

2012 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 60 percent of the natural gas industry in the United States. Since the inception of the program, these domestic partners have eliminated more than 1.15 trillion cubic feet (TCF) of methane emissions by implementing approximately 150 cost-effective technologies and practices.

Advancing Natural Gas STAR International

In 2012, EPA also met with several oil and gas companies to discuss the possibility of joining NGSI. New partners include:

- India's Petronet LNG – This new partner company is a joint venture by the Indian government to import liquefied natural gas (LNG) and set up LNG terminals in the country. Petronet LNG Limited has set up the country's first LNG receiving and regasification terminal in Dahej, Gujarat.
- Tunisia's Ecumed Petroleum – This new partner was referred by a connection made via EPA's participation in a December 2011 GGFR workshop.

With the launch of Natural Gas STAR International (NGSI) 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, NGSI partners have reduced methane emissions by 98 Bcf.

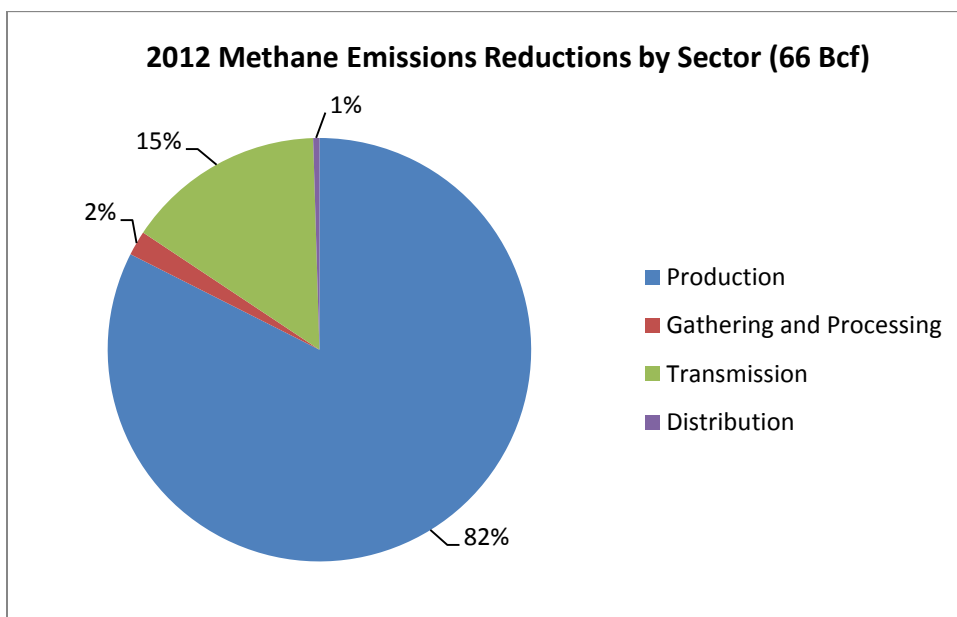
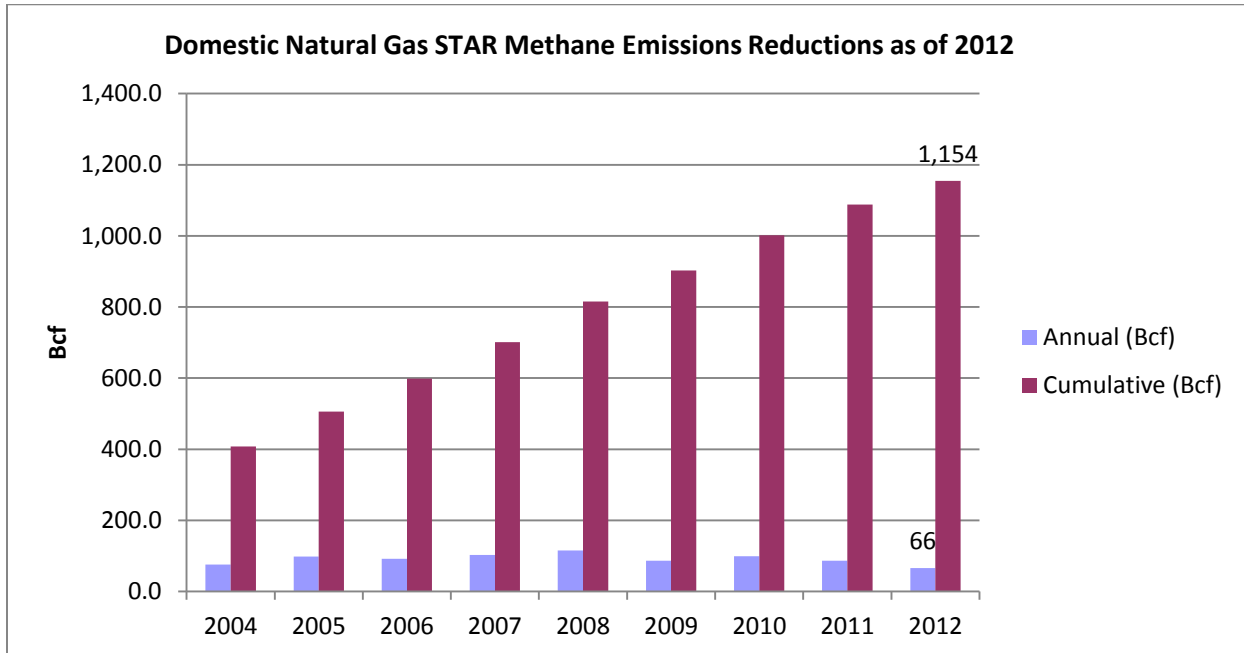
Together, Natural Gas STAR and NGSI have over 120 partner companies—20 of which are international partners. This document highlights the methane emissions reductions that both domestic and international partners have achieved, as well as the variety of technologies and practices they have implemented to reduce methane emissions.

Ongoing Success in the U.S.

During calendar year 2013, 59 percent of U.S. partners submitted an annual report detailing their efforts in 2012 to reduce methane emissions from their operations. These voluntary activities consisted of nearly 50 technologies and practices and resulted in domestic emissions reductions of 66 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 2012 emission reductions are equivalent to:

- The additional revenue of more than \$264 million in natural gas sales (assumes an average natural gas price of \$4.00 per thousand cubic feet).
- The avoidance of 26.7 million tonnes CO₂ equivalent.
- The carbon sequestered annually by 5.7 million acres of pine or fir forests.



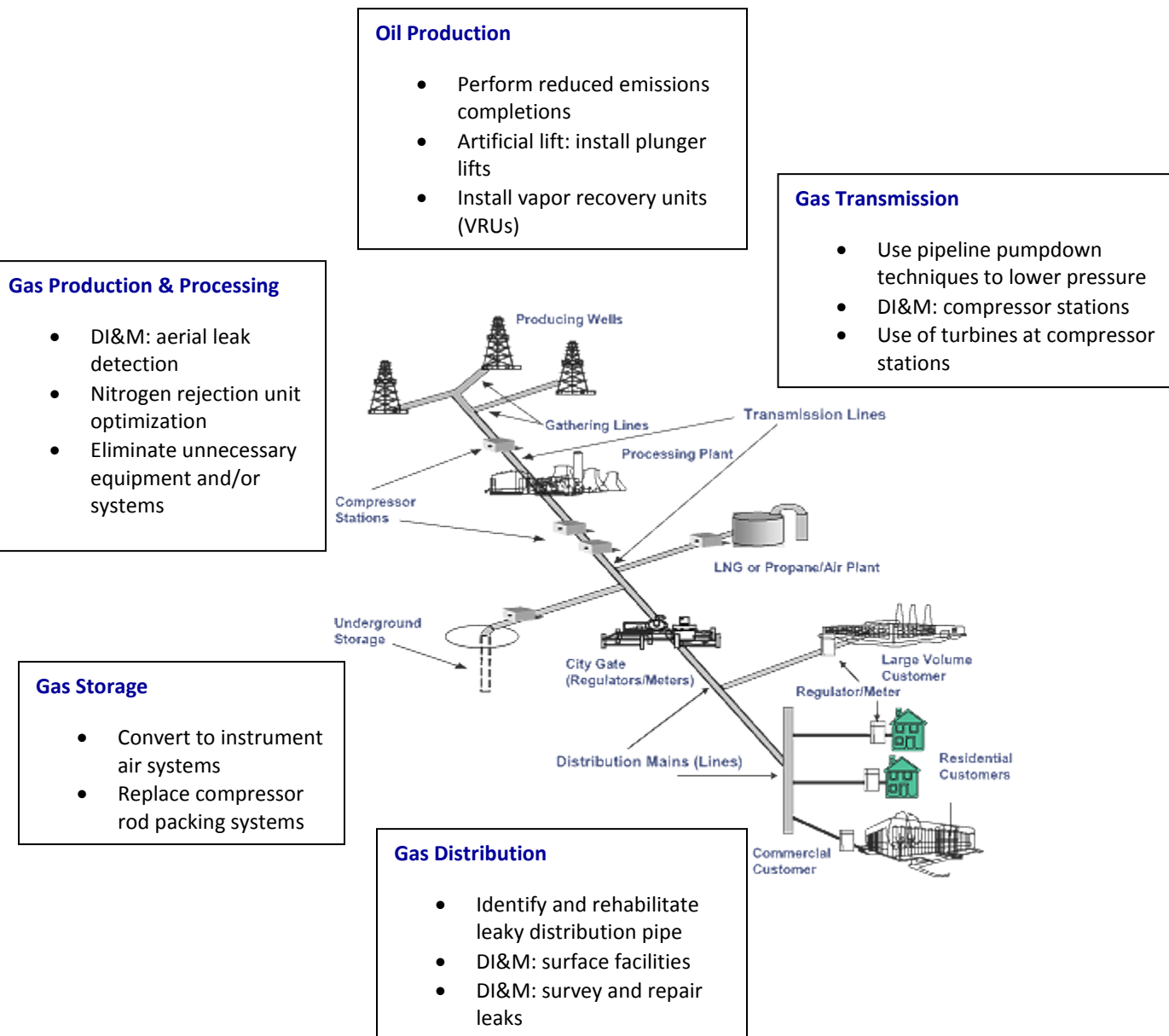
2012 Capacity Building

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. Recent noteworthy events in 2012 included:

- The 18th Annual Implementation Workshop was held in conjunction with the Global Methane Initiative's (GMI) Oil & Gas Subcommittee meeting from April 10-12, 2012 in Denver, Colorado, United States. This unique event included a tour of nearby oil and natural gas operations and technical sessions. It provided an opportunity for attendees to learn how Natural Gas STAR and GMI work collaboratively to encourage implementation of projects that reduce methane emissions, increase safety and enhance operational efficiency globally. The event gave a truly worldwide perspective on the industry sector.
- Natural Gas STAR and GMI hosted a Study Tour pairing Natural Gas STAR International Partners with their U.S.-based peers to tour facilities and exchange ideas for accelerating methane capture and use and project implementation. Participants observed implemented projects that included vapor recovery units, plunger lifts, and reduced emission completions.
- EPA conducted or participated in and sponsored numerous oil and gas sector workshops around the world, including in Colombia and Indonesia. These workshops covered a variety of topics related to oil and gas operations, such as industry best practices to detect, quantify, and reduce methane emissions. Additionally, EPA provided measurement study support and collaborated on international efforts targeting methane emissions in oil and gas operations, thereby enabling natural gas savings and associated economic and energy supply benefits.

Domestic Emissions Reductions by Sector

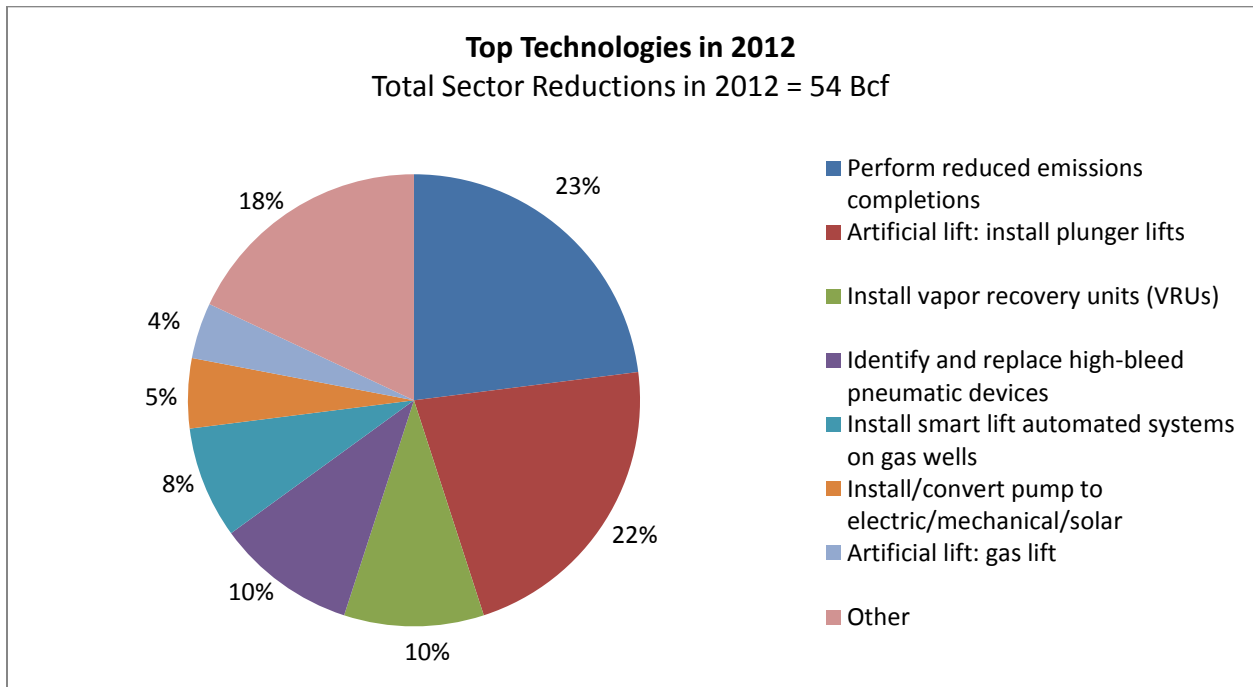
The following section illustrates the major sources of methane emissions from each industry sector and the technologies and practices implemented by partners to reduce emissions. The information showing the breakdown of emissions sources was taken from the *EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, dated April 2013, 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 emissions reduction opportunities for each sector:



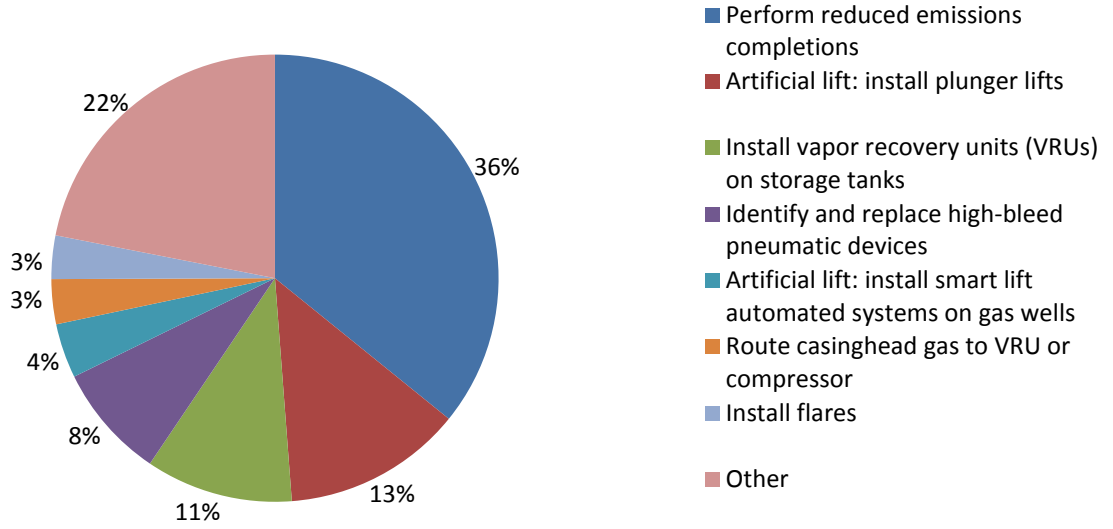
Production Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2011, April 2013. Available at: epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Production sector partners reported 54 Bcf of methane emissions reductions in 2012—and a total of 819.4 Bcf since 1990. The top technologies and practices employed by production sector partners are displayed in the charts below.



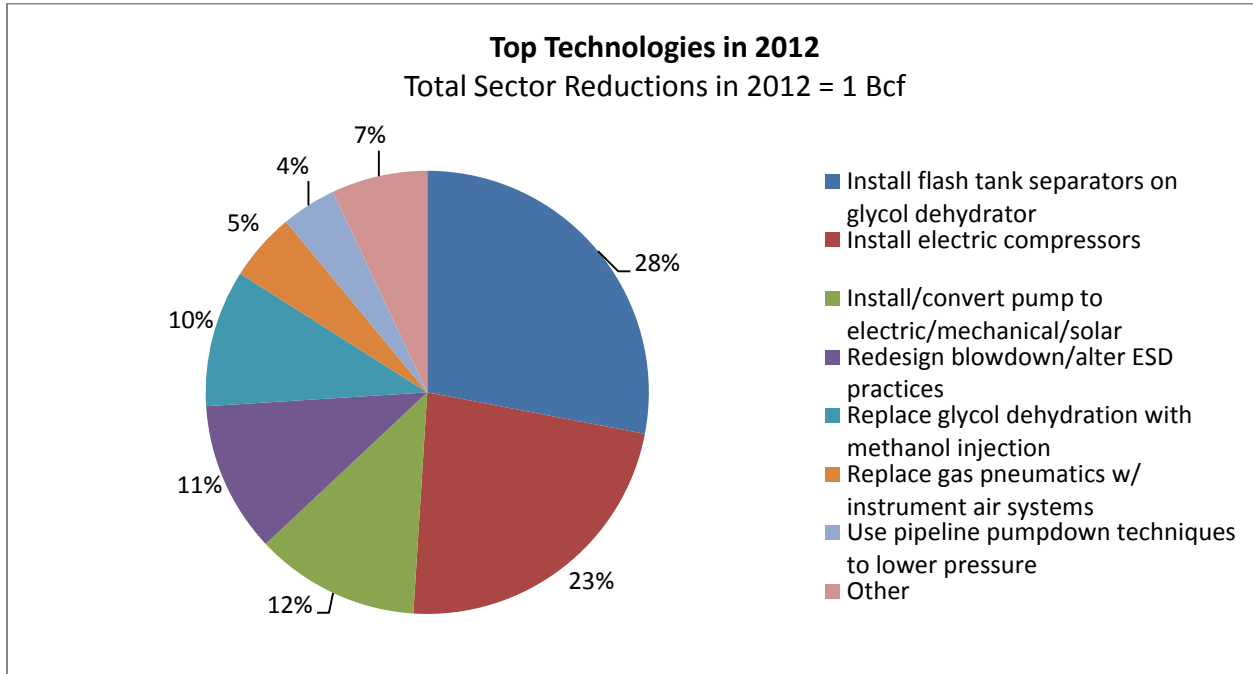
Top Technologies Since 1990
Cumulative Sector Reductions = 819.4 Bcf



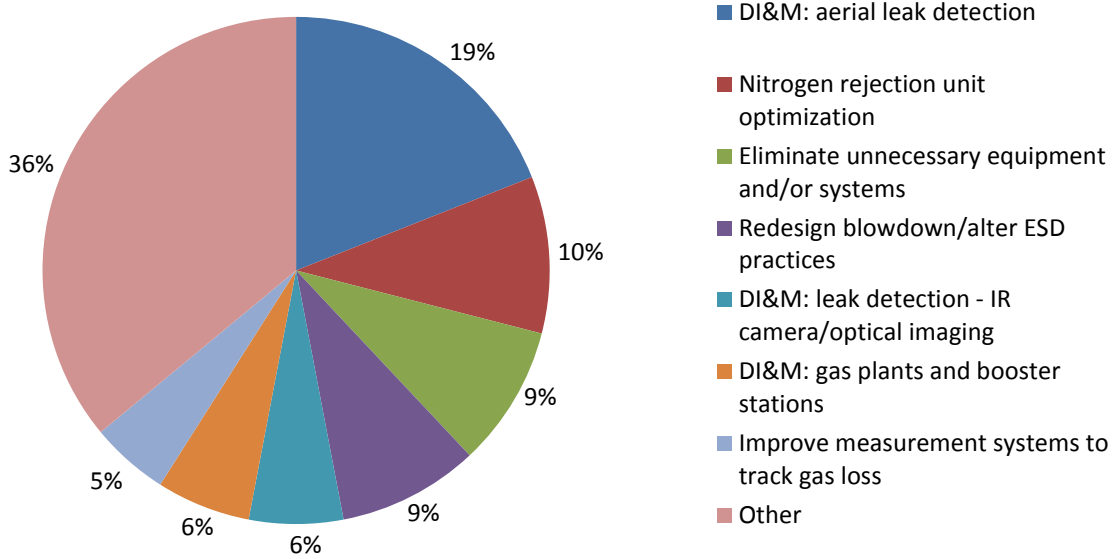
Gathering and Processing Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2011, April 2013. Available at: epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Gathering and processing sector partners reported 1 Bcf of methane emissions reductions in 2012—and a total of 48 Bcf since 1990. The top technologies and practices employed by gathering and processing sector partners are displayed in the charts below.



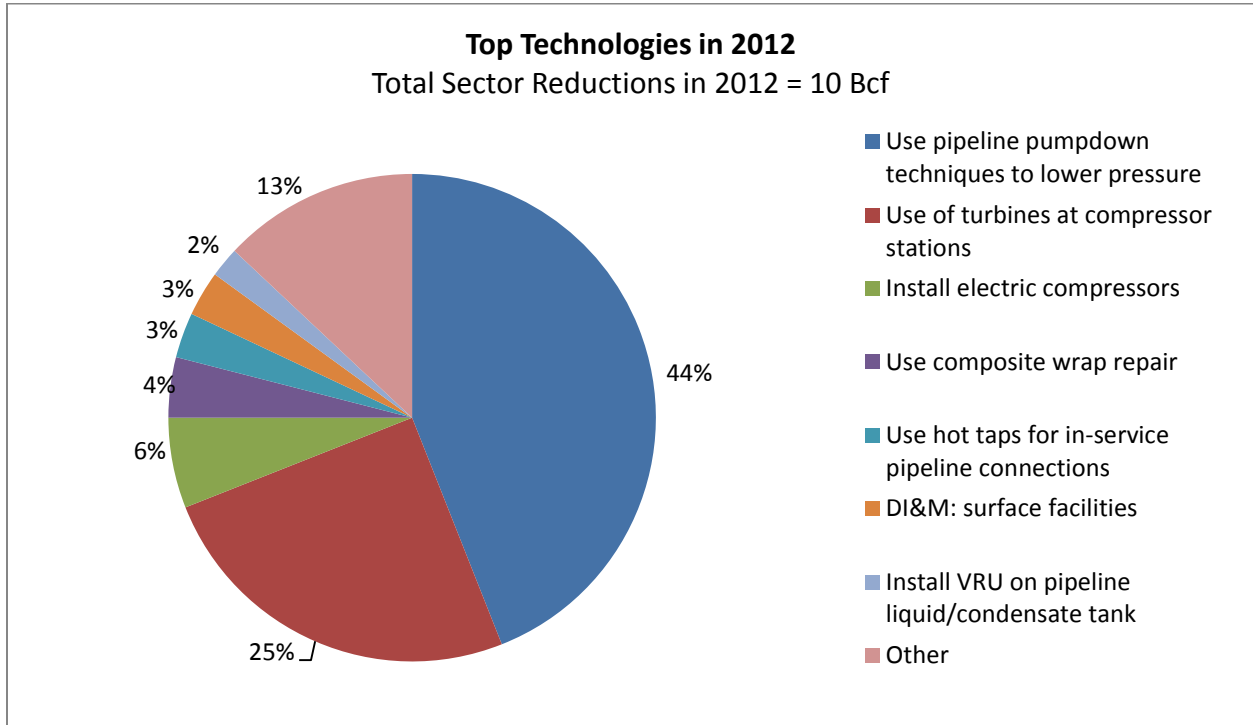
Top Technologies Since 1990
Cumulative Sector Reductions = 48 Bcf



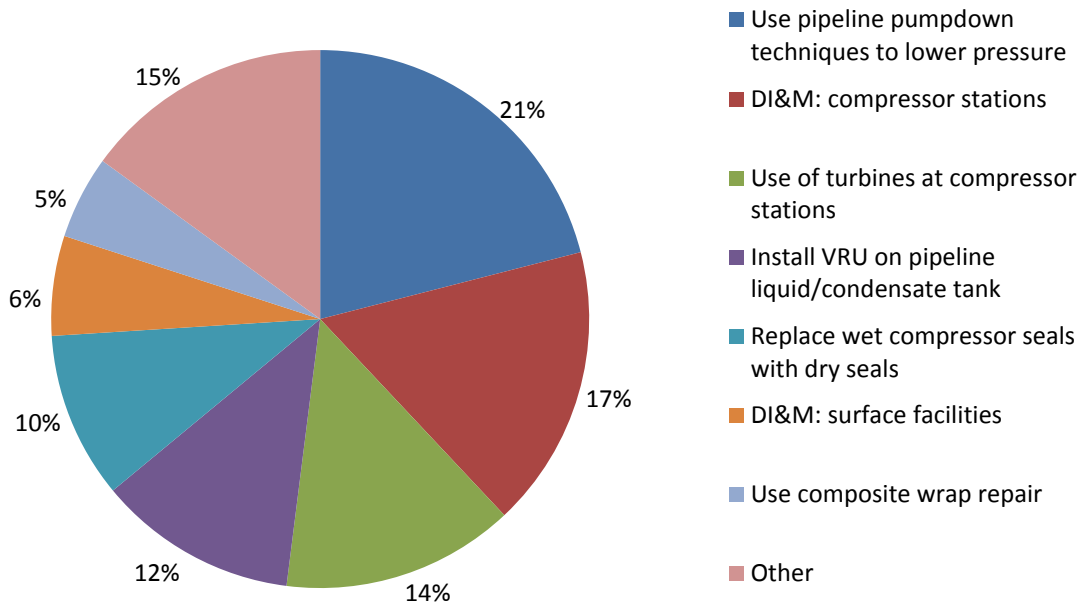
Transmission Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2011, April 2013. Available at: epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Transmission sector partners reported 10 Bcf of methane emissions reductions in 2012—and a total of 255.9 Bcf since 1993. The top technologies and practices employed by transmission sector partners are displayed in the charts below.



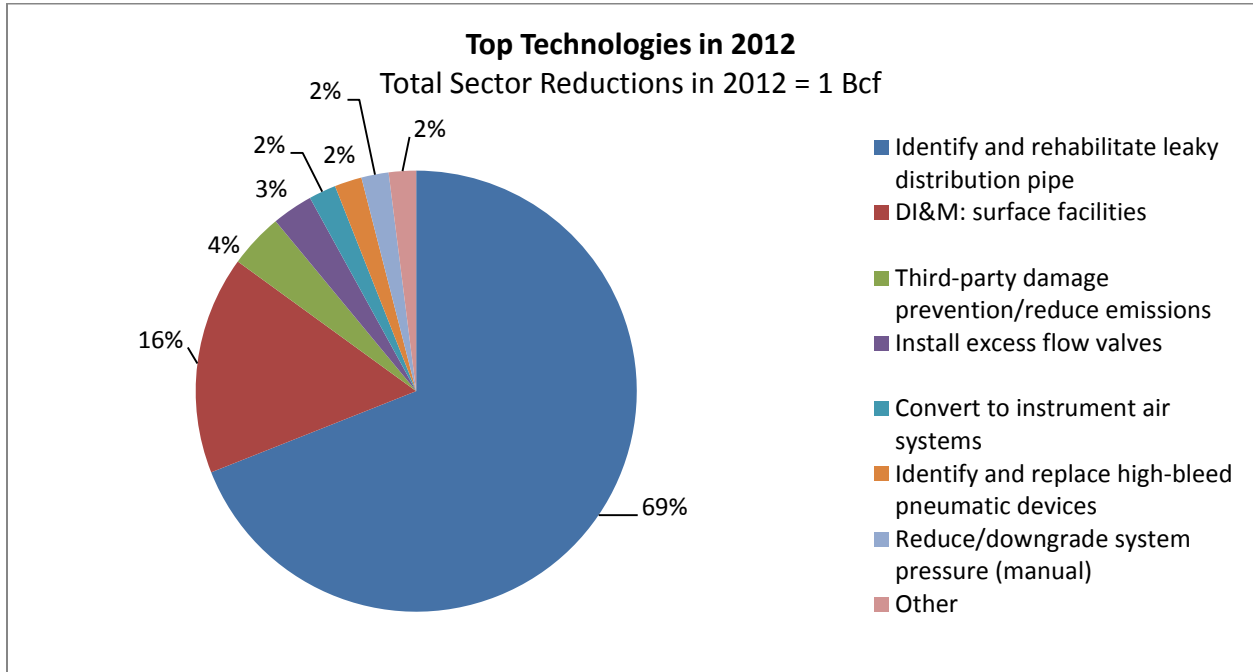
Top Technologies Since 1993
Cumulative Sector Reductions = 255.9 Bcf



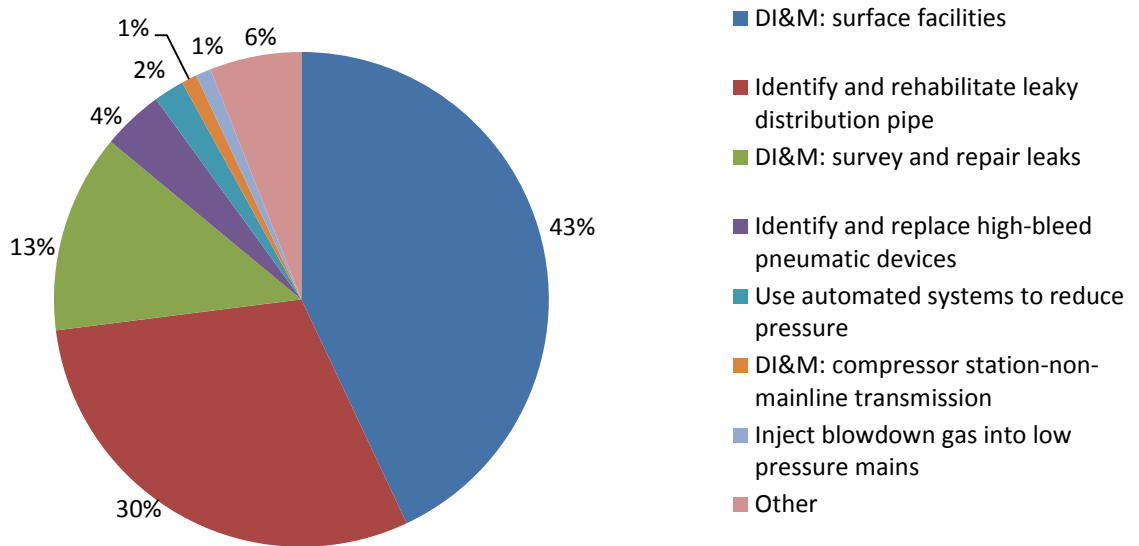
Distribution Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2011, April 2013. Available at: epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Distribution sector partners reported 1 Bcf of methane emissions reductions in 2012—and a total of 45.4 Bcf since 1993. The top technologies and practices employed by distribution sector partners are displayed in the charts below.



Top Technologies Since 1993
Cumulative Sector Reductions = 45.4 Bcf

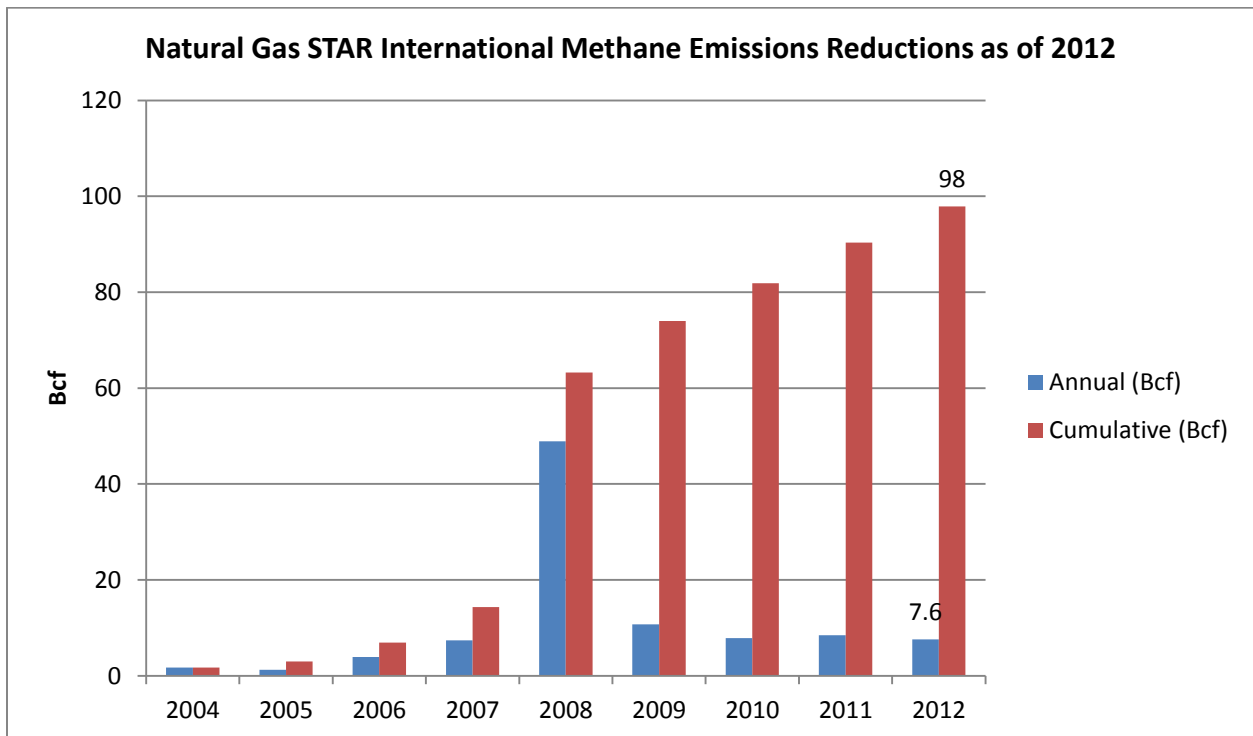


Natural Gas STAR International

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 7.6 Bcf in methane emissions reductions for a total of 98 Bcf since the inception of Natural Gas STAR International Program. To date, international partners have undertaken methane emission reduction activities in Argentina, Brazil, Canada, Chile, Colombia, Equatorial Guinea, India, Indonesia, Nigeria, Oman, Poland and Qatar. For 2012, these companies reported methane emissions reductions from the implementation of 13 technologies and practices.

The 2012 voluntary international methane emissions reductions are equivalent to:

- The additional revenue of more than \$30.4 million in natural gas sales (assumes an average natural gas price of \$4.00 per thousand cubic feet).
- The avoidance of nearly 3.1 million tonnes CO₂ equivalent.
- The carbon sequestered annually by more than 655,000 acres of pine or fir forests.



**Co-locating GMI Oil & Gas Subcommittee Meeting and
Natural Gas STAR Annual Implementation Workshop**

In April 2012, GMI co-located their Subcommittee meeting with the Natural Gas STAR Annual Implementation Workshop. Linking GMI with similar organizations/initiatives is paramount as both promote the recovery and use of methane from oil and gas operations, so there are similarities in the technologies and approaches that each program member employs and the barriers and challenges each faces. Conducting combined meetings increases collaboration and communication on cross cutting issues in addition to conserving resources.

GMI is planning to co-locate their upcoming Subcommittee meeting with the Natural Gas STAR Annual Implementation Workshop in the spring of 2014.