

Methane Emissions Reductions: Barriers, Opportunities and Possibilities for Oil and Natural Gas



2009 Annual Implementation Workshop



**Natural Gas STAR Program
October 20, 2009**



Agenda

- 🔥 2008/2009 Overview & Highlights
- 🔥 Program Resources and Services
- 🔥 Overview of Annual Workshop

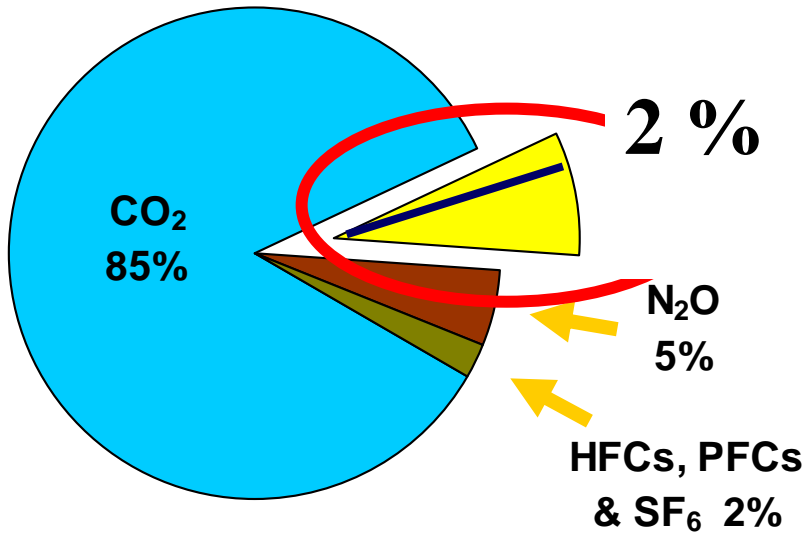
Overview & Highlights





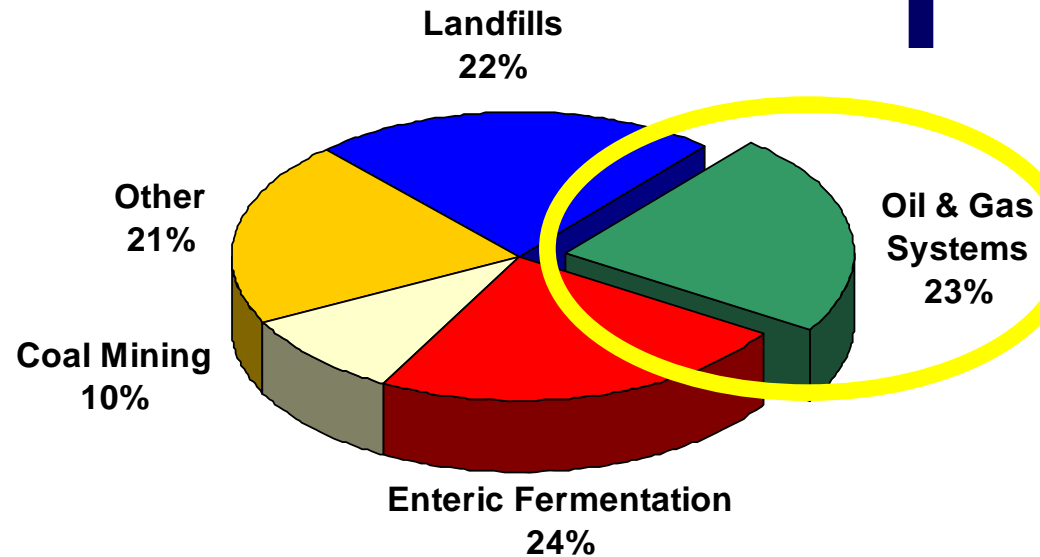
Current U.S. Greenhouse Gas Emissions Estimates

U.S. Greenhouse Gas Emissions All Sources



Methane emissions from oil and natural gas systems make up about 2% of total U.S. greenhouse gas emissions

U.S. Methane Emissions by Sector

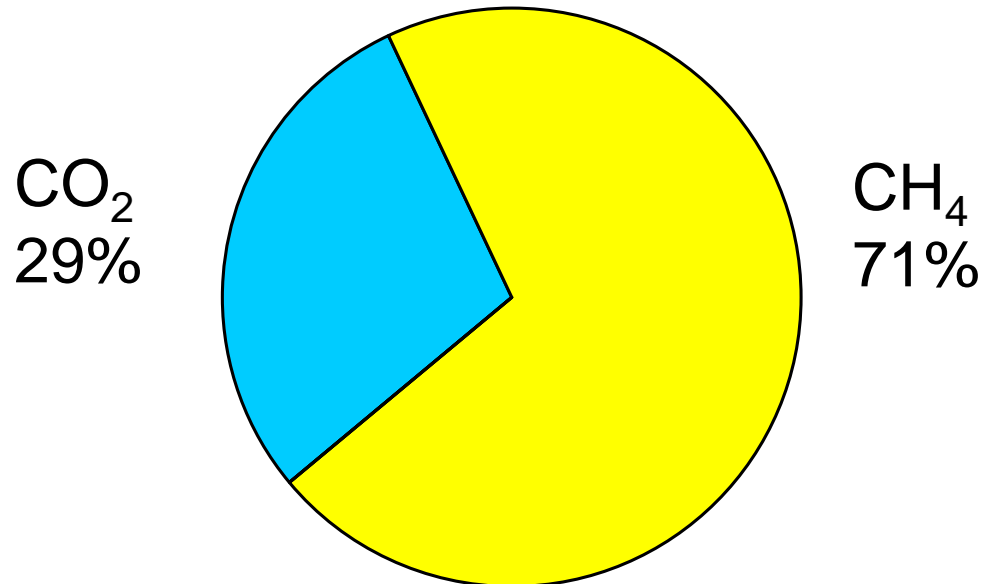


Oil and natural gas systems are the second largest man-made source of methane emissions in the U.S. (23%)



U.S. Natural Gas Industry GHG Emissions: 20 year Global Warming Potential Basis

🔥 Methane emissions comprise 72% of total U.S. Natural Gas industry GHG emissions



(N₂O Emissions are negligible)

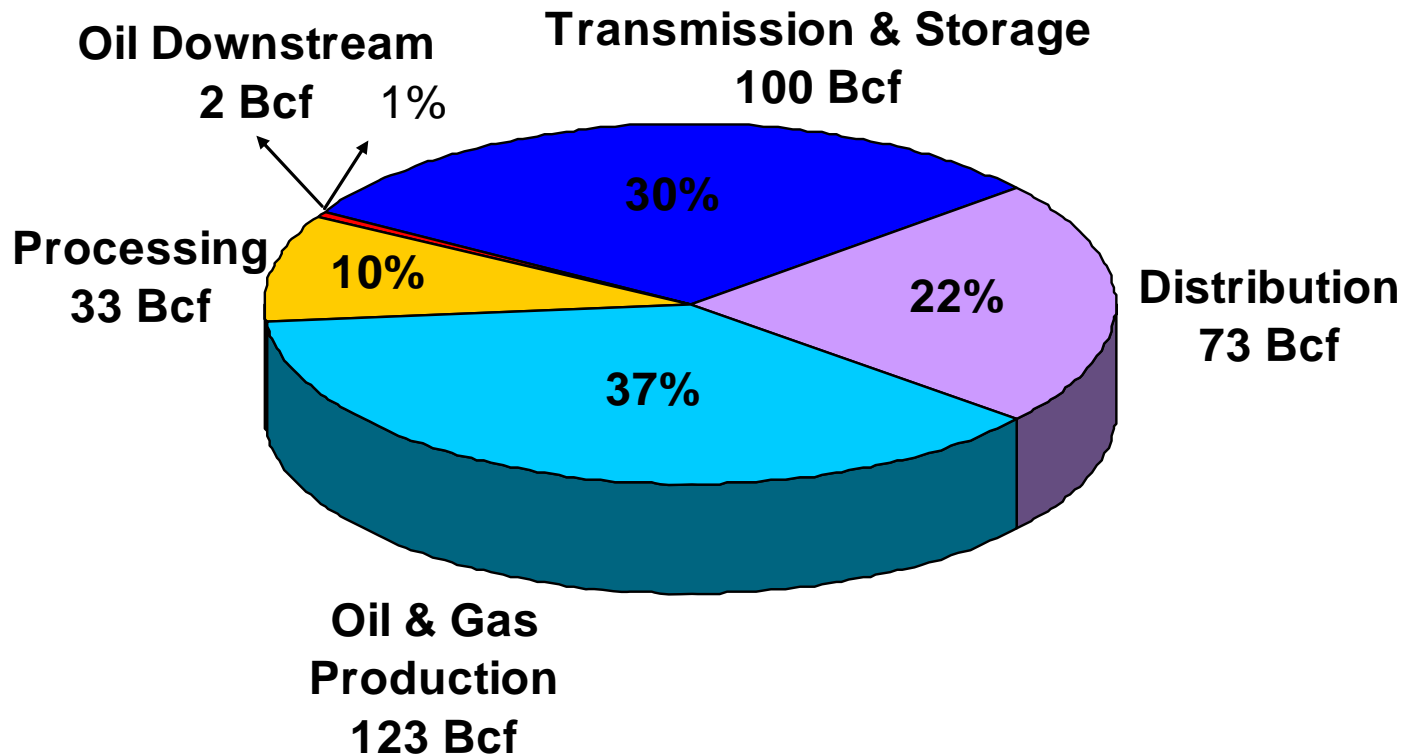
EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2009.

Updated with 20-year GWP from IPCC. *Changes in Atmospheric Constituents and in Radiative Forcing*. 2007.



Background: U.S. Oil and Gas Methane Emissions by Sector

🔥 **2007 U.S. methane emissions from oil and natural gas industry: 331 Bcf (2% of total U.S. greenhouse gas emissions)**



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

Note: Natural Gas STAR reductions from gathering and boosting operations are reflected in the production sector.



U.S. Oil & Natural Gas Opportunities: Why Gas STAR?

- 💧 **331 Bcf of methane emissions per year amounts to:**
 - 💧 \$1.49B worth of gas lost (at \$4.50/Mcf)
 - 💧 CO₂ emissions from the electricity use of 17.7 million homes for one year
 - 💧 Annual greenhouse gas emissions from 24.5 million passenger vehicles

- 💧 **U.S. oil and natural gas industry has an opportunity to cost-effectively reduce methane emissions resulting in:**
 - 💧 Improved safety
 - 💧 Increased operational efficiency
 - 💧 Increased domestic natural gas supply
 - 💧 Increased revenue/profits
 - 💧 Improved environmental performance



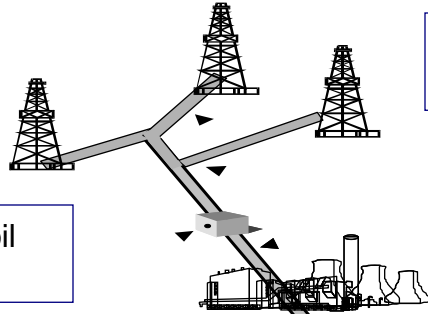


Cost-Effective Methane Mitigation Opportunities

Oil Production

Route casinghead gas to VRU or compressor for recovery & use or sale

Install VRUs on crude oil storage tanks



Reduced emissions well completions

Aerial leak detection using laser and/or infrared technology

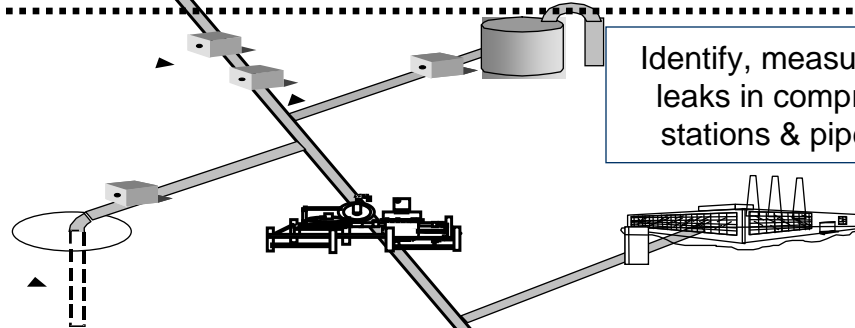
Install plunger lifts

Identify, measure & fix leaks in processing plants

Gas Transmission

Use pipeline pumpdown

Install vapor recovery units on pipeline liquid/condensate tanks



Identify, measure & fix leaks in compressor stations & pipelines

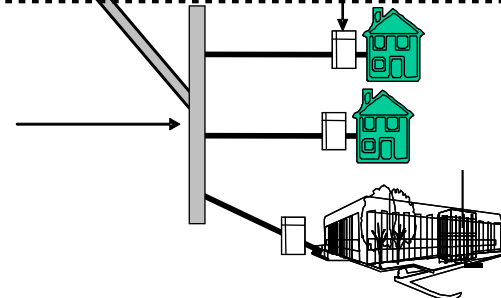
Re-route gas to fuel system or sales line or flare

Replace wet seals with dry in centrifugal compressors

Gas Distribution

Identify, measure & fix leaks in pipelines & metering and regulating stations

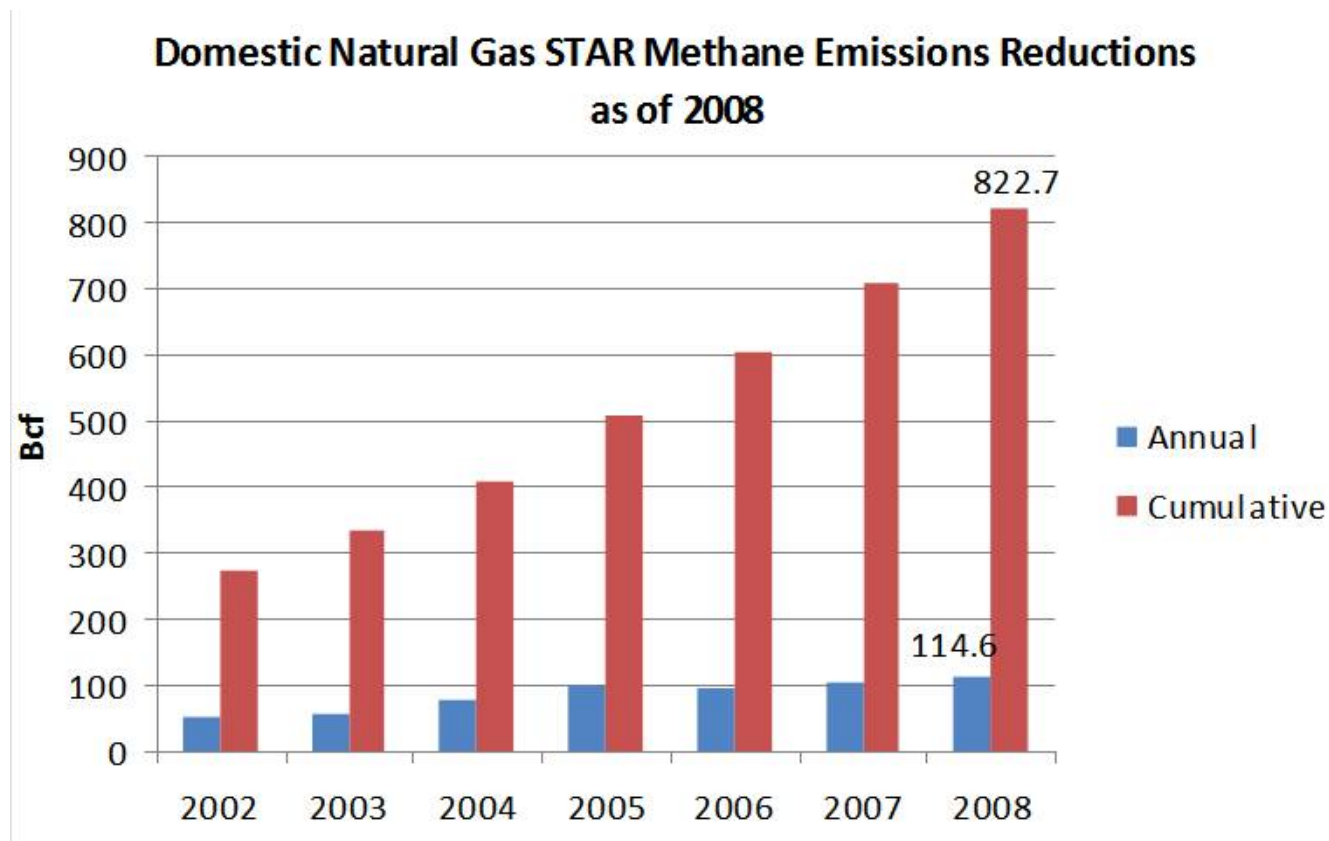
Inject blowdown gas into low pressure mains





2008 Another Successful Year Domestic Methane Emission Reductions

- Gas STAR Partners reduced methane emissions by 114.6 Bcf in 2008
- 822.7 Bcf in cumulative reductions since 1990





Natural Gas STAR Continues to Grow

Over 130 Partners, including 12 International Partners

New Partners

- 🔥 **Arcland Energy**
- 🔥 **Empresa Nacional del Petroleo (ENAP) – International Partner**
- 🔥 **ENAP Sipetrol S.A. - International Partner**
- 🔥 **GAZ-SYSTEM S.A. - International Partner**
- 🔥 **Hightmount E&P LLC**
- 🔥 **Plains Exploration & Production Company**
- 🔥 **Prism Gas Company**



Technology Transfer Workshops

🔥 2009 Technology Transfer Workshops

- **Charleston, WV (February 27, 2009)**
 - **Interstate Oil & Gas Compact Commission**
- **Oklahoma City, OK (May 14, 2009)**
 - **Chesapeake Energy and Devon Energy**
- **Billings, MT (August 31, 2009)**
 - **Montana Producers Association**

Upcoming Marcellus Shale Workshop!

State College, PA - November 18, 2009

Cosponsor - Interstate Oil & Gas Compact Commission



Natural Gas STAR International

EPA expanded Program to include international operations in 2006 under the Methane to Markets Partnership.

🔥 Currently 12 International Partners

🔥 Participation involves:

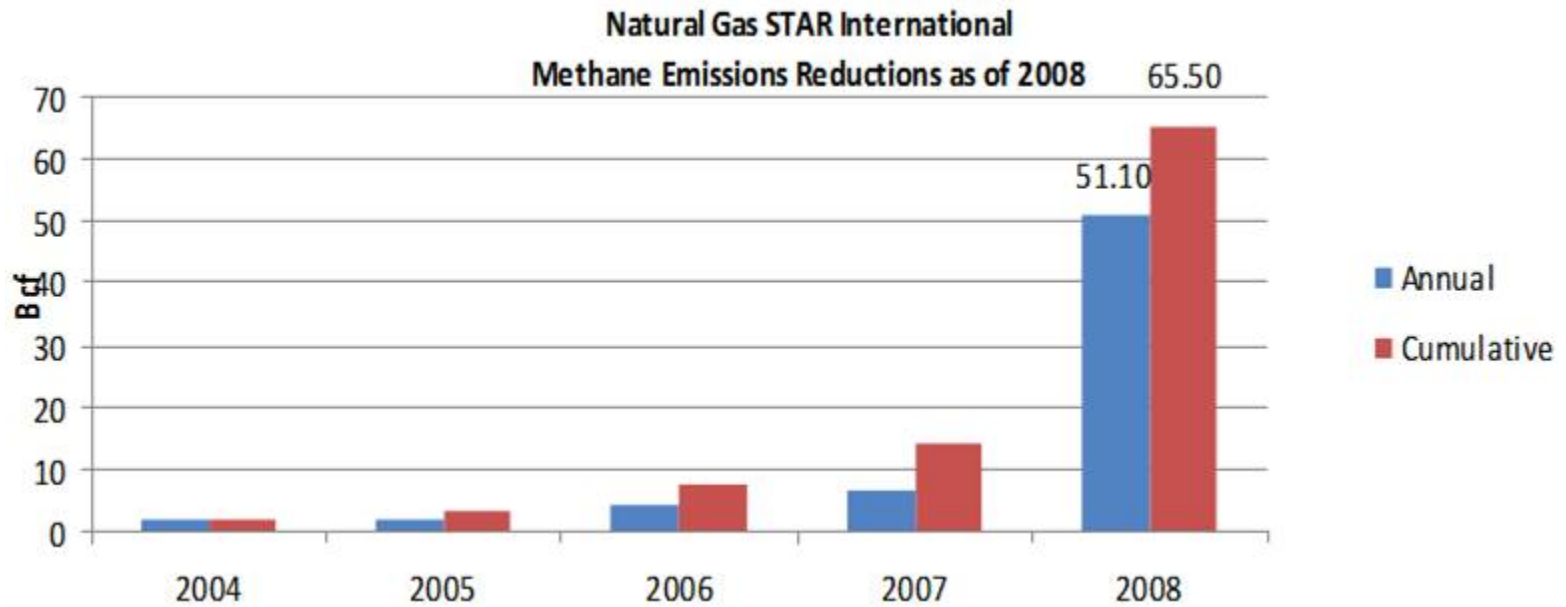
- 🔥 Developing an implementation plan
- 🔥 Identifying and implementing cost-effective projects
- 🔥 Reporting your success

🔥 Support from Gas STAR International is available:

- 🔥 Identify top cost-effective methane reduction project opportunities
- 🔥 Conduct project pre-feasibility analysis
- 🔥 On-site training and workshop development



Natural Gas STAR International Methane Emissions Reductions



Program Resources and Services





Web site: www.epa.gov/gasstar

U.S. ENVIRONMENTAL PROTECTION AGENCY



Natural Gas STAR Program

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You are here: [EPA Home](#) » [Climate Change](#) » [Methane](#) » Natural Gas STAR Program

The Natural Gas STAR Program is a flexible, voluntary partnership that encourages oil and natural gas companies—both domestically and abroad—to adopt cost-effective technologies and practices that improve operational efficiency and reduce emissions of methane, a potent greenhouse gas and clean energy source.

- Methane Home
- Natural Gas STAR Home
- Basic Information
- Accomplishments
- Partners
- Join the Program
- Guidelines to Participation
- Documents, Tools & Resources
- Newsroom
- Workshops/ Conferences
- Natural Gas STAR International
- Frequent Questions



Basic Information

[Program Overview](#) | [Overview Oil and Natural Gas Industry](#) | [Methane Emission Sources and Opportunities](#) | [Industry Links](#)



Accomplishments

[Emission Reduction Achievements](#) | [New Tools and Resources](#)



Partners

[International Partners](#) | [Domestic Partners](#) | [Endorsers](#)



Join the Program

[Program Forms](#)



Guidelines to Participation

[Key Components of Natural Gas STAR](#) | [Annual Reporting](#) | [Beyond the Basics](#)



Highlights

FLARING AND VENTING REDUCTION
&
NATURAL GAS UTILISATION FORUM
AMSTERDAM 3-5 DECEMBER 2008
NH GRAND HOTEL KRASNAPOLSKY

- » Nov 11-13 - 15th Annual Natural Gas STAR Implementation Workshop
- » The Natural Gas STAR Partner Update – Fall 2008
- » Other Current News



Key Program Resources

- 🔥 Lessons Learned and PRO documents available in several languages!
 - 🔥 Russian
 - 🔥 Spanish
 - 🔥 Chinese
 - 🔥 Arabic

- 🔥 Service Provider Directory

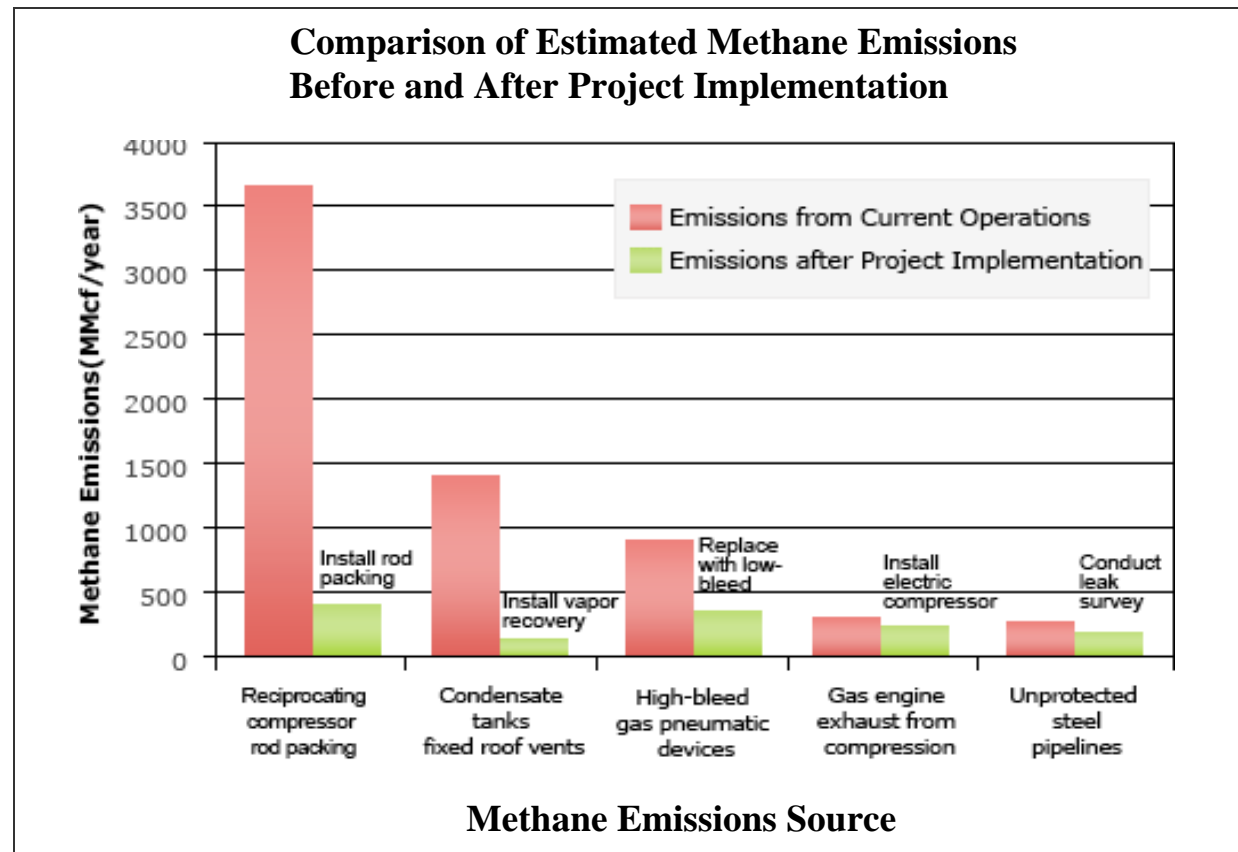
- 🔥 Partner Challenge



Natural Gas STAR “Partner Challenge”

🔥 EPA offers one-on-one technical assistance to partners in identifying and prioritizing cost-effective methane emission reduction opportunities

- 🔥 Uses company-specific data
- 🔥 Quantifies Partners’ methane emissions and identifies corresponding emission reduction opportunities
- 🔥 Details economic and operational benefits of reduction technologies & practices





Upcoming Events

**🔥 Marcellus Shale Basin Producers Technology Transfer Workshop - State College, PA
November 18, 2009**

**🔥 Methane to Markets Partnership Expo – New Delhi, India
March 2 – 5, 2010**

For more information and workshop announcements:
www.epa.gov/gasstar/workshops/index.html



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www.epa.gov/gasstar

2009 Annual Implementation Workshop





Workshop Overview

Plenary Session

Awards Luncheon Ceremony

3 Concurrent Track Sessions

- ♦ Production
- ♦ Gathering & Processing
- ♦ Transmission & Distribution

Networking Reception

Today

- Navarro Ballroom
- Hidalgo Ballroom

- Navarro Ballroom A
- Navarro Ballroom B
- Encino Room (Lobby level)

- Navarro Ballroom Foyer

Tomorrow

**Climate Change Policy/MRR Update
Quantification & Measurement Panel**

Networking Lunch

- Navarro Ballroom
- Navarro Ballroom

- Navarro Ballroom & Foyer