

Office of Atmospheric Programs Climate Protection Partnerships

2013 ANNUAL REPORT



TABLE OF CONTENTS

LETTER FROM THE ADMINISTRATOR	1
EXECUTIVE SUMMARY	2
ENERGY STAR PROGRAM	7
CERTIFIED PRODUCTS	7
RESIDENTIAL SECTOR	12
COMMERCIAL SECTOR	14
INDUSTRIAL SECTOR	15
CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS	18
GREEN POWER PARTNERSHIP (GPP)	19
COMBINED HEAT AND POWER PARTNERSHIP (CHPP)	20
METHANE EMISSIONS REDUCTION PROGRAMS	21
NATURAL GAS STAR	21
AGSTAR	22
LANDFILL METHANE OUTREACH PROGRAM (LMOP)	23
COALBED METHANE OUTREACH PROGRAM (CMOP)	25
FLUORINATED GREENHOUSE GAS EMISSIONS REDUCTION PROGRAMS	26
VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)	27
SF ₆ EMISSIONS REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS (EPS)	27
RESPONSIBLE APPLIANCE DISPOSAL PROGRAM (RAD)	28
GREENHILL PARTNERSHIP	29
CROSS-CUTTING EMISSIONS REDUCTION PROGRAMS.....	30
CENTER FOR CORPORATE CLIMATE LEADERSHIP	30
STATE AND LOCAL CLIMATE AND ENERGY PROGRAM	31
MEASURING RESULTS: REPORT METHODOLOGY	32
APPENDIX	40
A: AWARDS	40
B: LIST OF FIGURES	44
C: LIST OF TABLES	45
D: REFERENCES	46

REFLECTING ON 2013 CLIMATE PROTECTION ACHIEVEMENTS



Climate change is one of the greatest challenges of our time. This past decade was the hottest on record. Across the country people grapple with floods, fires, and severe weather, along with the economic impacts of climate change, including job losses. As seas rise, so do insurance premiums, medical bills, and food prices. In addition, 2012 was the second costliest year in history for natural disasters, with a price tag of \$110 billion. From water scarcity to wilting crops, companies understand that climate change is a real threat to commerce.

Climate action isn't just about polar bears and melting ice caps. It's about protecting local economies and creating jobs. We must act.

That's why in June 2013 President Obama announced a Climate Action Plan to cut carbon pollution fueling climate change, prepare U.S. communities for the impacts of climate change, and lead international efforts to address global climate change. Since then the U.S. Environmental Protection Agency has taken critical steps forward under the President's plan by proposing to cut carbon pollution from fossil-fueled power plants. The EPA is working toward other critical goals in the President's plan, including cutting energy waste in half by 2030

and leveraging new opportunities to reduce pollution from highly potent greenhouse gases, such as hydrofluorocarbons and methane.

The good news is we can turn our challenge into an opportunity to modernize our power sector and build a low-carbon economy that will fuel growth for decades to come. That story of energy progress is being written across America by companies that are proud to partner with the EPA. The climate partnerships in our Office of Atmospheric Programs continue to build on more than 20 years of experience and are making steady progress toward that cleaner future. Our partners are reducing greenhouse gas emissions, cutting wasted energy, and helping American families and businesses save money. Following are some highlighted achievements.

- With the help of ENERGY STAR, more than 293 million metric tons of greenhouse gas emissions (see Figure 1, pg. 3) were prevented in 2013 alone, providing more than \$11 billion in benefits to society due to reducing damages from climate change.
- Since the Green Power Partnership was introduced in 2001, more than 1,500 organizations have committed to using about 35 billion kilowatt-hours of clean, renewable green power each year.
- More than 480 partners have installed nearly 6,200 megawatts of new combined heat and power since the Combined Heat and Power Partnership launched in 2001.
- In 2013 the 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 12 million homes.
- In total, more than 19,000 organizations and millions of Americans partnered with the EPA through the Office of Atmospheric Programs' climate partnerships and produced significant environmental benefits, including preventing more than 421 million metric tons of greenhouse gas emissions equal to the annual electricity use of more than 57 million homes.

Together with our climate protection partners, we have achieved meaningful reductions in greenhouse gas emissions. Like so many environmental challenges, climate change cannot be addressed solely by the EPA's actions or even by the entire government. Everyone can play a role 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

¹ For additional information, see www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule.

EXECUTIVE SUMMARY

As reflected in President Obama's *Climate Action Plan*, the urgency to act on climate change is clear. 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. These changes come with serious consequences and real economic costs to Americans.

The good news is we can act on climate change using responsible steps to protect public health and the environment without sacrificing economic growth. There are many opportunities to greatly reduce GHG emissions, and many of these strategies are cost beneficial. The challenge is to maximize access to these opportunities, so 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 emission reductions.

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

In 2013, EPA's climate protection partnerships produced impressive results.² More than 19,000 organizations across the United States partnered with EPA to reduce emissions and achieve significant environmental and economic benefits (see Table 1)³:

- Preventing more than 421 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 58 million homes—providing over \$16 billion in benefits to society due to reducing damages from climate change.⁴
- Reducing net energy bills by more than \$30 billion and reductions in methane emissions valued at \$6.6 billion in 2013 alone.
- Investing over \$145 billion in energy-efficient technologies and practices through 2013.
- Preventing more than 3,700 MMTCO₂e of GHG emissions cumulatively due to investments made through 2013.

² 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 exceed 650 million metric tons of carbon dioxide equivalent (MMTCO₂e) in 2013.

³ Benefits include domestic GHG reductions only. In addition, Global Methane Initiative supported projects reduced international methane emissions by approximately 29 MMTCO₂e in 2013.

⁴ 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. \$12.7 billion and \$3.5 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 Fourth 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 2013 Dollars and MMTCO₂e)

PROGRAM	ECONOMIC BENEFITS (BILLION \$) ¹		ENVIRONMENTAL BENEFITS: GHG EMISSIONS AVOIDED (MMTCO ₂ e)		ANNUAL GOALS: GHG EMISSIONS AVOIDED (MMTCO ₂ e)	
	ANNUAL BENEFITS FOR 2013	CUMULATIVE BENEFITS (1992-2013)	ANNUAL BENEFITS FOR 2013	CUMULATIVE BENEFITS (1992-2013)	2015 GOALS	2020 GOALS
ENERGY STAR Program Total	\$31.5	\$295.4	293.9	2,197.6	217.4	275.1
Products and Homes	\$21.6	\$169.9	158.2	963.2	116.8	145.0
Buildings	\$7.7	\$101.4	96.0	880.9	75.0	93.5
Industrial	\$2.2	\$24.1	39.7	353.4	25.6	36.6
Energy Supply Programs	—	—	36.3	226.1	44.0	73.3
Methane Programs²	\$6.6	\$219.4	75.0	1,058.5	58.7	62.1
Fluorinated GHG Programs³	—	—	16.6	219.9	11.5	14.6
TOTAL	—	—	421.7	3,702.1	331.6	425.1

Note: Information listed in this table and provided in this report includes partnership programs within EPA's Office of Atmospheric Programs. For more information on EPA's other climate partnership programs, see www.epa.gov/climatechange/EPAactivities/voluntaryprograms.html. 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 2013, Methane programs accounted for over 65 MMTCO₂e of direct GHG emissions reductions.

³ Includes the Voluntary Aluminum Industrial Partnership, SF₆ Emissions Reduction Partnership for Electric Power Systems, Responsible Appliance Disposal Program, and GreenChill Partnership.
—: Not applicable

HIGHLIGHTS OF 2013

Promoting Energy Efficiency Through ENERGY STAR

Since 1992, the ENERGY STAR® program has served as a trusted source for voluntary standards and unbiased information for products, homes, commercial buildings, and industrial plants to help consumers, government, organizations, and businesses 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 2013, EPA's ENERGY STAR efforts helped Americans:

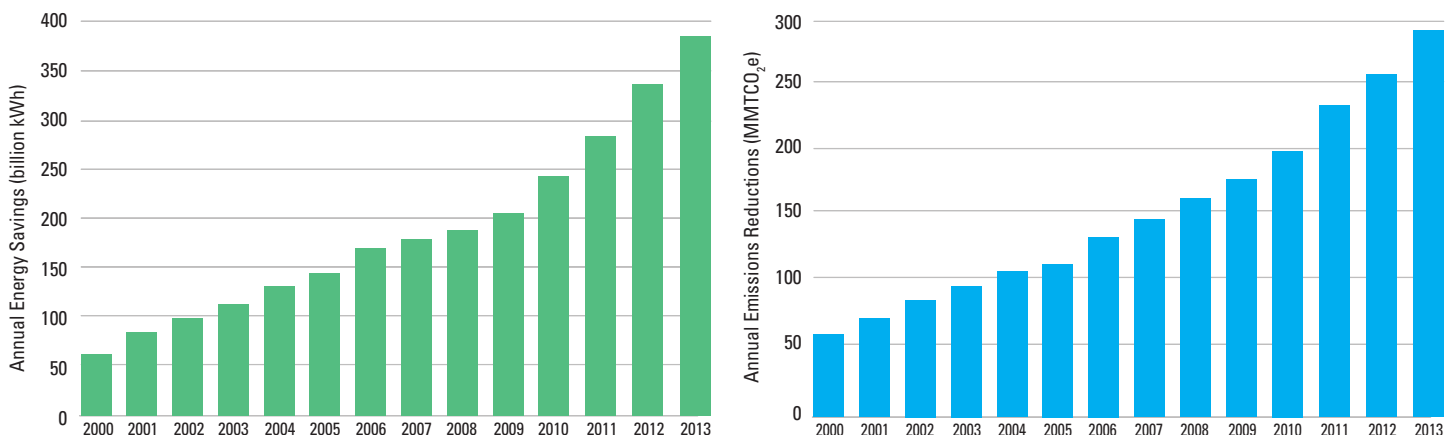
- Save more than 380 billion kilowatt-hours (kWh)—over 5 percent of U.S. electricity demand.
- Prevent more than 293 million metric tons of GHGs—equivalent to the annual electricity use of 40 million homes.
- Save more than \$30 billion on their energy bills.

These benefits have tripled in the last 10 years (see Figure 1, pg. 4).

Cost Effectiveness of the ENERGY STAR Program

EPA's ENERGY STAR is a highly cost-effective program that helps Americans reduce greenhouse gas emissions while saving energy and money. Since 2000:

- For every incremental dollar Americans invested in energy efficiency through ENERGY STAR, they saved, on average, \$4.50 on their energy bills and prevented more than 30 pounds of greenhouse gas emissions.
- For every metric ton of greenhouse gas emissions reduced through ENERGY STAR, Americans saved more than \$125 on their energy bills.

FIGURE 1. ENERGY STAR Annual Benefits Have Tripled in the Last 10 Years

Transforming the Energy Supply Marketplace

EPA's Clean Energy Supply Programs—the Green Power Partnership and the Combined Heat and Power Partnership (CHPP)—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 1,500 partners in the purchase of about 35 billion kWh of green power annually and more than 480 partners in the installation of nearly 6,200 megawatts (MW) of new CHP capacity, the energy supply programs reduced GHG emissions by over 36 MMTCO₂e in 2013 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 75.0 MMTCO₂e in 2013, 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 2013, these programs avoided 16.6 MMTCO₂e of GHG emissions.

Facilitating Cross-Cutting Emissions Reductions Programs

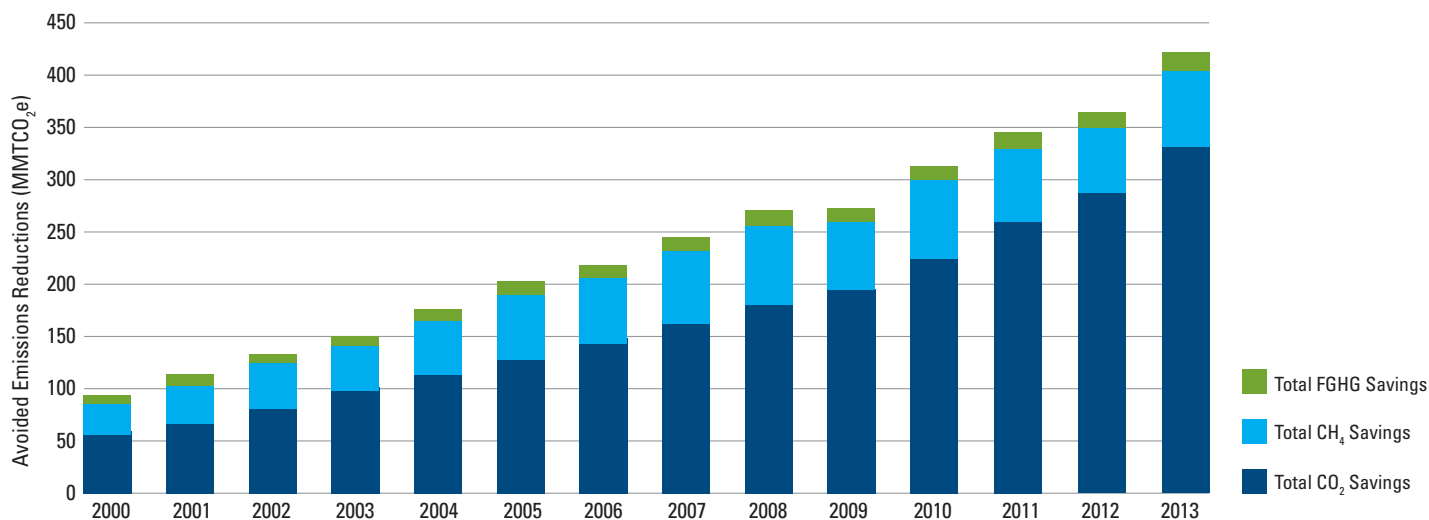
In 2012, EPA launched the Center for Corporate Climate Leadership. The Center serves as a resource for all organizations interested in measuring and managing their GHG emissions, and works with non-governmental organization partners to recognize superior climate achievements through the Climate Leadership 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 2013, 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 CHPP Awards
- Landfill Methane Outreach Program Awards
- GreenChill Achievement Awards

A list of the 2013 award winners can be found in Appendix A on page 40.

FIGURE 2. Annual GHG Emissions Reductions from OAP Climate Partnerships Exceed 421 MMTCO₂e in 2013

The 2013 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 2013 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 2013, 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 32.

TABLE 2. Summary of OAP Climate Protection Partnership Programs

PROGRAM	DESCRIPTION	START DATE	NUMBER OF PARTNERS	2013 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	16,000	293.9	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	1,500	36.3	www.epa.gov/greenpower
Combined Heat & Power Partnership (CHPP)	Promotes increased use of combined heat and power, a cleaner and more efficient alternative to separately produced electricity and thermal energy, such as steam and hot water.	2001	480		
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	127	24.1	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	12	1.0	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	1,070 ¹	40.3	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	—	9.6	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.	1995	3	6.5	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	85	5.5	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	54	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	2	4.4	www.epa.gov/greenchill
State and Local Climate and Energy Program	Helps state and local governments develop 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

Note: GHG emissions reductions assume global warming potentials based on the Intergovernmental Panel on Climate Change's Fourth Assessment Report (IPCC 2007).

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 2.1 MMTCO_{2e} for the RAD Program and 1.7 MMTCO_{2e} for the GreenChill Partnership.

ENERGY STAR®



LEARN MORE AT
energystar.gov

Global climate change continues to be a pressing environmental problem, but through energy efficiency, individuals and organizations are already reaping the benefits of reduced greenhouse gas emissions. Consistent with the President's 2013 Climate Action Plan, the U.S. Environmental Protection Agency (EPA) continues to support the deployment of energy-efficient products, practices, and services through the ENERGY STAR program. This voluntary program represents one component of EPA's ongoing efforts to develop national programs, policies, and regulations for reducing air pollution. The investment in both near- and long-term solutions to combat climate change through energy efficiency is contributing to important health and environmental benefits while strengthening our economy.

Since 1992, the ENERGY STAR program has led the way in finding innovative solutions for reducing GHG emissions. Together with its diverse set of partners, ENERGY STAR is dismantling market barriers that limit the growth of widespread energy efficiency and persist across the residential, commercial, and industrial sectors. By offering technical assistance, developing tools, and sharing best practices, the ENERGY STAR program helps consumers and businesses to improve energy efficiency. In 2013, EPA recognized more than 125 partners for their commitment to energy efficiency (see Appendix A, pg. 40). The ENERGY STAR program continues to be a trusted source of information that helps Americans make energy-saving changes to the way they live and work.

Millions of consumers and 16,000 partners tapped the value of ENERGY STAR and achieved impressive financial and environmental results in 2013. Their investments in energy-efficient technologies and practices reduced utility bills by \$30 billion and will continue to provide cost savings for years to come. Americans, with the help of ENERGY STAR, prevented more than 293 million metric tons of GHG emissions in 2013 alone—providing over \$11 billion in benefits to society due to reduced damages from climate change.

ENERGY STAR Certified Products

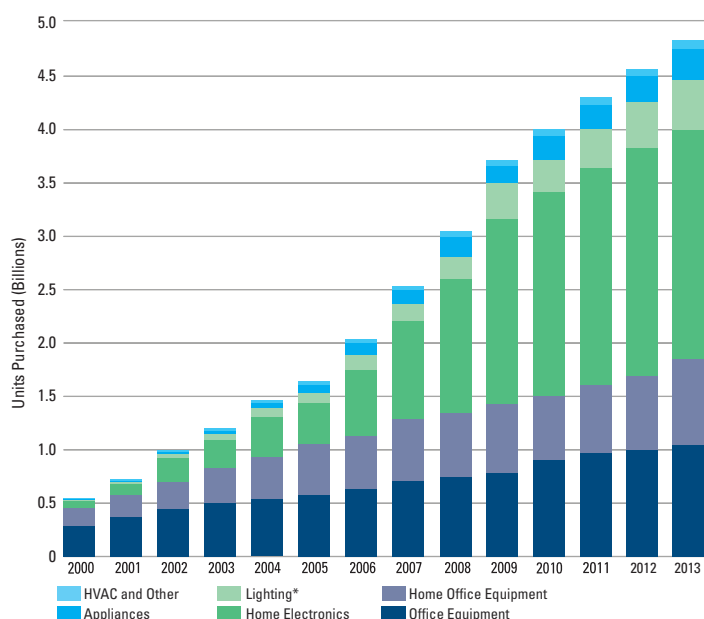
The trusted national symbol for energy efficiency, ENERGY STAR helps Americans make informed purchasing choices, save money on utility bills, and protect the environment. In 2013, Americans purchased about 300 million products that earned the ENERGY STAR label across more than 70 product categories for a cumulative total of more than 4.8 billion⁵ ENERGY STAR certified products purchased since the program began (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 2013

Keeping ENERGY STAR Requirements Up To Date

EPA updated performance requirements for enterprise servers, imaging equipment, computers, telephony, lamps, commercial refrigeration and ovens, water coolers, refrigerators, residential boilers, and roofs. Four new categories were added to the ENERGY STAR program: data center storage, small network equipment, pool pumps, and commercial water heaters (see Tables 4 and 5).

FIGURE 3. More Than 4.8 Billion ENERGY STAR Certified Products Purchased Since the Program Began



*Lighting category does not include purchases of light bulbs.

⁵ Light bulbs are not included in the number of ENERGY STAR certified products purchased.

TABLE 3. ENERGY STAR Key Program Indicators, 2000 and 2013

KEY INDICATORS	YEAR OF RESULTS	
	2000	2013
Annual Emissions Reductions (MMTCO ₂ e)	54	> 293
Cumulative Emissions Reductions (MMTCO ₂ e)	> 160 million	> 2.1 billion
Annual Net Energy Bill Savings ¹	\$10 billion	> \$30 billion
Cumulative Utility Bill Savings ¹	\$19 billion	\$295 billion
Annual Societal Benefits ¹	—	> \$11 billion
Electricity Savings as % of Total U.S. Electricity Demand	>1%	> 5%
Brand Awareness Among American Households	40%	> 85%
Cumulative Individuals Taken ENERGY STAR Pledge	—	> 3.2 million
ENERGY STAR CERTIFIED PRODUCTS		
Cumulative Certified Products Sold ²	600 million	> 4.8 billion ³
Annual Certified Products Sold	171 million	~ 300 million
Individual Certified Product Models	11,000	> 45,000
Product Categories Eligible for ENERGY STAR	33	> 70
Manufacturing Partners	1,600	~ 1,800
Retail Partners	550	> 2,600
ENERGY STAR RESIDENTIAL		
Home Builder Partners	1,600	> 2,700
Cumulative Number of Certified New Homes Built	25,000	> 1.5 million
Annual Certified New Homes Built	> 13,000	> 90,000
Annual Certified Homes Built as Percent of New U.S. Home Starts	< 1%	13%
Cumulative Number of Certified Manufactured Homes	—	~ 58,000
Cumulative Completion of Certified New Multifamily High-Rise Units	—	> 6,100
Percent Energy Savings over IECC 2009 Code	—	at least 15%
Percent Energy Savings over Typical New Home	—	20-30%
Cumulative Number of Completions of the Home Advisor and Home Energy Yardstick	—	> 813,000
ENERGY STAR COMMERCIAL		
Cumulative Number of Certified Buildings	450	> 22,000
Annual Certified Buildings (includes re-labels)	—	> 8,200
Building Types Eligible for the ENERGY STAR	2	17
Cumulative Number of Buildings Benchmarked in Portfolio Manager	> 4,000	> 325,000
Cumulative Square Footage Benchmarked	> 400 million	> 30 billion
Number of Buildings in Battle of the Buildings	—	> 3,000
Cumulative Number of Buildings Designed to Earn the ENERGY STAR	—	500
ENERGY STAR INDUSTRIAL		
Cumulative Number of Facilities Certified	—	131
Industrial Sectors & Subsectors	—	28
Facility Types Eligible for the ENERGY STAR	—	12
Number of Industrial Challenge Sites Achieving 10% Reduction in Energy Intensity in 5 years or Less	—	247

¹ Financial benefits are presented in 2013 dollars and present value terms.

² The cumulative total of product sales across the entire ENERGY STAR program from 1992 through 2013, 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 sold.

— : Not applicable

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 2013
Consumer Electronics	21	6	5	1
Office Equipment	14	8	4	5
HVAC	9	7	5	1
Commercial Food Service Equipment	9	8	3	2
Lighting	4	3	1	1
Building Envelope	5	3	Not Applicable	1
Appliances	9	8	6	2
Other	3	3	2	2

Inspiring Consumer Action

Through public outreach, EPA encourages Americans to make energy-efficient changes at home, at work, and in their communities. The ENERGY STAR program's approach highlights both the financial and environmental benefits of energy efficiency and provides a platform for others to help drive behavior change. The following 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. Through 2013, more than 3.2 million individuals took the ENERGY STAR Pledge to make energy-efficient changes at home, representing more than 15 billion pounds of GHG emissions reductions. Increased use of social (Facebook and Twitter) and online media, along with traditional media, spread the ENERGY STAR message to more than 16.4 million people.
- EPA celebrated its second annual ENERGY STAR Day by demonstrating how energy efficiency and community service can go hand in hand. Two events honored ENERGY STAR Day, including improvements to a Boys & Girls Club in Atlantic City that had been damaged as a result of Hurricane Sandy and an event with Rebuilding Together to renovate a New Orleans home damaged by Hurricane Katrina. Both events were supported by ENERGY STAR Partners through on-the-ground services and product donations. Together they served as a shining example of how energy-efficient improvements can not only reinvigorate a home and a Club, but also provide long-term community benefits.

- The 2013 *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.
- 2013 also marked the second year of *Team ENERGY STAR*, this time featuring themes from the 20th Century Fox movie, EPIC. Working with PTO Today and Boys & Girls Clubs of America, nearly 300,000 youths made an EPIC difference with ENERGY STAR through pledges, stories, artwork, and educational events at schools across the country. A Team ENERGY STAR print PSA garnered 4.5 million impressions, and social media results totaled 3.5 million impressions.

Today, over 85 percent of American households recognize the ENERGY STAR label, and more than 40 percent knowingly purchased an ENERGY STAR certified product in the past year (see Figure 4, pg. 10).⁶ Of those purchasers, more than 70 percent reported the label as influential in their purchasing decision; over 70 percent also reported they are likely to recommend products that have earned the ENERGY STAR to friends.

ENERGY STAR Emerging Technology Award

The ENERGY STAR Emerging Technology Award is given annually in select product categories to innovative products that have the potential to significantly reduce greenhouse gas emissions. Chosen products must meet rigorous performance requirements. In 2013 the Award was given to advanced clothes dryers that were at least 32 percent more efficient than standard dryers, with each saving \$460 in electric costs over its service life while reducing greenhouse gas emissions by three tons (CO₂).

⁶For more information, see *National Awareness of ENERGY STAR for 2013: Analysis of CEE Household Survey*. References: Appendix D (p. 46), U.S. EPA 2014b.

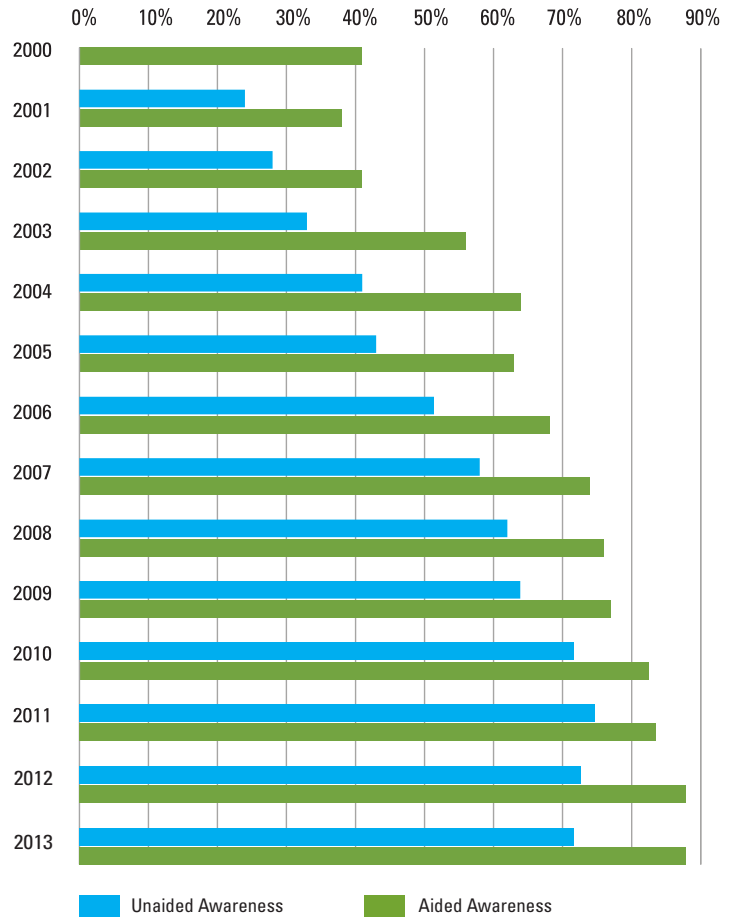
Improving Access to Data. EPA developed its enhanced Product Finder tool that provides consumers with access to energy efficiency information on all ENERGY STAR products. This tool provides a user-friendly interface to help consumers filter and sort through large data sets to identify products based on key criteria such as energy efficiency, brand, and product features. In addition, Product Finder offers advanced features to support the more complex data analysis required by partners and third parties. More than 22,000 products were certified in 2013 and featured through this new tool.

Protecting the Consumer Experience. The ENERGY STAR label is backed by a robust, state-of-the-art system for third-party certification. This system includes a worldwide network of nearly 600 laboratories testing products, complemented by 24 independent, accredited certification organizations reviewing results. All products that earn the ENERGY STAR are subject to strict testing and certification before they can carry the label. As of the end of 2013, there were more than 45,000 certified products. Verification testing administered by EPA-recognized certification bodies is also in process for all product categories. In 2013 EPA disqualified 62 models based on the results of this post-market testing, with an overall compliance rate of 95 percent. The program's emphasis on testing and third-party product review ensures that consumers can trust ENERGY STAR certified products to deliver the energy savings promised by the label.

ENERGY STAR Most Efficient 2013

ENERGY STAR Most Efficient is a new distinction that recognizes products that deliver cutting edge energy efficiency along with the latest in technological innovation. It is recognition that represents the best of ENERGY STAR. By the end of 2013, more than 1,500 models from nearly 140 manufacturers were recognized as the "best of the best" in energy efficiency. Categories included televisions, computer monitors, clothes washers, refrigerators, heating and cooling equipment, ventilation and ceiling fans, and windows.

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 2013: Analysis of CEE Household Survey. U.S. EPA 2014b.

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

PRODUCT CATEGORY	YEAR INTRODUCED (AND REVISED)	STATUS OF ACTIVITY IN 2013
2013 NEW SPECIFICATIONS		
Pool Pumps	2013	Completed. Took effect February 15, 2013
Commercial Water Heaters	2013	Completed. Took effect March 2013
Data Center Storage	2013	Completed. Took effect December 2, 2013
Small Network Equipment	2013	Completed. Took effect September 3, 2103
2013 REVISIONS COMPLETED		
Servers	2009 (2013)	Revised specification took effect December 16, 2013
Imaging	1992 (1996, 2000, 2007, 2009, 2014)	Revised specification to take effect January 1, 2014
Commercial Ovens	2009 (2014)	Revised specification to take effect January 1, 2014
Watercoolers	2000 (2004, 2010, 2014)	Revised specification to take effect February 1, 2014
Refrigerator/Freezer	1996 (2004, 2008, 2014)	Revised specification to take effect September 15, 2014
Bulbs	1999 (2008, 2010, 2014)	Revised specification to take effect September 30, 2014
Computers	1992 (1995, 1999, 2000, 2007, 2009, 2014)	Revised specification to take effect June 2, 2014
Commercial Refrigerator/Freezer	2001 (2009, 2010, 2014)	Revised specification to take effect October 1, 2014
Roofs	1998 (2001, 2003, 2007, 2009, 2017)	Revised specification to take effect July 1, 2017
Telephony	2002 (2004, 2006, 2008, 2014)	Revised specification to take effect October 1, 2014
Boilers	1996 (1998, 2002, 2014)	Revised specification to take effect October 1, 2014
2013 REVISIONS IN PROGRESS		
Clothes washers	1997 (2007, 2009, 2011, 2013)	In process, expected to be complete in 2015
Set-top Boxes	2001 (2005, 2009, 2011)	In process, expected to be complete in 2014
Battery Chargers	2006	In process, expected to be complete in 2014
Windows/Doors/Skylights	1998 (2003, 2005, 2009)	In process, expected to be complete in 2014
NEW SPECIFICATIONS IN DEVELOPMENT		
Clothes Dryers		New specification to be completed in 2014
Lab Grade Refrigerators/Freezers		New specification to be completed in 2015
Large Network Equipment		New specification to be completed in 2015

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 2013

ENERGY STAR Certified Homes

Full Implementation of New Requirements for ENERGY STAR Certified Homes. 2013 was the first year of full implementation of EPA's new, more rigorous requirements for homes to earn the ENERGY STAR label. Homes certified under these requirements are at least 15 percent more efficient than those built to the 2009 International Energy Conservation Code (IECC), and include additional energy-saving features to deliver a performance advantage of up to 30 percent compared to typical new homes. More than 90,000 new homes earned the ENERGY STAR in 2013, bringing the total number of certified homes to more than 1.5 million (see Figure 5). Since EPA began labeling new homes in 1995, American homeowners have saved over \$4 billion on their energy bills and reduced GHG emissions by over 21 MMTCO₂e. In 2013 alone, families living in ENERGY STAR certified homes saved in excess of \$550 million on their utility bills.

FIGURE 5. More Than 1.5 Million Homes Nationwide Have Earned the ENERGY STAR Label

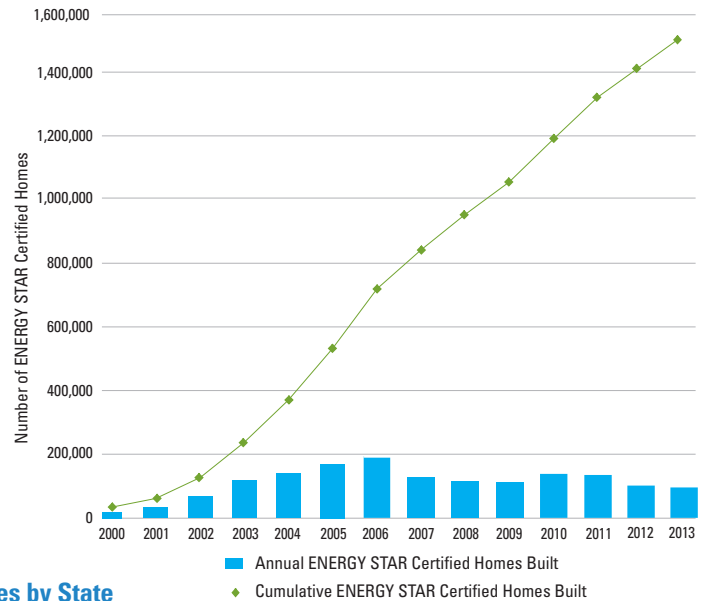
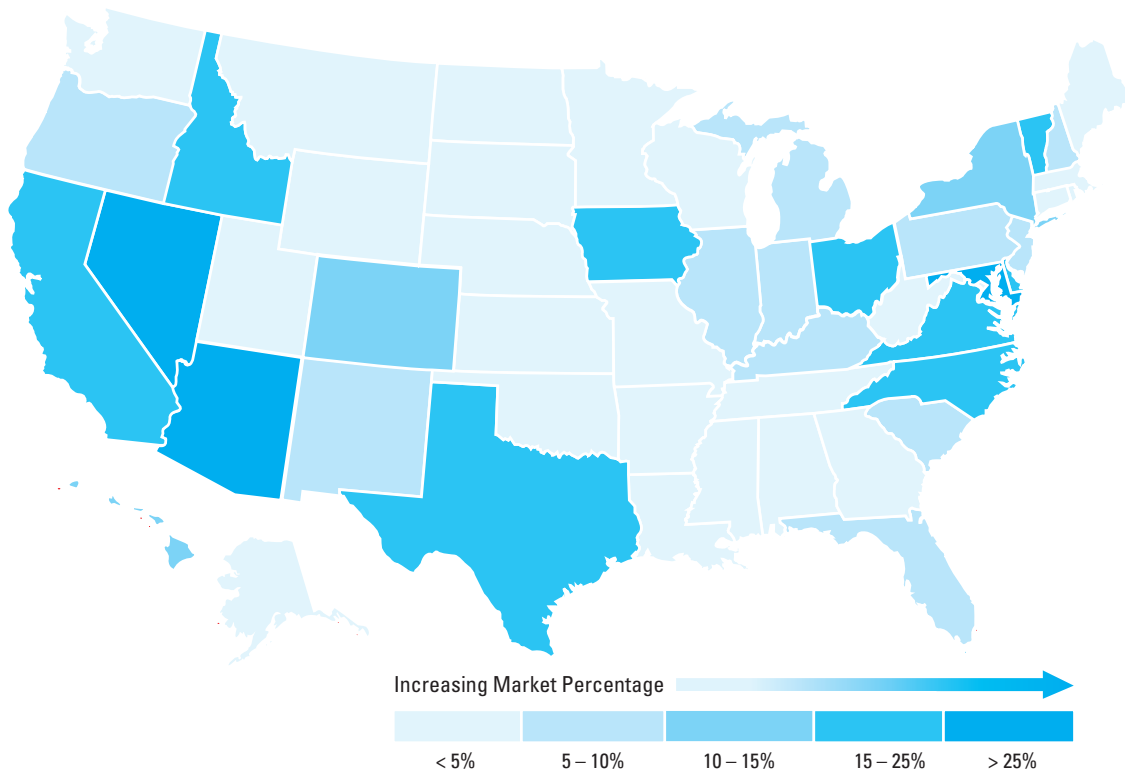


FIGURE 6. 2013 Market Share for ENERGY STAR Certified New Homes by State



⁷ For more information, see Appendix D: References (p. 46), U.S. EPA 2014a.

ENERGY STAR for New Multifamily High-Rise Units. Since units in multifamily high-rise buildings first became eligible to earn the ENERGY STAR label in 2011, more than 6,100 units have been certified across 69 different buildings. These units must meet EPA's energy efficiency guidelines and be designed to be at least 15 percent more efficient than the building energy code. In 2013, more than 2,300 multifamily high-rise units were certified across 28 buildings. When combined with multifamily low-rise homes, more than 100,000 multifamily housing units have been certified to date.

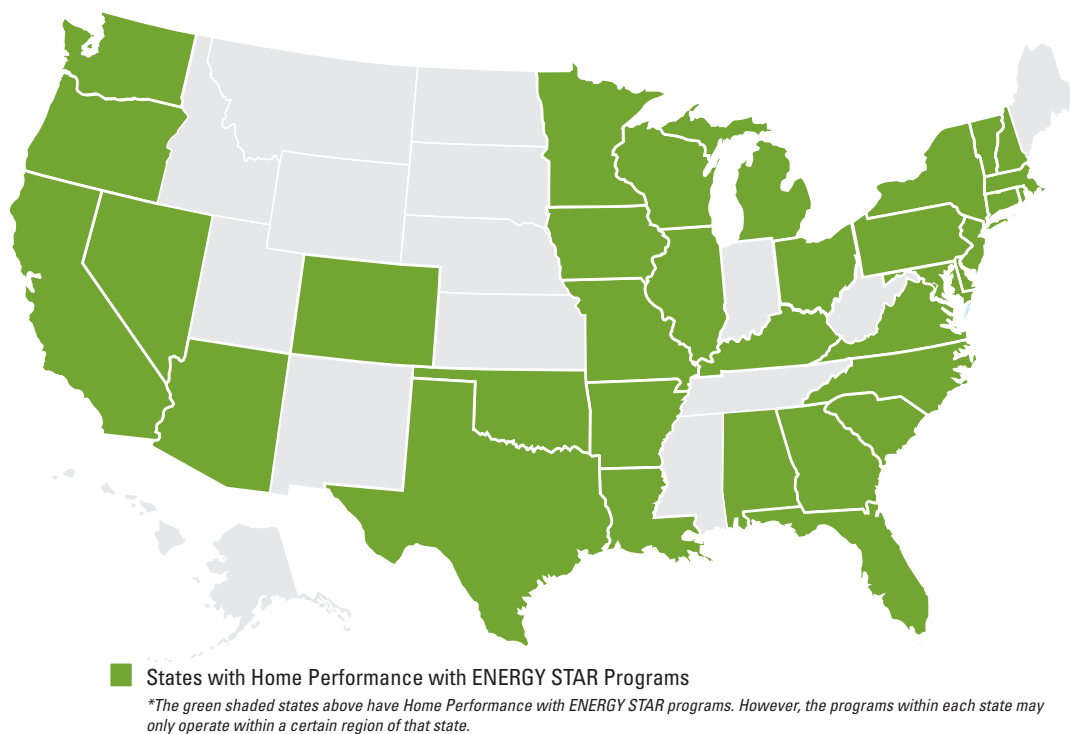
Making Affordable Housing More Energy-Efficient. EPA continued working with a variety of stakeholders to improve the energy efficiency of the nation's affordable housing stock, while reducing the utility bills of families living in those homes. In fiscal year 2013,⁸ more than 5,000 ENERGY STAR certified homes were built within the affordable housing sector using funding from the U.S. Department of Housing and Urban Development's HOME Investment Partnerships Program. EPA also partners with Habitat for Humanity to promote the construction of ENERGY STAR certified homes. More than 150 Habitat for Humanity affiliates nationwide built about 1,000 ENERGY STAR certified homes for low-income families in 2013. In addition, over 6,500 ENERGY STAR certified manufactured homes were built nationwide, for a cumulative total of more than 57,000.

ENERGY STAR Home Improvement

Home Performance with ENERGY STAR (HPwES). In 2013, an estimated 80,000 homes were improved through the comprehensive retrofit program Home Performance with ENERGY STAR (HPwES). This work was performed by 50 locally sponsored programs, including two new programs launched in 2013 and more than 2,000 participating contractors across the nation (see Figure 7). Since the program's inception, more than 335,000 homes have been improved through HPwES. The HPwES program is administered by the U.S. Department of Energy with support from EPA.

Energy Efficiency Guidance and Tools for Consumers. Americans viewed the home improvement section of the ENERGY STAR website nearly 1.5 million times during 2013 to find information about making their homes more energy efficient. This website access included using the Home Energy Yardstick and Home Energy Advisor online tools to assess their homes' energy use and get recommendations to help reduce utility bills and improve comfort.⁹ In 2013, ENERGY STAR improved the Home Energy Yardstick with the addition of Green Button functionality, a standardized way for utility customers to get their energy usage information electronically. Homeowners with access to Green Button can easily upload their home utility data into the Yardstick to see how their home energy use compares to other similar homes.

FIGURE 7. Home Performance With ENERGY STAR Spreads Across the Country in 2013



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

⁹ For more information, see www.energystar.gov/yardstick and www.energystar.gov/homeadvisor.

ENERGY STAR in the Commercial Sector

More than 7,000 organizations have partnered with EPA to deliver GHG emissions reductions, reduce business risk, and increase financial value through the ENERGY STAR commercial buildings program. These ENERGY STAR partners demonstrate practical and proven solutions to increase the efficiency of buildings and industrial plants and serve as examples for others to follow.

Achievements in 2013

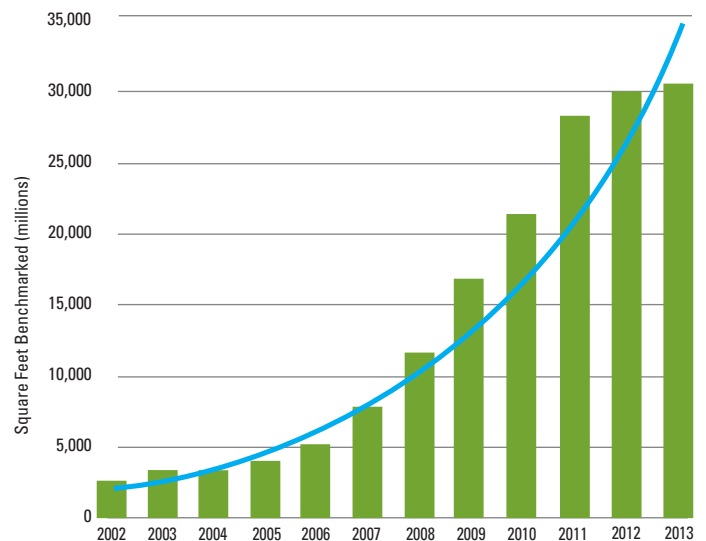
ENERGY STAR Certification for Top Performance. By the end of 2013, more than 22,000 buildings and plants representing more than 3 billion square feet of space had earned ENERGY STAR certification (see Figure 9). These top performers demonstrate that it is possible to emit 35 percent fewer GHG emissions than typical facilities while delivering financial value to an organization. Academic, industry, and EPA studies have shown that ENERGY STAR certified buildings cost less to operate, increase the asset value of the property, and have increased rent and less turnover than similar non-certified buildings.

ENERGY STAR Portfolio Manager Gets Turbo Charged. In 2013, EPA released a complete upgrade for ENERGY STAR Portfolio Manager, the industry-leading benchmarking tool used by more than 70,000 individual users to measure, track, assess, and report on the energy and water consumption of more than 325,000 commercial buildings nationwide—nearly 40 percent of the nation's commercial building space (see Figure 8). The new tool improves collaboration through advanced reporting and increased security. It offers easier data entry and enhanced graphics, data checks, and custom tabs to plan and set goals for current and future projects. This makes it possible to track a building from design to operation.

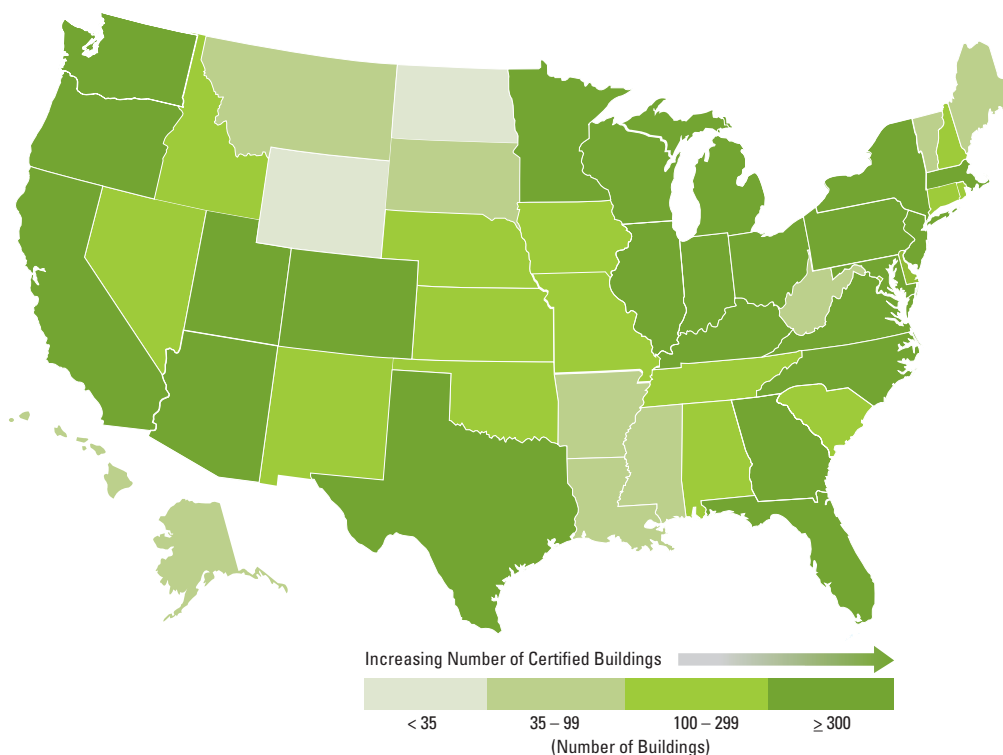
1-100 ENERGY STAR Scores Launched in Canada. Through a multi-year partnership with Natural Resources Canada, ENERGY STAR Portfolio Manager debuted in Canada with a scoring system for commercial buildings. The unprecedented launch increased the functionality of Portfolio Manager, making it easier for multinational organizations to use one platform for consistent energy management.

The Battle of the Buildings Advances. The 2013 competition ended with more than 3,000 competitors who reduced annual GHG emissions equal to the electricity used by more than 19,000 homes. Teams represented more than 25 different types of commercial buildings and hailed from all 50 states, two U.S. territories, and the District of Columbia, making it a truly nationwide competition. The winning elementary school from Baton Rouge, LA, cut its energy use by 45 percent. Nearly 50 buildings in the competition reduced energy by at least 20 percent in one year.

FIGURE 8. Cumulative Square Feet Benchmarked in Portfolio Manager



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

FIGURE 9. More Than 22,000 Buildings Have Earned the ENERGY STAR Through 2013

ENERGY STAR in the Industrial Sector

The industrial sector is a vital part of the U.S. economy. Manufacturing goods are valued at just over \$5.5 trillion, contribute more than 11 percent to the U.S. Gross Domestic Product (GDP), and provide more than 10.5 million jobs paying an average of \$52,500 annually.¹⁰ This sector also generates more than a quarter of the nation's annual GHG emissions.¹¹ 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 2013

Improving Performance—The ENERGY STAR Focus Industries

EPA works closely with specific industries to provide advanced tools that help companies learn to manage energy use and build long-term, productive energy programs (see Table 6, pg. 17). In 2013, the number of ENERGY STAR Focus Industries grew to 28 with the addition of the metal casting sectors of investment steel, carbon alloy steel, and aluminum, as well as automobile powertrain manufacturing.

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 the 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 2013, EPA worked with industry stakeholders to continue testing draft EPIs for lithographic printing and ready mixed concrete production. EPA issued a second draft of EPIs for iron casting based on industry review for subsequent testing. EPA also released first draft EPIs for industry testing for integrated steel mills, investment steel casting, carbon alloy steel casting, and commercial bakeries.

New Guidance for Improving Energy Efficiency in Industrial Sectors. ENERGY STAR energy guides identify ways to improve energy efficiency in a specific industry. In 2013, EPA released a new energy guide for concrete manufacturers in an abbreviated form and also updated the energy efficiency guide for the cement industry. A draft guide for the metal casting industry was produced for industry review. The growing library of energy guides continued to help industrial managers identify areas for energy efficiency improvements.

¹⁰ For more information, see Appendix D: References (p. 46), U.S. Census Bureau, 2013.

¹¹ For more information, see Appendix D: References (p. 46), U.S. EPA 2014a.

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 2013, 913 sites had taken the Challenge, and 247 achieved the goal, saving over 51 trillion Btu. The average site energy intensity reduction observed was 20 percent. Several corporations have instituted the ENERGY STAR Challenge for Industry at all of their sites worldwide.

Partnerships with National Collaboration Expanded Reach.

EPA continued to support the 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.¹² 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 continued campaigns to promote the ENERGY STAR Challenge for Industry to their members.

Partnering with Utility Programs. EPA partnered with Danville Utilities, a municipal utility, to test an innovative energy management training platform for small and medium-sized manufacturers. This project, called Southside Plant Performance, trained a cohort of energy champions from local manufacturing plants on ENERGY STAR tools that helped these companies establish energy management programs and find quick energy savings.

Energy Treasure Hunt Guidance. Much can be accomplished when facilities are assessed for energy waste using staff within an organization. EPA released instructional guidance for conducting "energy treasure hunts" using internal teams and conducted training to inform organizations about how to run treasure hunts in facilities. As a result, industrial and commercial organizations are now implementing this cost-effective approach to facility energy assessment.

Continuing to Earn ENERGY STAR Certification

In 2013, 64 plants earned the ENERGY STAR certification by achieving energy performance in the top quartile nationally, bringing the cumulative number of certified plants to 131. The cement and cookie and cracker baking sectors earned the greatest number of certifications among the industrial sectors. ENERGY STAR certification is valued by industry as it differentiates high performing plants.

TABLE 6. EPA ENERGY STAR Industrial Focuses on Energy

FOCUS	PEER EXCHANGE NETWORK	INDUSTRIAL ENERGY GUIDE	ENERGY PERFORMANCE INDICATOR	ENERGY STAR CERTIFICATION
Aluminum Casting	●	In progress	In progress	
Cement Manufacturing	●	Published	Released 2006 , Updated 2011	★
Concrete Manufacturing	●	Published	Draft under review	
Corn Refining	●	Published	Released 2006, Updated 2012	★
Dairy				
• Ice Cream	●	Published	Draft under review	
• Fluid Milk			Draft under review	
• Cheesemaking			Draft under review	
Food Processing				
• Bread and Rolls			Draft under review	
• Cookies & Crackers	●	Published	Released 2011	★
• Juice			Released 2009	★
• Frozen Fried Potato Products			Released 2009	★
• Tomato Products			Draft under review	
Glass Manufacturing				
• Fiberglass	●	Published	Draft under review	
• Flat glass			Released 2009	★
• Container glass			Released 2009	★
Metal Casting				
• Iron	●	Draft	Draft under review	
• Investment Steel Casting			Draft under review	
• Carbon/Alloy Casting			Draft under review	
Motor Vehicle Manufacturing				
• Auto Assembly	●	Published	Released 2006	★
• Powertrain			Updated 2010	
			In development	
Petrochemical Manufacturing	●	Published	Draft under review	
Petroleum Industry	●	Published	Private System recognized by EPA	★
Pharmaceuticals	●	Published	Released 2008	★
Printing	●	Draft	Draft under review	
Pulp & Paper				
• Pulp Mill	●	Published	Released 2010	★
• Integrated Mill			Released 2012	★
Steel				
• Mini Mills	●	Published	Draft under review	
• Integrated			Draft under review	

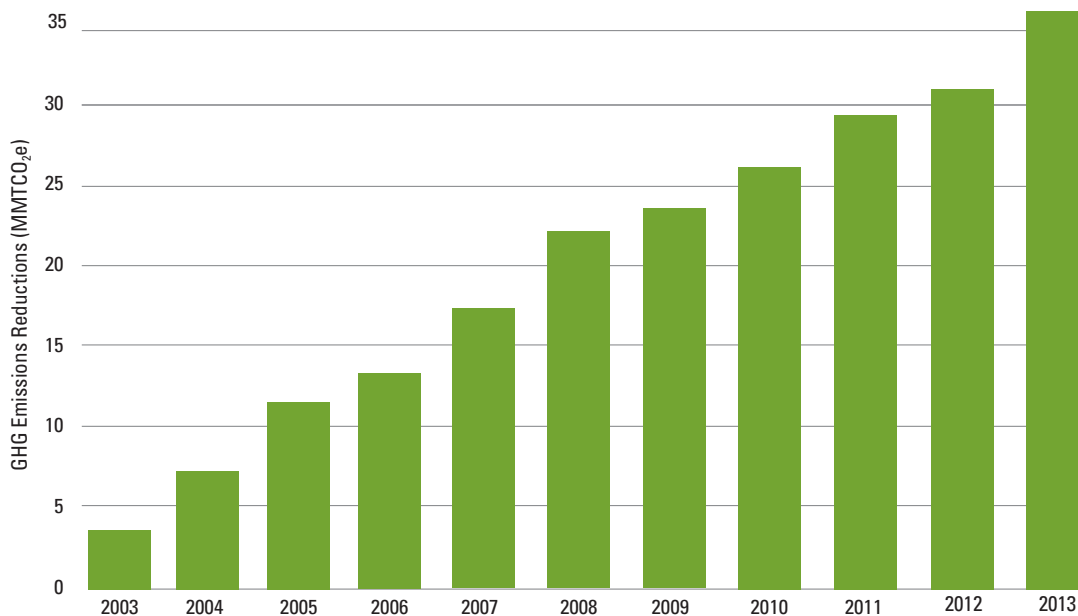
CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS

EPA launched the Green Power Partnership (GPP) and Combined Heat and Power Partnership (CHPP) in 2001 to facilitate the growth of green power generation and environmentally beneficial CHP across the nation.

For the past 12 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. CHPP 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 2013 alone, EPA's energy supply programs reduced GHG emissions by 36.3 MMTCO₂e (see Figure 10).

FIGURE 10. Annual GHG Emissions Reductions by the Carbon Dioxide Reducing Energy Supply Programs



GREEN POWER PARTNERSHIP (GPP)

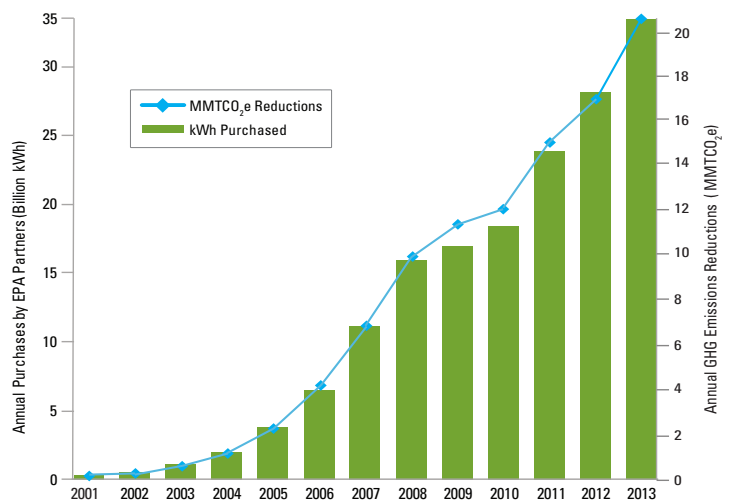


EPA's Green Power Partnership is a voluntary program that encourages organizations to buy green power to reduce the environmental impacts associated with purchased electricity use and, in so doing, demonstrate their environmental leadership.¹³ EPA's Green Power partners include a wide variety of forward-thinking 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 2013 another exceptional year for EPA's Green Power Partnership.

Achievements in 2013

- Added 313 new partners, bringing the total to more than 1,500. These organizations have committed to buying about 35 billion kWh of green power annually—enough electricity to run nearly 3 million average American homes for one year (see Figure 11).
- Organized 11 webinars on important topics such as aggregated renewable energy purchasing groups, green power procurement options for K-12 schools and sports teams/venues, and renewable energy market innovations and outlook.
- Further 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 11 proposals submitted on behalf of nine project developers, EPA selected seven projects to present to partners during a networking webinar.
- Acknowledged 78 partners in EPA's College & University 2012–2013 Green Power Challenge. EPA ranked the green power purchases of individual schools against others within their athletic conferences and calculated cumulative purchases among competing conferences. The Big 10 Conference topped the list with the largest total purchase (more than 309 million kWh of annual green power use) and earned recognition as the 2012–2013 Collective Conference Champion.
- Presented 21 Green Power Leadership Awards to top purchasers of green power and on-site renewable power systems, and three awards to green power suppliers (see Appendix A, pg. 41).

FIGURE 11. 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 use green power in amounts that meet or exceed EPA's GPP community usage requirements. Between 2004 and 2013, 48 communities mobilized to reduce their carbon footprints by buying and using green power. Their green power use helped avoid annual CO₂ emissions equivalent to those from the electricity used in more than 570,000 average American homes.

The participating communities added more than one billion kWh of green power to the overall GPC total during the 2012–2013 *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, IL, had the highest green power percentage of total electricity use (close to 92 percent).

¹³ For additional information on GPP, see www.epa.gov/greenpower/.

COMBINED HEAT AND POWER PARTNERSHIP (CHPP)



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 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.¹⁴

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 56 percent of the new CHP capacity additions.

Achievements in 2013

- Assisted in the deployment of more than 278 MW of new CHP nationwide (out of 597 MW of new nationwide capacity), bringing the cumulative impact of the program to nearly 6,200 MW of new CHP (see Table 7).
- Welcomed 50 new partners, bringing the total to more than 480.
- Responded to 91 technical assistance requests from organizations across the country, such as equipment manufacturers, project developers, state and federal agencies, national laboratories, wastewater treatment facilities, multifamily building owners and developers, project permitting consultants, and universities.
- Added eight new key policy categories to the Partnership's online database (*d*CHPP) where users can search for CHP policies and incentives at the state and federal levels.¹⁵
- Collaborated with the U.S. Departments of Energy and Housing and Urban Development to develop a *Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings*, which addresses how CHP can be used to increase the resilience of facilities and critical infrastructure in response to natural disasters and other crises.¹⁶ The guide provides examples of residential and other critical facilities that were able to use CHP as an alternative to backup generators and continue to operate during Hurricane Sandy.
- Developed a fact sheet on CHP as a boiler replacement opportunity targeted at facilities that may be considering boiler investments to replace aging boilers, expand capacity, or respond to new regulations.
- Provided a scoping study requested by the City of New York to help evaluate CHP as an option to improve the resiliency of the Breezy Point neighborhood, which was devastated by Hurricane Sandy.
- Developed tools and resources to support implementation of Executive Order 13624, "Accelerating Investments in Industrial Energy Efficiency."¹⁷
- Honored seven highly efficient CHP projects with ENERGY STAR CHPP awards: a 1.9 MW system at the Marine Corps Logistics Base Albany; a 150 kW system at the National Archives and Records Administration; a 46 MW system at Boston's Medical Area Total Energy Plant; an 11 MW system at Montefiore Medical Center; a 7.5 MW system at New York-Presbyterian Hospital/Weill Cornell Medical Center; a 12.8 MW system at New York University; and a 45 MW system at Texas A&M University (see Appendix A, pg. 41).

TABLE 7. U.S. CHP Capacity and Partnership Market Share

YEAR	TOTAL NEW CHP CAPACITY (MW)	NEW CHP CAPACITY CREDITABLE TO THE PARTNERSHIP (MW)
2002	5,580	620 (11%)
2003	4,033	548 (14%)
2004	3,717	1,963 (53%)
2005	1,715	848 (49%)
2006	553	140 (27%)
2007	628	342 (54%)
2008	444	193 (44%)
2009	721	403 (56%)
2010	710	301 (42%)
2011	566	309 (55%)
2012	944	254 (27%)
2013	597	278 (47%)
Total	20,208	6,199 (31%)

¹⁴ For additional information on CHPP, see www.epa.gov/chp/basic/efficiency.html.

¹⁵ For additional information, see www.epa.gov/chp/policies/database.html

¹⁶ For more information, see portal.hud.gov/hudportal/documents/huddoc?id=CHPSept2013.pdf.

¹⁷ For additional information, see 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.¹⁸ 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.¹⁹ 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 75.0 MMTCO₂e in 2013 (see Table 2, pg. 6).

NATURAL GAS STAR PROGRAM



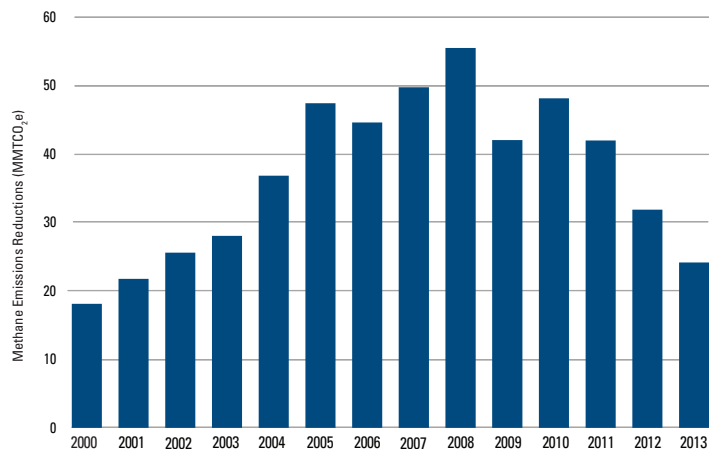
Natural Gas STAR is a flexible, collaborative partnership between EPA and oil and natural gas companies, designed to spur the adoption of cost-effective technologies and practices that reduce methane emissions. By working with both domestic and international companies involved in oil production and all 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.²⁰

Achievements in 2013

- Reduced U.S. methane emissions by 24.1 MMTCO₂e through efforts undertaken and reported by domestic partners for 2013 (see Figure 12), achieving cumulative program reductions over 580 MMTCO₂e since 1990.²¹
- Welcomed 6 new (international) partners, bringing the total to 127 domestic and international companies.
- Hosted domestic technology transfer workshops in Philadelphia, PA, and Orlando, FL, to promote technologies and practices that reduce methane emissions.

FIGURE 12. Natural Gas STAR Annual Methane Emissions Reductions



¹⁸ For more information, see Appendix D: References (p. 46), U.S. EPA 2014a.

¹⁹ For more information, see Appendix D: References (p. 46), IPCC 2007.

²⁰ For additional information on Natural Gas STAR and 2013 accomplishments, see www.epa.gov/gasstar/accomplishments/index.html.

²¹ Voluntary emissions reductions reported to Natural Gas STAR annually by program partners decreased due to several factors, including new regulatory requirements [New Source Performance Standards for the Oil and Natural Gas Sector] that are no longer reportable to the program as a voluntary action.



AgSTAR PROGRAM

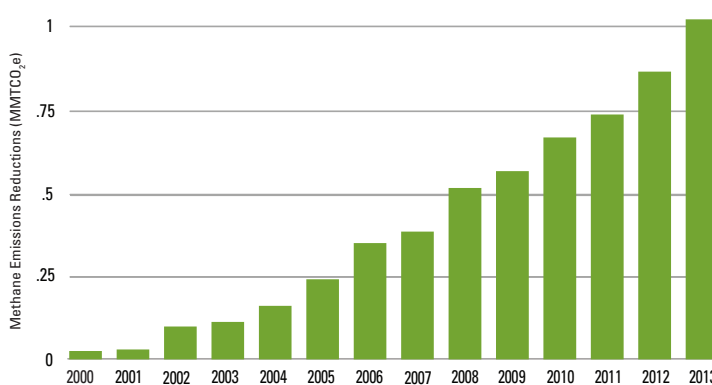
Biogas recovery systems help reduce GHG emissions by enabling the recovery and use of methane from animal manure and other organic wastes. A biogas recovery system is typically anchored by a manure digester that captures and combusts biogas to produce electricity, heat, or hot water. In addition to avoiding 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) and 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.²²

Achievements in 2013

- Reduced direct methane emissions from approximately 239 livestock farms by 0.8 MMTCO₂e and avoided approximately 0.2 MMTCO₂e in fossil fuel emissions, producing total emission reductions of 1.0 MMTCO₂e in 2013 (see Figure 13). Cumulatively, anaerobic digesters on livestock farms have reduced emissions by 5.4 MMTCO₂e in the past decade.
- Participated in several outreach events with livestock producers, renewable energy industry leaders, and state and local governments.
- Renewed the AgSTAR Partnership program, which brings together representatives of universities, state and local governments, not-for-profits, and other related organizations to share information and encourage implementation of biogas recovery systems.
- In 2013, there were approximately 239 biogas recovery systems operating in the livestock sector. The majority of the systems utilize complete mix (33%) or plug flow (32%) designs. Almost all of the systems use the biogas to generate electricity (86%), many of which also recover waste heat through combined heat and power systems.

FIGURE 13. AgSTAR Annual Methane Emissions Reductions





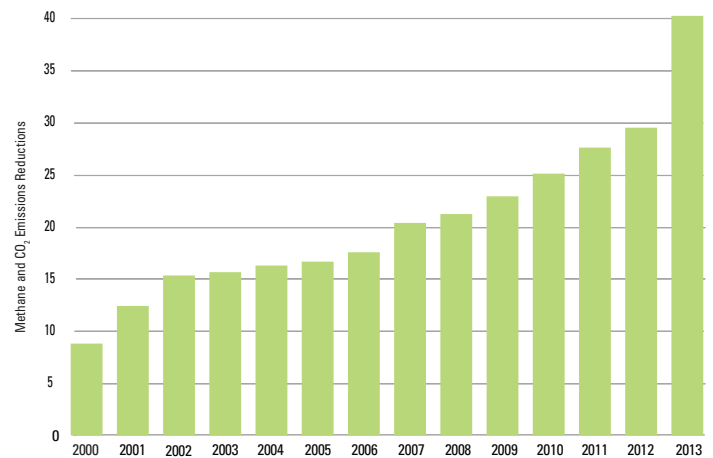
LANDFILL METHANE OUTREACH PROGRAM (LMOP)

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.²³ Annually, EPA recognizes outstanding partners for their work on LFG energy projects. See the full list of 2013 winners in Appendix A, page 42.

Achievements in 2013

- Reduced methane emissions from hundreds of U.S. landfills and avoided CO₂ emissions totaling approximately 40.3 MMTCO₂e in 2013 (see Figure 14). Over the past 19 years, LMOP has assisted 607 LFG energy projects and the nationwide total reached 634 currently operational projects in 2013. The 607 LMOP-assisted projects have collectively reduced and avoided more than 306 MMTCO₂e since the program began.
- Welcomed 45 new partners and endorsers, bringing the total to more than 1,070 LMOP partners and endorsers.
- Hosted the Annual LMOP Conference and Project Expo, attracting more than 660 people.
- Conducted outreach supporting three events and hosted workshops and webinars to promote landfill methane mitigation.
- Partnered with Texas Solid Waste Association of North America to host a state-specific LFG energy workshop.

FIGURE 14. LMOP Annual Methane and CO₂ Emissions Reductions



²³ For additional information on LMOP and 2013 accomplishments, see www.epa.gov/lmop/.

U.S. LEADERSHIP IN INTERNATIONAL METHANE INITIATIVES

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, Chile, India, Indonesia, Kazakhstan, Mexico, and Turkey. EPA leads USG efforts supporting GMI and partners with other agencies including Department of State, DOE, and USDA.²⁴



Achievements in 2013

- Since 2004, the U.S. has provided technical, financial, and capacity-building support to more than 1000 global methane projects that have reduced methane emissions cumulatively by over 200 MMTCO₂e.
- U.S. investment of approximately \$80 million in this Initiative since 2004 has leveraged nearly \$529 million in contributions of in-kind services from other Partners or Project Network members.
- During 2013, the U.S. supported more than 100 GMI project development activities including pre-feasibility studies in Kazakhstan; workshops and trainings in 9 different countries; and developed new tools such as an Anaerobic Digestion Best Practices guide for the Agriculture sector.²⁵ These efforts contributed to methane emission reductions of 29 MMTCO₂e in 2013 alone.

CLIMATE AND CLEAN AIR COALITION

The Climate and Clean Air Coalition (CCAC) to Reduce Short Lived Climate Pollutants (SLCPs) is an initiative that the United States launched in February 2012, along with the governments of Bangladesh, Canada, Ghana, Mexico, and Sweden and the United Nations Environment Programme (UNEP). CCAC membership has grown rapidly and the Partnership now includes over 80 state and non-state partners. The Coalition is the first effort to treat short-lived climate pollutants (black carbon, methane, and hydrofluorocarbons or HFCs) as a collective challenge. Addressing these short-lived climate pollutants

can have immediate, multiple benefits. Reducing them will protect human health and the environment now and slow the rate of climate change within the first half of this century. The Coalition's objectives are to address short-lived climate pollutants by:

1. Raising awareness of short-lived climate pollutant impacts and mitigation strategies;
2. Enhancing and developing new national and regional actions, including by identifying and overcoming barriers, enhancing capacity, and mobilizing support;
3. Promoting best practices and showcasing successful efforts; and
4. Improving scientific understanding of short-lived climate pollutant impacts and mitigation strategies.

In its first years, the CCAC has approved 11 rapid implementation initiatives targeted to accelerate action against climate-damaging emissions of short-lived climate pollutants. EPA provides leadership and critical technical support for several of these initiatives, allowing EPA to expand the impact of its work internationally.

- Reducing Black Carbon Emissions from Heavy Duty Diesel Vehicles and Engines
- Mitigating Black Carbon and Other Pollutants From Brick Production
- Mitigating SLCPs from the Municipal Solid Waste Sector
- Promoting HFC Alternative Technology and Standards
- Accelerating Methane and Black Carbon Reductions from Oil and Natural Gas Production
- Addressing SLCPs from Agriculture
- Reducing SLCPs from Household Cooking and Domestic Heating
- Financing of SLCP mitigation
- Supporting National Planning for action on SLCPs
- Regional Assessments of SLCPs
- Urban Health Initiative

²⁴ For additional information on GMI and 2013 accomplishments, see www.epa.gov/globalmethane/accompreport.htm.

²⁵ For additional information, see www.globalmethane.org/tools-resources/tools.aspx



COALBED METHANE OUTREACH PROGRAM (CMOP)

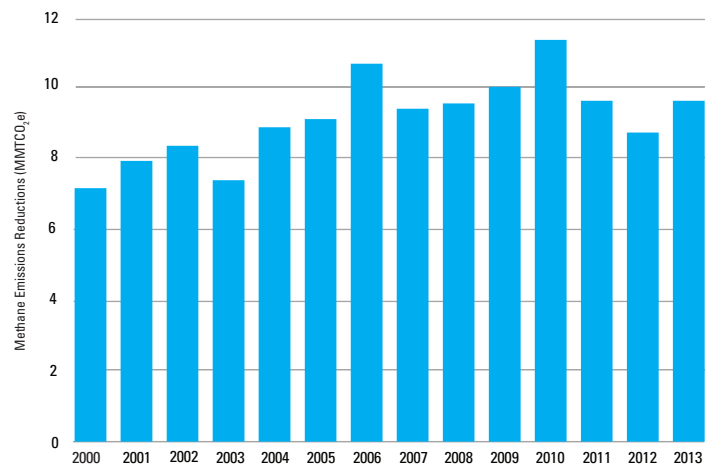
The Coalbed Methane Outreach Program (CMOP) strives to reduce methane emissions from coal mining activities. Coal mine methane (CMM) is a potent GHG and can be an explosive hazard inside mines. But if CMM is recovered safely and used for energy, it is a valuable, clean-burning fuel source. CMOP collaborates 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.²⁶

Achievements in 2013

- CMOP reduced CMM emissions by 9.6 MMTCO₂e in 2013 (see Figure 15),²⁷ and since the program began in 1994, it has achieved cumulative reductions of 163.8 MMTCO₂e.
- There are 17 operating coal mine methane projects in the U.S.: 15 using drained gas from active underground mines, 2 mitigating dilute ventilation air methane (VAM) at active underground mines, and 18 using abandoned mine methane gas.
- Conducted a number of outreach meetings and calls with coal companies and individual mines to discuss CMM capture and use opportunities.
- Provided technical analysis to proactively engage U.S. coal mines and industry representatives to stimulate further domestic CMM project development.

FIGURE 15. CMOP Annual Methane Emissions Reductions



²⁶ For additional information on CMOP and 2013 accomplishments, see www.epa.gov/cmop/.

²⁷ Emission reductions are draft, pending the final 2013 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 CO₂.²⁸

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 2013, FGHG emissions reductions across the partnership programs totaled 16.6 MMTCO₂e as EPA continued to support partners in their efforts to improve industrial processes and share best practices.²⁹

²⁸ For more information, see Appendix D: References (p. 46), IPCC 2007.

²⁹ These are emissions reductions from voluntary programs and do not include reductions from regulatory programs such as the Significant New Alternatives Policy (SNAP) program.

THE VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP (VAIP)

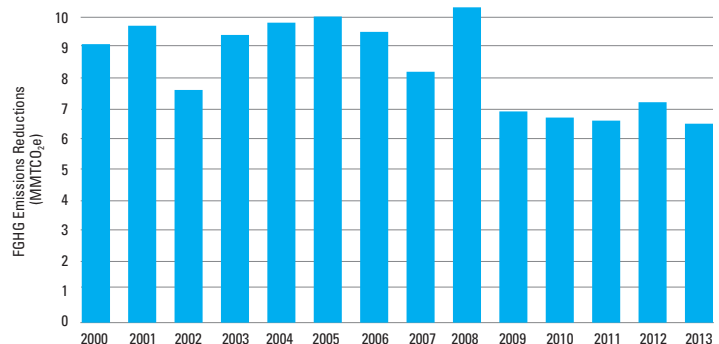


Since 1995, EPA and the U.S. primary aluminum industry have worked together through the Voluntary Aluminum Industrial Partnership (VAIP), which represents 98 percent of U.S. production capacity, to reduce perfluorocarbon (PFC) emissions from aluminum production.³⁰ PFC emissions of perfluoromethane (CF₄) and perfluoroethane (C₂F₆) are inadvertent byproducts of the smelting process, and are 7,390 and 12,200 times more potent warming agents than CO₂.³¹ 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 data through the Greenhouse Gas Reporting Program.³²

Achievements in 2013

- Reduced PFC emissions on a per ton basis by more than 30 percent and absolute emissions by 6.5 MMTCO₂e compared to the industry's 1990 baseline (see Figure 16).³³
- Participated in the Minerals, Metals, and Materials Society (TMS) Conference and Aluminum Association programs on PFC reductions.
- Completed technology type benchmarking analysis for each partner company to support efforts to further reduce PFC emissions and set new emissions reduction goals.

FIGURE 16. VAIP Annual Emissions Reductions



SF₆ EMISSIONS REDUCTION PARTNERSHIP FOR ELECTRIC POWER SYSTEMS (EPS)

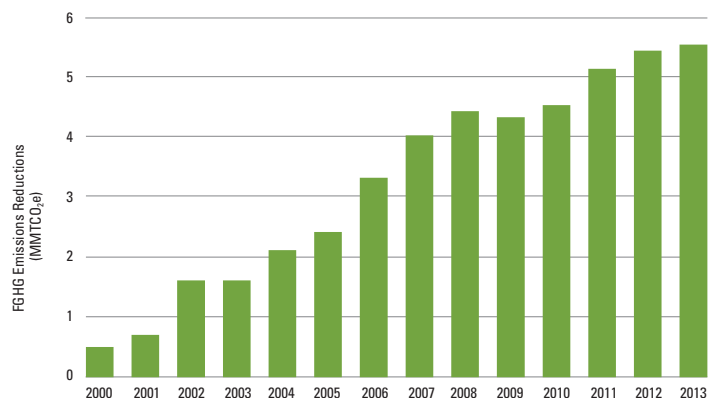


SF₆ is the most potent and persistent GHG—it traps 22,800 times more infrared radiation than the equivalent amount of CO₂.³⁴ Used primarily by electric utilities, SF₆ is a gaseous dielectric for high-voltage circuit breakers and gas-insulated substations. Utilities nationwide have the opportunity to make a big difference in the nation's emissions of SF₆. EPA partners with 85 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.³⁵

Achievements in 2013

- Reduced emissions by 5.5 MMTCO₂e, bringing average SF₆ emissions rates down to 2.4 percent of the total equipment nameplate capacity (see Figure 17).
- Conducted Workshop on SF₆ Reductions with over 130 participants and 18 exhibitors.
- Recognized Commonwealth Edison of Illinois and the New York Power Authority for SF₆ emission reduction program achievements.
- Welcomed two new partners to the program and continued to work with partners to update their SF₆ reduction goals.

FIGURE 17. EPS Annual Emissions Reductions



³⁰ For additional information about the Voluntary Aluminum Industrial Partnership and 2013 accomplishments, see www.epa.gov/highgp/aluminum-pfc

³¹ For more information, see Appendix D: References (p. 46), IPCC 2007.

³² For more information, see www.epa.gov/ghgreporting/

³³ 2010-2013 reductions are based on estimated, not reported production numbers.

³⁴ For more information, see Appendix D: References (p. 46), IPCC 2007.

³⁵ For additional information about the SF₆ Emission Reduction Partnership for Electric Power Systems and 2013 accomplishments, see www.epa.gov/highgp/electricpower-sf6/index.html.



RESPONSIBLE APPLIANCE DISPOSAL PROGRAM (RAD)

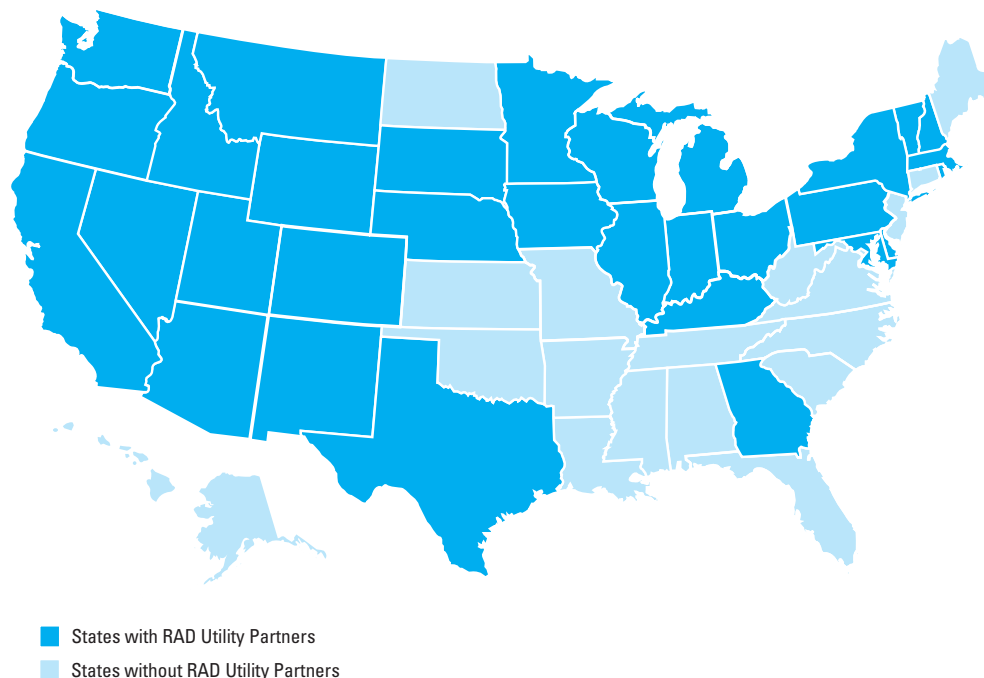
EPA launched the Responsible Appliance Disposal Program (RAD) in October 2006 to help protect the ozone layer and reduce GHG emissions. Partners go beyond Clean Air Act Section 608 regulatory requirements³⁶ by ensuring that old refrigerators, freezers, window air conditioners, and dehumidifiers are recycled 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 utility, retailer, and manufacturer partners as well as state affiliates commit 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 to 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 18).³⁷

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 2013

- Avoided emissions of over 0.2 MMTCO₂e and more than 579,800 pounds of ozone-depleting substances (263 ODP weighted metric tons) through the proper disposal of approximately 910,800 refrigerant-containing appliances.
- Expanded from 50 to 54 partners and affiliates.
- Recovered 385,300 pounds of refrigerants and 385,700 pounds of blowing agent.
- Prevented the following materials from going to a landfill: 119.2 million pounds of ferrous metals; 5.8 million pounds of non-ferrous metals; 21.2 million pounds of plastic; and 3.4 million pounds of glass.
- Properly handled the following toxic or hazardous substances: 73,700 gallons of used oil; 41,500 PCB-containing capacitors; and 13,000 mercury-containing components.
- RAD has partner representation in all 50 states.

FIGURE 18. Utility Partners Across the United States Are Participating with RAD



³⁶ For additional information, see www.epa.gov/oar/caa/title6.html or www.epa.gov/ozone/title6/downloads/Section_608_FactSheet2010.pdf.

³⁷ For additional information on RAD and 2013 accomplishments, see www.epa.gov/rad.

³⁸ For more information, see Appendix D: References (p. 46), IPCC 2007.



GREENCHILL PARTNERSHIP

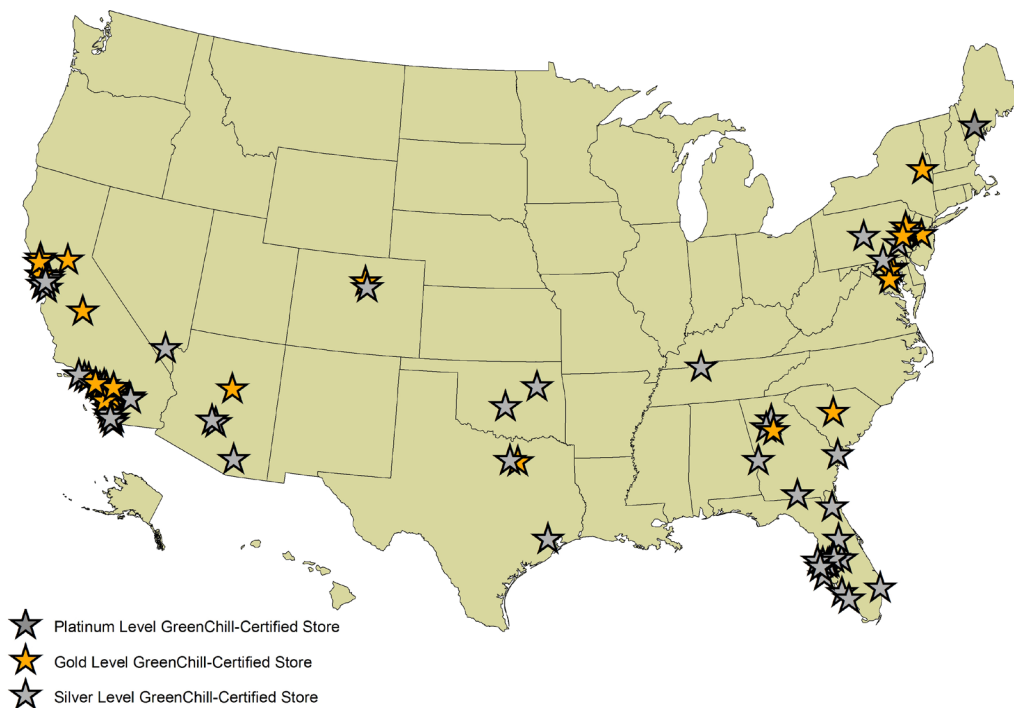
EPA’s GreenChill Partnership works with the supermarket industry to reduce refrigerant emissions that harm the ozone layer and contribute to climate change. The refrigerants used in supermarkets are generally 1,500 to 3,300 times more potent global warmers than CO₂.³⁹ Supermarkets leak about 35 million 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 608.⁴⁰ GreenChill helps supermarkets transition to refrigerants that are more environmentally friendly, significantly reduce the amount of refrigerant used, appreciably lower refrigerant leak rates, and adopt green refrigeration technologies and best environmental practices.⁴¹

GreenChill’s Corporate Emissions Reduction Program asks supermarkets in the Partnership to set corporate emission reduction goals each year. In 2013, the supermarket partners reduced the amount of refrigerant in their commercial systems by about 66 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 2013

- GreenChill partners had a weighted-average annual leak rate (12.4 percent) that was at least 50 percent lower than the national average annual leak rate (25 percent).
- An average GreenChill store’s installed refrigerant in 2013 had a climate impact (2,861 MTCO₂e) that was 37 percent lower than the national average store’s impact (4,525 MTCO₂e).
- Eighty-two GreenChill stores were certified in 2013 for advanced refrigeration technology that prevents refrigerant leaks (see Figure 19)—2 platinum, 32 gold, and 48 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 partners have stores in all 50 states.

FIGURE 19. GreenChill Certified Stores in 2013



³⁹ For more information, see Appendix D: References (p. 46), IPCC 2007.

⁴⁰ For additional information, see www.epa.gov/oar/caa/title6.html or www.epa.gov/ozone/title6/downloads/Section_608_FactSheet2010.pdf.

⁴¹ For additional information about GreenChill and 2013 accomplishments, see www.epa.gov/greenchill.

CROSS-CUTTING EMISSIONS REDUCTION PROGRAMS

EPA supports several additional 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 implement renewable energy and energy efficiency policies and programs, reduce carbon and other pollutant emissions through their own policies, and set an example for other jurisdictions. EPA established the State and Local Climate and Energy Program to help state and local governments meet sustainability and environmental 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.⁴²

Achievements in 2013

- Organized and sponsored the second annual Climate Leadership Awards (CLA), a national awards program that recognizes and incentivizes exemplary corporate, organizational, and individual leadership in response to climate change. In 2013, the awards were presented to two individuals and 21 organizations from across the United States who have been leading the way in the management and reduction of GHG emissions—both in 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. 43).
- Served as the headline sponsor of the second annual Climate Leadership Conference—an exchange for addressing global climate change through innovation and business solutions. The conference brought together more than 400 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.
- Launched and hosted a webinar series called *What is Climate Leadership?*⁴³ highlighting organizational leadership, supply chain management, GHG reduction goal-setting, integrating energy and climate risk management, and EPA's ENERGY STAR Portfolio Manager®, a tool to measure and track energy and water consumption and GHG emissions in commercial buildings.
- Promoted the program's technical resources housed on The Center's website, including: methodological guidance on developing a company-wide GHG inventory; tools to help calculate a company's

30 ⁴² For additional information on The Center, see www.epa.gov/climateleadership/.

⁴³ For additional information, see www.epa.gov/climateleadership/events/index.html

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.

- Developed a new Supply Chain section on The Center’s website for organizations interested in reducing their supply chain emissions. Information features resources and case studies, as well as a “sector spotlight” which highlights activities to reduce supply

chain GHG emissions at the sectoral level. As a first initiative, EPA featured the electronics sector, specifically flat panel display suppliers’ efforts to reduce F-GHG emissions in flat panel manufacturing.

- Promoted the Climate Leadership Awards and The Center’s resources. Received coverage in several media outlets, including *American City and County Magazine*, *Environmental Leader*, and *GreenBiz*.



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 decision makers to support their efforts to provide cost-effective energy efficiency to their communities.

Achievements in 2013

STATE CLIMATE AND ENERGY PROGRAM

- Played an integral role in involving states and utilities in an extensive external engagement process that contributed to EPA’s proposed Clean Power Plan for Existing Power Plants. Participated on multiple teams critical to the design and drafting of the proposed plan.
- Provided direct technical assistance to states on effectively using renewable energy and energy efficiency to meet EPA regulations.
- Launched and updated tools and data that states can use to quantify and promote the impacts of renewable energy and energy efficiency, including the AVOIDed Emissions and geneRation Tool (AVERT), Energy Efficiency Load Shapes, and updated State Energy Savings Estimates.

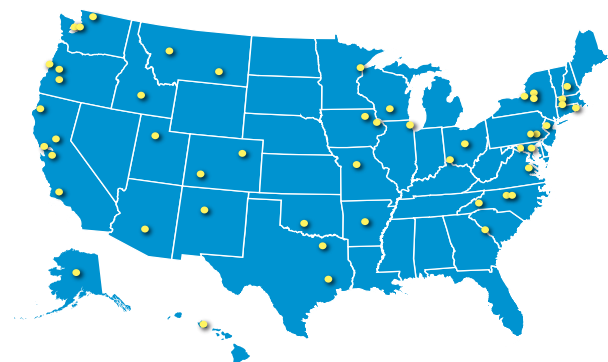
LOCAL CLIMATE AND ENERGY PROGRAM

- Enhanced the Climate Showcase Communities Network with the replication and expansion of multiple projects, including: Little Rock, AR; Seattle, WA; Cary, NC; and Durham, NC.
- Provided resources to meet local and tribal needs, including a webcast series on Adaptation and Communications, online Tribal Climate and Energy resources, and a Local Strategy Guide on Energy Efficiency in Water & Wastewater Facilities.
- Re-launched EPA’s Heat Island Reduction Program, providing background, resources, and case studies on the heat island effect.

Climate Showcase Communities

EPA held a workshop for the 50 Climate Showcase Communities that are implementing local and tribal government climate change initiatives (see Figure 20). 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.⁴⁵

FIGURE 20. EPA Supports 50 Climate Showcase Communities



⁴⁴ For additional information, see www1.eere.energy.gov/seeaction/.

⁴⁵ For additional information, see 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 2013. 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 2013.
- 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 *Fourth Assessment Report*.⁴⁶
- 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.⁴⁷

The 2013 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 in Table 8 on page 33. The information presented in this report is similar to EPA budget information provided by EPA to the U.S. Office of Management and Budget (OMB).

⁴⁶ For more information, see Appendix D: References (p. 46), IPCC 2007.

⁴⁷ 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. \$12.7 billion and \$3.5 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 Fourth 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 2013	START YEAR	ANNUAL EMISSIONS REDUCTIONS (MMTCO ₂ e)						
					2009	2010	2011	2012	2013	2015 GOAL	2020 GOAL
ENERGY STAR PROGRAMS											
Certified Products	CO ₂	Residential, Commercial	More than 70 product categories	1992	71.9	81.4	107.4	129.2	155.1	113.6	141.2
Residential	CO ₂	Residential	16% of new home market	1995	2.1	2.4	2.7	2.9	3.1	3.2	3.8
Commercial	CO ₂	Commercial	More than 27,000 labeled buildings across 16 building types	1995	69.2	81.2	86.6	89.8	96.0	75.0	93.5
Industrial	CO ₂	Industrial	131 labeled plants across 28 Industrial sectors and subsectors	1995	26.4	33.2	32.2	32.7	39.7	25.6	36.6
CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS¹											
Green Power Partnership	CO ₂	State & Local Government, Commercial, Industrial	Over 1,500 partners	2001	23.8	26.4	29.6	31.6	36.3	44.0	73.3
Combined Heat & Power Partnership	CO ₂	Commercial, Industrial	Over 480 partners, 47% of new CHP capacity creditable to CHPP	2001							
METHANE PROGRAMS											
Natural Gas STAR	CH ₄	Natural Gas	127 US and International partners	1993	42.0	48.1	42.0	31.9	24.1	30.1	31.8
AgSTAR ²	CH ₄	Agriculture	239 anaerobic digester systems	1994	0.6	0.7	0.7	0.8	1.0	1.1	1.1
Landfill Methane Outreach Program (LMOP) ²	CH ₄	Waste Management	1,070 partners and endorsers	1994	22.9	25.1	27.6	29.6	40.3	17.0	18.7
Coalbed Methane Outreach Program (CMOP)	CH ₄	Coal Mining	85% of gas from underground coal mine degasification systems was recovered and used.	1994	10.0	11.3	9.6	8.7	9.6	10.5	10.5
FLUORINATED GREENHOUSE GAS PROGRAMS											
Voluntary Aluminum Industrial Partnership (VAIP)	PFCs	Aluminum Smelting	98% of Industry	1995	6.9	6.7	6.6	7.2	6.5	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	4.3	4.5	5.1	5.4	5.5	5.4	5.0
Responsible Appliance Disposal Program (RAD) ³	HFCs	Utility, Retail, Manufacturer, State & Local Government	54 partners servicing 31 states	2006	0.3	0.3	0.3	0.2	0.2	0.4	0.7
GreenChill ³	HFCs	Supermarket Industry	21% of supermarkets	2007	2.2	2.5	4.6	4.9	4.4	5.3	8.5

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. GHG emissions reductions assume global warming potentials based on the Intergovernmental Panel on Climate Change's Fourth Assessment Report (IPCC 2007). 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 2013, direct emissions reductions were 0.8 MMTCO₂e for AgSTAR and 31.2 MMTCO₂e for LMOP.

³ Does not incorporate climate benefits from ozone-depleting substances, which would result in an increase of 1.1- 2.2 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 that 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.⁴⁸ EPA's calculations assume sector-specific, national-average prices, including electricity and fossil fuel prices published by the Energy Information Administration (EIA).⁴⁹ 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 from 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.⁵⁰ These sales are estimated by:
 - Collecting annual sales data on ENERGY STAR certified products from participating product manufacturers, provided to EPA 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 2013.
 - 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.⁵¹
- 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 have verified to be ENERGY STAR, provided 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.

⁴⁸ For more information, see Appendix D: References (p. 46), U.S. Department of Commerce 2014.

⁴⁹ For more information, see Appendix D: References (p. 46), Energy Information Administration 2014.

⁵⁰ For more details on many aspects of this method, see Appendix D: References (p. 46), DNV KEMA 2014.

⁵¹ Calculated using a 7% discount rate and 2014 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 industrial sector data from the U.S. Energy Information Administration's State Energy Database as the basis for developing multivariate statistical models that estimate the change in national electricity, natural gas, coal, petroleum, and wood and wood waste consumption resulting from publically-funded energy efficiency programs. The details of the impact evaluation methodology are published in peer-reviewed papers in the international scientific journals *Energy Efficiency and The Energy Journal*.⁵⁴
- 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 state-level industrial sector energy consumption take 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.⁵⁵
- 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*.⁵²
- 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.⁵³

Program Cost-Effectiveness

EPA estimates the cost-effectiveness of the ENERGY STAR Program for each dollar invested and metric ton of GHG emissions reduced. For incremental investment ratios, total bill savings and total GHG emissions reductions are divided by the additional cost (if any) to partners and consumers of investments in energy efficiency, adjusted for current reporting year dollars. EPA also calculates the ratio of cumulative net bill savings and cumulative GHG emissions attributable to ENERGY STAR, also adjusted for current reporting year dollars.

⁵² For more details on this method, see Appendix D: References (p. 46), Horowitz 2007.

⁵³ For more details on this method, see Appendix D: References (p. 46), Horowitz 2014b.

⁵⁴ For more details on this method, see Appendix D: References (p. 46), Horowitz 2014a.

⁵⁵ For more details on many aspects of this method, see Appendix D: References (p. 46), Horowitz 2001, 2007, and 2014c.

CARBON DIOXIDE REDUCING ENERGY SUPPLY PROGRAMS

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 and install and use green power on-site. 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.

Combined Heat and Power Partnership (CHPP) Green Power Partnership (GPP)

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 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.

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 from this and other OAP Partnership Programs by having program staff meet annually to identify and resolve any overlap issues.

CHPP 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.

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 that 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.

THE METHANE EMISSIONS REDUCTION PROGRAMS

EPA's methane programs facilitate recovery of methane from landfills, oil and natural gas systems, agriculture (manure management), and coal mines, as well as use of 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.⁵⁶ 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 are 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 tracks and publishes a map of commercially operational anaerobic digester systems at 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)

Through 2013, 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 municipal solid waste 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 have 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 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 its methodology in calendar year 2005 to apply a tiered system 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.

⁵⁶ For more information, see Appendix D: References (p. 46), Energy Information Administration 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 best environmental practices and technologies that are more environmentally friendly.

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 Reporting 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 (HFCs) 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.⁵⁷

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 it can use to double-check its 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 emissions from 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). 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 from 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 2013 Annual Report

- Global warming potentials from the Intergovernmental Panel on Climate Change *Fourth Assessment Report* are applied to all GHG estimates.
- Historical values in Table 8 have changed since the 2012 Annual Report for Methane and Fluorinated Greenhouse Gas programs to reflect additional information received from program partners and the *Fourth Assessment Report* global warming potentials.
- ENERGY STAR program cost-effectiveness metrics added for year 2013 reporting.

APPENDIX A

ENERGY STAR Award Winners for Achievements in 2013

PARTNER OF THE YEAR - SUSTAINED EXCELLENCE

3M Company
St. Paul, MN

AEP Ohio
Columbus, OH

AEP Texas Central
Corpus Christi, TX

Air King Limited
West Chester, PA

Allergan, Inc.
Irvine, CA

Arizona Public Service
Phoenix, AZ

Austin Energy
Austin, TX

AVR Homebuilders
Yonkers, NY

Baltimore Gas and Electric
Company (BGE)
Baltimore, MD

Beacon Capital Partners LLC
Boston, MA

Bentall Kennedy
Seattle, WA

BOMA International
Washington, DC

Bosch Home Appliances
Irvine, CA

CalPortland Company
Glendora, CA

CBRE, Inc.
Los Angeles, CA

Cenergistic
Dallas, TX

CenterPoint Energy
Houston, TX

Colgate-Palmolive Company
New York, NY

Columbia Gas of Ohio
Columbus, OH

ComEd
Chicago, IL

Des Moines Public School
District
Des Moines, IA

Eastman Chemical Company
Kingsport, TN

Ecova
Spokane, WA

Energy Inspectors Corporation
Las Vegas, NV

EnergyCAP, Inc.
State College, PA

EnergyLogic, Inc.
Berthoud, CO

Entergy Texas
Beaumont, TX

Evergreen Public Schools
Vancouver, WA

Fanning Howey
Celina, OH

Focus on Energy
Madison, WI

Food Lion and Bottom Dollar
Food
Salisbury, NC

General Motors Company
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

Hines
Houston, TX

Houston Habitat for Humanity
Houston, TX

ITW Food Equipment Group, LLC
Troy, OH

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

JLL
Chicago, IL

KB Home
Los Angeles, CA

Kentucky Pollution Prevention
Center
Louisville, KY

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

LG Electronics, Inc.
Englewood Cliffs, NJ

Liberty Property Trust
Malvern, PA

Loudoun County Public Schools
Broadlands, VA

Manitowoc Foodservice
New Port Richey, FL

Merck & Co., Inc.
Whitehouse Station, NJ

Meritage Homes Corporation
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

Panasonic Eco Solutions North
America
Newark, NJ

PepsiCo, Inc.
Purchase, NY

ProVia Door, Inc.
Sugar Creek, OH

PSEG Long Island
Uniondale, NY

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

Staples, Inc.
Framingham, MA

The Boeing Company
Chicago, IL

The Home Depot
Atlanta, GA

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 - CLIMATE COMMUNICATIONS

Air King Limited
West Chester, PA

Allergan, Inc.
Irvine, CA

Des Moines Public School
District
Des Moines, IA

General Motors Company
Detroit, MI

Georgia Interfaith Power & Light
Decatur, GA

JLL
Chicago, IL

KB Home
Los Angeles, CA

LG Electronics, Inc.
Englewood Cliffs, NJ

New York-Presbyterian Hospital
New York, NY

Samsung Electronics Co., Ltd.
Suwon, South Korea

PARTNER OF THE YEAR

Beazer Homes USA, Inc.
Atlanta, GA

Best Buy Co., Inc.
Richfield, MN

Brandywine Realty Trust
Radnor, PA

Brighton Homes Idaho, Inc.
Boise, ID

Building Energy, Incorporated
Star, ID

Burton Energy Group
Alpharetta, GA

Cassidy Turley
Washington, DC

Consumers Energy
Jackson, MI

Corning Incorporated
Corning, NY

D.R. Wastchak, LLC
Tempe, AZ

Delmarva Power & Light
Company (Delmarva Power)
Washington, DC

DIRECTV
El Segundo, CA

Efficiency Vermont
Burlington, VT

Entergy New Orleans
New Orleans, LA

Goby
Chicago, IL

Good Earth Lighting, Inc.
Wheeling, IL

Hoshizaki America, Inc.
Peachtree City, GA

Illinois Energy Office at the
Department of Commerce and
Economic Opportunity
Springfield, IL

Institute for Sustainable Energy
Willimantic, CT

Integral Building & Design, Inc.
New Paltz, NY

Intertape Polymer Group, Inc.
Sarasota, FL

Kenton County School District
Ft. Wright, KY

Kentucky School Boards
Association
Frankfort, KY

Kilroy Realty Corporation
Los Angeles, CA

Mansfield Independent School
District
Mansfield, TX

Masco Home Services
Daytona Beach, FL

MaxLite
West Caldwell, NJ

Memorial Hermann Health
System
Houston, TX

Nationwide Marketing Group
Winston Salem, NC

New Mexico Gas Company
Albuquerque, NM

NH CORE Energy Efficiency
Team
Manchester, NH

NH CORE Energy Efficiency
Team
Manchester, NH

North Penn School District
Lansdale, PA

Parmenter Realty Partners
Miami, FL

Pella Corporation
Pella, IA

Pentair Aquatic Systems
Sanford, NC

Philips Lighting Company
Somerset, NJ

Potomac Electric Power
Company (Peppco)
Washington, DC

Salt River Project Agricultural
Improvement and Power
District
Tempe, AZ

SkyeTec
Jacksonville, FL

Soft-Lite Windows
Streetsboro, OH

South Carolina Electric & Gas
Cayce, SC

Southern Maryland Electric
Cooperative (SMECO)
Hughesville, MD

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

Verizon Wireless
Basking Ridge, NJ

Vornado Realty Trust
New York, NY

AWARDS FOR EXCELLENCE

ENERGY STAR Promotion

Dominion East Ohio Gas
Company
Cleveland, OH

Northwest Energy Efficiency
Council
Seattle, WA

The Energy Efficiency Fund
New Britain, CT

The United Illuminating
Company
Orange, CT

Retailing

Metro Lighting
Brentwood, MO

Energy Efficient Product Design

Cree, Inc.
Durham, NC

Ricoh Americas Corporation
Malvern, PA

Affordable Housing

Habitat for Humanity of Pinellas
County, Inc.
Clearwater, FL

Tennessee Valley Authority
(TVA)
Knoxville, TN

AWARDS

2013 Green Power Leadership Awards

PARTNER OF THE YEAR

Cisco Systems, Inc.	<i>San Jose, CA</i>
Georgetown University	<i>Washington, DC</i>
Microsoft Corporation	<i>Redmond, WA</i>
The Ohio State University	<i>Columbus, OH</i>

GREEN POWER PURCHASING

Accredo Packaging, Inc.	<i>Sugar Land, TX</i>
Dell Inc.	<i>Round Rock, TX</i>
Pearson	<i>London, UK</i>
Powdr	<i>Park City, UT</i>
The North Face	<i>Alameda, CA</i>
U. S. Department of Energy	<i>Washington, DC</i>
UW Credit Union	<i>Madison, WI</i>
Western Pennsylvania Energy Consortium	<i>Pittsburgh, PA</i>

ON-SITE GENERATION

Apple, Inc.	<i>Cupertino, CA</i>
County of Santa Clara, CA	<i>Santa Clara, CA</i>
Kaiser Permanente	<i>Oakland, CA</i>
Volkswagen Group of America Chattanooga Operations, LLC	<i>Chattanooga, TN</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>

GREEN POWER COMMUNITY OF THE YEAR

Cincinnati, OH Community	<i>Cincinnati, OH</i>
Mercer Island, WA Community	<i>Mercer Island, WA</i>

GREEN POWER SUPPLIER OF THE YEAR

3Degrees	<i>San Francisco, CA</i>
Dominion Virginia Power	<i>Richmond, VA</i>
Sterling Planet	<i>Atlanta, GA</i>

2013 ENERGY STAR Combined Heat and Power Awards

CHPP PROJECT

Marine Corps Logistics Base Albany	<i>Albany, GA</i>
National Archives and Records Administration	<i>Washington, DC</i>
Medical Area Total Energy Plant	<i>Boston, MA</i>
Montefiore Medical Center	<i>New York City, NY</i>
New York-Presbyterian Hospital/Weill Cornell Medical Center	<i>New York City, NY</i>
New York University	<i>New York City, NY</i>
Texas A&M University	<i>College Station, TX</i>

LOCATION

CONTRIBUTING EPA CHPP PARTNERS

Chevron Energy Solutions, GE Power and Water
Aegis Energy Services, Ameresco
Siemens Energy, Veolia Energy North America
Solar Turbines
Dylan Associates, Gotham 360, Luthin Associates, NYSERDA, Solar Turbines
Solar Turbines, SourceOne, Vanderweil Engineers
US Department of Energy, GE Power and Water, Jacobs

AWARDS

2013 Landfill Methane Outreach Program Projects and Partner of the Year Awards

PROJECTS AND PARTNER OF THE YEAR

Blue Ridge Renewable Energy Plant	<i>Chambersburg, PA</i>
Seminole Road Landfill Renewable Fuels Facility	<i>Ellenwood, GA</i>
Gaston County Solid Waste and Recycling Division (2013 Community Partner of the Year)	<i>Dallas, NC</i>

2013 GreenChill Achievement Awards

SUPERIOR GOAL ACHIEVEMENT

Brookshire Grocery Company
 Bruhler's Fresh Foods
 Food Lion
 King Kullen
 Meijer Sweetbay
 Weis Markets

EXCEPTIONAL GOAL ACHIEVEMENT

King Kullen

MOST IMPROVED EMISSIONS RATE

Buehler's Fresh Foods

BEST EMISSIONS RATE

Stater Bros. Supermarkets

BEST OF THE BEST

Whole Foods Market – Brooklyn, NY

STORE CERTIFICATION EXCELLENCE (SUPERMARKET PARTNER)

Publix Super Markets
 Sprouts Farmers Market

STORE CERTIFICATION EXCELLENCE (NON-SUPERMARKET PARTNER)

Hillphoenix

STORE RE-CERTIFICATION EXCELLENCE (SUPERMARKET PARTNER)

Food Lion – Columbia, SC
 Publix Super Markets – Winter Haven, FL
 Publix Super Markets – Suwanee, GA
 Sprouts Farmers Market – San Diego, CA
 Weis Markets – Hanover, PA

DISTINGUISHED PARTNER

Raley's

AWARDS

2013 Climate Leadership Award Winners

ORGANIZATIONAL LEADERSHIP AWARD

Boulder County, Colorado
City of Austin, Texas
Intel
San Diego Unified Port District
Sonoma County Water Agency

INDIVIDUAL LEADERSHIP AWARD

T.J. DiCaprio, Senior Director, Carbon and Energy, Microsoft Corporation
J. Wayne Leonard, Former Chairman and CEO of Entergy Corporation (retired)

SUPPLY CHAIN LEADERSHIP AWARD

Cisco Systems, Inc.
IBM
San Diego Gas & Electric

EXCELLENCE IN GHG MANAGEMENT (GOAL ACHIEVEMENT AWARD)

Abbott Laboratories
CSX Transportation, Inc.
Limited Brands, Inc.
Office Depot
Raytheon Company
Staples, Inc.
Tiffany & Co.
Turner Construction Company

EXCELLENCE IN GHG MANAGEMENT (GOAL SETTING CERTIFICATE)

Bank of America
Lockheed Martin Corporation
SAIC
S.C. Johnson & Son, Inc.
Wells Fargo and Company

APPENDIX B

LIST OF FIGURES

FIGURE 1. ENERGY STAR Annual Benefits Have More Than Quadrupled Since 2000	4
FIGURE 2. Annual GHG Emissions Reductions from OAP Climate Partnerships Exceed 419 MMTCO ₂ e in 2013	5
FIGURE 3. More Than 4.8 Billion ENERGY STAR Certified Products Purchased Since the Program Began	7
FIGURE 4. Awareness of ENERGY STAR Growing in the United States	10
FIGURE 5. More Than 1.5 Million Homes Nationwide Have Earned the ENERGY STAR Label	12
FIGURE 6. 2013 Market Share for ENERGY STAR Certified New Homes by State	12
FIGURE 7. Home Performance With ENERGY STAR Spreads Across the Country in 2013	13
FIGURE 8. Cumulative Square Feet Benchmarked in Portfolio Manager	14
FIGURE 9. More Than 22,000 Buildings Have Earned the ENERGY STAR Through 2013.....	15
FIGURE 10. Annual GHG Emissions Reductions by the Carbon Dioxide Reducing Energy Supply Programs	18
FIGURE 11. Green Power Purchased and GHG Emissions Reductions	19
FIGURE 12. Natural Gas STAR Annual Methane Emissions Reductions	21
FIGURE 13. AgSTAR Annual Methane Emissions Reductions	22
FIGURE 14. LMOP Annual Methane Emissions Reduced and Carbon Dioxide Avoided	23
FIGURE 15. CMOP Annual Methane Emissions Reductions	25
FIGURE 16. VAIP Annual Emissions Reductions	27
FIGURE 17. EPS Annual Emissions Reductions	27
FIGURE 18. Utility Partners Across the United States are Participating with RAD	28
FIGURE 19. GreenChill Certified Stores in 2013	29
FIGURE 20. EPA Supports 50 Climate Showcase Communities	31

APPENDIX C

LIST OF TABLES

TABLE 1. Summary of OAP Climate Protection Partnership Programs' Benefits and Goals (In Billions of 2013 Dollars and MMTCO ₂ e).....	3
TABLE 2. Summary of OAP Climate Protection Partnership Programs.....	6
TABLE 3. ENERGY STAR Key Program Indicators, 2000 and 2013.....	8
TABLE 4. EPA Maintains Efficiency Standards with Product Specifications and Revisions.....	9
TABLE 5. ENERGY STAR Product Specifications Added, Revised, and In Progress.....	11
TABLE 6. EPA ENERGY STAR Industrial Focuses on Energy.....	17
TABLE 7. U.S. CHP Capacity and Partnership Market Share.....	20
TABLE 8. Overview of OAP Climate Protection Partnership Programs with Annual GHG Reductions and Program Goals.....	33

APPENDIX D

REFERENCES

- Climate Protection Partnerships Division, Climate Change Division, Stratospheric Protection Division, U.S. Environmental Protection Agency. 2014. Partner and emissions data for 2013 provided by individual programs within the Office of Atmospheric Programs.
- DNV KEMA Energy & Sustainability. 2014. "E-CAST 2013 Results for Carbon and Energy Savings from the ENERGY STAR Program." Technical Memorandum to EPA November 2014.
- Energy Information Administration (EIA). 2014. Annual Energy Outlook 2014 with Projections to 2040. Office of Integrated and International Energy Analysis. (DOE/EIA-0383ER(2014)). April. Available online at www.eia.gov/forecasts/aeo.
- Horowitz, Marvin J. 2014a. "Purchased Energy and Policy Impacts in the U.S. Manufacturing Sector." Energy Efficiency, DOI 10.1007/s12053-013-9200-3, February.
- Horowitz, Marvin J., 2014b. "Technical Memorandum: Impact Evaluation of ENERGY STAR for the Commercial Buildings Sector in 2013" to EPA January 2015.
- Horowitz, Marvin J., 2014c. "Technical Memorandum: Impact Evaluation of ENERGY STAR for the Industrial Sector in 2013" to EPA January 2015.
- 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 www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf.
- IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland.
- U.S. Department of Commerce, Bureau of Economic Analysis. 2014. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product. October 2014. Available online at www.bea.gov/national/txt/dpga.txt.
- U.S. EPA. 2014a. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012. Tables ES-7 and ES-8. U.S. Environmental Protection Agency, Washington, DC. U.S. EPA #430-R-14-003. April. Available online at www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.
- U.S. EPA. 2014b. National Awareness of ENERGY STAR for 2013: Analysis of 2012 CEE Household Survey. Office of Air and Radiation, Climate Protection Partnerships Division. Available online at www.energystar.gov/sites/default/uploads/about/old/files/2013%20CEE%20Report_508%20compliant.pdf.
- U.S. Census Bureau. 2013. 2011 Annual Survey of Manufactures. December. Available online at www.census.gov/manufacturing/asm/index.html.



United States
Environmental Protection Agency
Air and Radiation 6202J
www.epa.gov
January 2015



Recycled/Recyclable *Printed on paper containing 50% post consumer waste.*