengthen it. In 2012, EPA engaged stakeholders on an update to the *Vision and Guiding Principles for the ENERGY STAR Products* program.⁶ EPA also partnered with the Information Technology Industry Association and other stakeholders in a road-mapping exercise to enhance future work on energy efficiency in information technology products.

⁵For more information, see *National Awareness of ENERGY STAR for 2012: Analysis of CEE Household Survey*. U.S. EPA 2013b.

⁶For more information, see http://www.energystar.gov/ia/partners/prod_development/downloads/ENERGY_STAR_Strategic_Vision_and_Guiding_Principles.pdf?20d0-f364.

ENERGY STAR Third-Party Certification and Compliance Monitoring

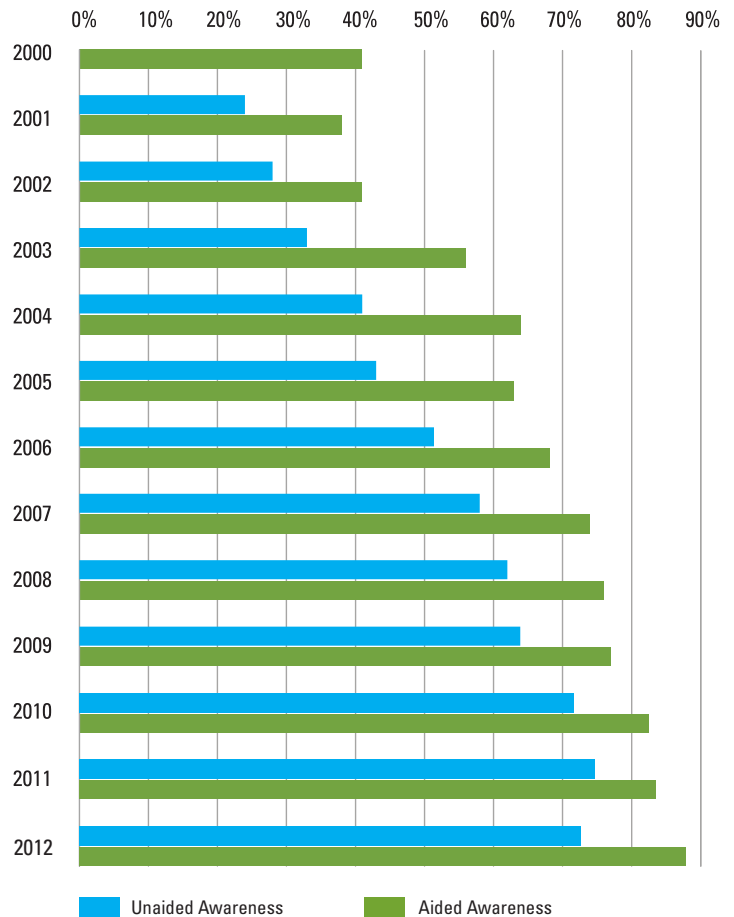
Improving the System. After 20 years, the value of the ENERGY STAR label is now backed by a robust, state-of-the-art system for third-party certification. This system includes a worldwide network of nearly 500 laboratories testing products, complemented by 22 independent, accredited certification organizations reviewing results. As a further enhancement in 2012, EPA rolled out a new IT system that allows certification bodies to share real-time information and data on ENERGY STAR products among certification bodies, EPA, and the public. The certified product exchange system increases EPA's ability to provide up-to-date information on ENERGY STAR products. More than 20,000 products were certified in 2012 and logged in the new system.

Protecting the Consumer Experience. Post-market verification testing administered by certification bodies continued to increase throughout 2012, while DOE continued to conduct complementary verification testing in some product categories. A total of 1,169 models underwent verification testing, with an overall compliance rate of 93 percent. EPA maintained ongoing oversight of the process, disqualifying products as appropriate after working with manufacturers through its dispute resolution process.

ENERGY STAR Most Efficient 2012

EPA extended the ENERGY STAR Most Efficient Pilot for a second year to allow further testing through broader implementation by partner efficiency programs. Throughout 2012, EPA also evaluated the pilot, monitoring indicators such as increases in the number of recognized models on the market, the potential to leverage private sector activities to increase visibility and consumer understanding of the ENERGY STAR Most Efficient designation. By the end of the year, this initiative became a permanent part of the program.

FIGURE 4. Awareness of ENERGY STAR Growing in the United States



Note: When a consumer recognizes the ENERGY STAR label before it is shown, it is defined as "unaided awareness." When a consumer recognizes the ENERGY STAR label after being shown the label, it is defined as "aided awareness."

Source: National Awareness of ENERGY STAR for 2012: Analysis of CEE Household Survey. U.S. EPA 2013b.

ENERGY STAR for Displays and Consumer Electronics

In 2012, EPA updated ENERGY STAR specifications for three high-demand product types: computer monitors, televisions, and audio/video equipment. The updated requirements reward advances in products that are now smarter thanks to network connectivity and more intuitive systems for powering down to consume even less energy when not in use. At the same time, they kept up with innovations such as higher resolution in displays and larger sizes in TVs. If all the products sold in these three updated categories were ENERGY STAR certified, the combined savings would grow to more than \$2.5 billion annually, preventing the GHG emissions equivalent to the annual electricity use of nearly 2 million homes.

TABLE 5. ENERGY STAR Product Specifications Added, Revised, and In Progress

PRODUCT CATEGORY	YEAR INTRODUCED (AND REVISED)	STATUS OF ACTIVITY IN 2012
2012 NEW SPECIFICATIONS		
Uninterruptible Power Supplies	2012	Completed. Took effect August 1, 2012.
2012 REVISIONS COMPLETED		
Audio/Video	1999 (2003, 2009, 2010, 2013)	Revised specification to take effect May 1, 2013.
Clothes Washers (small commercial)	1997 (2007, 2009, 2011, 2013)	Revised specification to take effect February 1, 2013.
Commercial Dishwashers	2007 (2013)	Revised specification to take effect February 1, 2013.
Commercial Ice Makers	2008 (2013)	Revised specification to take effect February 1, 2013.
Displays	1992 (1995, 1998, 1999, 2005, 2009, 2010, 2013)	Revised specification to take effect June 1, 2013.
Residential Water Heaters	2009 (2013)	Revised specification to take effect July 1, 2013.
Room Air Conditioners	1996 (2001, 2003, 2005, 2013)	Revised specification to take effect October 1, 2013.
Televisions	1998 (2002, 2004, 2005, 2008, 2010, 2011, 2013)	Revised specification to take effect June 1, 2013.
Vending Machines	2004 (2006, 2013)	Revised specification to take effect February 1, 2013.
2012 REVISIONS IN PROGRESS		
Battery Charging Systems	2006	In process, expected to be complete in 2013.
Commercial Ovens	2009	In process, expected to be complete in 2013.
Commercial Refrigerators	2002 (2004, 2006, 2008)	In process, expected to be complete in 2013.
Computers	1992 (1995, 1999, 2004, 2008)	In process, expected to be complete in 2013.
Imaging Equipment	1992 (1995, 2000, 2007, 2009)	In process, expected to be complete in 2013.
Lamps	1999 (2002, 2008, 2009)	In process, expected to be complete in 2013.
Residential Refrigerators/Freezers	1992 (1995, 1999, 2004, 2008)	In process, expected to be complete in 2013.
Roofs	1998 (2001, 2003, 2007, 2009)	In process, expected to be complete in 2013.
Servers	2009	In process, expected to be complete in 2013.
Telephony	2001 (2009, 2010)	In process, expected to be complete in 2013.
Water Coolers	2000	In process, expected to be complete in 2013.
NEW SPECIFICATIONS IN DEVELOPMENT		
Commercial Water Heaters		New specification to be completed in 2013.
Data Center Storage		New specification to be completed in 2013.
Laboratory Grade Refrigerators and Freezers		New specification to be completed in 2014.
Pool Pumps		New specification to be completed in 2013.
Small Network Equipment		New specification to be completed in 2013.

ENERGY STAR® in the Residential Sector

More than 17 percent of the GHGs emitted in the United States are attributed to the energy we use to heat, cool, and light our homes, as well as power the appliances and electronics in them.⁷ 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 tools and resources to households and the housing industry to cost-effectively increase the energy efficiency of the nation's housing stock.

Achievements in 2012

ENERGY STAR Certified Homes

More than 1.4 Million New Homes Have Earned the ENERGY STAR. In 2012 alone, more than 100,000 homes were constructed to meet ENERGY STAR requirements⁸ (see Figure 5), representing 16 percent of new home starts (see Figure 6). Since 1995, some 27,000 builder partners nationwide have helped American homeowners save more than \$4 billion on their energy bills and reduce GHG emissions by over 18 MMTCO₂e. In 2012, families living in ENERGY STAR certified homes saved in excess of \$500 million on their utility bills, while avoiding GHG emissions equivalent to the electricity use of more than 400,000 homes in one year.

FIGURE 5. More Than 1.4 Million Homes Nationwide Have Earned the ENERGY STAR Label

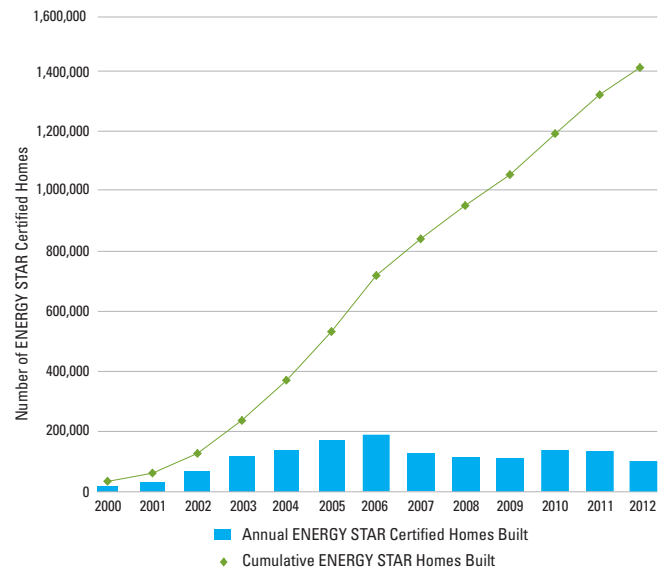
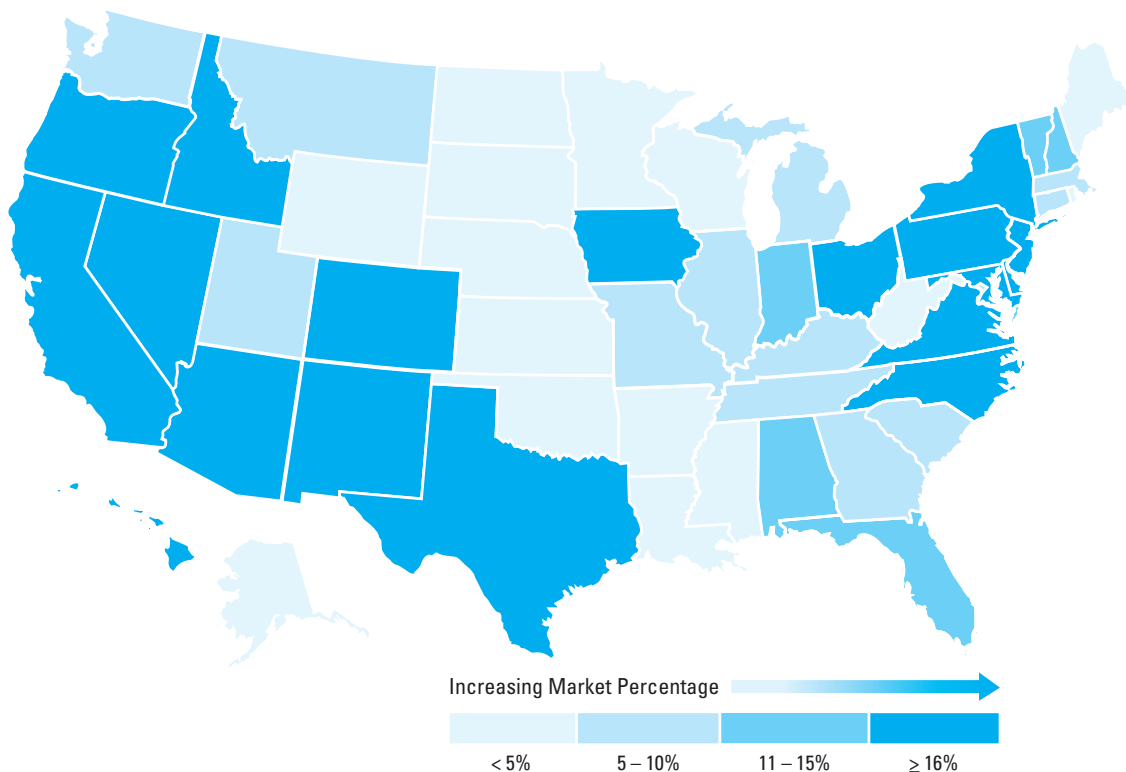


FIGURE 6. 2012 Market Share for ENERGY STAR Certified New Homes by State



⁷ For more information, see U.S. EPA 2013a.

ENERGY STAR for New Multifamily High-Rise Buildings. Through 2012, 40 buildings with more than 3,800 individual units have been certified as ENERGY STAR through the Multifamily High-Rise program.⁹ In 2012 alone, 16 buildings housing over 900 multifamily high-rise units were certified. New and substantially rehabilitated multifamily high-rise buildings that earn the ENERGY STAR certification are designed to be at least 15 percent more efficient than the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) energy use standard.

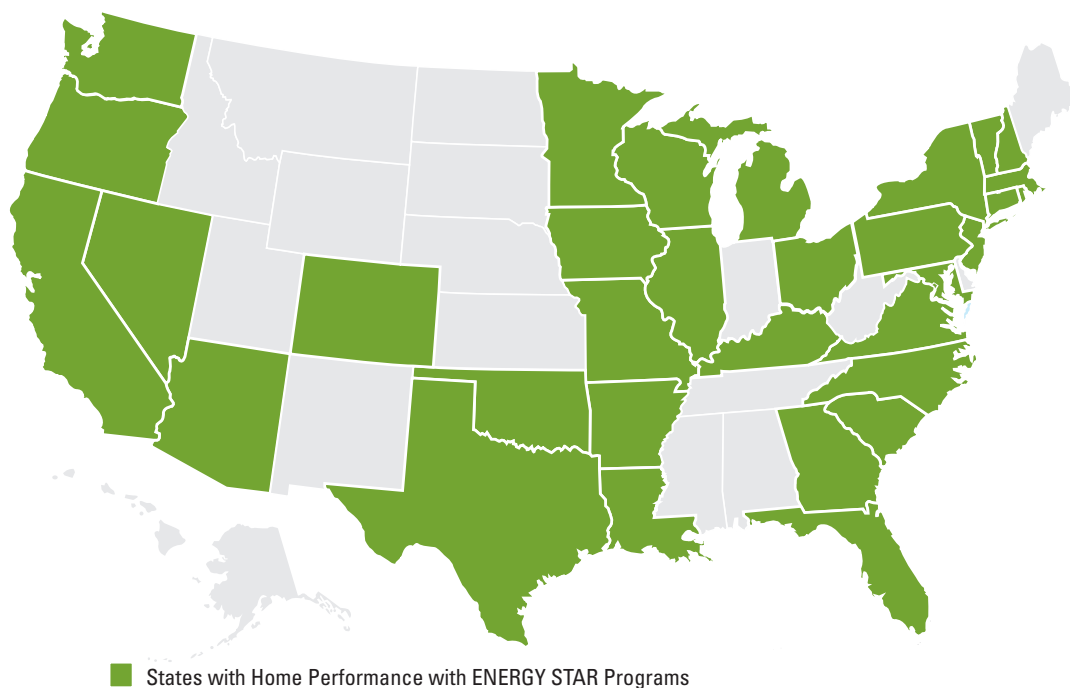
Making Affordable Housing More Energy Efficient. In 2012, EPA continued working with a variety of stakeholders to improve the energy efficiency of the nation's affordable housing stock, while reducing the utility bills of families living in those homes. Based on data from the U.S. Department of Housing and Urban Development (HUD), more than 7,500 ENERGY STAR certified homes were built in FY2012 using public funding from HUD's HOME program, a 34 percent increase over FY2011.¹⁰ In 2012, HUD and EPA completed their collaboration on developing alternate ENERGY STAR compliance guidance for housing projects undergoing gut rehabilitation,¹¹ 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 2012, more than 600 Habitat for Humanity affiliates built nearly 1,700 homes to ENERGY STAR specifications. In addition, nearly 4,000 ENERGY STAR certified manufactured homes were built nationwide, for a cumulative total of more than 50,000.

ENERGY STAR Home Improvement

Home Performance with ENERGY STAR (HPwES). Through a network of 50 sponsoring partners—such as state and local governments, utilities, and nonprofit organizations—and more than 1,900 participating contractors, HPwES offers homeowners in 34 states a comprehensive, whole-house approach to making energy efficiency improvements (see Figure 7).¹² During 2012, more than 78,000 homes were retrofitted through HPwES programs, for a cumulative total exceeding 275,000 homes. Also in 2012, nearly 100 participating contractors were recognized with the ENERGY STAR Century Club Award for improving more than 100 homes each. The HPwES program is managed by the U.S. DOE, with support from EPA.

Energy Efficiency Guidance and Tools for Consumers. Through 2012, nearly 1.2 million consumers used EPA's online Home Energy Yardstick and Home Energy Advisor to assess their homes' energy use and get recommendations to help reduce utility bills and improve comfort.¹³ EPA enhanced the Home Energy Yardstick in 2012 to incorporate "Green Button" functionality, which enables quicker and more accurate input of the consumer's utility data into the tool, making it easier to receive the home's efficiency score.

FIGURE 7. Home Performance With ENERGY STAR Spreads Across the Country in 2012



**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.*

⁹ For more information, see http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_multifamily_highrise.

¹⁰ Given in fiscal year (FY), not calendar year, due to data availability; fiscal year is from October 1 to September 30.

¹¹ For more information, see http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v3_sector_specific_policies.

¹² For more information, see http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showSplash&s=mega.

¹³ For more information, see <https://www.energystar.gov/yardstick> and <http://www.energystar.gov/homeadvisor>.

ENERGY STAR® in the Commercial Sector

Through the ENERGY STAR® program, 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 using ENERGY STAR tools and resources to help realize significant energy savings that prevent GHG emissions and contribute to meeting the ambitious goals set in the President's Climate Action Plan. The accomplishments below demonstrate the power of the ENERGY STAR partnership to bring together governments, private sector businesses, utilities, architects, and service and product providers to reduce GHG emissions.

Achievements in 2012

Benchmarking Shows Big Savings. Unveiling the largest U.S. building energy benchmarking data analysis to date, EPA examined more than 35,000 buildings that consistently used the ENERGY STAR Portfolio Manager measurement tool from 2008 to 2011. The buildings showed an average of 7 percent energy savings and 6 percent GHG emissions reductions over three years—with the buildings that were initially the lowest performers making the greatest improvements (see Figure 8). In addition to that analysis, EPA released a series of ENERGY STAR Portfolio Manager Data Trends and Fact Sheets in 2012 (see Figure 9).

ENERGY STAR Certification for Top Performance. By the end of 2012, more than 8,200 buildings became ENERGY STAR certified, for a total exceeding 20,000 facilities (see Figure 10). ENERGY STAR buildings emit 35 percent fewer GHG emissions and use 35 percent less energy than average buildings.

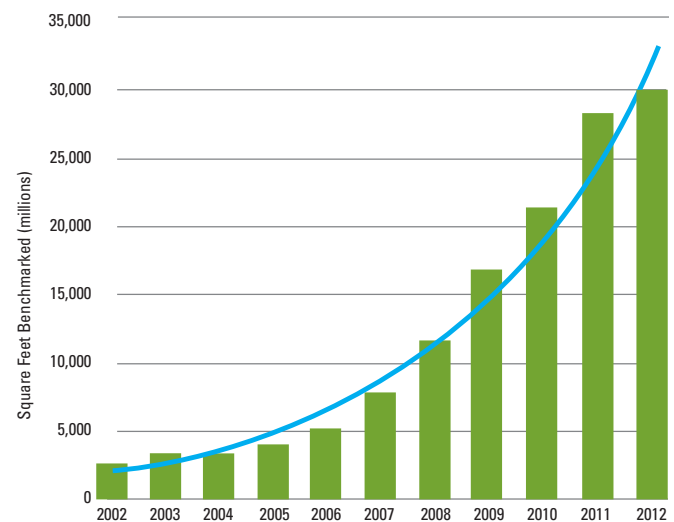
Significant Portfolio-Wide Savings. More than 270 leading companies and school districts have been recognized as ENERGY STAR Leaders for portfolio-wide energy savings, a 30-percent growth over 2011. Some organizations earned recognition for reducing energy use up to 60 percent. Energy management strategies—such as executive commitment; active involvement of staff, tenants, or students; and investment in new technologies—were integral to their success.

Biggest National Building Competition Yet. The 2012 *ENERGY STAR Battle of the Buildings* marked the largest participant field yet in the competition's 3-year history. An elementary school in Bloomfield, New Jersey, won with a 52 percent reduction in energy use intensity. More than 85 buildings in the competition demonstrated energy use reductions of 20 percent or more. In addition, nearly 400 competitors also tracked and reduced their water consumption with help from EPA's WaterSense program.¹⁴

FIGURE 8. Energy Savings from Benchmarking

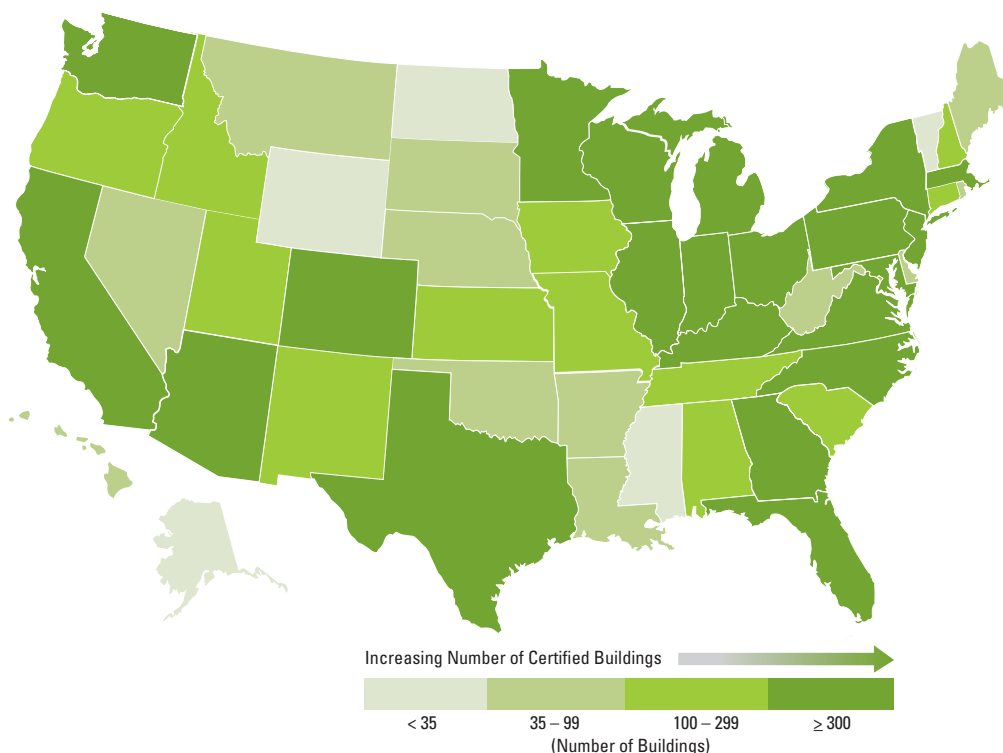


FIGURE 9. Cumulative Square Feet Benchmarked in Portfolio Manager



¹⁴Only 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.

¹⁴ For more information, see <http://www.epa.gov/watersense/>.

FIGURE 10. More Than 20,000 Buildings Have Earned the ENERGY STAR Through 2012

ENERGY STAR® in the Industrial Sector

The industrial sector is a vital 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.¹⁵ This sector also generates more than a quarter of the nation's annual GHG emissions.¹⁶ 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.

Achievements in 2012

Improving Performance—The ENERGY STAR Focus Industries

EPA works closely with specific industries to provide advanced tools that help companies manage energy use themselves and build long-term, productive energy programs (see Table 6, pg. 16). In 2012, the number of ENERGY STAR Focus Industries grew to 24 with the addition of integrated steel production.

New Measures of Plant Energy Performance. Objective measurement of plant energy performance is key to improving industrial energy management. Most companies are unable to assess a plant's energy performance relative to their industry and do not know if a plant is meeting its efficiency potential. ENERGY STAR plant energy

performance indicators (EPIs) overcome that barrier by empowering companies to evaluate good energy performance within the industry and set strong performance goals for their plants. In 2012, EPA released draft EPIs for testing to the bread and roll baking, iron casting, lithographic printing, and ready mixed concrete production industries. EPA also completed a new EPI for gauging the energy performance of integrated pulp and paper mills, and revised and reissued the wet corn mill EPI.

New Guidance for Improving Energy Efficiency in Industrial Sectors. ENERGY STAR energy guides identify ways to improve energy efficiency in a specific industry. In 2012, EPA issued energy guides for commercial bakeries and concrete production. The growing library of energy guides continued to help industrial managers identify areas for improvement.

¹⁵ For more information, see U.S. Census Bureau 2010, 2008 Annual Survey of Manufactures.

¹⁶ For more information, see U.S. EPA 2013a.

TABLE 6. EPA ENERGY STAR Industrial Focuses on Energy

FOCUS	PEER EXCHANGE NETWORK	INDUSTRIAL ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR	ENERGY STAR CERTIFICATION
Cement Manufacturing	●	Published	Released 2006 , Updated 2011	★
Concrete Manufacturing	●	Published	Draft under review	
Corn Refining	●	Published	Released 2006, Updated 2011	★
Dairy	●	Published		
• Ice Cream			Draft under review	
• Fluid Milk			Draft under review	
• Cheesemaking			Draft under review	
Food Processing	●	Published		
• Bread and Rolls			Draft under review	
• Cookies & Crackers			Released 2011	★
• Juice			Released 2009	★
• Frozen Fried Potato Products			Released 2009	★
• Tomato Products			Draft under review	
Glass Manufacturing	●	Published		
• Fiberglass			Draft under review	
• Flat Glass			Released 2009	★
• Container Glass			Released 2009	★
Metal Casting	●	In progress	Draft under review	
Motor Vehicle Manufacturing	●	Published		
• Auto Assembly			Released 2006	★
			Updated 2010	
Petrochemical Manufacturing	●	Published	Draft under review	
Petroleum Industry	●	Published	Private System Recognized by EPA	★
Pharmaceuticals	●	Published	Released 2010	★
Printing	●	In Progress	Draft under review	
Pulp & Paper	●	Published		
• Pulp Mill			Released 2012	★
• Integrated Mill			Released 2012	★
Steel	●	Published		
• Mini Mills			Draft under review	
• Integrated			Draft under review	

Assistance for Regulated Industry. EPA provided guidance through ENERGY STAR to partners and the regulated community on boiler efficiency and tune-ups to support EPA's recent Boiler Maximum Achievable Control Technology (MACT) regulations, highlighting ENERGY STAR resources and strategies for success.

Landmark Gains Achieved in Wet Corn Mill Energy Performance.

EPA re-benchmarked the energy performance of U.S. wet corn mills as part of the regular update process for EPIs. That benchmarking revealed dramatic improvements in energy efficiency across the wet corn milling industry, including a 4.3 percent improvement in energy intensity (see Figure 11). The industry reduced annual energy use by 6.7 trillion Btu, which can be equated to eliminating 470,000 metric tons (or 0.5 million metric tons) of GHG emissions.

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 Continued to Grow. EPA's *ENERGY STAR Challenge for Industry* helps manufacturers improve the energy efficiency of their sites by 10 percent within 5 years or less through the fundamental energy management practices of establishing baselines, setting reduction goals, and tracking and managing energy use over time. By the close of 2012, 704 sites took the Challenge, and 175 achieved the goal, saving over 33 trillion Btu.

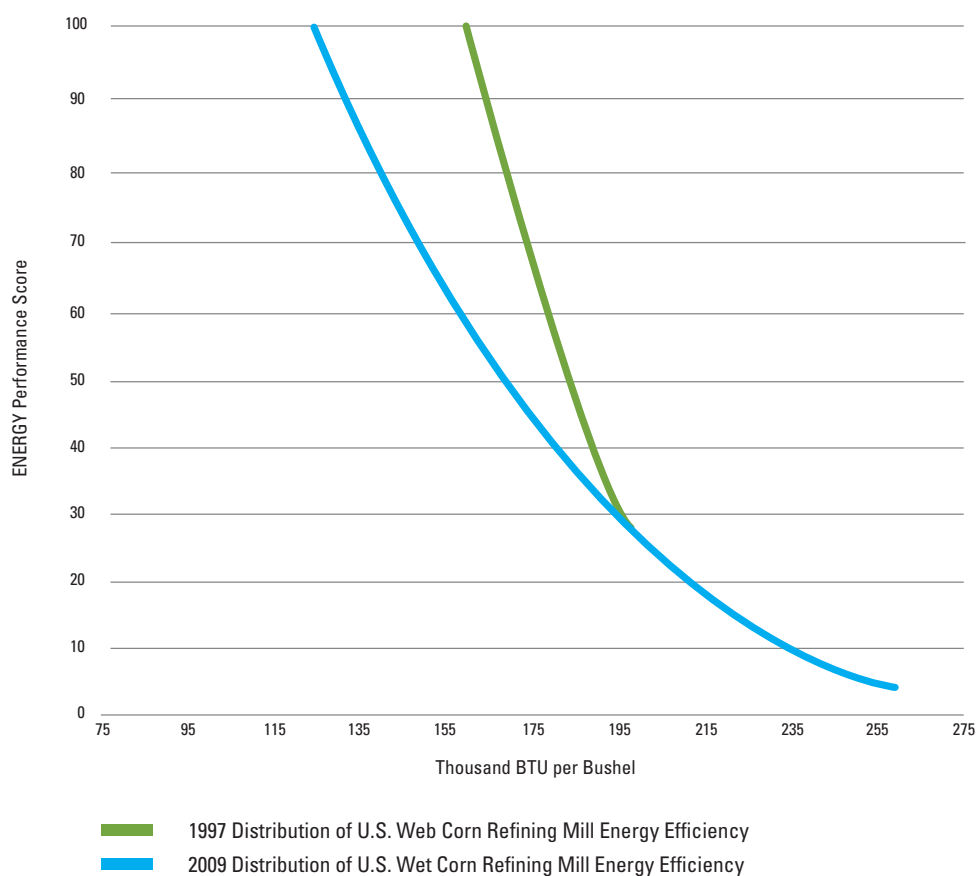
Partnerships with National Collaborations Expanded Reach.

EPA supported the development and implementation of the President's Executive Order 13624, "Accelerating Investment in Industrial Energy Efficiency" to extend ENERGY STAR resources to new portions of the industrial market.¹⁷ Further, EPA collaboration with national-level industrial groups increased industry's exposure to ENERGY STAR resources. For example, the American Baking Association and the National Ready Mixed Concrete Association launched campaigns to promote the ENERGY STAR Challenge for Industry to their members.

Continuing to Earn ENERGY STAR Certification

In 2012, 62 plants earned the ENERGY STAR certification by achieving energy performance in the top quartile nationally, bringing the cumulative number of certified plants to 122. The cement and auto assembly sectors earned the greatest number of certifications among the industrial sectors.

FIGURE 11. Improvement in U.S. Wet Corn Mill Energy Performance, 1997-2009



¹⁷ For more information, see <http://www.gpo.gov/fdsys/pkg/FR-2012-09-05/pdf/2012-22030.pdf>

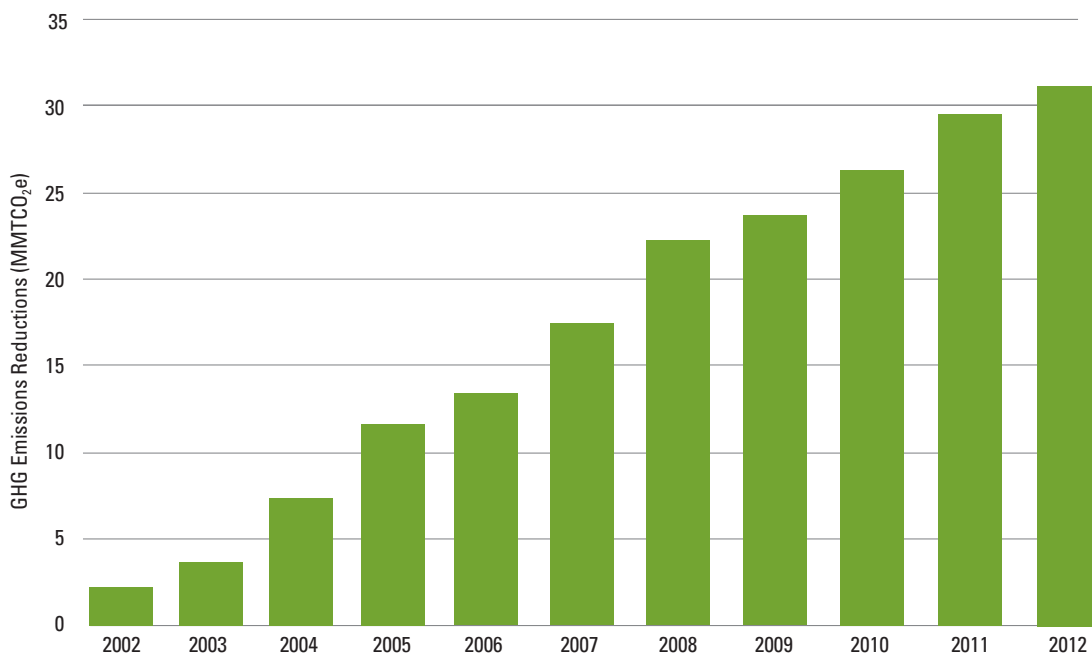
CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS

EPA launched the Green Power Partnership (GPP) and Combined Heat and Power (CHP) Partnership 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 and to the broader clean energy community through program websites and public webinars.

In turn, partner investments in clean energy yield significant environmental benefits by reducing GHG emissions and a variety of 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 2012 alone, EPA's energy supply programs reduced GHG emissions by 31.6 MMTCO₂e (see Figure 12).

FIGURE 12. Annual GHG Emissions Reductions by the Carbon Dioxide Reducing Energy Supply Programs



GREEN POWER PARTNERSHIP (GPP)

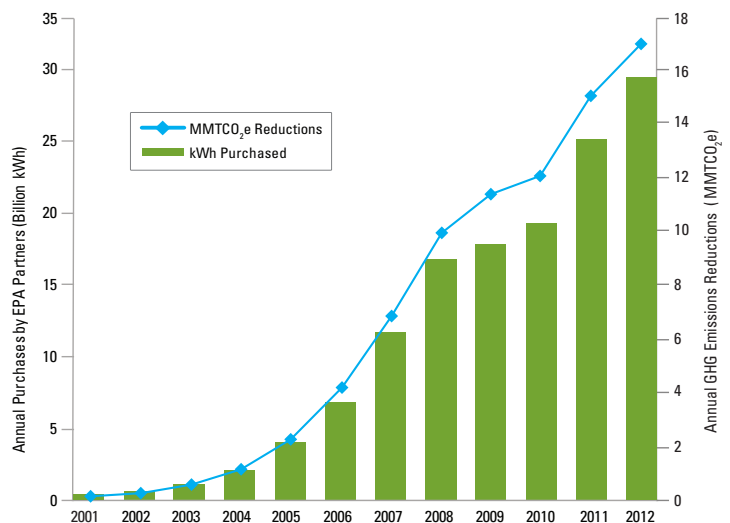


EPA's Green Power Partnership is a voluntary program that encourages organizations to buy green power to reduce the environmental impacts associated with purchased electricity use and, in so doing, demonstrate their environmental leadership.¹⁸ EPA's Green Power partners include a wide variety of forward-thinking 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 2012 an exceptional year for EPA's Green Power Partnership.

Achievements in 2012

- Added 314 new partners, bringing the total to more than 1,400. These organizations have committed to buying about 29 billion kWh of green power annually—enough electricity to run more than two million average American homes for one year (see Figure 13).
- Expanded efforts 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 22 proposals submitted on behalf of 15 project developers, EPA selected seven projects to present to partners during a networking webinar.
- Acknowledged 71 partners in EPA's *College & University 2011–2012 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 Pac-12 conference topped the list with the largest total purchase and earned recognition as the 2011–2012 Collective Conference Champion.
- Presented 24 Green Power Leadership Awards to top purchasers of green power and onsite renewable power systems, and three awards to green power suppliers (see Appendix A, pg. 39).
- Organized 10 webinars on important topics such as innovative financing and procurement strategies for renewable energy projects, the needs of colleges/universities and hotels, and community-level approaches.

FIGURE 13. Green Power Purchased and GHG Emissions Reductions



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, and 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 2012, 39 communities mobilized to reduce their carbon footprints by buying and using green power. Their purchases helped avoid annual CO₂ emissions equivalent to those from the electricity used in more than 600,000 average American homes.

The participating communities added close to one billion kWh of green power to the overall GPC total during the 2011–2012 *Green Power Community Challenge*. Washington, DC, won the Challenge title by using the most green power annually (more than one billion kWh), while Oak Park, Illinois, had the highest green power percentage of total electricity use (close to 92 percent).

¹⁸ For additional information on GPP, see <http://www.epa.gov/greenpower/>.

COMBINED HEAT AND POWER PARTNERSHIP (CHP)



EPA's CHP Partnership encourages the use of CHP, which is cleaner than separately produced electricity and thermal energy, such as steam and hot water. CHP projects are up to 80 percent more efficient than traditional separate heat and power generation, and they can also reduce reliance on grid-supplied electricity, increase the reliability of the U.S. electricity supply, and lessen the need to build new transmission and distribution capacity.¹⁹

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 54 percent of the new CHP capacity additions.

Achievements in 2012

- Assisted in the deployment of more than 156 MW of new CHP nationwide (out of 869 MW of total new nationwide capacity), bringing the cumulative impact of the program to over 5,700 MW of new CHP (see Table 7).
- Welcomed 59 new partners, bringing the total to more than 450.
- Responded to 76 technical assistance requests from organizations across the country such as K-12 school districts, hospitals, manufacturers, federal agencies, and CHP project developers.
- Assisted energy managers considering CHP by introducing a calculator to evaluate the potential economic feasibility of a prospective CHP system, based on user-supplied data (or facility-specific default values when user-supplied data are not available).
- Issued a paper presenting a recommended methodology for calculating fuel and CO₂ emissions savings from CHP compared to separate heat and power (i.e., obtaining electricity from the grid and producing thermal energy using an onsite boiler or other source). The paper is intended for policymakers, project developers, energy managers, and others who need to quantify the fuel and CO₂ emissions savings of CHP projects.
- Added new features to the CHP Emissions Calculator including calculation of CO₂e, CH₄, and N₂O emissions; and fuel-specific CO₂, CH₄, and N₂O factors used in the Greenhouse Gas Reporting Program.²⁰
- Published a fact sheet on waste heat to power systems.²¹
- Supported the development and implementation of the President's Executive Order 13624 on "Accelerating Investment in Industrial Energy Efficiency" issued in August 2012.²²
- Honored two highly efficient CHP projects with ENERGY STAR CHP Awards: a 7.5 MW system at the Marine Corps Air Ground Combat Center Twentynine Palms, California, and a 5 MW system at the Fort Bragg U.S. Army Garrison, North Carolina (see Appendix A, pg. 39).

TABLE 7. 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	3,717	1,963 (53%)
2005	1,715	821 (48%)
2006	521	140 (27%)
2007	628	342 (54%)
2008	428	190 (44%)
2009	721	373 (52%)
2010	686	268 (39%)
2011	618	312 (50%)
2012	869	156 (18%)
TOTAL	19,436	5,701 (29%)

¹⁹ For additional information on CHP, see www.epa.gov/chp/basic/efficiency.html.

²⁰ For additional information, see <http://www.epa.gov/chp/basic/calculator.html>.

²¹ For additional information, see http://www.epa.gov/chp/documents/waste_heat_power.pdf.

²² For additional information, see <http://www.gpo.gov/fdsys/pkg/FR-2012-09-05/pdf/2012-22030.pdf>.

METHANE EMISSIONS REDUCTION 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 CO₂ by annual emissions, and currently contributes one third of all anthropogenic (man-made) GHG emissions to climate change.²³ 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.²⁴ And unlike other GHGs, methane is an important energy resource that allows for cost-effective mitigation. 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. Together, these programs reduced U.S. emissions by 63.2 MMTCO₂e in 2012 (see Table 1, pg. 3).

NATURAL GAS STAR PROGRAM



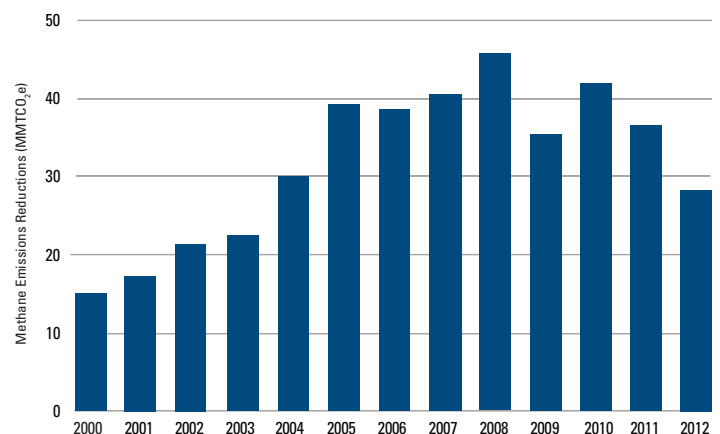
Natural Gas STAR is a flexible, collaborative partnership between EPA and oil and natural gas companies, designed to spur the adoption of cost-effective technologies and practices that reduce methane emissions. By working with both domestic and international companies involved in oil production and all sectors of the natural gas supply chain, Natural Gas STAR helps lower 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 fora—to assist companies in implementing a wide range of cost-effective best management practices and technologies to reduce emissions.²⁵

Achievements in 2012

- Reduced U.S. methane emissions by 26.8 MMTCO₂e through efforts undertaken and reported by domestic partners for 2012 (see Figure 14), achieving cumulative program reductions of 469.4 MMTCO₂e since 1990.
- Welcomed 3 new partners bringing the total to 121 domestic and international partners.
- Hosted domestic technology transfer workshops to promote technologies and practices that reduce methane emissions from natural gas production and distribution.

FIGURE 14. Natural Gas STAR Annual Methane Emissions Reductions



²³ For more information, see U.S. EPA 2013a.

²⁴ For more information, see IPCC 1996.

²⁵ For additional information on Natural Gas STAR and 2012 accomplishments, see <http://www.epa.gov/gasstar/accomplishments/index.html>



AgSTAR PROGRAM

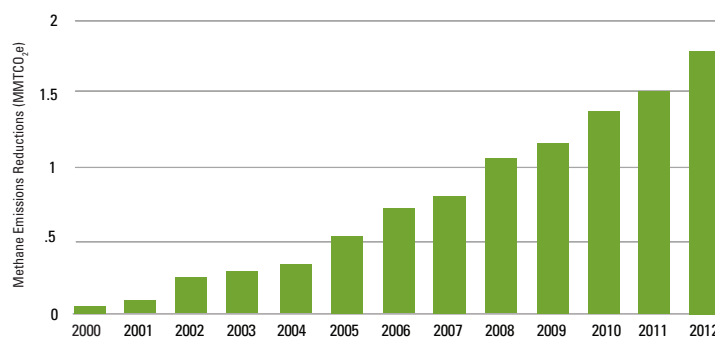
Biogas recovery systems help reduce GHG emissions by enabling the recovery and use of methane from animal manure and other organic wastes. A biogas recovery system is typically anchored by a manure digester that captures and combusts biogas to produce electricity, heat, or hot water. In addition to avoiding 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.²⁶

Achievements in 2012

- Reduced direct methane emissions from approximately 200 livestock farms by 1.4 MMTCO₂e and avoided approximately 0.4 MMTCO₂e in fossil fuel emissions, producing total emission reductions of 1.8 MMTCO₂e in 2012 (see Figure 15). Cumulatively, anaerobic digesters on livestock farms have reduced emissions by 9.7 MMTCO₂e in the past decade.
- Organized several education and outreach events, including a virtual renewable energy field day and a national conference.
- Developed new technical resources for farmers, industry members, and other stakeholders.

FIGURE 15. AgSTAR Annual Methane Emissions Reductions



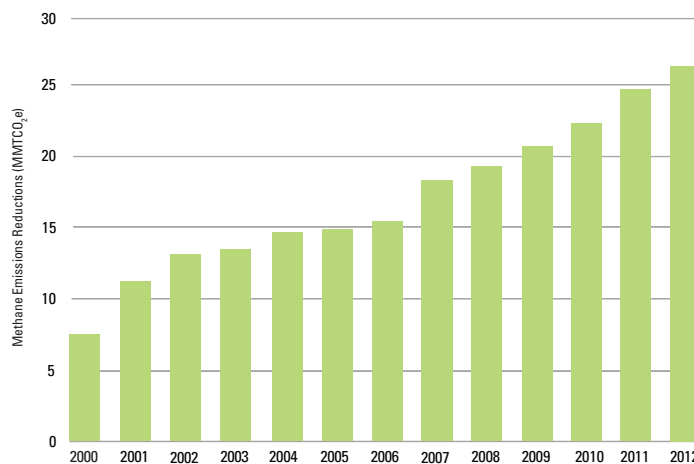
LANDFILL METHANE OUTREACH PROGRAM (LMOP)

Landfill gas (LFG) energy projects prevent direct methane emissions from landfills and reduce indirect CO₂ emissions by displacing energy generated from the burning of fossil fuels with LFG, an alternative energy source. 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.²⁷ Annually, EPA recognizes outstanding partners for their work on LFG energy projects. See the full list of 2012 winners in Appendix A, page 40.

Achievements in 2012

- Reduced methane emissions from hundreds of U.S. landfills and avoided CO₂ emissions totaling approximately 26.3 MMTCO₂e in 2012 (see Figure 16). Over the past 18 years, LMOP has assisted 580 LFG energy projects and the country reached 619 currently operational projects in 2012. The 580 LMOP-assisted projects have collectively reduced and avoided over 215 MMTCO₂e since the program began.
- Welcomed 54 new partners and endorsers, bringing the total to more than 1,050 LMOP partners and endorsers.
- Assisted partners in implementing a variety of projects that use LFG for energy projects across the United States including Anchorage, Alaska; La Crosse County, Wisconsin; St. Landry Parish, Louisiana; and Hickory Ridge Landfill, Georgia.
- Conducted outreach including supporting ribbon cuttings and participating in and hosting conferences, workshops, and webinars to promote methane mitigation activities.

FIGURE 16. LMOP Annual Methane Emissions Reductions



²⁶ For additional information on AgSTAR and 2012 accomplishments, see <http://www.epa.gov/agstar/about-us/accomplish.html>.

²⁷ For additional information on LMOP and 2012 accomplishments, see <http://www.epa.gov/lmop/>.

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 such as Argentina, China, Colombia, India, Indonesia, Mexico, Russia, Ukraine, and Vietnam. The United States has been a leader in the GMI from the beginning.²⁸



Achievements in 2012

- The U.S. provided technical, financial, or capacity-building support to more than 600 global methane projects that reduced methane emissions by approximately 23 MMTCO₂e in 2012. The U.S. worked with all 42 GMI partner countries with successes ranging from innovative agriculture anaerobic digestion projects in China and coal mine methane inventories in Mongolia, to an international best practices guide for LFG energy projects and undertaking field emission measurement studies in the oil and gas sector in Colombia.
- During the year, U.S. agencies held more than 20 workshops and technical demonstrations in more than a dozen partner countries and undertook numerous site visits, measurement studies, study tours, and technology demonstrations.
- 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. CCAC will provide an additional venue for the United States to share its methane reduction expertise and capacity building experience garnered through GMI. EPA has been supporting additional efforts to reduce methane from the municipal solid waste and oil and gas sectors via CCAC.

COALBED METHANE OUTREACH PROGRAM (CMOP)



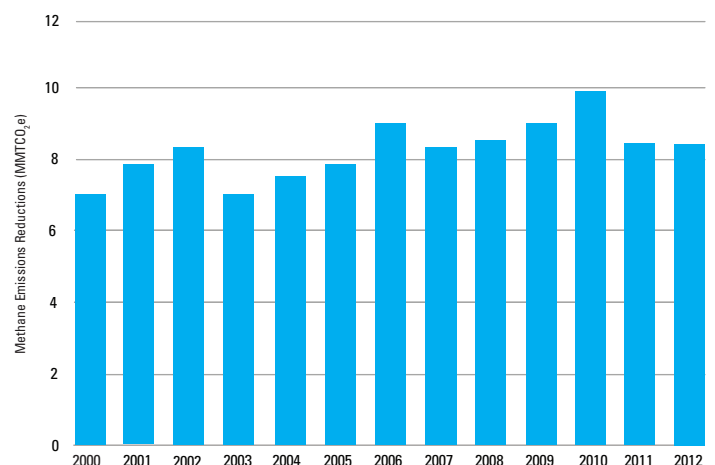
The Coalbed Methane Outreach Program (CMOP) strives to reduce methane emissions from coal mining activities. Coal mine methane (CMM) is a potent GHG and can be an explosive hazard inside mines. But if CMM is recovered safely and used for energy, it is a valuable, clean-burning fuel source. CMOP collaborates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

The program primarily focuses on mitigating U.S. 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, mine-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 pre-feasibility assessments and market evaluations, and analyzing financial incentives and regulatory hurdles.²⁹

Achievements in 2012

- There are 26 operating coal mine methane projects in the U.S.: 14 using drained gas from active underground mines, 2 mitigating dilute ventilation air methane (VAM) at active underground mines, and 10 using abandoned mine methane gas.
- CMOP reduced CMM emissions by 8.4 MMTCO₂e in 2012 (see Figure 17),³⁰ and since the program began in 1994, cumulative reductions are 140.2 MMTCO₂e.
- Developed new technical reports and outreach materials for coal companies, project developers, and industry stakeholders.
- Continued to proactively engage U.S. coal mines and industry representatives to stimulate further domestic CMM project development.

FIGURE 17. CMOP Annual Methane Emissions Reductions



²⁸ For additional information on GMI and 2012 accomplishments, see <http://www.epa.gov/globalmethane/accompreport.htm>.

²⁹ For additional information on CMOP and 2012 accomplishments, see <http://www.epa.gov/cmop/>.

³⁰ Emission reductions are draft, pending the final 2012 CMM Inventory Numbers.

FLUORINATED GREENHOUSE GAS EMISSIONS REDUCTION PROGRAMS

EPA's 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 (NF₃), and sulfur hexafluoride (SF₆)—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 chemicals and best environmental practices. Although FGHGs account for a small portion of total U.S. GHG emissions, they have very high global warming potentials (GWPs); emissions on a per-facility basis tend to be high. FGHGs trap substantially more heat in the atmosphere than does CO₂ on a per-mass basis, and some can have much longer atmospheric lifetimes than CO₂.³¹

The combined efforts of the FGHG partnerships have helped partners maintain their emissions substantially below baseline levels—an impressive achievement given the sizable growth in many of these industries. In 2012, FGHG emissions reductions across the partnership programs totaled 16.1 MMTCO₂e as EPA continues to support partners in their efforts to improve industrial processes and share best practices.³²

³¹ For more information, see IPCC 1996.



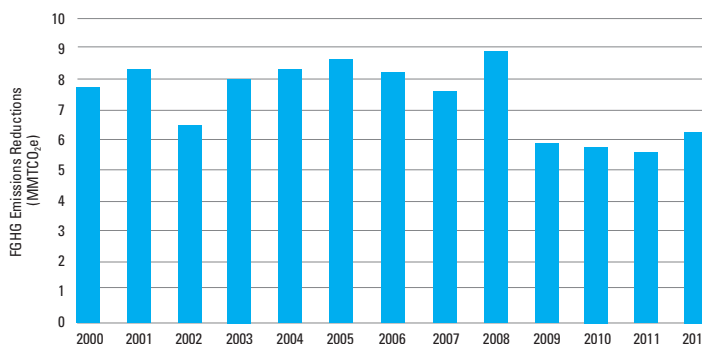
THE VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)

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 (CF₄) and perfluoroethane (C₂F₆) are inadvertent byproducts of the smelting process, and are between 6,500 and 9,200 times more potent warming agents than CO₂.³³ 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.³⁴

Achievements in 2012

- Reduced PFC emissions on a per ton basis by more than 74 percent and absolute emissions by 6.2 MMTCO₂e compared to the industry’s 1990 baseline (see Figure 18).
- Updated several analytical tools including those used for smelter training and measurements using data collected through the Greenhouse Gas Reporting Program.
- Completed technology-based benchmarking analysis to support partner efforts to further reduce PFC emissions.
- Worked with the International Aluminium Institute (IAI) to update the EPA/IAI Guidelines for PFC Measurement.

FIGURE 18. VAIP Annual Emissions Reductions



SF₆ EMISSIONS REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS (EPS)

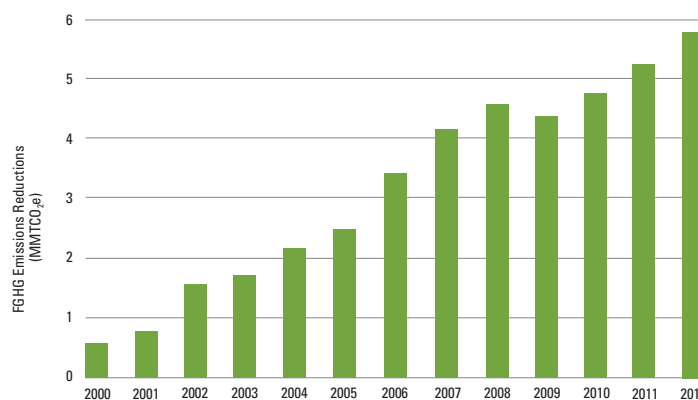


SF₆ is the most potent and persistent GHG—it traps 23,900 times more infrared radiation than the equivalent amount of CO₂.³⁵ Used primarily by electric utilities, SF₆ is a gaseous dielectric for high-voltage circuit breakers and gas-insulated substations. Utilities nationwide have the opportunity to make a big difference in the nation’s emissions of SF₆. EPA partners with 83 electric power companies through the voluntary SF₆ Emissions 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 SF₆ gas purchases. Partners represent 48 percent of the total U.S. transmission system.³⁶

Achievements in 2012

- Reduced emissions by 5.6 MMTCO₂e, bringing average SF₆ emissions rates down to 2.2 percent of the total equipment nameplate capacity (see Figure 19).
- Launched a stakeholder group—including partner companies, equipment manufacturers, and gas distributors—to explore issues related to Nameplate Capacity data quality.
- Completed webinars on SF₆ emissions inventory methods and emissions reporting requirements.
- Welcomed a new partner to the program and continued to work with partners to update their SF₆ reduction goals.

FIGURE 19. EPS Annual Emissions Reductions



³³ For more information, see IPCC 1996.

³⁴ For additional information about VAIP and 2012 accomplishments, see <http://www.epa.gov/highgwp/aluminum-pfc/index.html>.

³⁵ For more information, see IPCC 1996.

³⁶ For additional information about the SF₆ Emission Reduction Partnership for Electric Power Systems and 2012 accomplishments, see <http://www.epa.gov/highgwp/electricpower-sf6/index.html>.



RESPONSIBLE APPLIANCE DISPOSAL PROGRAM (RAD)

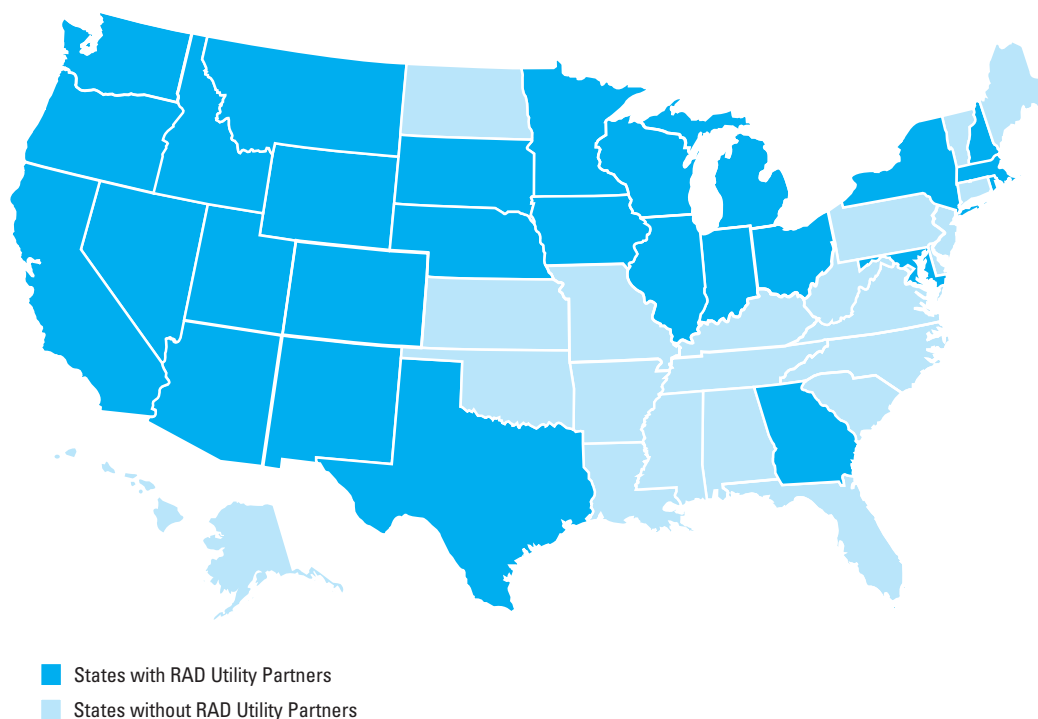
EPA launched the Responsible Appliance Disposal Program (RAD) in October 2006 to help protect the ozone layer and reduce GHG emissions. Partners go beyond Clean Air Act Section 608 regulatory requirements³⁷ by ensuring that old refrigerators, freezers, window air conditioners, and dehumidifiers are recycled using the best environmental practices available. Partners recover not only refrigerant, as required by law, but also ozone-depleting and high-GWP chemicals from the insulating foam. Foam is recovered and destroyed, or the blowing agent is recovered and reclaimed. Further, while regulations only require the final disposer (i.e., a landfill or scrap recycler) to ensure that refrigerant has been recovered at an appliance's end of life, RAD partner utilities, retailers, and manufacturers are committed to responsible recycling as part of their energy efficiency and corporate sustainability programs. 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 (see Figure 20).

EPA calculates stratospheric ozone benefits, climate benefits, and energy savings achieved by RAD partners. HFC refrigerant and foams in disposed of appliances are about 1,000 times more potent global warmers than CO₂.³⁸ 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 2012

- Avoided emissions of 0.2 MMTCO₂e and more than 756,000 pounds of ozone-depleting substances through the proper disposal of approximately 890,000 refrigerant-containing appliances.
- Celebrated the recycling of founding partner Southern California Edison's one millionth refrigerator.
- Welcomed new utility partners, bringing the total to 44 utility partners servicing 27 states (see Figure 20). On average, refrigerators collected by RAD utility partners were more than 20 years old. Disposing of a 20-year old refrigerator could save a household roughly 1,040 kWh/year or about \$125/year in utility bills.

FIGURE 20. Utility Partners Across the United States Are Participating with RAD



³⁷ For additional information, see <http://www.epa.gov/oar/caa/title6.html> or http://www.epa.gov/ozone/title6/downloads/Section_608_FactSheet2010.pdf.

³⁸ For more information, see IPCC 1996.

³⁹ For additional information on RAD and 2012 accomplishments, see <http://www.epa.gov/rad>.



GREENCHILL PARTNERSHIP

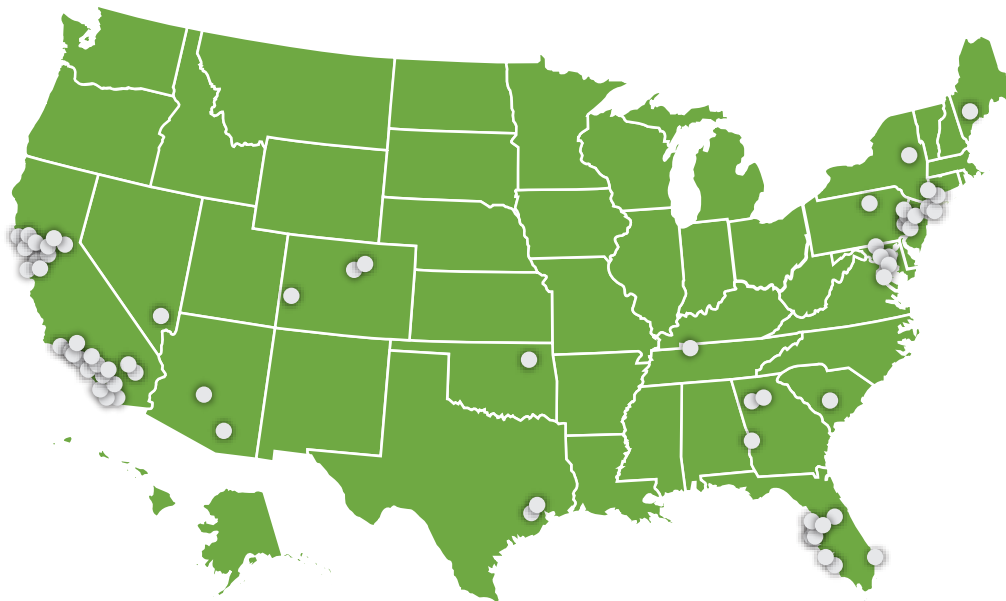
EPA’s GreenChill Partnership works with the supermarket industry to reduce refrigerant emissions that harm the ozone layer and contribute to climate change. The refrigerants used in supermarkets are generally 1,500 to 3,300 times more potent global warmers than CO₂.⁴⁰ Supermarkets leak about 35 million pounds of these refrigerants annually. Partners go beyond regulatory requirements by tracking the use and emissions of all their refrigerants, not just the ozone-depleting substances required to be monitored by Clean Air Act Section 608.⁴¹ GreenChill helps supermarkets transition to environmentally friendlier refrigerants, significantly reduce the amount of refrigerant used, appreciably lower refrigerant leak rates, and adopt green refrigeration technologies and best environmental practices.⁴²

GreenChill’s Corporate Emissions Reduction Program currently has 8,034 partner stores—representing just over 21 percent of the supermarket industry. In 2012, GreenChill supermarket partners set corporate goals and reduced the amount of refrigerant in their commercial systems by about 33 percent compared to the industry average. The Store Certification Program encourages emissions reductions by setting standards for individual store’s 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 2012

- GreenChill partners had an average annual leak rate (11.7 percent) that was at least 50 percent lower than the national average annual leak rate (25 percent).
- An average GreenChill store’s climate impact due to refrigerant leaks (344 MTCO₂e) was 67 percent lower than the national average store’s (1,053 MTCO₂e).
- Seventy-five GreenChill stores were certified in 2012 for advanced refrigeration technology that prevents refrigerant leaks (see Figure 21)—3 platinum, 34 gold, and 38 silver. Stores with a platinum, gold, or silver certification prevented at least 95 percent, 75 percent, or 65 percent, respectively, of the refrigerant leaks from a typical store.
- GreenChill’s Advanced Refrigeration program recognized the first CO₂ transcritical refrigeration system established in a U.S. supermarket. This supermarket was one of the three stores to receive platinum certification in 2012.

FIGURE 21. GreenChill Certified Stores in 2012



⁴⁰ For more information, see IPCC 1996.

⁴¹ For additional information, see <http://www.epa.gov/oar/caa/title6.html> or http://www.epa.gov/ozone/title6/downloads/Section_608_FactSheet2010.pdf.

⁴² For additional information about GreenChill and 2012 accomplishments, see <http://www.epa.gov/greenchill>.

CROSS-CUTTING EMISSIONS REDUCTION PROGRAMS

EPA supports several additional partnership programs that cut across multiple policy areas to contribute to sustained emissions reductions. Many organizations have already established sustainability or climate objectives to identify and achieve cost-effective GHG reduction strategies. In 2012, EPA launched the Center for Corporate Climate Leadership to serve as a resource for those organizations interested in reducing their environmental impacts associated with climate change. The Center also strives to help more advanced organizations continue to improve their GHG reduction strategies and serve as influencers to drive change in their supply chains and beyond.

State and local governments have a unique opportunity to advance clean energy and reduce emissions through their own policies, and set an example for other communities across the country. EPA established the State and Local Climate and Energy Program to assist state and local governments in their efforts to meet sustainability and economic development goals.

Through these cross-cutting programs, EPA provides partners with technical assistance, analytical tools, and peer exchange opportunities to help them develop and implement cost-effective solutions to reduce GHG emissions.

CENTER FOR CORPORATE CLIMATE LEADERSHIP



Launched in 2012, the Center for Corporate Climate Leadership (The Center) serves as a resource for organizations of all sizes in measuring and managing their GHG emissions. The Center provides technical tools, ground-tested guidance, educational resources, opportunities for information sharing, and a platform for peer exchange. The Center also promotes practices and innovative approaches, drawing upon the successes of Climate Leadership Award recipients and former Climate Leaders partners.⁴³

Achievements in 2012

- Organized and sponsored the first-ever Climate Leadership Awards (CLA), a national awards program that recognizes and incentivizes exemplary corporate, organizational, and individual leadership in response to climate change. The 2012 awards honored one individual and 20 organizations from across the United States that are leading the way in managing and reducing GHG emissions—both in their internal operations and throughout the supply chain. The Center co-sponsored the Awards with three NGO partners: the Association of Climate Change Officers, the Center for Climate and Energy Solutions (C₂ES), and The Climate Registry (see Appendix A, pg. 41).
- Served as the lead sponsor of the first Climate Leadership Conference—an exchange for addressing global climate change through innovation and business solutions. The inaugural conference brought together more than 200 forward-thinking leaders from business, government, academia, and the nonprofit community who shared best practices for integrating GHG reductions, as well as climate risk and resilience strategies, into their organizations' operations. The leadership awards were presented during the conference.
- Hosted webinars on the Climate Leadership Awards process and on EPA's Corporate GHG Goal Evaluation Model.
- Posted Climate Leaders program technical resources on the Center's website, including methodological guidance on developing a company-wide GHG inventory; tools to help calculate a company's carbon footprint, identify GHG reduction sources, and track progress; and a GHG benchmarking tool to help organizations evaluate and establish existing or new GHG goals that go beyond business as usual.

⁴³ For additional information on The Center, see <http://www.epa.gov/climateleadership/>.



STATE AND LOCAL CLIMATE AND ENERGY PROGRAM

EPA helps state and local governments use renewable energy, energy efficiency, and other policies to reduce carbon pollution and other pollutant emissions and achieve the associated environmental, energy system, and economic benefits. EPA provides technical assistance, analytical tools, and peer exchange opportunities for state and local officials.

As part of its support for state and local governments, EPA also works with DOE to co-facilitate the State and Local Energy Efficiency Action Network (SEE Action).⁴⁴ 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.

Achievements in 2012

STATE CLIMATE AND ENERGY PROGRAM

- Developed state-by-state projections of the energy impacts (in MWh) from energy efficiency and renewable energy (EE/RE) policies. The analysis will be useful to jurisdictions interested in including EE/RE as an emissions reduction strategy in meeting Clean Air Act or other objectives.
- Hosted state climate and energy webcasts on *Quantifying Emissions Reductions from Clean Energy Policies and Programs; Using EPA's GHG Reporting Rule Data for State and Local Governments*; and, *Estimating the Health Impacts of Climate Change and Clean Energy Programs*.⁴⁵

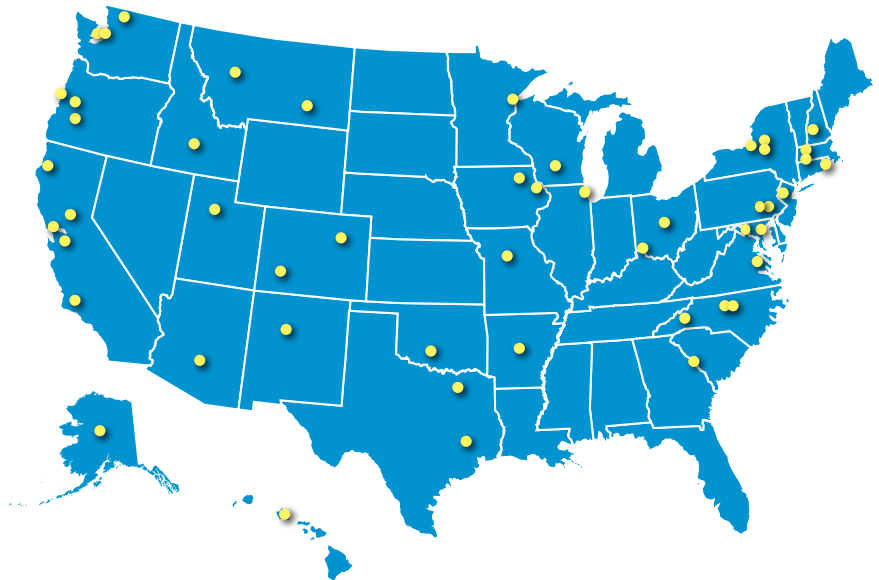
LOCAL CLIMATE AND ENERGY PROGRAM

- Issued two new *Local Climate and Energy Strategy Guides*, titled *Landfill Gas Energy* and *Energy Efficiency in Resource Conservation and Recovery*. These are the latest installments in a series that provides comprehensive, straightforward overviews of GHG emissions reduction strategies for local governments.⁴⁶
- Hosted a three-part webcast series on *Financing Local Clean Energy Programs*. The series covered how to design and implement funding programs, how to locate available sources of funding, and how to leverage existing funds and make clean energy investments more affordable.⁴⁷

Climate Showcase Communities

EPA held a workshop for the 50 Climate Showcase Communities that are piloting local and tribal government climate change initiatives (see Figure 22). 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.⁴⁸

FIGURE 22. EPA Supports 50 Climate Showcase Communities



⁴⁴ For additional information, see <http://www1.eere.energy.gov/seeaction/>.

⁴⁵ State Climate and Energy Webcasts are available at <http://epa.gov/statelocalclimate/web-podcasts/forum.html>.

⁴⁶ For additional information on the Local Climate and Energy Strategy Guides, see <http://epa.gov/statelocalclimate/resources/strategy-guides.html>.

⁴⁷ For additional information, see <http://epa.gov/statelocalclimate/web-podcasts/local-webcasts.html>.

⁴⁸ For additional information, see <http://www.epa.gov/statelocalclimate/local/showcase/index.html>.

MEASURING RESULTS: REPORT METHODOLOGY

Measuring Results of the Climate Protection Partnership Programs

EPA's climate protection partnerships are important components 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. To present the most realistic estimates of program benefits, EPA employs a common analytical framework across all of the individual program approaches. However, the specific approach will vary by program strategy, sector, availability of data, and market characteristics.

- 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 federal programs, the efforts of third-party actors, and other program-specific market effects.
- Where uncertainty exists, EPA uses the best available information and practices that yield conservative benefit estimates.
- Annual benefits reflect investments that occurred during the year, as well as those benefits that persist during that year from investments made in previous years.
- Cumulative benefits are the sum total of annual benefits through 2012. Cumulative benefits do not include the benefits expected in future years, such as benefits that will persist over the lifetime of an investment or expectations of future investments. Cumulative reductions from EPA programs include only active programs in 2012.
- Greenhouse gas (GHG) emissions reductions are estimated for the operational phase of affected measures and global warming potentials are based on the Intergovernmental Panel on Climate Change's *Second Assessment Report*.⁴⁹
- Societal benefits are calculated based on the social cost of carbon which monetizes the damages associated with an incremental increase in carbon emissions in a given year.⁵⁰

The 2012 annual and cumulative environmental and financial benefits are summarized in Table 1 on page 3. The historical and projected environmental benefits of these programs are summarized on Table 8 on page 31. The information presented in this report is similar to much of the information used in EPA's Justification of Appropriations Estimates reviewed by the U.S. Office of Management and Budget (OMB).

⁴⁹ For more information, see IPCC 1996.

⁵⁰ Damages associated with an incremental increase in carbon emissions in a given year may include, but are not limited to, changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services. \$10.5 billion and \$2.9 billion of the societal benefits are from CO₂ and non-CO₂ emissions, respectively. The non-CO₂ emissions were converted to CO₂-equivalents assuming global warming potentials from the IPCC Second Assessment Report before applying the social cost of CO₂. For more information see Interagency Working Group on Social Cost of Carbon, United States Government. 2013.

TABLE 8. Overview of OAP Climate Protection Partnership Programs with Annual GHG Reductions and Program Goals

PROGRAM	GREENHOUSE GASES ADDRESSED	KEY SECTORS	MARKET PENETRATION INDICATORS AS OF 2012	START YEAR	ANNUAL EMISSIONS REDUCTIONS (MMTCO ₂ e)						
					2008	2009	2010	2011	2012	2015 GOAL	2020 GOAL
ENERGY STAR PROGRAMS											
Certified Products	CO ₂	Residential, Commercial	More than 65 product categories	1992	62.5	71.9	81.4	107.4	129.2	113.6	141.2
Residential	CO ₂	Residential	16% of new home market	1995	1.9	2.1	2.4	2.7	2.9	3.2	3.8
Commercial	CO ₂	Commercial	More than 20,000 labeled buildings across 16 building types	1995	67.9	69.2	81.2	86.6	89.8	75.0	93.5
Industrial	CO ₂	Industrial	122 labeled plants across 12 industrial sectors and subsectors	1995	24.2	26.4	33.2	32.2	32.7	25.6	36.6
CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS¹											
Green Power Partnership	CO ₂	State & Local Government, Commercial, Industrial	Over 1,400 partners	2001	22.4	23.8	26.4	29.6	31.6	44.0	73.3
Combined Heat & Power Partnership	CO ₂	Commercial, Industrial	Over 450 partners, 18% of new CHP capacity creditable to CHPP	2001							
METHANE PROGRAMS											
Natural Gas STAR	CH ₄	Natural Gas	121 US and International partners	1993	46.6	35.3	40.4	35.3	26.8	20.6	22.1
AgSTAR ²	CH ₄	Agriculture	200 anaerobic digester systems	1994	1.1	1.1	1.4	1.5	1.8	0.9	0.9
Landfill Methane Outreach Program (LMOP) ²	CH ₄	Waste Management	~1,050 partners and endorsers	1994	19.0	20.5	22.4	24.6	26.3	14.3	15.7
Coalbed Methane Outreach Program (CMOP)	CH ₄	Coal Mining	Over 80% of gas from underground coal mine degasification systems was recovered and used.	1994	8.4	8.8	9.9	8.5	8.4	9.3	9.4
FLUORINATED GREENHOUSE GAS PROGRAMS											
Voluntary Aluminum Industrial Partnership (VAIP)	PFCs	Aluminum Smelting	98% of industry	1995	8.9	5.9	5.8	5.6	6.2	0.4	0.4
SF ₆ Emission Reduction Partnerships for Electric Power Systems (EPS)	SF ₆	Electric Power Systems	48% of US transmission system	1999	4.5	4.4	4.7	5.3	5.6	9.0	9.3
Responsible Appliance Disposal Program (RAD) ³	HFCs	Utility, Retail, Manufacturer, State & Local Government	50 partners servicing 27 states	2006	0.1	0.2	0.3	0.3	0.2	0.4	0.6
GreenChill ³	HFCs	Supermarket Industry	54 partners	2007	1.5	1.8	2.1	3.8	4.1	5.4	8.8

Note: Historic annual reductions reflect the most up-to-date data collected from EPA partners and may differ from reductions reported in previous annual reports. All program benefits reflect GHG emissions reductions attributable to EPA efforts that are above pre-existing trends, any existing regulatory requirements, or BAU scenarios. EPA also makes adjustments to avoid double counting with other federal or state policies or programs. See each individual program write-up in this section for additional details.

¹ GHG reductions and goals are for both the Green Power Partnership and Combined Heat and Power Partnership.

² Program goals include only direct GHG emissions reductions. In 2012, direct emissions reductions were 1.4 MMTCO₂e for AgSTAR and 17.1 MMTCO₂e for LMOP.

³ Does not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 0.9 - 2.9 MMTCO₂e per year.

ENERGY STAR® PROGRAMS TO REDUCE CARBON DIOXIDE EMISSIONS

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.

EPA calculates GHG emissions benefits of the ENERGY STAR program by applying CO₂ emissions factors, as applicable, to net annual electricity and fossil fuel savings attributable to the program. For electricity, a national marginal carbon emissions factor is assumed to reflect power plants which will run less due to energy efficiency. Emissions factors applied to fossil fuel savings are based on on-site fuel combustion.

The financial benefits for the ENERGY STAR program are placed in present value terms. The GDP Implicit Price Deflator Index is used to convert nominal dollars to constant current reporting year dollars.⁵¹ EPA's calculations assume sector-specific, national-average prices, including electricity and fossil fuel prices published by the Energy Information Administration (EIA).⁵² A private sector real discount rate is used as the interest rate for financing purchases of new technologies and practices since the majority of EPA partners making the investments are in the private sector.

The methods for estimating actual and projected energy savings of each of these strategies are described below.

ENERGY STAR Certified Products

- Sales of products due to the ENERGY STAR program are determined as those above and beyond BAU purchases of these products.⁵³ These sales are estimated by:
 - Collecting annual sales data on ENERGY STAR certified products from participating product manufacturers as a condition of partnership and comparing these data to industry reports on total annual product sales. EPA screens the data and investigates and resolves issues when market penetration is not as expected.
 - 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.
- 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 reviewed the 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.
 - Subtracts out the savings associated with products used in ENERGY STAR Certified New Homes to avoid double counting 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.⁵⁴
- Energy savings goals are estimated based on market projections for future product sales applied to net annual energy savings for product types in the program. EPA regularly reassesses key factors, such as energy consumption of standard non-ENERGY STAR products, changes in market sales, and new and revised ENERGY STAR product specifications.

ENERGY STAR Certified New Homes

- EPA receives data quarterly from third-party Home Energy Rating Providers certified by the Residential Energy Services Network (RESNET) 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.

⁵¹ For more details, see U.S. Department of Commerce 2013.

⁵² For more details, see EIA 2013.

⁵³ For more details on many aspects of this method, see DNV KEMA 2013.

⁵⁴ Calculated using a 7% discount rate and 2012 perspective.

- To account for the energy savings resulting from the operation of ENERGY STAR certified homes across a range of climates, sizes, and fuel types, EPA developed composite estimates by determining the energy consumption of a standard (i.e., code-minimum) home constructed in each of seven climate zones, taking into account regional construction characteristics (e.g., foundation type, typical fuel use profile) and configuring the home to the national model energy code. EPA then applied ENERGY STAR requirements to each modeled home to determine the estimated annual energy savings achieved (for both electricity and natural gas) as compared to the standard home. This approach avoids double counting of energy savings from building energy codes.
- Energy bill savings are calculated using an approach similar to that used for ENERGY STAR products where energy bill savings are reduced by the incremental cost of purchasing an ENERGY STAR certified home. National average energy prices for the residential sector and a 30-year average lifetime of a home are assumed.
- The number of ENERGY STAR certified homes to be constructed in future years is estimated by applying the annualized average growth of ENERGY STAR certified homes since 1994 to 2012 actuals.
- Energy savings goals are estimated by applying a steady growth rate to program savings based on an examination of the opportunity for emissions reductions in the commercial sector.

ENERGY STAR for Industry

- To calculate energy savings, EPA uses the data from the U.S. Department of Commerce's Annual Survey of Manufactures as the basis for developing multivariate statistical models that estimate the change in national electricity consumption, and fuel expenditures for 184 manufacturing industries in aggregate as a result of publicly-funded energy efficiency programs. The details of this methodology are published in the peer-reviewed, international scientific journal *Energy Efficiency*.⁵⁷
 - Cumulative annual ENERGY STAR for Industry program accomplishments for the current year, defined as the accomplishments from current year activities as well as from the accomplishments of program activities, are derived after making adjustments to avoid double counting of energy savings impacts from electric and natural gas utility demand side management programs, state and third-party public benefits energy efficiency programs, and DOE Advanced Manufacturing Office programs. The econometric model-based analyses of manufacturing industry energy consumption takes into consideration permanent shifts in energy consumption trends in the past decade, and temporary shock due to the recent economic downturn, as well other market determinants of purchased energy.⁵⁸
 - Energy savings goals are estimated based on an examination of the opportunity for emissions reductions in the industrial sector.
- ## ENERGY STAR Commercial Buildings
- To calculate energy savings, EPA uses the data from the U.S. Energy Information Administration's State Energy Data System as the basis for developing multivariate statistical models that estimate the change in national electricity and natural gas consumption for the 48 contiguous states in aggregate as a result of publicly-funded energy efficiency programs. The general details of this methodology, which uses the historical variation in levels of energy efficiency program activity in the 48 states to simulate current year energy consumption in the absence of all public programs, are published in the peer-reviewed, international scientific journal *The Energy Journal*.⁵⁵
 - Cumulative annual energy savings for the current year, defined as the accomplishments from current year activities as well as from the accomplishments of program activities, are derived after controlling for the uptake in ENERGY STAR products in commercial buildings. In addition, ENERGY STAR for Commercial Buildings program accomplishments take into account the reported energy savings impacts from electric and natural gas utility demand side management programs, state and third-party public benefits energy efficiency programs, state building codes and appliance standards programs, and DOE Building Technologies Office programs. The spillover and market transformation effects captured in this methodology reflect the primary actions of the program.⁵⁶

⁵⁵ For more details on this method, see Horowitz 2007.

⁵⁶ For more details on this method, see Horowitz 2013b.

⁵⁷ For more details on this method, see Horowitz 2013a.

⁵⁸ For more details on many aspects of this method, see Horowitz 2001, 2007, and 2013c.

CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS

The OAP Carbon Dioxide Reducing Energy Supply Programs include the Green Power Partnership and Combined Heat and Power Partnership. The Green Power Partnership boosts supply of clean energy by helping U.S. organizations purchase electricity from eligible renewable generation sources. The CHP Partnership dismantles the market barriers preventing investment in environmentally beneficial CHP projects.

The benefits analyses for both energy supply programs are limited to GHG emissions benefits for these programs. Consistent CO₂ emissions factors are assumed across OAP programs for electricity and fossil fuel savings attributable to the programs.

Energy savings goals are estimated by applying a steady growth rate to program savings based on an examination of the opportunity for emissions reductions from green power and CHP.

Green Power Partnership (GPP)

As a condition of partnership, GPP partners submit data annually on their purchases of qualifying green power products. These data are screened and any issues resolved.

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 market transformation benefits, leading to additional voluntary green power purchases that are not included in the program's GHG emissions reduction estimates.

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

CHP partners may also receive assistance from other programs, including those receiving funding through federal grant programs. No adjustments are made for such double counting as the magnitude of potential overlap is estimated to be equal to or less than projects not reported to EPA, though influenced by the partnership's broader market transformation efforts.

Combined Heat and Power Partnership (CHP)

The CHP Partnership's GHG reduction benefits are calculated by subtracting the emissions from specific CHP systems from the emissions of the electricity and thermal sources (i.e., electric power grid and comparable boilers) displaced by those systems. CHP system emissions are calculated using fuel-specific emissions factors and operational data provided by the system operators. 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.

Each project's CO₂ benefit is calculated individually accounting for its actual start-up date. Each project receives a credit for avoided transmission and distribution (T&D) losses, based on a published national loss factor, reduced based on the amount of electricity supplied to the grid by the CHP system.

THE METHANE EMISSIONS REDUCTION PROGRAMS

EPA's methane programs facilitate recovering methane from landfills, oil and natural gas systems, agriculture (manure management), and coal mines, as well as using methane as a clean energy resource. Value of gas mitigated assumes all methane mitigated is sold as natural gas, using the average annual gas price from EIA.⁵⁹ In order to estimate program goals, OAP relies on a marginal abatement cost (MAC) curve analysis to estimate future program impacts.

Natural Gas STAR Program

The Natural Gas Star Program calculates its achieved annual emissions reductions based on 100 percent of the emissions reductions reported to the Program by program partners, who submit methane emission reduction data to EPA annually. These data are used to determine Program emissions reduction totals and measure the overall effectiveness of the Natural Gas STAR Program. The Natural Gas STAR Program focuses on implementation of best management practices (BMPs) and partner reported opportunities (PROs) that were undertaken by companies voluntarily. Partner companies have the option of using default calculation methodologies or company-specific methodologies, which must be documented on their annual reports. Reported reductions must be voluntary in nature and cannot be attributable to compliance with existing regulations. Each Annual Report is reviewed to ensure that all reductions data are accurate and non-regulatory in nature. Any inconsistencies are resolved through direct correspondence with the appropriate partner company. As appropriate, these data are omitted or adjusted prior to their inclusion in the Natural Gas STAR Program annual totals.

AgSTAR PROGRAM

AgSTAR is an outreach program aimed at reducing methane emissions from livestock waste management operations by promoting the use of biogas recovery systems. AgSTAR tracks and publishes a map of commercially operational anaerobic digester systems on livestock facilities in the United States. AgSTAR follows the Intergovernmental Panel on Climate Change (IPCC) methodology to estimate methane emissions reductions from these projects and counts both direct and indirect reductions from anaerobic digester systems in its annual program accomplishments. Program goals are based on modeled direct emissions reductions only.

Anaerobic digesters reduce GHG emissions in two ways. The first is the direct methane emissions reduction from the capture and burning of biogas that otherwise would escape into the atmosphere from the waste management system. For projects that generate energy, a second benefit is the avoided GHG emissions (CO₂, methane, and nitrous oxide) and other pollutants from the use of biogas to displace fossil fuels that otherwise would be used to generate energy.

Landfill Methane Outreach Program (LMOP)

LMOP promotes projects that reduce landfill gas (LFG) emissions. Through 2012, LMOP used a methodology for estimating direct methane

and indirect CO₂ emission reductions from LFG energy projects. The direct reductions represent the collection and destruction of methane generated from landfill waste, whereas indirect reductions represent offsets from the combustion of fossil fuels that emit anthropogenic CO₂. LMOP calculates annual reductions from projects for which LMOP provides assistance, technical information, and/or where there is partner involvement in implementing the project. Reductions of methane that are the result of compliance with EPA's air regulations are not included in the program estimates. In addition, only emission reductions from projects that meet the LMOP assistance criteria are included in the program benefit estimates.

LMOP maintains a comprehensive database of MSW landfills and LFG energy projects in the United States. These data are updated frequently based on information gathered from partners, LMOP's outreach efforts, and other various sources. In 2011, the Greenhouse Gas Reporting Program began providing annual facility level data related to LFG emissions, which has been incorporated into the LMOP database. For operational LFG energy projects, the LMOP database includes the estimated MW capacity of each electricity project and the estimated amount of LFG utilized by each direct-use project, which are used in the calculations to determine annual emission reductions.

Coalbed Methane Outreach Program (CMOP)

CMOP promotes the profitable recovery and utilization of coal mine methane. CMOP annually measures the program's accomplishments using a metric of emissions reductions achieved from coal mine methane recovery projects in the United States. Emissions reductions attributable to program activities are distinguished from emissions reductions that would have occurred without the program. CMOP updated their methodology in calendar year 2005 to incorporate a tiered system applied to total emissions reductions from active underground and abandoned mines. This tiered approach gives weightings of 90 percent, 70 percent, and 40 percent, depending on the extent of the program's involvement in the specific project or the type of project. For example, ventilation air methane (VAM) emission reduction projects are assigned the highest weighting because of the program's instrumental role in promoting and demonstrating this innovative emissions reduction technology. Similarly, projects where direct technical assistance was provided by CMOP are also given a high weighting. In 2012, the Greenhouse Gas Reporting Program began providing annual facility-level emissions and other data from this sector, which can be used in the calculation of CMOP accomplishments.

⁵⁹ For more details, see EIA 2013.

THE FLUORINATED GREENHOUSE GAS EMISSIONS REDUCTION PROGRAMS

Through fluorinated greenhouse gas (FGHG) partnership programs, EPA identifies cost-effective emissions reductions opportunities, recognizes industry accomplishments, and facilitates the transition toward environmentally friendlier technologies and best environmental practices.

Voluntary Aluminum Industrial Partnership (VAIP)

Historically, VAIP has used a methodology to estimate emissions of PFCs based on the smelter-specific correlation between measured PFC emissions and operating parameters, weighted by activity data. VAIP participants reported a smelter-specific emissions coefficient derived from stack measurements and annual operating parameter data (frequency and duration of anode effects) and production data. EPA calculated the VAIP program achievements as the difference between annual estimated emissions under BAU practices (based on emissions rates from 1990) and current annual emissions as reported under the program. In 2011, the Greenhouse Gas Reporting Program began providing annual facility-level emissions data from this sector from both partners and non-partners. These data replace the partnership collected data. In order to estimate program goals, OAP relies on a marginal abatement cost (MAC) curve analysis to estimate future program impacts.

SF₆ Emissions Reduction Partnership for Electric Power Systems (EPS)

The SF₆ Emissions Reduction Partnership for Electric Power Systems has been estimating emissions of SF₆ using a facility-specific mass-balance methodology. The mass-balance method works by tracking and systematically accounting for all company uses of SF₆ during the reporting year. This method is provided by the 2006 IPCC Guidelines as the Tier 3 approach for estimating emissions from electrical transmission and distribution facilities. EPA calculates program achievements as the difference between annual estimated emissions under BAU practices and annual reported emissions under the program. In 2012, the Greenhouse Gas Reporting Program began providing annual facility-level emissions data from this sector, from both partners and non-partners. In most cases, these data replace the partnership collected data since the majority of partner facilities are subject to mandatory reporting through the Greenhouse Gas Report Program. In order to estimate program goals, OAP relies on a marginal abatement cost (MAC) curve analysis to estimate future program impacts.

Responsible Appliance Disposal Program (RAD)

To estimate emissions reductions, the masses of individual refrigerant and foam-blowing agents reclaimed or destroyed by RAD partners, provided by the partners in annual reports disaggregated by chemical,

are multiplied by their global warming potential and summed. Only hydrofluorocarbons are included in the totals; the ozone depleting substances (ODS) are not included. The destruction or reclamation of these chemicals is not required by law; however, partners voluntarily undertake these emissions reductions pursuant to their agreement as RAD program partners.

A projection of the number of appliances collected and processed by RAD partners is made. To estimate future emissions reductions, the past emissions reductions are scaled based on the number of appliances collected and processed by RAD partners in those years. In addition, it is assumed that the chemicals whose emissions are avoided will change over time due to the projected ODS to HFC transition.

Finally, these results are adjusted to account for the recycling of durable components (metal, plastic, glass) that also occurs under the RAD program. EPA's Waste Reduction Model (WARM) is used to estimate this factor for each year data were reported, and the weighted average of those calculations is used for future projections.⁶⁰

GreenChill Partnership

To determine emissions reductions from the GreenChill Partnership, partners provide annual reports of their corporate banks of refrigerant (i.e., refrigerant contained in equipment owned by the partner) as well as emissions. EPA analyzes this information from partners, extrapolates trends and compares the results to typical U.S. non-GreenChill supermarkets. GreenChill partners provide emissions data disaggregated by chemical. These data are used to calculate emissions of HFCs in CO₂ equivalents and to determine the weighted average emissions rate of the GreenChill partners. To ensure calculations are correct, each partner is given a report to double-check their individual corporate-wide emissions rates, and partnership averages are provided so that partners can assess the reasonableness of those averages, benchmark their own emissions rates, and set goals to improve.

The average partner emissions are then compared to the national average for typical U.S. supermarkets, based on information from EPA's Vintaging Model, the partners, and other industry experts. The past emissions reductions from the partnership are then taken as the difference of the typical U.S. store and the partnership average store, multiplied by the number of stores represented by the data provided by the partners.

Due to phaseout regulations for ozone-depleting substances under CAA Title VI, it is assumed that the types of refrigerant used by all supermarkets, including GreenChill partners, will change over time, replacing ozone-depleting substances with alternatives (primarily HFCs).

⁶⁰ For more information about WARM, see http://www.epa.gov/climatechange/waste/calculators/Warm_home.html.

To be conservative, it is assumed that the average GWP of the alternatives used today will stay the same in the future.

In addition, GreenChill has fostered leak reductions amongst the partnership. Annual emissions rates as calculated above (total partner emissions divided by total partner banks) change year to year. The average reduction in emissions rates achieved during past years is then assumed to continue annually into the future, on a percent reduction basis (i.e., so that future leak rates never reach or go below zero percent).

GreenChill assumes that the market share represented by all GreenChill partners increases annually based on the historic growth rate. To be conservative, it is assumed that individual GreenChill partners do not increase their market share, even though promotion and monetary savings through the partnership may help them do so.

Key Changes to Results Measurements for the 2012 Annual Report

- Historical values in Table 8 have changed slightly since the 2011 Annual Report for ENERGY STAR Products, ENERGY STAR Certified New Homes, Methane, and FGHG programs to reflect additional information received from program partners. The goals for these programs were also adjusted where applicable.
- The Methane programs' GHG emissions reduction methodologies have been revised to reflect new information from the Greenhouse Gas Reporting Rule, as well as methane reduction co-benefits expected from regulatory programs for the natural gas and landfill sectors.
- The Methane programs began estimating the value of natural gas mitigated in addition to GHG emissions reductions.
- ENERGY STAR Certified New Homes revised their goal values to reflect the program's actual long-term average growth rate, which accounts for changes in the housing markets.
- AgSTAR annual emissions reductions, as well as societal benefits for all projects, are reported for the first time in this report.

APPENDIX A

AWARDS

ENERGY STAR Award Winners

PARTNER OF THE YEAR-
SUSTAINED EXCELLENCE

3M
St. Paul, MN

AEP Texas Central
Corpus Christi, TX

Andersen Corporation
Bayport, MN

APS (Arizona Public Service)
Phoenix, AZ

ArcelorMittal USA
Chicago, IL

Austin Energy
Austin, TX

Bentall Kennedy
Toronto, ON

Bosch Home Appliances
Corporation
Irvine, CA

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

CalPortland Company
Glendora, CA

CBRE, Inc.
Los Angeles, CA

Cenergistic
Dallas, TX

CenterPoint Energy
Houston, TX

Cleveland Clinic
Cleveland, OH

Colgate-Palmolive Company
New York, NY

ComEd
Chicago, IL

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

Ecova
Spokane, WA

Energy Inspectors Corporation
Las Vegas, NV

EnergyCAP, Inc.
State College, PA

EnergyLogic
Berthoud, CO

Evergreen Public Schools
Vancouver, WA

Focus on Energy
Madison, WI

Food Lion, Bottom Dollar Food,
Harveys and Reid's
Salisbury, NC

GE Lighting
Fairfield, CT

General Motors
Detroit, MI

Gresham-Barlow School District
Gresham, OR

Habitat for Humanity of Greater
Nashville
Nashville, TN

Habitat for Humanity of Metro
Denver
Denver, CO

Hanesbrands Inc.
Winston-Salem, NC

HEI Hotels & Resorts
Norwalk, CT

Hines
Houston, TX

ITW Food Equipment Group
Troy, OH

Ivey Residential, LLC
Evans, GA

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

Jones Lang LaSalle
Chicago, IL

KB Home
Los Angeles, CA

Kohls Department Stores, Inc.
Menomonee Falls, WI

KPPC-Kentucky Pollution
Prevention Center
Louisville, KY

LG&E and KU
Louisville, KY

Long Island Power Authority
(LIPA)
Uniondale, NY

Loudoun County Public Schools
Ashburn, VA

Lowe's Companies, Inc.
Moorestville, NC

Manitowoc Foodservice
New Port Richey, FL

Merck
Whitehouse Station, NJ

Meritage Homes
Scottsdale, AZ

New Jersey Board of Public
Utilities
Trenton, NJ

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

New York-Presbyterian Hospital
New York, NY

Nissan North America, Inc.
Franklin, TN

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

Northwest Energy Efficiency
Alliance (NEEA)
Portland, OR

Pacific Gas and Electric
Company
San Francisco, CA

Panasonic Eco Solutions North
America
Secaucus, NJ

PepsiCo, Inc.
Purchase, NY

Public Service Company of
Oklahoma (PSO)
Tulsa, OK

Raytheon Company
Waltham, MA

Saint-Gobain
Valley Forge, PA

Samsung Electronics Co., Ltd.
Suwon, South Korea

Sears Holdings Corporation
Hoffman Estates, IL

Servidyne
Atlanta, GA

Southern California Edison
Rosemead, CA

Southern Energy Management
Morrisville, NC

Staples, Inc.
Framingham, MA

The Boeing Company
Chicago, IL

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

TIAA-CREF
New York, NY

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

TRANSWESTERN
Houston, TX

USAA Real Estate Company
San Antonio, TX

PARTNER OF THE YEAR

AEP Ohio
Columbus, OH

Air Force Medical Support Agency-
Health Facilities Division
San Antonio, TX

Air-King, Ltd.
West Chester, PA

Allergan, Inc.
Irvine, CA

AVR Homebuilders
Yonkers, NY

Beacon Capital Partners, LLC
Boston, MA

Brandywine Realty Trust
Radnor, PA

Burton Energy Group
Alpharetta, GA

Cassidy Turley
Washington, DC

Columbia Gas of Ohio
Columbus, OH

Des Moines Public Schools
Des Moines, IA

DIRECTV
El Segundo, CA

Dominion East Ohio
Richmond, VA

Eastman Chemical Company
Kingsport, TN

El Paso Electric
El Paso, TX

Energy Services Group
New Castle, DE

Entergy Texas
Beaumont, TX

Fanning/Howey Associates, Inc.
Celina, OH

Grayhawk Homes, Inc.
Columbus, GA

Hoshizaki America, Inc.
Peachtree City, GA

Kenton County School District
Ft. Wright, KY

LG Electronics, Inc.
Englewood Cliffs, NJ

Liberty Property Trust
Malvern, PA

Memorial Hermann Healthcare
System
Houston, TX

Nationwide Marketing Group
Winston Salem, NC

New Hampshire CORE Utilities
Manchester, NH

North Penn School District
Lansdale, PA

PECO Energy Company
Philadelphia, PA

Pella Corporation
Pella, IA

Philips Lighting Company
Somerset, NJ

ProVia
Sugarcreek, OH

Scotsman Ice Systems
Vernon Hills, IL

Scott County Schools
Georgetown, KY

Sharp Electronics Corporation
Mahwah, NJ

Southern Maryland Electric
Cooperative (SMECO)
Hughesville, MD

Technical Consumer Products,
Inc. (TCP)
Aurora, OH

The Connecticut Energy Efficiency
Fund with UI and CL&P
Orange, CT

The Home Depot
Atlanta, GA

Verizon Wireless
Basking Ridge, NJ

Vornado Realty Trust
New York, NY

Wells Real Estate Funds
Norcross, GA

AWARDS FOR
EXCELLENCE

ENERGY STAR Promotion

Amerlux
Fairfield, NJ

FSL Home Energy Solutions
Phoenix, AZ

National Grid
Waltham, MA

South Carolina Electric & Gas
Company
Cayce, SC

Affordable Housing

Milford Housing Development
Corporation
Milford, DE

Energy-Efficient Product Design

Cree, Inc.
Durham, NC

Retailing

Metro Lighting
Brentwood, MO

AWARDS

2012 Green Power Leadership Awards

GREEN POWER PURCHASING

American University	<i>Washington, DC</i>
Bloomberg L.P.	<i>New York, NY</i>
City of Philadelphia	<i>Philadelphia, PA</i>
Hobart and William Smith Colleges	<i>Geneva, NY</i>
Kettle Foods	<i>Salem, OR</i>
Lockheed Martin	<i>Bethesda, MD</i>
McDonald's USA, LLC	<i>Oak Brook, IL</i>
MOM's Organic Market	<i>Rockville, MD</i>
NYSE Euronext	<i>New York, NY</i>
Quinnipiac University	<i>Hamden, CT</i>
TD Bank	<i>Cherry Hill, NJ</i>

SUSTAINED EXCELLENCE IN GREEN POWER

Intel Corporation	<i>Santa Clara, CA</i>
Kohl's Department Stores	<i>Menomonee Falls, WI</i>
Staples	<i>Framingham, MA</i>
Whole Foods Market	<i>Austin, TX</i>

ON-SITE GENERATION

Coca-Cola Refreshments	<i>Atlanta, GA</i>
Zotos International, Inc.	<i>Geneva, NY</i>

GREEN POWER PARTNER OF THE YEAR

City of Austin	<i>Austin, TX</i>
Hilton Worldwide	<i>Mountain View, CA</i>
Microsoft Corporation	<i>Redmond, WA</i>
University of Oklahoma	<i>Norman, OK</i>

GREEN POWER COMMUNITY OF THE YEAR

Beaverton, OR	<i>Beaverton, OR</i>
Oak Park, IL	<i>Oak Park, IL</i>

GREEN POWER SUPPLIER OF THE YEAR

Renewable Choice Energy	<i>Boulder, CO</i>
Sterling Planet	<i>Atlanta, GA</i>

INNOVATIVE GREEN POWER PROGRAM OF THE YEAR

Wellesley Municipal Light Plan	<i>Wellesley, MA</i>
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2012 ENERGY STAR Combined Heat and Power Awards

CHP PROJECT

LOCATION

COLLABORATING CHP PARTNERSHIP PARTNERS

Marine Corps Air Ground Combat Center, Marine Air Ground Task Force Training Command Twentynine Palms	<i>Twentynine Palms, CA</i>	Marine Corps Air Ground Combat Center, Johnson Controls, Solar Turbines, Vanderweil Engineers
US Army Garrison, Fort Bragg	<i>Fort Bragg, NC</i>	US DOE, Broad U.S.S., Honeywell, North Carolina Solar Center, Solar Turbines, Vanderweil Engineers

Natural Gas STAR Awards

Natural Gas STAR did not provide partner awards in 2012. For information on upcoming events and awards, please visit <http://www.epa.gov/gasstar/newsroom/awardwinners.html#2012>.

AWARDS

2012 Landfill Methane Outreach Program Awards

PROJECTS OF THE YEAR

Anne Arundel County's Millersville Landfill Electricity Project	<i>Maryland</i>	St. Landry Parish Landfill CNG Project	<i>Louisiana</i>
Hickory Ridge Landfill and Coca-Cola CCHP Project	<i>Georgia</i>	Watauga County Landfill Small Electricity Project	<i>North Carolina</i>
La Crosse County Landfill and Gundersen Health System CHP Project	<i>Wisconsin</i>	INDUSTRY PARTNER OF THE YEAR	
Lycoming County Landfill Dual Cogeneration and Electricity Project	<i>Pennsylvania</i>	Landfill Energy Systems	<i>Michigan</i>
Orange County's Olinda Alpha Landfill Combined Cycle Project	<i>California</i>		

2012 GreenChill Achievement Awards

SUPERIOR GOAL ACHIEVEMENT

Food Lion
Hy-Vee
King Kullen
Price Chopper
Stater Bros. Supermarkets
Weis Markets

EXCEPTIONAL GOAL ACHIEVEMENT

King Kullen

MOST IMPROVED EMISSIONS RATE

Price Chopper (year-to-year)
McQuade's Marketplace (since baseline year)

BEST EMISSIONS RATE

Stater Bros. Supermarkets

BEST OF THE BEST

Hannaford Turner, ME

STORE CERTIFICATION EXCELLENCE (SUPERMARKET PARTNER)

Sprouts Farmers Market

STORE CERTIFICATION EXCELLENCE (NON-SUPERMARKET PARTNER)

Hillphoenix

STORE RE-CERTIFICATION EXCELLENCE (SUPERMARKET PARTNER)

Raley's Petaluma, CA

DISTINGUISHED PARTNER

Ronald Vogl
Weis Markets

AWARDS

2012 Climate Leadership Award Winners

ORGANIZATIONAL LEADERSHIP AWARD

IBM
San Diego Gas & Electric

INDIVIDUAL LEADERSHIP AWARD

Gene Rodrigues, Director of Customer Energy Efficiency & Solar, Southern California Edison

SUPPLY CHAIN LEADERSHIP AWARD

Port of Los Angeles
SAP
UPS

EXCELLENCE IN GHG MANAGEMENT (GOAL SETTING CERTIFICATE)

Avaya
Bentley Prince Street
Campbell Soup Company
Ford Motor Company
Gap Inc.
Ingersoll Rand

EXCELLENCE IN GHG MANAGEMENT (GOAL ACHIEVEMENT AWARD)

Campbell Soup Company
Casella Waste Systems
Conservation Services Group
Cummins Inc.
Fairchild Semiconductor
Genzyme
Hasbro
Intel Corporation
International Paper
SC Johnson

APPENDIX B

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REFERENCES

- Climate Protection Partnerships Division, Climate Change Division, Stratospheric Protection Division, U.S. Environmental Protection Agency. 2013. Partner and emissions data for 2012 provided by individual programs within the Office of Atmospheric Programs.
- DNV KEMA Energy & Sustainability. 2013. "E-CAST 2012 Results for Carbon and Energy Savings from the ENERGY STAR Program." Technical Memorandum to EPA December 2013.
- Energy Information Administration (EIA). 2013. *Annual Energy Outlook 2013 with Projections to 2040*. Office of Integrated and International Energy Analysis. (DOE/EIA-0383 (2013)). April. Available online at <http://www.eia.gov/forecasts/archive/aeo13/index.cfm>.
- Horowitz, Marvin J. 2013a. "Purchased energy and Policy Impacts in the U.S. Manufacturing Sector." Energy Efficiency, DOI 10.007/s12053-013-9200-3, April.
- Horowitz, Marvin J., 2013b. "Technical Memorandum: Impact Evaluation of ENERGY STAR for the Commercial Buildings Sector in 2012." to EPA November 2013.
- Horowitz, Marvin J., 2013c. "Technical Memorandum: Impact Evaluation of ENERGY STAR for the Industrial Sector in 2012." to EPA November 2013.
- Horowitz, M.J. 2007. "Changes in Electricity Demand in the United States from the 1970s to 2003." *The Energy Journal*, Vol 28, Summer (3):93-119.
- Horowitz, M.J. 2001. "Economic Indicators of Market Transformation: Energy Efficient Lighting and EPA's Green Lights." *The Energy Journal*, Vol 22, Fall (4):95-122.
- Interagency Working Group on Social Cost of Carbon, United States Government. 2013. *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*. November. United States Government. Available online at <http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf>.
- Intergovernmental Panel on Climate Change (IPCC). 1996. *IPCC Second Assessment Report: Climate Change 1995*. [J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Katenberg, and K. Maskell, (eds.)]. Cambridge University Press. Cambridge, UK.
- U.S. Department of Commerce, Bureau of Economic Analysis. 2013. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product. October 2013. Available online at <http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1&903=13>.
- U.S. Environmental Protection Agency (U.S. EPA). 2013a. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*. Tables ES-7 and ES-8. U.S. Environmental Protection Agency, Washington, DC. U.S. EPA #430-R-13-001. April. Available online at <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.
- U.S. EPA. 2013b. *National Awareness of ENERGY STAR for 2012: Analysis of 2012 CEE Household Survey*. Office of Air and Radiation, Climate Protection Partnerships Division. Available online at <http://www.energystar.gov/ia/partners/publications/pubdocs/National%20Awareness%20of%20ENERGY%20STAR%202012%20508%20compliant.pdf?b1ef-17eb>.
- U.S. Census Bureau. 2010. *2008 Annual Survey of Manufactures*. March. Available online at <http://www.census.gov/manufacturing/asm/index.html>.



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