Natural Gas STAR Program

Program Overview

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

Overview & Highlights

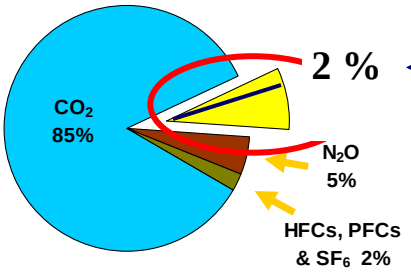
Natural Gas STAR Program

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 130 Program Partners across four sectors**
  - 12 International Partners
  - 20 Endorser Associations

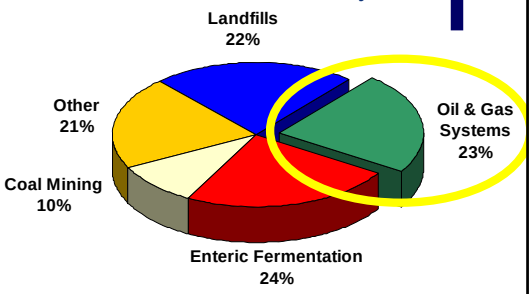
Current U.S. Greenhouse Gas Emissions Estimates

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%)**

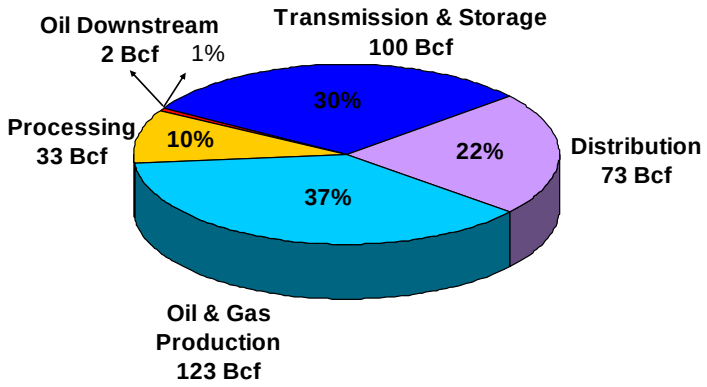
Source: EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007.* April, 2009.

Why Focus on Methane?

- **A potent greenhouse gas (GHG) with 100-year global warming potential of 25; atmospheric lifetime of ~12 years**
- **The 2nd most important GHG accounting for ~18% of total climate forcing**
- **A 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.**

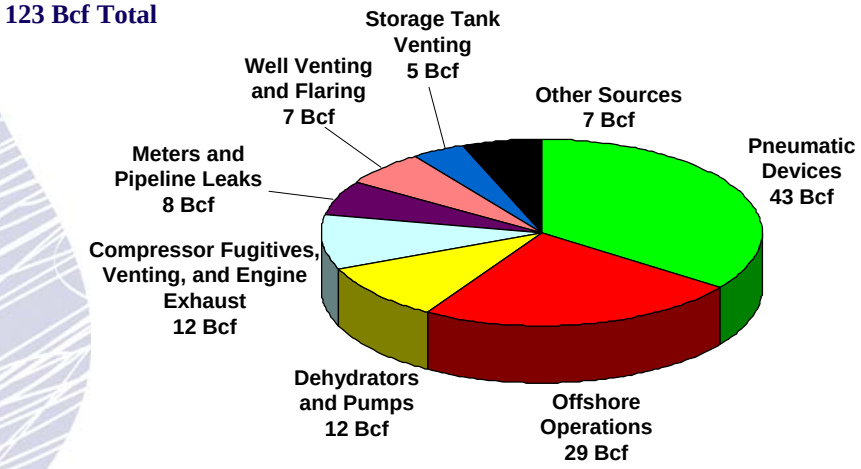
Background: U.S. Oil and Gas Methane Emissions by Sector

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.

2007 Production Sector Methane Emissions



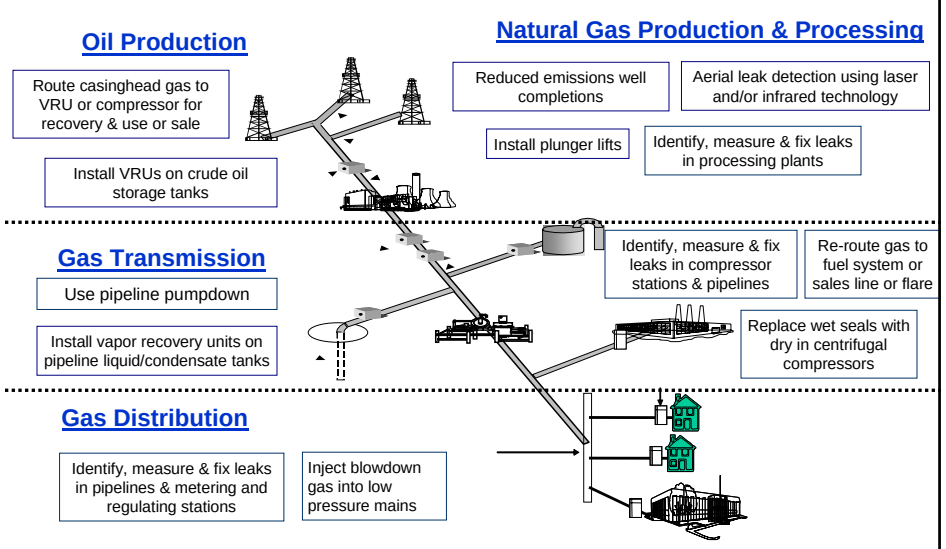
EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007.* April, 2009. Available on the web at: epa.gov/climatechange/emissions/usinventoryreport.html

Natural Gas STAR reductions from gathering and boosting operations have been moved to the production sector.

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



Picture courtesy of American Gas Association

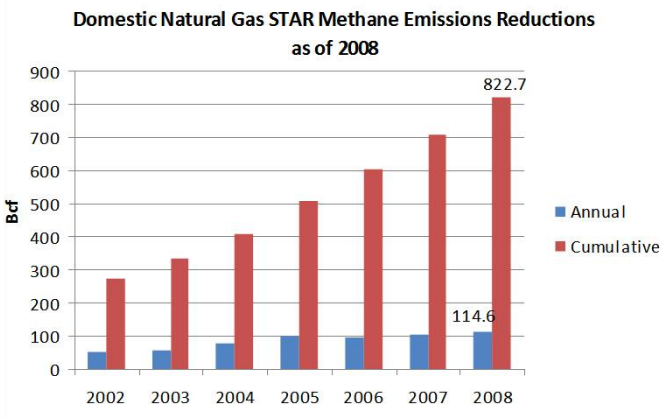
What is Cost Effective?

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

Payback within 10 years	**87%**	**Percentage of over 80 Gas STAR Recommended Technologies and practices at each payback level**
Payback within 3 years	**77%**	
Payback within 12 months	**47%**	
Immediate payback	**1%**	

2008 Another Successful Year
Domestic Methane Emission Reductions

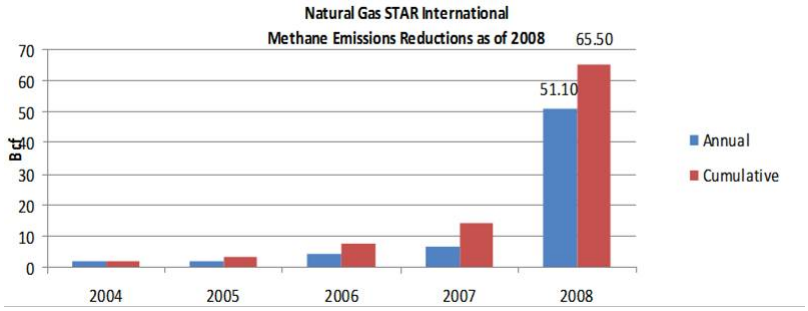
- Gas STAR Partners reduced methane emissions by 114.6 Bcf in 2008
  - 822.7 Bcf in cumulative reductions since 1990



Natural Gas STAR International

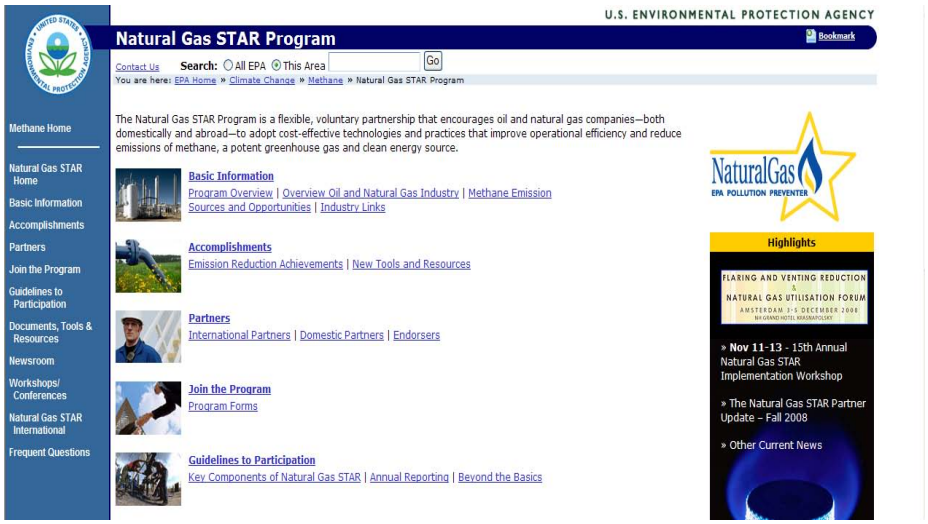
- EPA expanded Program to include international operations in 2006 under the Methane to Markets Partnership.
- Currently 12 International Partners
- Participation involves:
  - Developing an implementation plan
  - Identifying and implementing cost-effective projects
  - Reporting your success
- Support 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



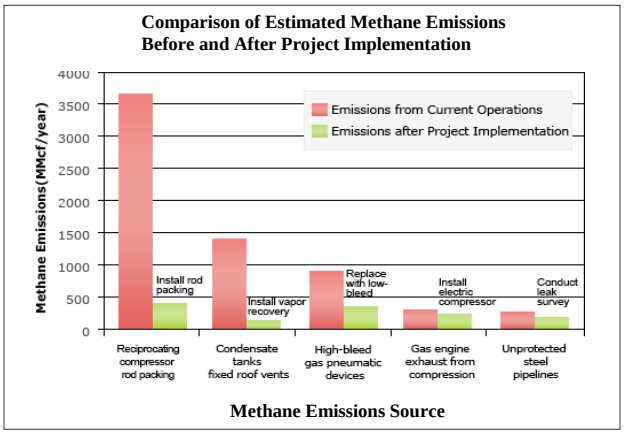
Key Program Resources

- 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



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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