



EPA Natural Gas STAR Program Accomplishments



Introduction

Established in 1993, the Natural Gas STAR Program is a flexible, voluntary partnership that encourages oil and natural gas companies—both in the United States and internationally—to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce methane emissions. Given that methane is the primary component of natural gas and is a potent greenhouse gas—21 times more powerful than carbon dioxide (CO₂) in trapping heat in the atmosphere over a 100-year period—reducing methane emissions can result in environmental, economic, and operational benefits.

Natural Gas STAR partners have operations in all of the major industry sectors (production, gathering and processing, transmission, and distribution) that deliver natural gas to end users. Program partners represent 59 percent of the natural gas industry in the United States. Since the inception of the program, these domestic partners have eliminated more than 994 billion cubic feet (Bcf) of methane emissions by implementing approximately 150 cost-effective technologies and practices.

With the launch of Natural Gas STAR International in 2006, the Program has expanded to include companies worldwide, significantly increasing opportunities to reduce methane emissions from oil and natural gas operations. Natural Gas STAR International builds off of the framework of the Global Methane Initiative (GMI), an international public-private partnership that advances the cost-effective, voluntary recovery of methane for use as a clean energy source. To date, international partners have reduced methane emissions by 77.8 Bcf.

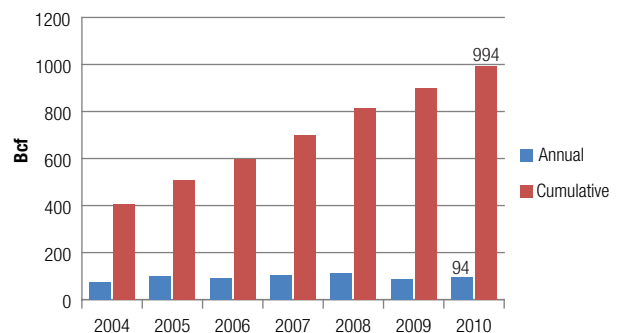
Today, Natural Gas STAR and Natural Gas STAR International together have more than 130 partner companies—14 of which are international partners. This document highlights the methane emissions reductions that both domestic and international partners have achieved, as well as the variety of technologies and practices they have implemented to reduce methane emissions.

2010: Ongoing Success in the U.S.

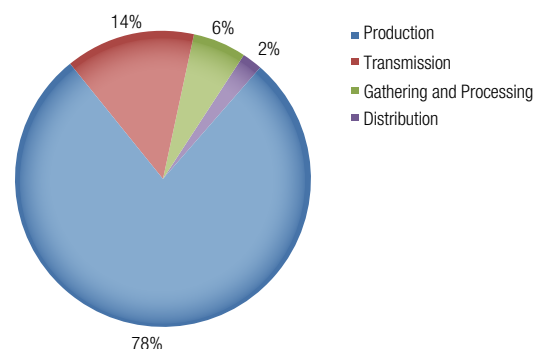
For calendar year 2010, nearly 80 percent of U.S. partners submitted an annual report detailing their efforts to reduce methane emissions from their operations. These voluntary activities consisted of nearly 100 technologies and practices and resulted in domestic emissions reductions of 94.1 Bcf for the year. These methane emissions reductions have cross-cutting benefits on domestic energy supply, industrial efficiency, revenue generation, and greenhouse gas emissions reductions. The 2010 voluntary domestic emission reductions are equivalent to:

- The additional revenue of more than \$376 million in natural gas sales (assumes an average natural gas price of \$4.00 per thousand cubic feet).
- The avoidance of 38.1 million tonnes CO₂ equivalent.
- The carbon sequestered annually by 8.1 million acres of pine or fir forests.
- The annual greenhouse gas emissions from nearly 7.3 million passenger vehicles.

Domestic Natural Gas STAR Methane Emissions Reductions as of 2010



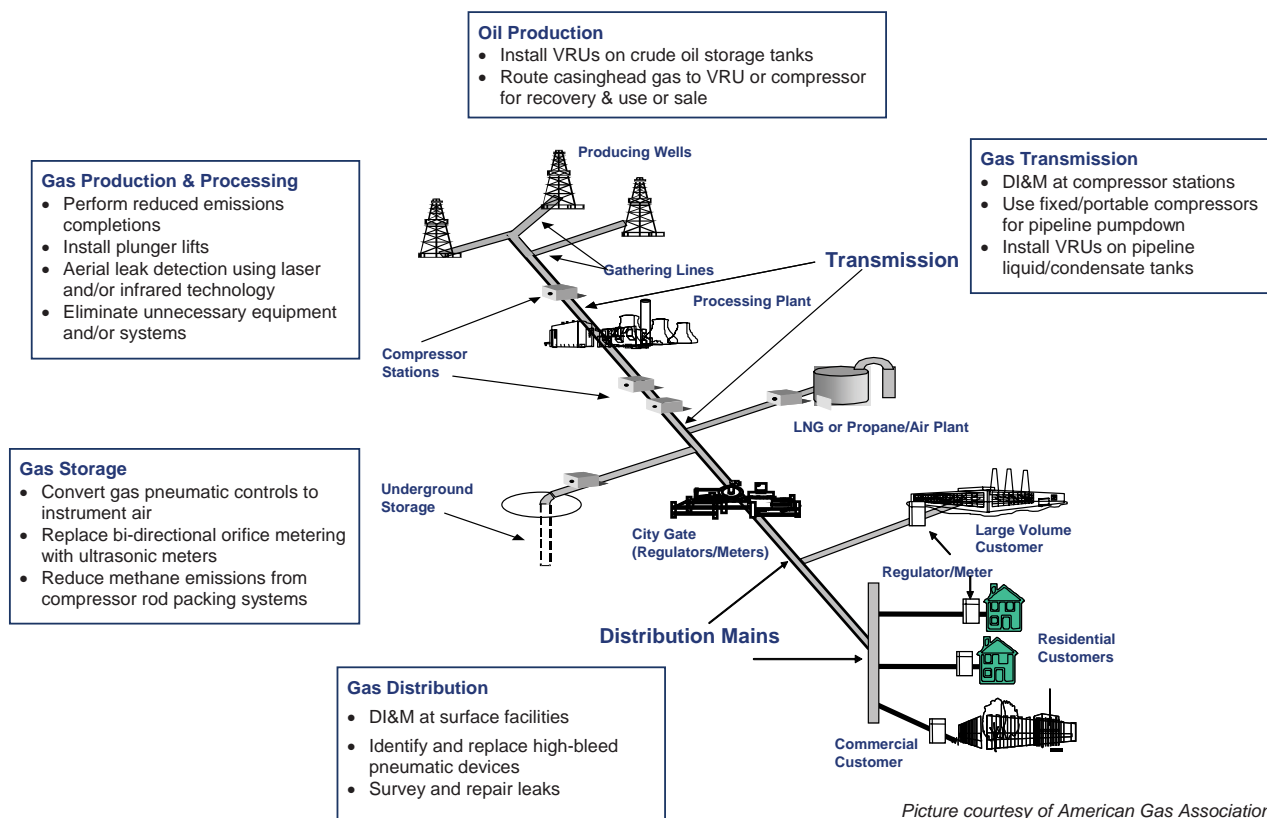
2010 Methane Emissions Reductions by Sector (94 Bcf)





Domestic Emissions Reductions by Sector

The following section illustrates the major sources of methane emissions from each industry sector and the technologies and practices implemented by partners to reduce emissions. The information showing the breakdown of emissions sources was taken from the *EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009*, dated April 2011, and the information showing Natural Gas STAR partner activities was taken from partner reports and Natural Gas STAR historical data. The following diagram shows some of the top methane emission reduction opportunities for each sector:



Picture courtesy of American Gas Association.

Capacity Building

Many methane emission reduction technologies and practices promoted by Natural Gas STAR have become widely implemented as a result of Program events and resources which allow partners to share their experiences across the industry. This outreach and partner exchange occurs through the development of technical documents and articles, tools, Program sponsored workshops, meetings and study tours. Noteworthy events in 2010 included:

- The 17th Annual Implementation Workshop was held in conjunction with the GMI Oil & Gas Subcommittee meeting during November 1-3, 2010. This unique event included a tour of nearby oil and natural gas operations and technical sessions. It also provided an opportunity for attendees to learn how Natural Gas STAR and GMI work collaboratively to encourage implementation of projects that

reduce methane emissions and enhance operational efficiency and safety on a global scale. More information on this and other workshop events can be found at epa.gov/gasstar/workshops/index.html.

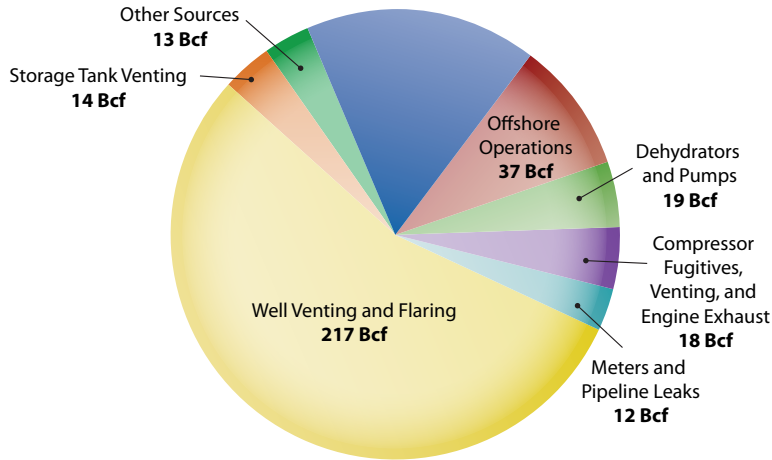
- Natural Gas STAR and GMI hosted a Study Tour pairing three Natural Gas STAR International Partners with their U.S.-based peers to visit facilities and exchange ideas for accelerating project implementation and methane capture and use. Specifically, representatives of ONGC, Gazprom, ENAP Sipepetrol, Chevron, Occidental Oil and Gas, and ConocoPhillips travelled through West Texas and New Mexico to visit sites where specific methane emissions reduction projects were successfully implemented. Observed projects included vapor recovery units, plunger lifts, and reduced emission completions.

More information on these and all Natural Gas STAR sponsored events can be found at epa.gov/gasstar/workshops/index.html.



Production Sector Accomplishments

2009 Production Sector Methane Emissions (397 Bcf)



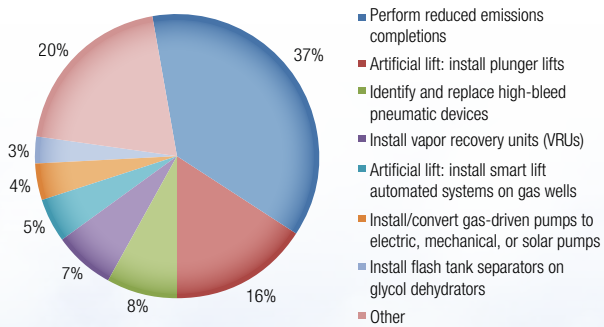
Source: EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2009, April 2011.

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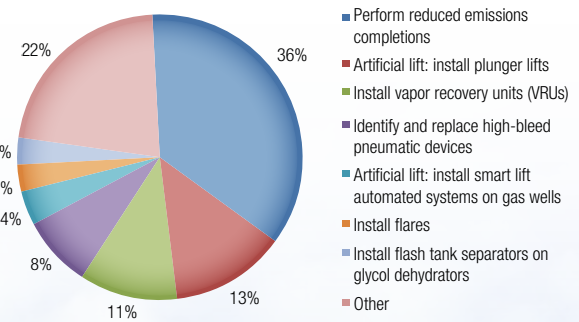
epa.gov/climatechange/emissions/usinventoryreport.html

Production sector partners reported 73.1 Bcf of methane emissions reductions in 2010—and a total of 684.7 Bcf since 1990. The top technologies and practices employed by production sector partners are displayed in the charts below.

Top Technologies in 2010
Total Sector Reductions in 2010 = 73.1 Bcf



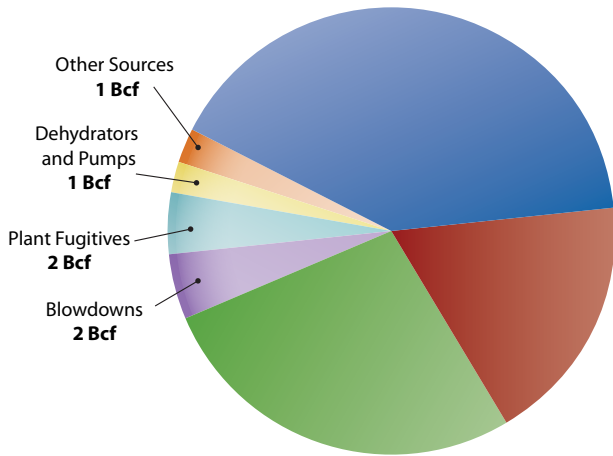
Top Technologies Since 1990
Cumulative Sector Reductions = 684.7 Bcf





Gathering and Processing Sector Accomplishments

2009 Gathering and Processing Sector Methane Emissions (44 Bcf)

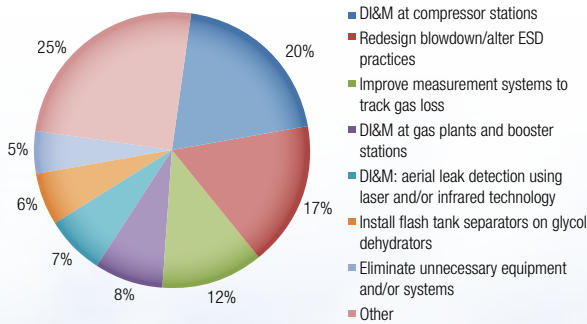


Source: EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2009, April 2011.

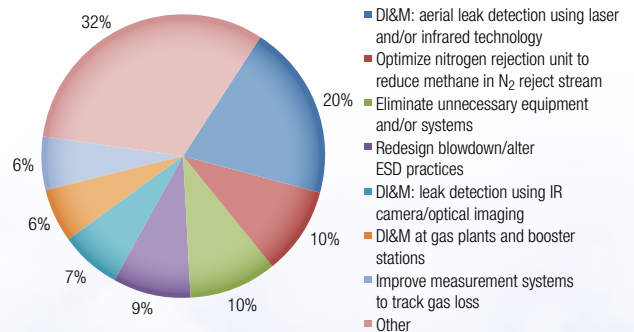
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epa.gov/climatechange/emissions/usinventoryreport.html.

Gathering and processing sector partners reported 6 Bcf of methane emissions reductions in 2010—and a total of 45.3 Bcf since 1990. The top technologies and practices employed by gathering and processing sector partners are displayed in the charts below.

Top Technologies in 2010
Total Sector Reductions in 2010 = 6.0 Bcf



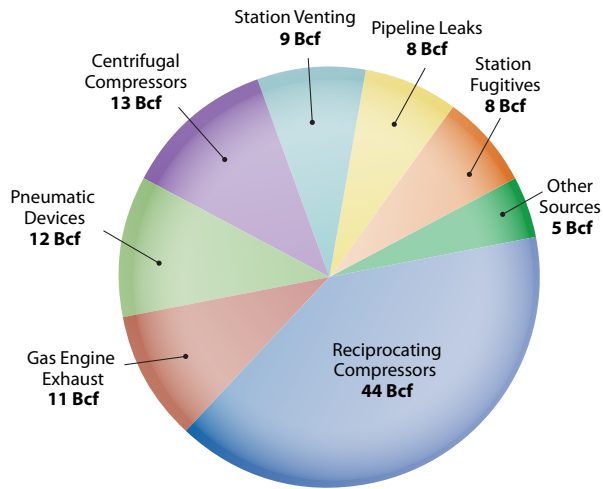
Top Technologies Since 1990
Cumulative Sector Reductions = 45.3 Bcf





Transmission Sector Accomplishments

2009 Transmission Sector Methane Emissions (110 Bcf)

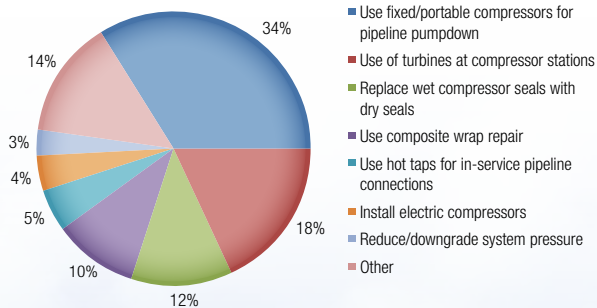


Source: EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2009, April 2011.

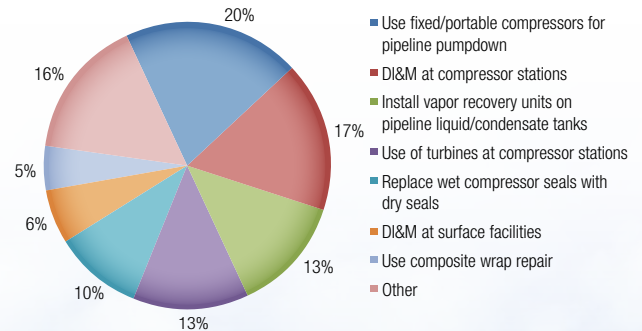
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epa.gov/climatechange/emissions/usinventoryreport.html.

Transmission sector partners reported 13.3 Bcf of methane emissions reductions in 2010—and a total of 232.8 Bcf since 1993. The top technologies and practices employed by transmission sector partners are displayed in the charts below.

Top Technologies in 2010
Total Sector Reductions in 2010 = 13.3 Bcf



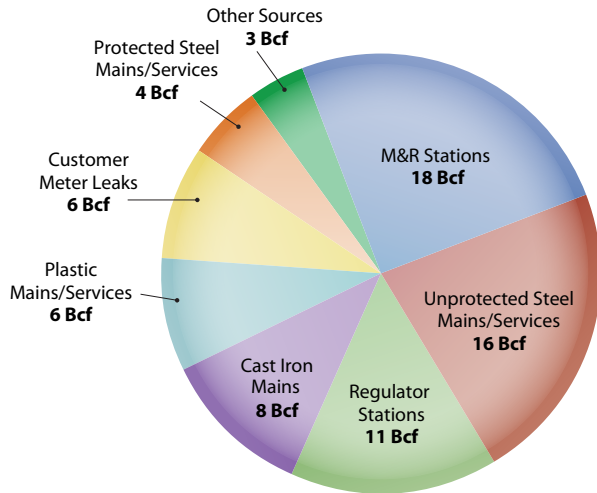
Top Technologies Since 1993
Cumulative Sector Reductions = 232.8 Bcf





Distribution Sector Accomplishments

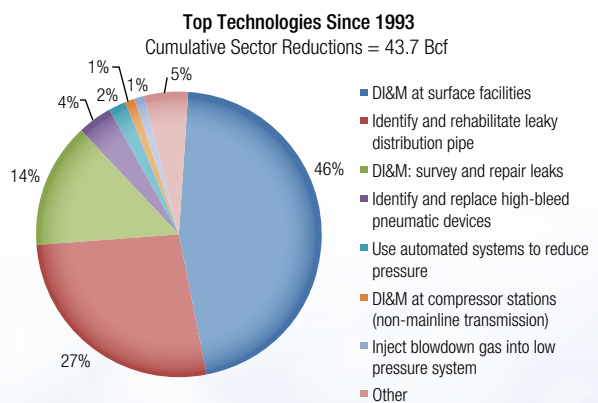
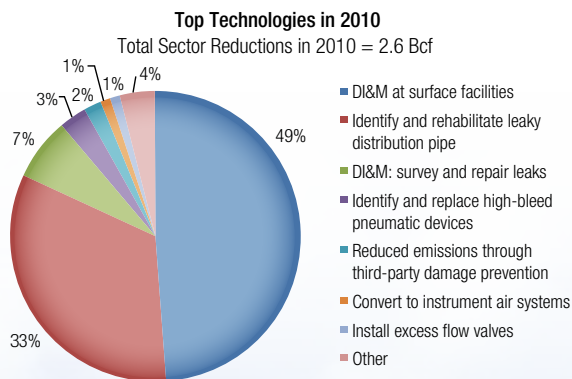
2009 Distribution Sector Methane Emissions (72 Bcf)



Source: EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2009, April 2011.

Available at:
epa.gov/climatechange/emissions/usinventoryreport.html

Distribution sector partners reported 2.6 Bcf of methane emissions reductions in 2010—and a total of 43.7 Bcf since 1993. The top technologies and practices employed by distribution sector partners are displayed in the charts below.





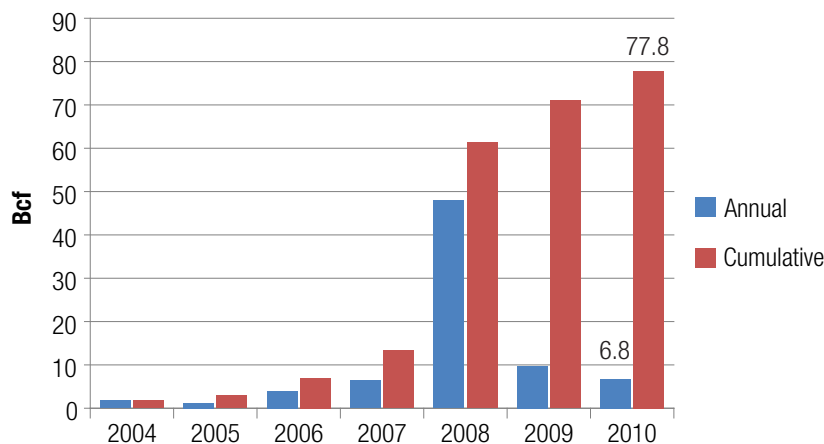
Natural Gas STAR International

In addition to the success reported under the domestic Program, progress is also being made in reducing global methane emissions through Natural Gas STAR International. International partners reported 6.8 Bcf in methane emissions reductions for a total of 77.8 Bcf since the inception of Natural Gas STAR International Program. To date, international partners have undertaken methane emission reduction activities in Argentina, Brazil, Canada, Equatorial Guinea, India, and Nigeria. For 2010, these companies reported methane emissions reductions from the implementation of 34 technologies and practices.

The 2010 voluntary international methane emissions reductions are equivalent to:

- The additional revenue of more than \$27 million in natural gas sales (assumes an average natural gas price of \$4.00 per thousand cubic feet).
- The avoidance of 2.7 million tonnes CO₂ equivalent.
- The carbon sequestered annually by nearly 586,000 acres of pine or fir forests.
- The annual greenhouse gas emissions from more than 525,000 passenger vehicles.

Natural Gas STAR International Methane Emissions Reductions as of 2010



New Tools and Resources

New Look for the Global Methane Initiative (globalmethane.org/participate/index.aspx)

The GMI has a new look. Building on the momentum surrounding the recent GMI (formerly the Methane to Markets Partnership) launch, the Administrative Support Group unveiled a new “look” to brand and unify GMI’s website and materials. The new logo features the methane flame and sun rays, representing a new beginning for the program as well as methane’s far-reaching potential for global change.

New Tools Help Partners Measure Fugitive Methane Emissions

Natural Gas STAR’s technical guidance has assisted many partners in the purchase of equipment to measure methane emissions from their operations. Specifically, the equipment is being used by internal teams to assess leaks in order to evaluate and adopt cost-effective technologies and practices to reduce methane emissions. Partners have reported purchasing equipment such as infrared cameras, flue gas analyzers, natural gas flow measurement systems, and probe leak detectors.

