EPA’s Natural Gas STAR Program

Producers Technology Transfer Workshop

Co-sponsored with:
Newfield Exploration Company,
Anadarko Petroleum Corporation,
Utah Petroleum Association,
Interstate Oil & Gas Compact Commission,
Independent Petroleum Association of Mountain States

Vernal, UT
March 23, 2010
epa.gov/gasstar

Agenda

- Natural Gas STAR: Overview & Highlights
- Program Resources and Services
- MRR Update
Overview & Highlights

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
  - 13 International Partners
  - 20 Endorser Associations
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

\[ \text{CO}_2 \quad 29\% \]
\[ \text{CH}_4 \quad 71\% \]

(N\textsubscript{2}O Emissions are negligible)


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)

- Oil & Gas Production: 123 Bcf (37%)
- Transmission & Storage: 100 Bcf (30%)
- Distribution: 73 Bcf (22%)
- Processing: 33 Bcf (10%)
- Oil Downstream: 2 Bcf (1%)

2007 Production Sector Methane Emissions

123 Bcf Total

- Pneumatic Devices: 43 Bcf
- Offshore Operations: 29 Bcf
- Compressor Fugitives, Venting, and Engine Exhaust: 12 Bcf
- Dehydrators and Pumps: 12 Bcf
- Meters and Pipeline Leaks: 8 Bcf
- Well Venting and Flaring: 7 Bcf
- Other Sources: 7 Bcf
- Storage Tank Venting: 5 Bcf


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:
  - $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
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

**Gas Distribution**
- Identify, measure & fix leaks in pipelines & metering and regulating stations
- Inject blowdown gas into low pressure mains

**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%
- Payback within 3 years: 77%
- Payback within 12 months: 47%
- Immediate payback: 1%

Percentage of Gas STAR Recommended Technologies and Practices at each payback level

Picture courtesy of American Gas Association
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

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
Program Resources and Services

Web site: www.epa.gov/gasstar

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.

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 Workshops

For more information and workshop announcements: [www.epa.gov/gasstar/workshops/index.html](http://www.epa.gov/gasstar/workshops/index.html)

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2010 Technology Transfer Workshops

- **Production**
  - Vernal, UT
  - Mar. 23-24, 2010

- **Production**
  - Farmington, NM
  - May 11, 2010

- **Annual Implementation Workshop**
  - New Orleans, LA
  - Nov. 1-3, 2010

For more information, visit [epa.gov/gasstar/workshops/index.html](http://epa.gov/gasstar/workshops/index.html)
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www.epa.gov/gasstar
More Information about the Mandatory GHG Reporting Rule

Rule for “petroleum and natural gas systems”
signed on 3/22/10

Visit EPA’s web site:
www.epa.gov/climatechange/emissions/ghgrule
making.html

For comments and questions:
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