



EPA's Natural Gas STAR Program



Producers Technology Transfer Workshop

Co-sponsored with:
ConocoPhillips Petroleum Company,
New Mexico Environment Department,
New Mexico Oil & Gas Association

Farmington, NM
May 11, 2010

epa.gov/gasstar



Agenda

- 🔥 Natural Gas STAR: Overview & Highlights
- 🔥 Program Resources and Services
- 🔥 Contact Information



Overview & Highlights



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Natural Gas STAR

The Natural Gas STAR Program is a *flexible, voluntary partnership* between EPA and the oil and natural gas industry designed to *cost-effectively* reduce methane emissions from natural gas operations.

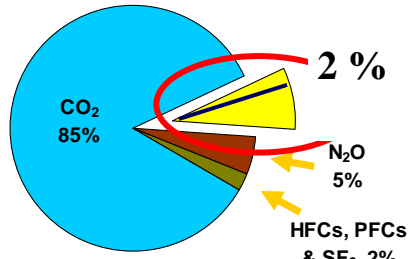
- ♠ Over 129 Program Partners across four sectors
 - ♠ 13 International Partners
 - ♠ 20 Endorser Associations

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Current U.S. Greenhouse Gas Emissions Estimates

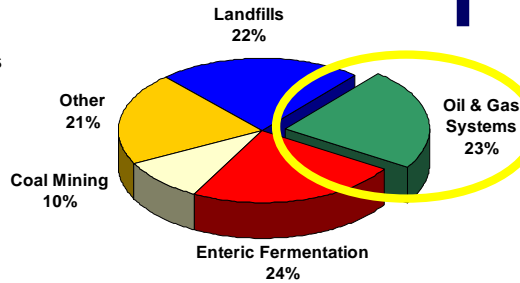
U.S. Greenhouse Gas Emissions All Sources



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

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



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



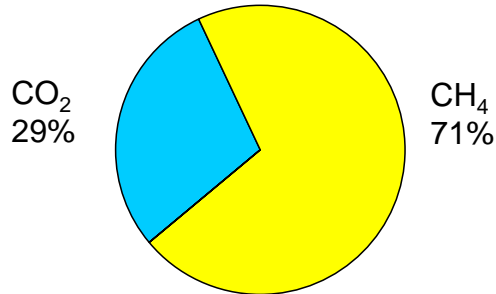
Why Focus on Methane?

- ⚡ A potent greenhouse gas (GHG) with 100-year global warming potential of 25; atmospheric lifetime of ~12 years
- ⚡ Second most important GHG accounting for ~18% of total climate forcing
- ⚡ Primary component of natural gas and a valuable, clean-burning energy source
 - ⚡ Proven, viable technologies and practices exist to reduce methane emissions cost-effectively
- ⚡ Oil and natural gas operations are a significant source of total U.S. (23%) and global (18%) human-made methane emissions.



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

◆ Methane emissions comprise 71% of total U.S. Natural Gas industry GHG emissions



(N₂O Emissions are negligible)

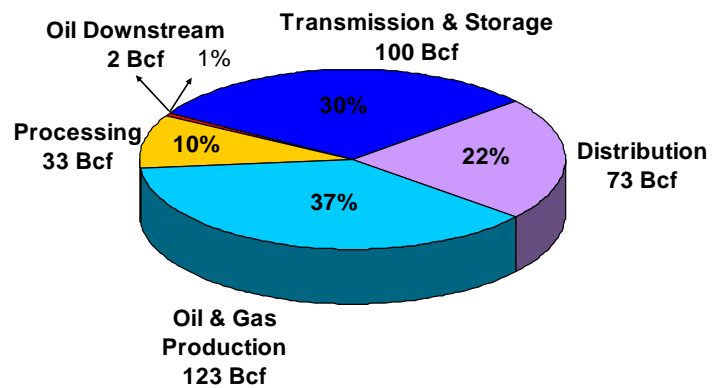
EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2009.
Updated with 20-year GWP from IPCC. *Changes in Atmospheric Constituents and in Radiative Forcing*. 2007.

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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)



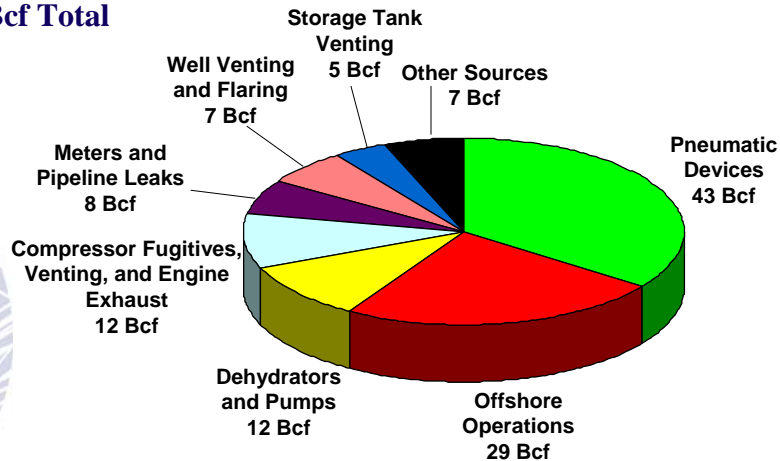
Source: EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2009.
Note: Natural Gas STAR reductions from gathering and boosting operations are reflected in the production sector.

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2007 Production Sector Methane Emissions

123 Bcf Total



EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2009. Available on the web at: epa.gov/climatechange/emissions/usinventoryreport.html
Natural Gas STAR reductions from gathering and boosting operations have been moved to the production sector.

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

🔥 331 Bcf of methane emissions per year amounts to:

- ◆ \$2.3B worth of gas lost (at \$7/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



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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

Natural Gas Production & Processing

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

Picture courtesy of American Gas Association



What is Cost Effective?

The simple payback is the number of years it takes to pay back the capital cost of a project (based on \$3/Mcf)

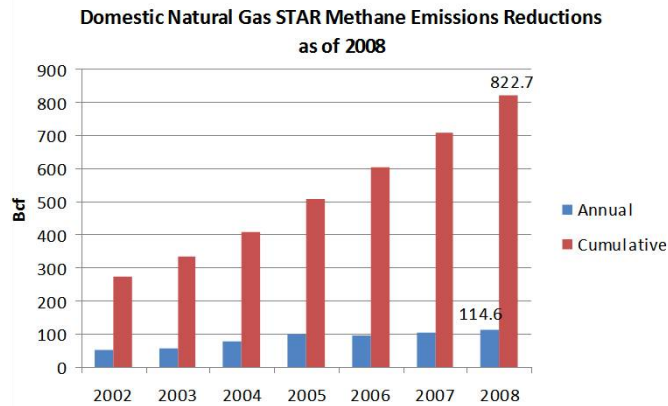
Payback period	Percentage	Percentage of Gas STAR Recommended Technologies and Practices at each payback level
Payback within 10 years	87%	
Payback within 3 years	77%	
Payback within 12 months	47%	
Immediate payback	1%	



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



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Natural Gas STAR International

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

Currently 13 International Partners

Participation involves:

- Developing an implementation plan
- Identifying and implementing cost-effective projects
- Reporting progress

Available Support from Gas STAR International:

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

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Program Resources and Services



Web site: www.epa.gov/gasstar

U.S. ENVIRONMENTAL PROTECTION AGENCY

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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.

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
 WWW.NATURALGASSTAR.ORG

» Nov 11-13 - 15th Annual Natural Gas STAR Implementation Workshop

» The Natural Gas STAR Partner Update - Fall 2008

» Other Current News

[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



Key Program Resources

- ❖ Lessons Learned and PRO documents available in several languages!
 - ❖ Russian
 - ❖ Spanish
 - ❖ Chinese
 - ❖ Arabic
- ❖ Service Provider Directory
- ❖ Partner Challenge

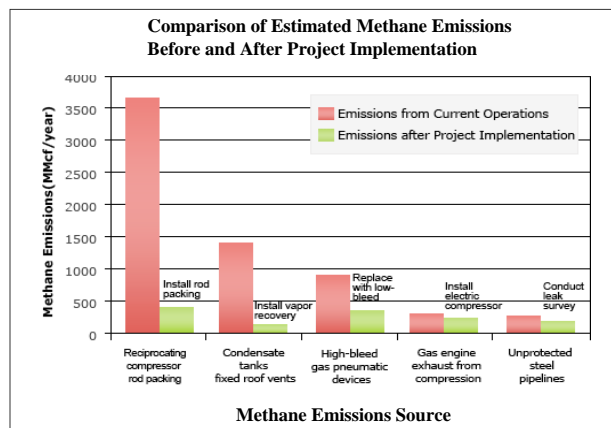
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Natural Gas STAR “Partner Challenge”

- ❖ 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



www.epa.gov/gasstar/tools/partner-challenge.html



Opportunities for Involvement

- ◆ Technology Transfer Workshops/Webcasts
- ◆ Study Tours
- ◆ Annual Implementation Workshop

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

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2010 Natural Gas STAR Events



For more information, visit epa.gov/gasstar/workshops/index.html



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www.epa.gov/gasstar