2013 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—25 times more powerful than carbon dioxide (CO_2) 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. Since the inception of the program, these domestic partners have eliminated more than 1.2 trillion cubic feet (TCF) of methane emissions by implementing approximately 150 cost-effective technologies and practices.

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. NGSI 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, NGSl partners have reduced methane emissions by 105 Bcf.

Together, Natural Gas STAR and NGSI have over 130 partner companies—24 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.

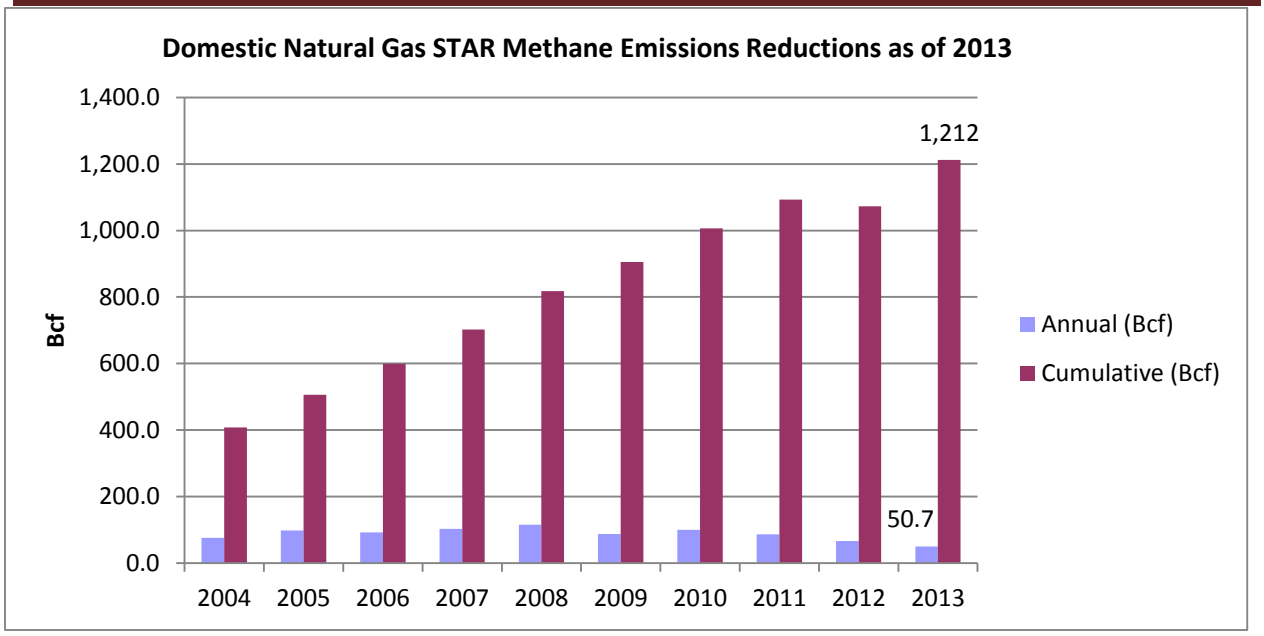
During calendar year 2014, 61 percent of U.S. partners submitted an annual report detailing their efforts in 2013 to reduce methane emissions from their operations. These voluntary activities consisted of nearly 50 technologies and practices and resulted in domestic emissions reductions of 50.7 Bcf for the year. These methane emissions reductions have cross-cutting benefits on domestic energy supply, industrial efficiency, revenue generation, and greenhouse gas emissions reductions. The 2013 emission reductions are equivalent to:

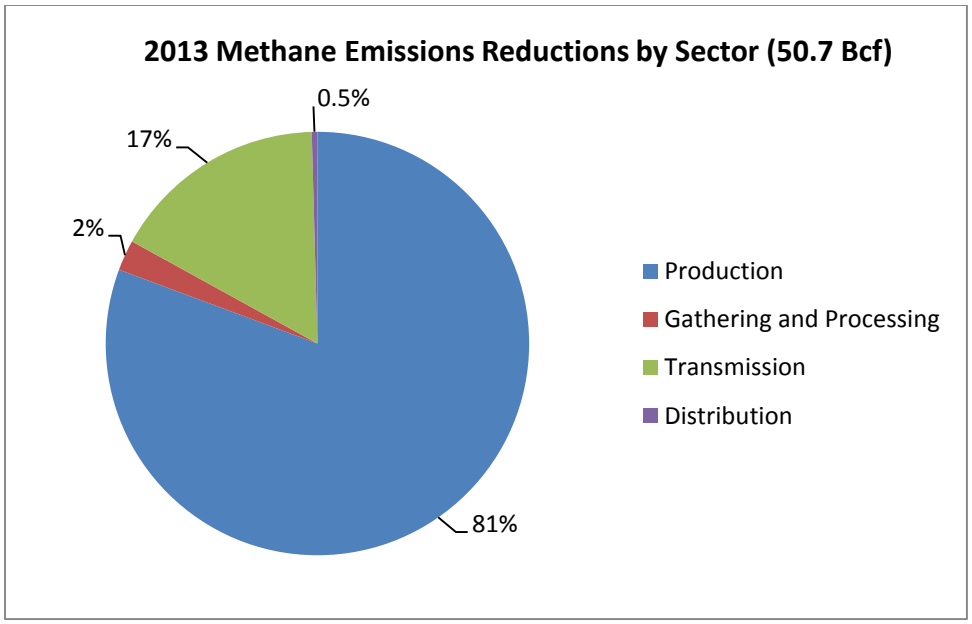
- The additional revenue of more than $200 million in natural gas sales (assumes an average natural gas price of $4.00 per thousand cubic feet).
- The avoidance of 24 million tonnes CO_2 equivalent.
- The carbon sequestered annually by 19 million acres of US forests.

2013 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 2013 included:

- **Methane Expo 2013** – During technical and policy sessions, more than 20 presentations covered several key topics, including best practices for evaluating and reducing emissions from oil and associated gas production, approaches to methane emission detection and measurement, and best practices for capturing and utilizing methane emissions in the oil and gas industry. Representatives from Forward Looking Infrared (FLIR) and Heath Consultants gave a hands-on demonstration of their FLIR GF Series and OPGAL EyeCGas infrared cameras, which are used to identify methane gas leaks.
- **Technology Transfer Workshops** - EPA conducted or participated in and sponsored numerous oil and gas sector workshops. 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. **Measurement Studies** - EPA provided measurement study support and collaborated on international efforts targeting methane emissions in oil and gas operations. Each effort took a holistic approach considering all practicable opportunities for reducing natural gas losses and avoidable consumption.





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: 1990-2012*, dated April 2014, 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 with the largest reported reductions for each sector:

Oil Production

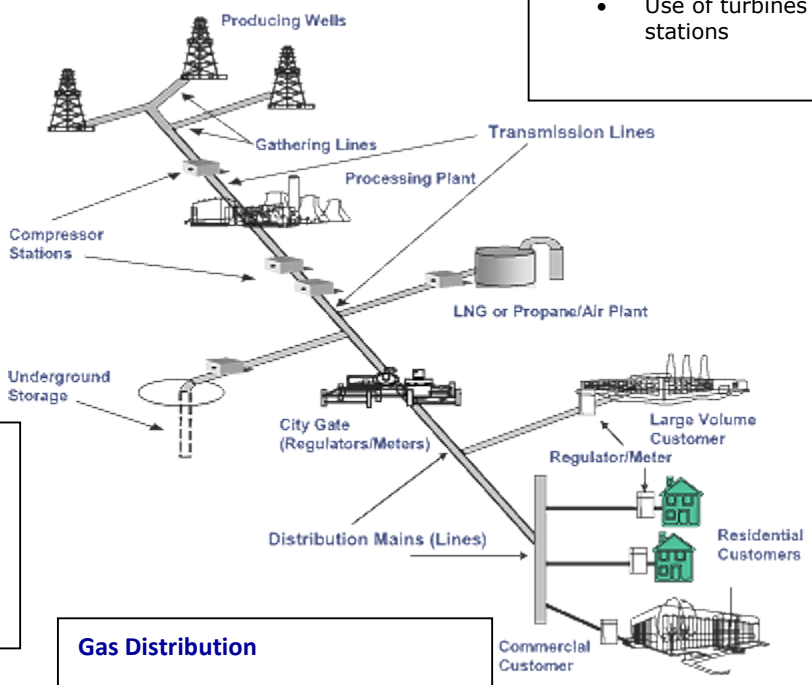
- Perform reduced emissions completions
- Artificial lift: install plunger lifts
- Install vapor recovery units (VRUs)

Gas Transmission

- Use pipeline pumpdown to lower pressure
- DI&M: compressor stations
- Use of turbines at compressor stations

Gas Gathering & Processing

- DI&M: aerial leak detection
- Nitrogen rejection unit optimization
- Redesign blowdown/alter ESD practice



Gas Storage

- Convert to instrument air systems
- Replace compressor rod packing systems

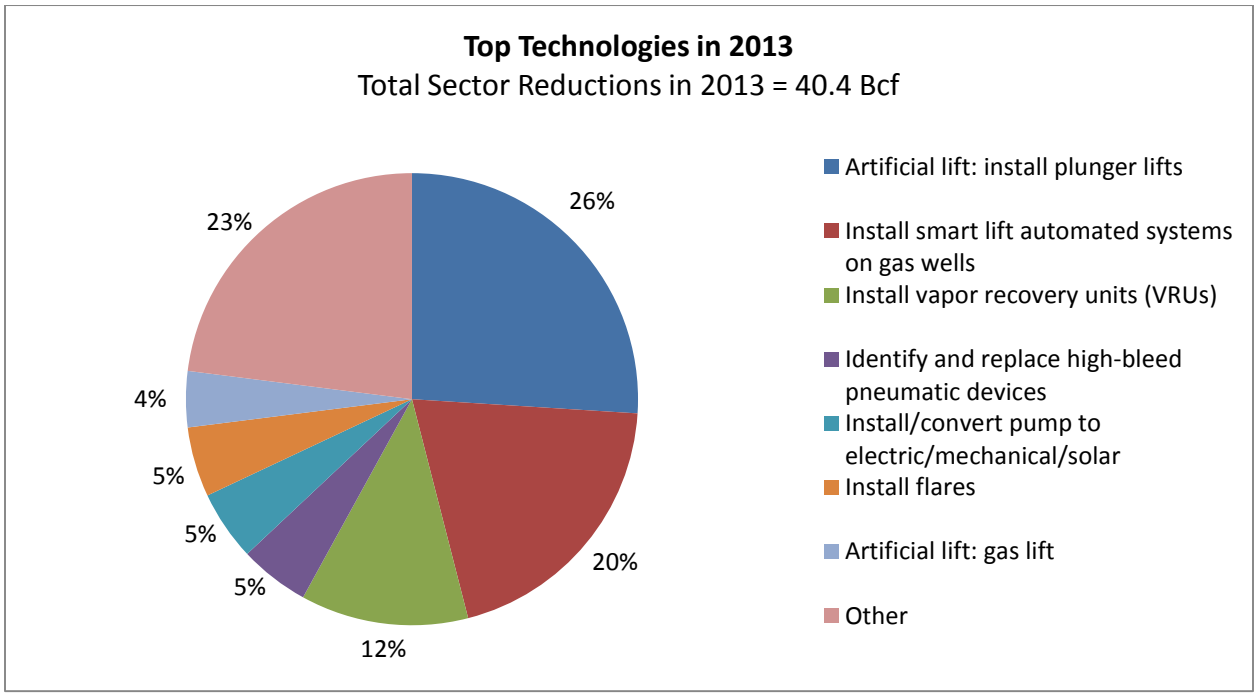
Gas Distribution

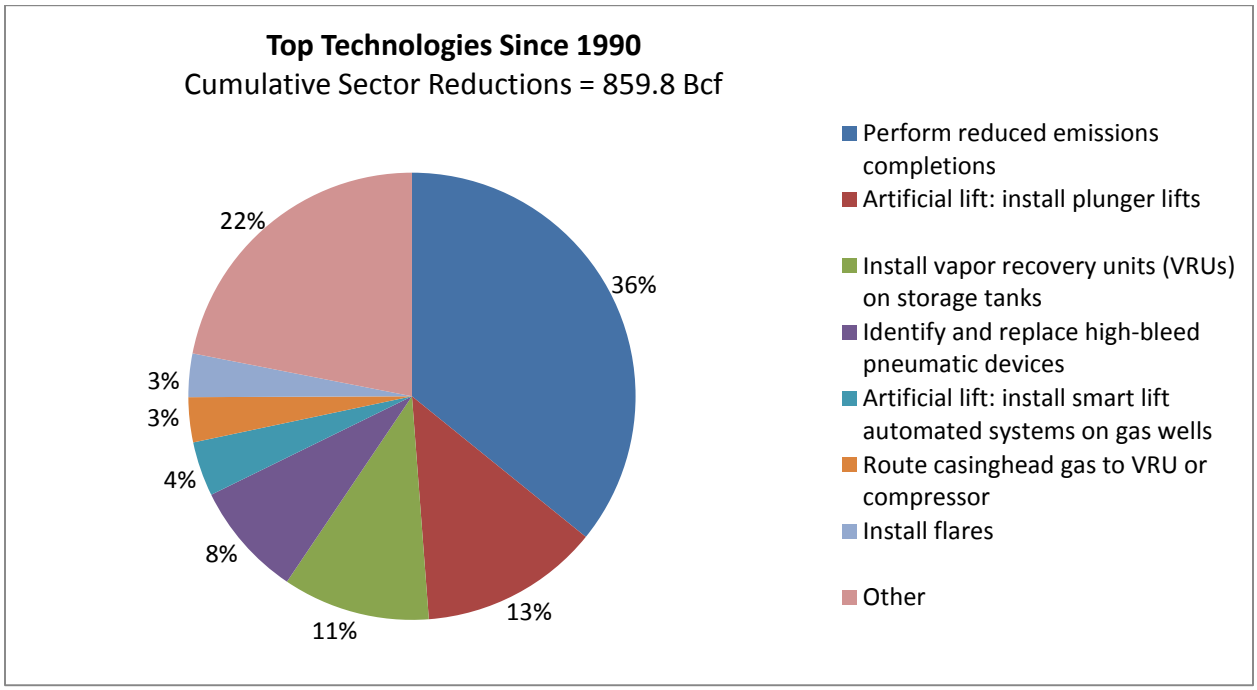
- Identify and rehabilitate leaky distribution pipe
- DI&M: surface facilities
- DI&M: survey and repair leaks

Production Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2012, April 2014. Available at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Production sector partners reported 40.4 Bcf of methane emissions reductions in 2013—and a total of 859.8 Bcf since 1990. The top technologies and practices employed by production sector partners are displayed in the charts below.

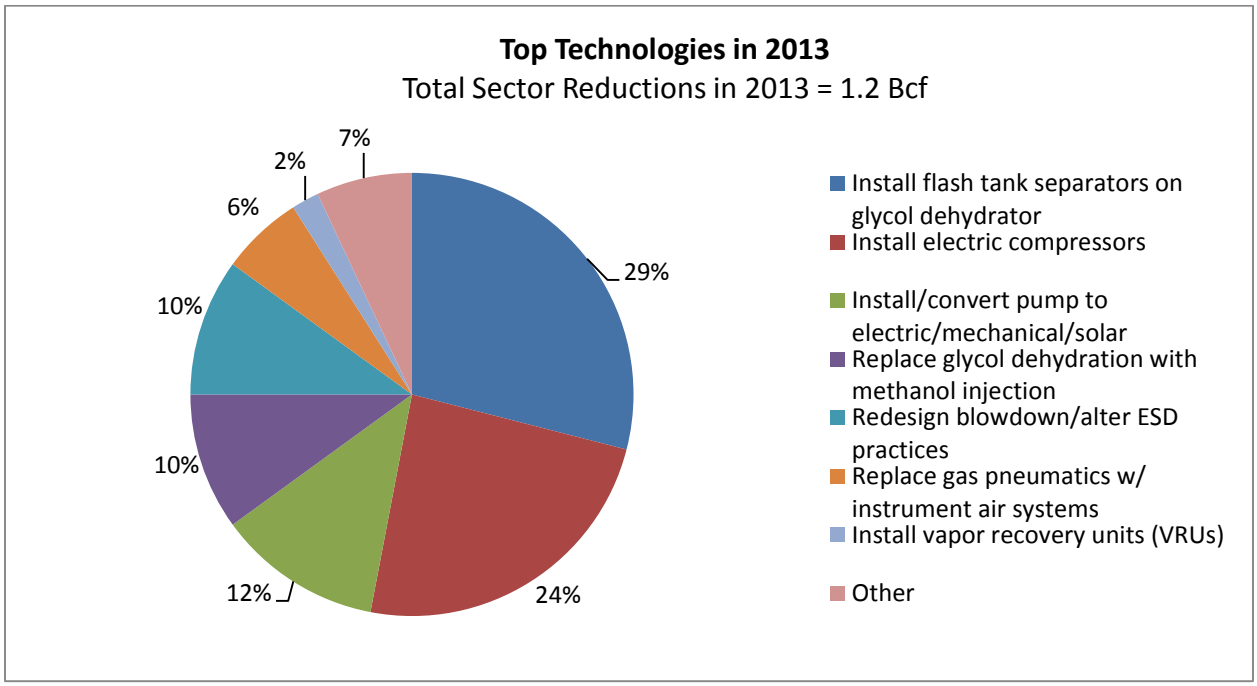


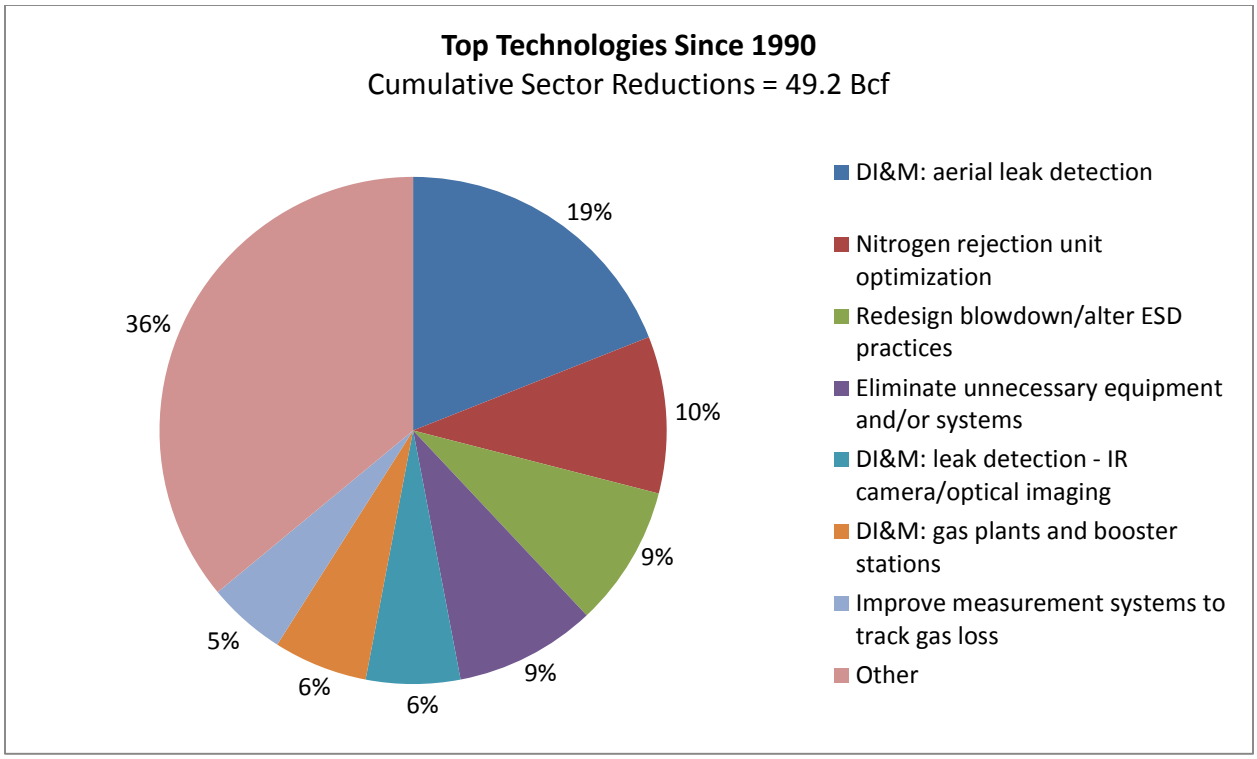


Gathering and Processing Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2012, April 2014. Available at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Gathering and processing sector partners reported 1.2 Bcf of methane emissions reductions in 2013—and a total of 49.2 Bcf since 1990. The top technologies and practices employed by gathering and processing sector partners are displayed in the charts below.

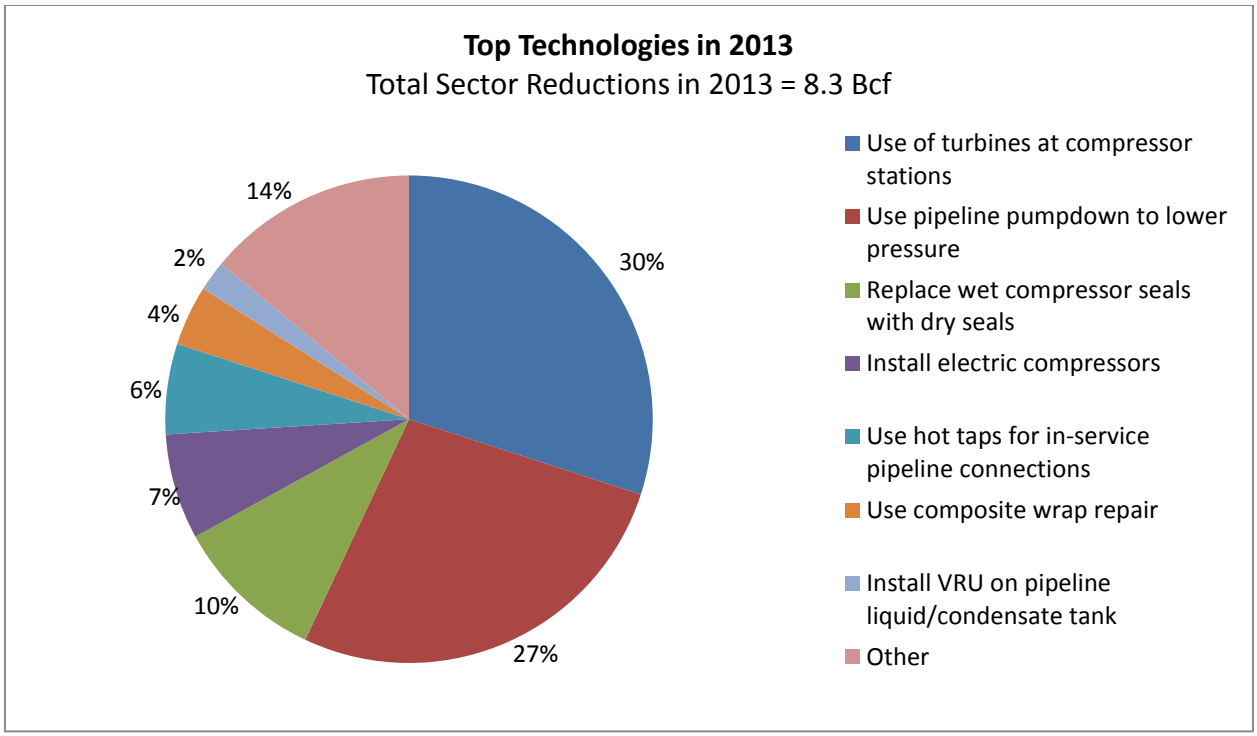


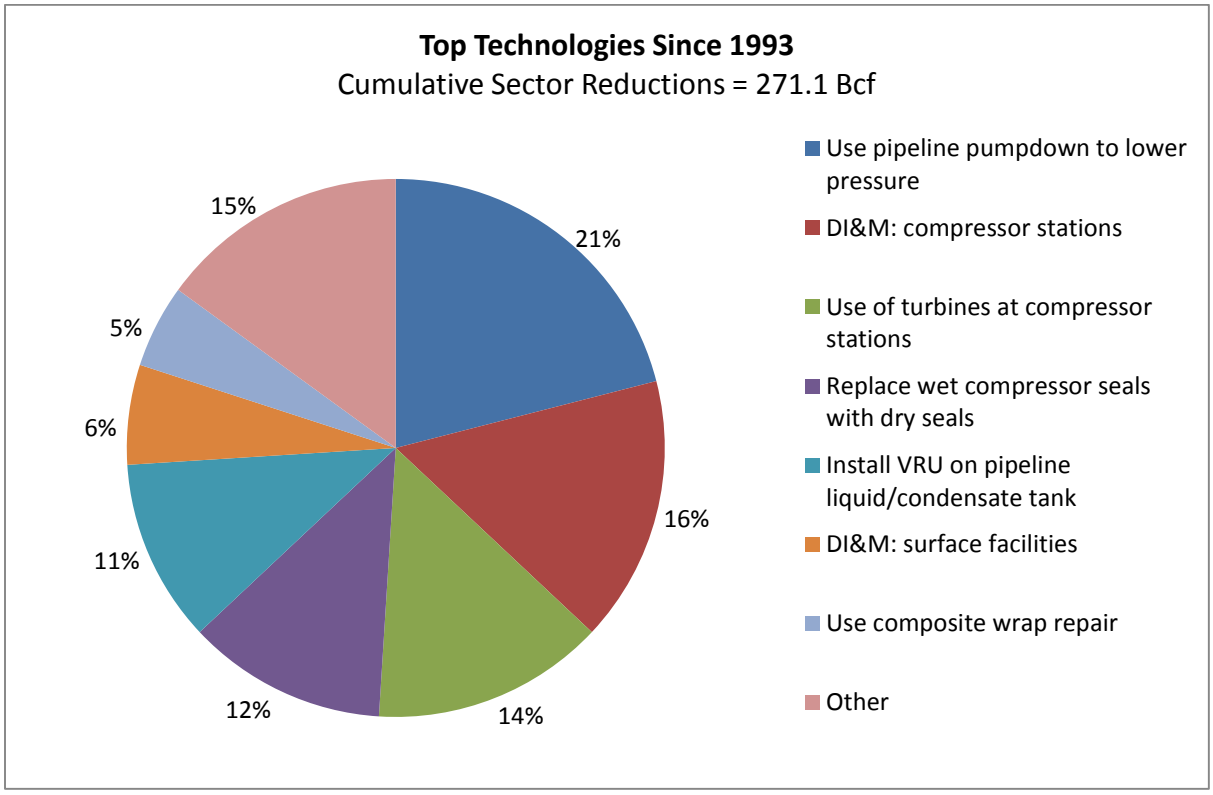


Transmission Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2012, April 2014. Available at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Transmission sector partners reported 8.3 Bcf of methane emissions reductions in 2013—and a total of 271.1 Bcf since 1993. The top technologies and practices employed by transmission sector partners are displayed in the charts below.

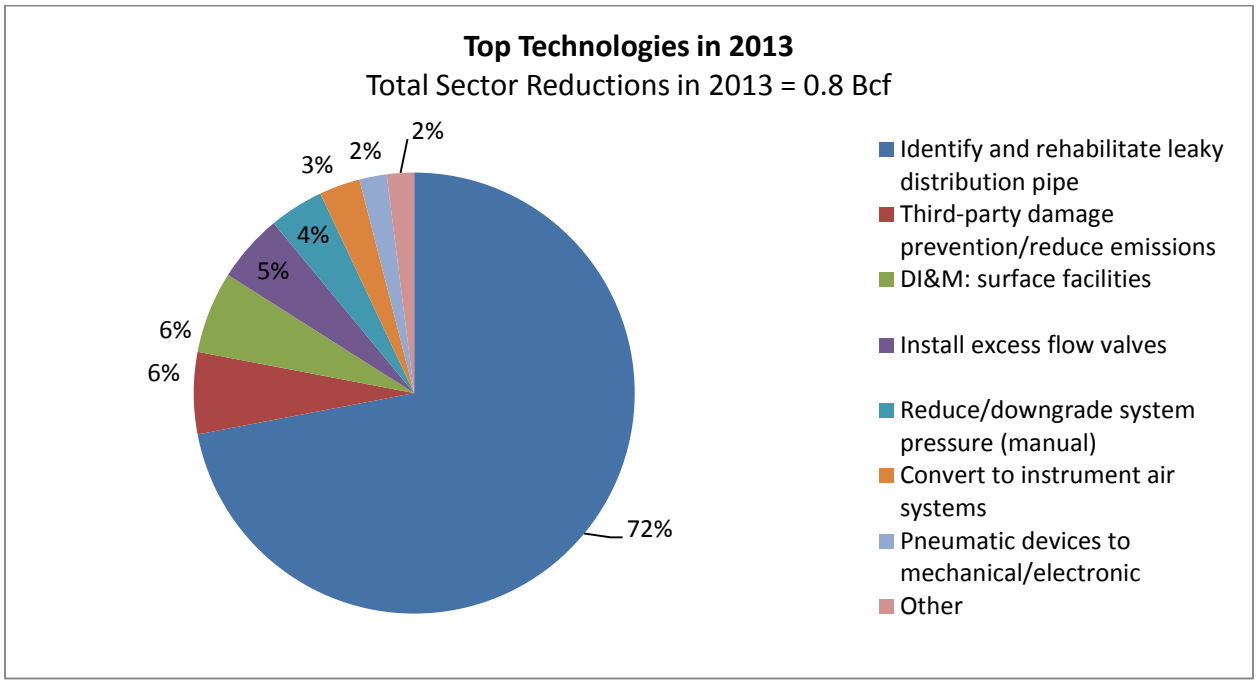

Top Technologies in 2013
Total Sector Reductions in 2013 = 8.3 Bcf
30%
27%
10%
7%
6%
4%
2%
14%
Use of turbines at compressor stations
Use pipeline pumpdown to lower pressure
Replace wet compressor seals with dry seals
Install electric compressors
Use hot taps for in-service pipeline connections
Use composite wrap repair
Install VRU on pipeline liquid/condensate tank
Other

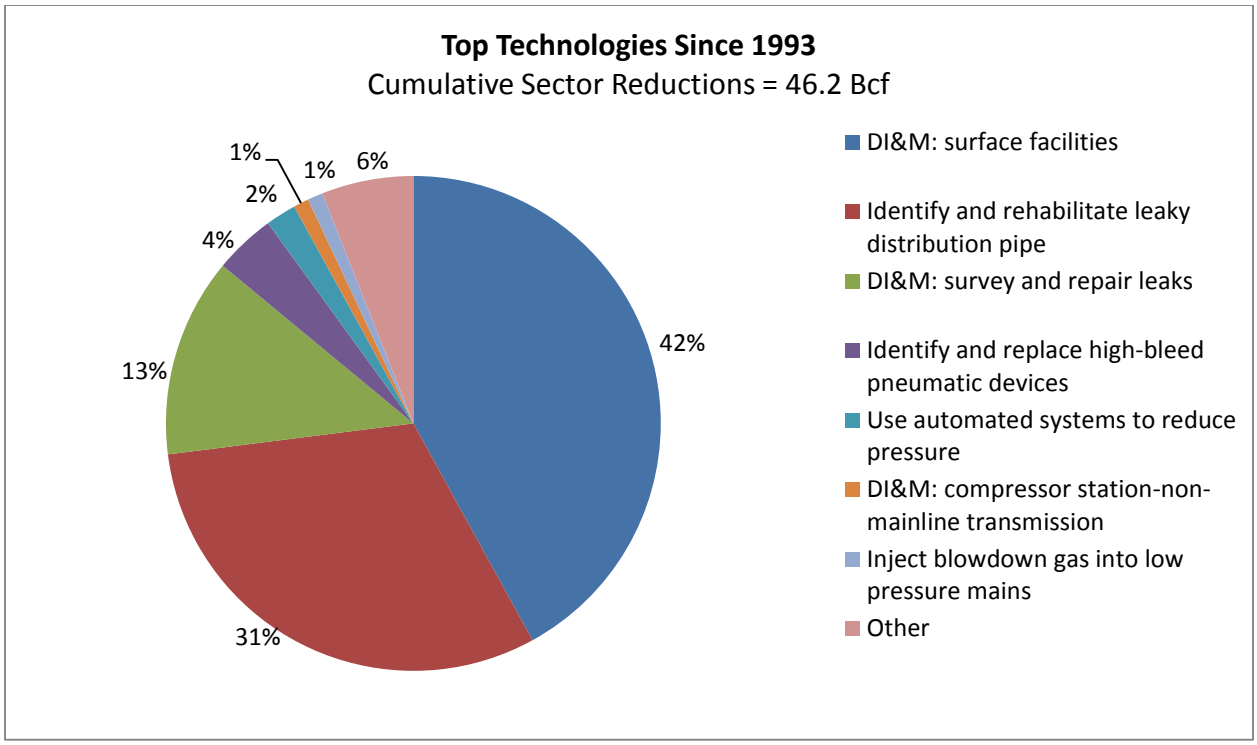

Top Technologies Since 1993
Cumulative Sector Reductions = 271.1 Bcf
21%
16%
14%
12%
11%
6%
5%
15%
Use pipeline pumpdown to lower pressure
DI&M: compressor stations
Use of turbines at compressor stations
Replace wet compressor seals with dry seals
Install VRU on pipeline liquid/condensate tank
DI&M: surface facilities
Use composite wrap repair
Other

Distribution Sector Accomplishments

EPA Inventory of U.S. Greenhouse Emissions and Sinks: 1990 – 2012, April 2014. Available at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

Distribution sector partners reported 0.8 Bcf of methane emissions reductions in 2013—and a total of 46.2 Bcf since 1993. The top technologies and practices employed by distribution sector partners are displayed in the charts below.





The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants

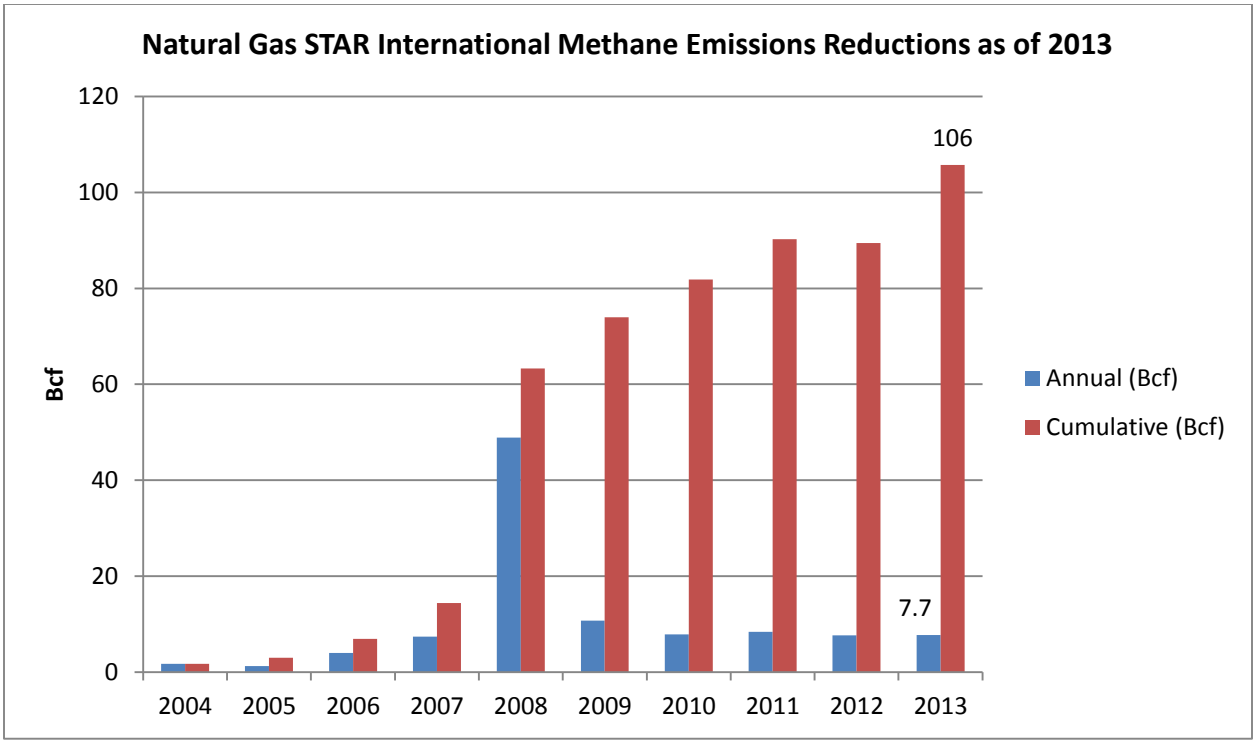
In January 2013, the Climate and Clean Air Coalitions (CCAC) launched an Oil and Gas Initiative. The Initiative focuses on reducing venting, leakage, and flaring of natural gas from global oil and gas operations and seeks to accelerate and expand global methane and black carbon emission reductions, building upon and scaling up achievements of the NGSI Program, GMI, and the World Bank-led Global Gas Flaring Reduction (GGFR) Partnership and showcase progress by companies in addressing short-lived climate pollutants. Follow the link for additional information: http://www.ccacoalition.org/index.html.

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 7.7 Bcf in methane emissions reductions for a total of 106 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 2013, these companies reported methane emissions reductions from the implementation of 11 technologies and practices.

The 2013 voluntary international methane emissions reductions are equivalent to:

- The additional revenue of more than $30.9 million in natural gas sales (assumes an average natural gas price of $4.00 per thousand cubic feet).
- The avoidance of nearly 3.7 million tonnes CO_2 equivalent.
- The carbon sequestered annually by more than 3 million acres of US forests.



Advancing Natural Gas STAR International

EPA also met with several oil and gas companies to engender support and to discuss the possibility of joining NGSI. Partners joining the program in 2014 include:

- **Cairn India**, one of the largest independent oil and gas exploration and production companies in India. Cairn India operates 28% of India's domestic crude oil production;
- **PT Pertamina (EP Asset 3)**, engaged in the upstream oil and gas production sector. Pertamina EP produces around 120 thousand barrels of oil per day (BOPD) and around 1,003 million standard cubic feet per day (MMSCFD) of natural gas; and
- **Surtigas S.A., E.S.P.** which started operations in 1968 with the marketing of propane and after 10 years in business, changing its focus to the sale of natural gas, a more economical, safe and environmentally friendly energy.