

# EPA Natural Gas STAR Program Accomplishments

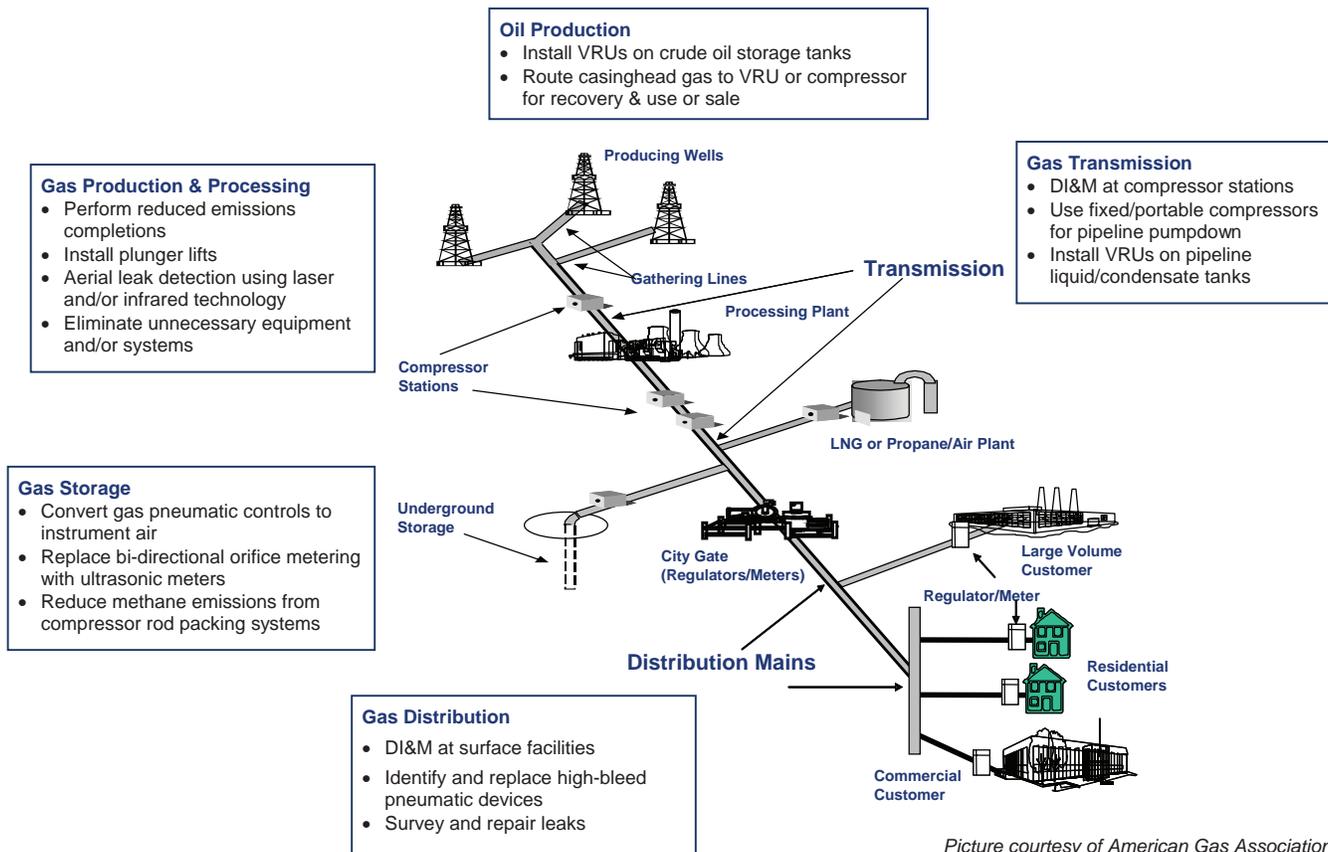
## Introduction

Established in 1993, the Natural Gas STAR Program is a flexible, voluntary partnership that encourages oil and natural gas companies—both domestically 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—23 times more powerful than carbon dioxide (CO<sub>2</sub>) 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 industry partners have operations in all of the major industry sectors—production, gathering and processing, transmission, and distribution—and represent 60 percent of the natural gas industry in the United States, including 18 of the top 25 natural gas production companies. Also, with the launch of Natural Gas STAR International in 2006, the Program expanded to include companies worldwide, significantly increasing opportunities to reduce methane emissions from oil and natural gas operations. Today, the Program has more than 130 partner companies (12 of which are international partners) and is endorsed by 20 major industry trade associations.

This document highlights the methane emissions reductions Natural Gas STAR partners have achieved to date under this important voluntary partnership program. It also highlights a variety of technologies and practices implemented by partners to reduce methane emissions. The following diagram shows some of the top methane emission reduction opportunities for each sector.



Picture courtesy of American Gas Association.



## 2008: Continuing Excellence

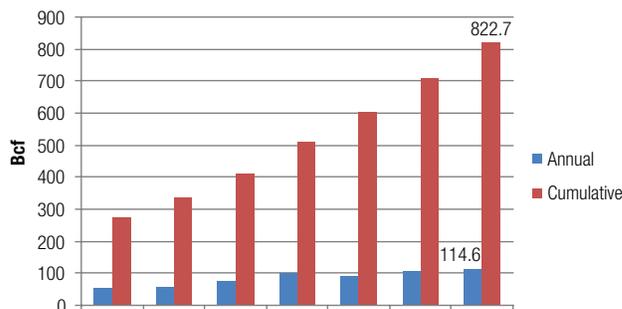
Now in its 16th year, the Natural Gas STAR Program continues to achieve success through its partnerships with the oil and natural gas industry. Since 1993, the oil and natural gas industry has eliminated more than 822 billion cubic feet (Bcf) of domestic methane emissions through the implementation of approximately 150 cost-effective technologies and practices.

For calendar year 2008, Natural Gas STAR partners reported domestic emissions reductions of more than 114 Bcf. These emissions reductions, voluntarily undertaken by Natural Gas STAR partner companies, have cross-cutting benefits on domestic energy supply, industrial efficiency, revenue generation, and greenhouse gas emissions reductions.

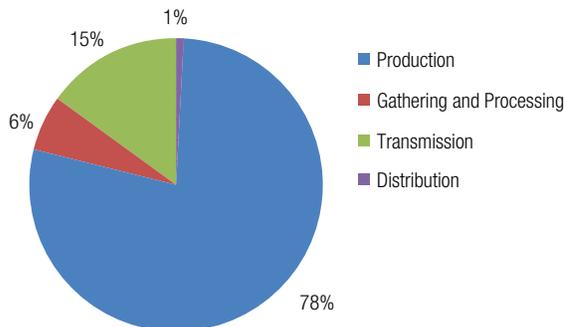
The 2008 voluntary domestic emissions reductions are equivalent to:

- The additional revenue of more than \$802 million in natural gas sales (assumes an average natural gas price of \$7.00 per thousand cubic feet).
- The avoidance of 46.3 million tonnes CO<sub>2</sub> equivalent.
- The CO<sub>2</sub> emissions from the electricity use consumption of more than 6 million homes for one year.
- The annual greenhouse gas emissions from 8.5 million passenger vehicles.
- The carbon sequestered annually by 10.5 million acres of pine or fir forests.

Domestic Natural Gas STAR Methane Emissions Reductions as of 2008



2008 Methane Emissions Reductions by Sector (114.6 Bcf)



## Technology Transfer Activities

Natural Gas STAR methane emission reducing technologies and practices have become widely implemented by partners as a result of technology transfer and sharing partner experiences across the industry. This is achieved through Natural Gas STAR technical documents, technology articles in the Partner Update, and partner sponsored Technology Transfer Workshops.

In 2009, Natural Gas STAR held four domestic Technology Transfer Workshops. Domestic workshops covered much of the oil and natural gas producing regions, with events in Montana, Oklahoma, Pennsylvania, and West Virginia. Co-sponsored by industry partners or endorser organizations, these workshops provide an opportunity for participants to engage in a peer-based exchange of technical and economic information related to cost-effective methane emission reduction technologies and practices and other best practices. More information on these technology transfer workshops can be found on the Natural Gas STAR Web site at [epa.gov/gasstar/workshops/index.html](http://epa.gov/gasstar/workshops/index.html).





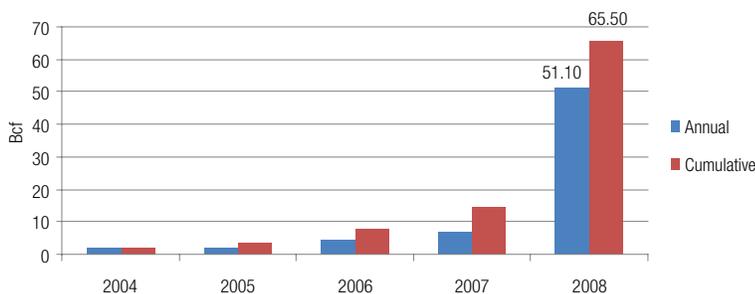
## Natural Gas STAR International

In addition to the growth experienced under the domestic Program since 1993, international progress is also being made in reducing methane emissions under Natural Gas STAR International. The Natural Gas STAR International Program requirements mirror that of the domestic Natural Gas STAR Program, and membership is open to all oil and natural gas companies worldwide. For 2008, Natural Gas STAR International partners reported 51.1 Bcf in methane emissions reductions and a total of 65.5 Bcf since the inception of the Natural Gas STAR International Program. This includes methane emissions reductions in Argentina, Brazil, Canada, Equatorial Guinea, India, and Nigeria.

The 2008 voluntary international methane emissions reductions are equivalent to:

- The additional revenue of nearly \$358 million in natural gas sales (assumes an average natural gas price of \$7.00 per thousand cubic feet).
- The avoidance of 20.7 million tons CO<sub>2</sub> equivalent.
- The CO<sub>2</sub> emissions from the electricity consumption of 2.7 million homes for one year.
- The annual greenhouse gas emissions from 3.8 million passenger vehicles.
- The carbon sequestered annually by 4.7 million acres of pine or fir forests.

Natural Gas STAR International Methane Emissions Reductions as of 2008



## New Tools and Resources

New Methane to Markets Web site ([www.methanetomarkets.org](http://www.methanetomarkets.org))

The redesigned Methane to Markets Web site includes new features to better serve the multi-national, multi-lingual, and multi-disciplinary community. New Web 2.0 features allow users to share Methane to Markets activities with others as well as translate content into dozens of languages. Updates were also made to country home pages, country detail pages, and the sector landing pages to make information easily accessible to users.





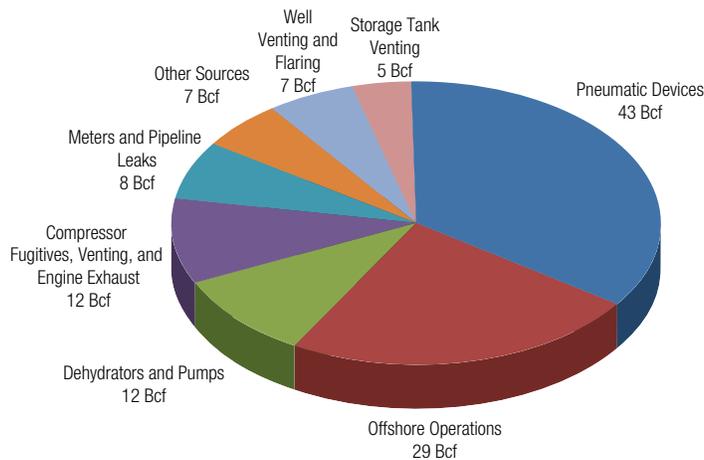
## Emissions Reductions by Sector

The following section illustrates the major sources of methane emissions from each industry sector and the technologies and practices implemented by partners to reduce methane emissions. The information showing the breakdown of emission sources was taken from the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks, and the information showing Natural Gas STAR partner activities, was taken from partner reports and Natural Gas STAR historical data.

### Production Sector Accomplishments

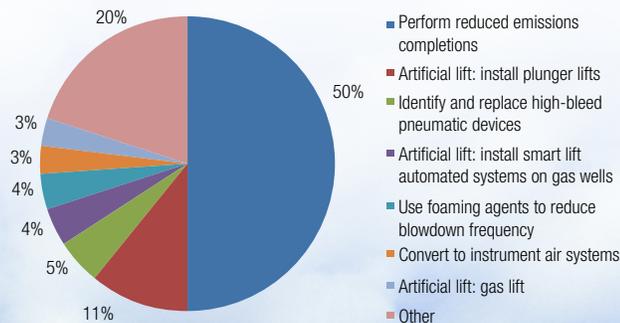
**Production Sector**  
Top Emission Sources in 2007

Source: EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2007, April 2009

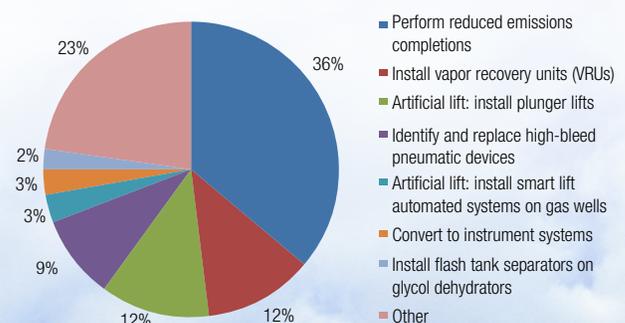


Production partners reported 89.3 Bcf of methane emissions reductions in 2008—and a total of 537 Bcf since 1990. The technologies and practices employed by production sector partners include:

**Top Technologies in 2008**  
Total Sector Reductions in 2008 = 89.3 Bcf



**Top Technologies Since 1990**  
Cumulative Sector Reductions = 537.4 Bcf

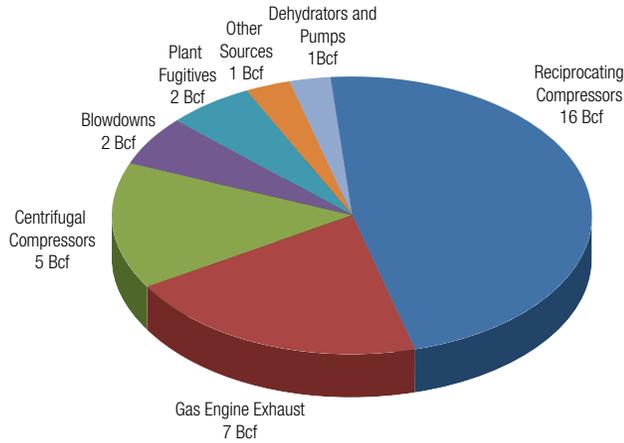




## Gathering and Processing Sector Accomplishments

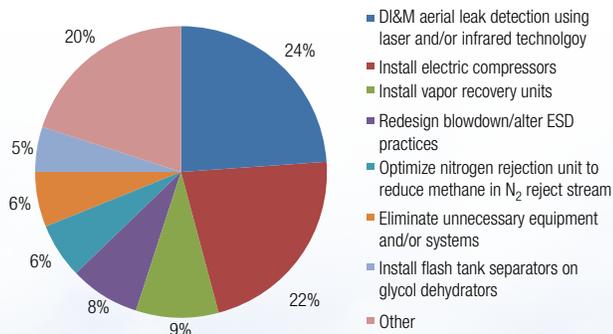
### Gathering and Processing Sector Top Emission Sources in 2007

Source: EPA Inventory of U.S.  
Greenhouse Gas Emissions and  
Sinks 1990-2007, April 2009

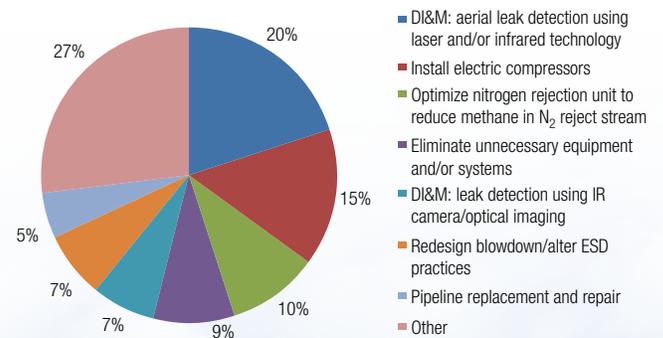


Gathering and processing partners reported 7 Bcf of methane emissions reductions in 2008—and a total of 42.8 since 1990. The technologies and practices employed by gathering and processing sector partners include:

**Top Technologies in 2008**  
Total Sector Reductions in 2008 = 7 Bcf



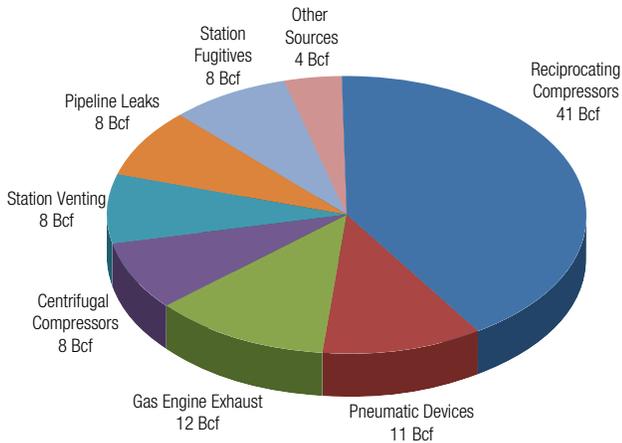
**Top Technologies Since 1990**  
Cumulative Sector Reductions = 42.8 Bcf





## Transmission Sector Accomplishments

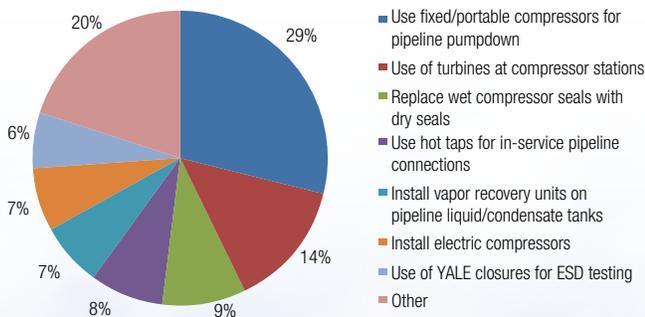
**Transmission Sector**  
Top Emission Sources in 2007



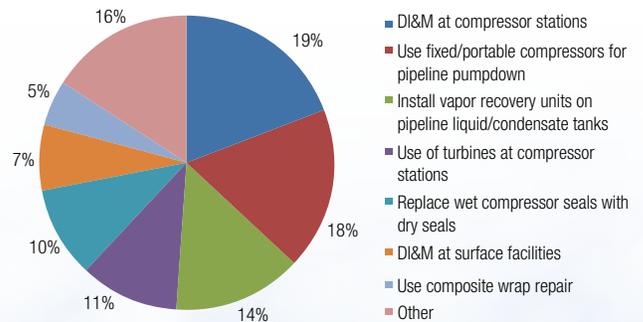
Source: EPA Inventory of U.S.  
Greenhouse Gas Emissions and  
Sinks 1990-2007, April 2009

Transmission partners reported 17.3 Bcf of methane emissions reductions in 2008—and a total of 214.4 Bcf since 1993. The technologies and practices employed by transmission sector partners include:

**Top Technologies in 2008**  
Total Sector Reductions in 2008 = 17.3 Bcf



**Top Technologies Since 1993**  
Cumulative Sector Reductions = 214.4 Bcf

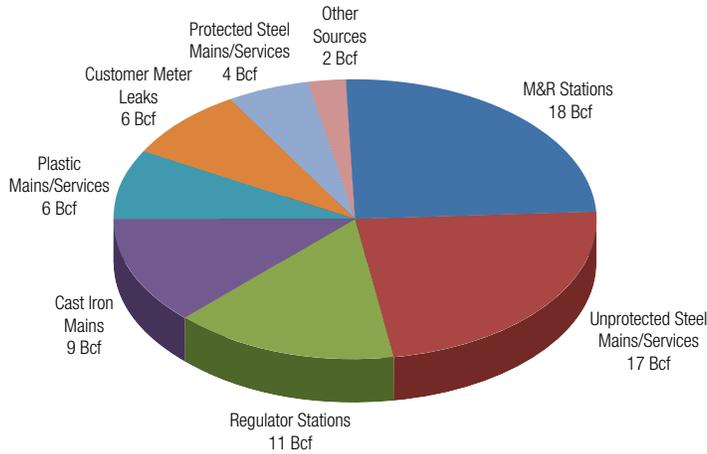




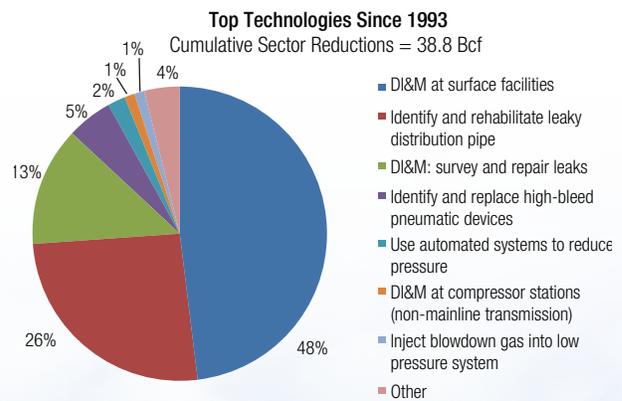
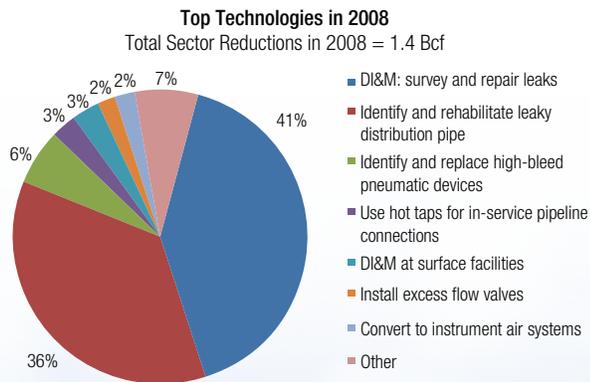
## Distribution Sector Accomplishments

**Distribution Sector**  
Top Emission Sources in 2007

Source: EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2007, April 2009



Distribution partners reported 1.4 Bcf of methane emissions reductions in 2008—and a total of 38.8 Bcf since 1993. The technologies and practices employed by distribution sector partners include:





## Natural Gas STAR Partners and Endorsers

### Production

Anadarko Petroleum Corporation  
Apache Corporation  
Arcland Energy  
BP  
Chesapeake Energy  
Chevron Corporation  
ConocoPhillips Alaska Natural Gas Corporation  
ConocoPhillips Petroleum Company  
Devon Energy  
El Paso E & P Company, L.P.  
EnCana Oil & Gas (USA) Inc.  
Ergen Resources  
ExxonMobil Production Company  
Hess Corporation's Americas Exploration and Production  
HighMount E&P LLC  
Hunt Oil Company  
Linn Energy, LLC  
Marathon Oil Company  
Murphy Exploration and Production Company  
Newfield Exploration Company  
Noble Energy, Inc.  
Occidental Oil and Gas Corporation  
Plains Exploration & Production Company (PXP)  
Quicksilver Resources  
SandRidge Midstream  
Shell Exploration & Production Company  
Southwestern Energy Company  
Torch Energy  
Total E&P USA  
Williams Production RMT Company  
XTO Energy

### Gathering and Processing

BP  
Chevron Corporation  
DCP Midstream  
Enbridge Energy Partners, L.P.  
Enogex LLC  
ExxonMobil Production Company  
ONEOK Partners  
Pioneer Natural Resources USA, Inc.  
Prism Gas Company  
ROC Gas Company (a wholly owned subsidiary of SandRidge Midstream)  
Targa Resources, Inc.  
Western Gas Resources (a wholly owned subsidiary of Anadarko Petroleum Corporation)

### Transmission

Alliance Pipeline LP  
ANR Pipeline Company (a TransCanada Company)  
Carolina Gas Transmission (a SCANA Corporation Company)  
Colorado Interstate Gas Company (an El Paso Transmission Company)  
Columbia Gas Transmission Corporation (a NiSource Transmission Company)  
Columbia Gulf Transmission Company (a NiSource Transmission Company)  
Consumers Energy  
DTE Energy - MichCon  
El Paso Natural Gas Company  
Enbridge, Inc.  
Florida Gas Transmission (a Southern Union Gas company)  
Granite State Gas Transmission, Inc. (a NiSource Transmission Company)  
Great Lakes Gas Transmission Company  
Gulf South Pipeline  
Iroquois Gas Transmission System  
Kinder Morgan  
New Mexico Gas Company  
Northern Natural Gas  
ONEOK Partners  
Pacific Gas and Electric Company  
Panhandle Eastern Pipeline (a Southern Union Gas company)  
Piedmont Natural Gas  
Questar Pipeline Company  
Source Gas LLC  
Southern California Gas Company  
Southern Natural Gas Company (an El Paso Transmission Company)  
Southwest Gas Corporation  
Spectra Energy Transmission  
Tennessee Gas Pipeline Company (an El Paso Transmission Company)  
TransCanada - Gas Transmission Northwest  
Trunkline Gas (a Southern Union Gas company)  
Williams Gas Pipeline  
Williston Basin Interstate Pipeline Company

### Distribution

AGL Resources  
Alliant Energy  
Atmos Energy Corporation  
Bay State Gas Company (a NiSource Distribution Company)  
Berkshire Gas  
CenterPoint Energy Arkla/Entex  
CenterPoint Energy Minnesota Gas  
Central Hudson Gas & Electric Corporation

Citizens Energy Group  
Columbia Gas of Kentucky, Inc. (a NiSource Distribution Company)  
Columbia Gas of Maryland, Inc. (a NiSource Distribution Company)  
Columbia Gas of Ohio, Inc. (a NiSource Distribution Company)  
Columbia Gas of Pennsylvania, Inc. (a NiSource Distribution Company)  
Columbia Gas of Virginia, Inc. (a NiSource Distribution Company)  
Connecticut Natural Gas Corporation  
Consolidated Edison Company of New York, Inc.  
Constellation Energy/Baltimore Gas and Electric Company  
Consumers Energy  
Corning Natural Gas Corporation  
Delmarva Power  
DTE Energy - MichCon  
Duke Energy Ohio/Kentucky  
Equitable Gas Co.  
Kansas Gas Services (a ONEOK Distribution Company)  
Kinder Morgan  
Kokomo Gas and Fuel Company (a NiSource Distribution Company)  
Laclede Gas Co.  
Maine Natural Gas  
National Grid  
New Jersey Natural Gas Company  
New Mexico Gas Company  
New York State Electric & Gas Corporation  
Nicor Gas  
Northern Indiana Fuel & Light Co. (a NiSource Distribution Company)  
Northern Indiana Public Service Company (a NiSource Distribution Company)  
Northern Utilities (a NiSource Distribution Company)  
Oklahoma Natural Gas (a ONEOK Distribution Company)  
Orange and Rockland Utilities, Inc.  
Pacific Gas and Electric Company  
PECO Energy Company  
Piedmont Natural Gas  
PSNC Energy  
Public Service Electric and Gas Company  
Puget Sound Energy  
Questar Gas Co.  
Rochester Gas & Electric Corporation  
Source Gas LLC  
South Carolina Electric & Gas Company (a SCANA Corporation Company)  
Southern California Gas Company  
Southern Connecticut Gas Company  
Southwest Gas Corporation

Texas Gas Services (a ONEOK Distribution Company)  
UGI Utilities, Inc.  
Washington Gas  
Wisconsin Public Service Company  
Xcel Energy

### International

Comgas  
ConocoPhillips Canada Ltd.  
Devon Energy Corporation  
Empresa Nacional del Petroleo (ENAP)  
ENAP Siptrol S.A. (international affiliate of ENAP)  
Enbridge, Inc.  
ExxonMobil Corporation  
GAZ-SYSTEM S.A.  
Marathon Oil Corporation  
Occidental Oil and Gas Corporation  
Oil and Natural Gas Corporation Ltd. (ONGC)  
TransCanada

### Endorsers

The Air & Waste Management Association (A&WMA)  
American Exploration & Production Council  
American Gas Association (AGA)  
American Institute of Chemical Engineers (AIChE) Institute for Sustainability  
American Petroleum Institute (API)  
Colorado Oil and Gas Association (COGA)  
Gas Processors Association (GPA)  
Gulf Coast Environmental Affairs Group (GCEAG)  
Independent Petroleum Association of America (IPAA)  
Independent Petroleum Association of Mountain States (IPAMS)  
Interstate Natural Gas Association of America (INGAA)  
Interstate Oil & Gas Compact Commission (IOGCC)  
Montana Petroleum Association (MPA)  
Natural Gas Supply Association (NGSA)  
New York State Energy Research and Development Authority (NYSERDA)  
Northeast Gas Association (NGA)  
Petroleum Association of Wyoming (PAW)  
Petroleum Technology Transfer Council  
Southern Gas Association (SGA)  
Texas Alliance of Energy Producers