Natural Gas STAR Program

Innovative Technologies for the Oil & Gas Industry: Product Capture, Process Optimization, and Pollution Prevention

Targa Resources and the Gas Processors Association

July 27, 2006

epa.gov/gasstar
Agenda

- Background – U.S. Methane Emissions
- Methane Emissions in the U.S. Oil and Gas Industry
- Natural Gas STAR Program Overview & Accomplishments
- Natural Gas STAR Program Resources
Why are methane emissions reductions important to you?

- Reducing methane emissions from the U.S. oil and gas industry has cross-cutting impacts
  - Addressing environmental and global warming concerns
  - Potential for increased profits and operational efficiency in the oil & gas sector
  - Increasing domestic natural gas supply
U.S. Greenhouse Gas Emissions
All Sources

CO₂ 85%

CH₄ 8%

N₂O 5%

HFCs, PCs, & SF₆ 2%

U.S. Methane Emissions

- Oil & Natural Gas Systems: 27%
- Enteric Fermentation: 20%
- Landfills: 25%
- Coal Mining: 10%
- Other: 18%

U.S. Oil and Gas Industry Methane Emissions (Annual)

- U.S. oil and natural gas industry methane emissions account for 2% of total U.S. greenhouse gas emissions.

- **Oil Downstream**: 2 Bcf (1%)
- **Transmission & Storage**: 95 Bcf (27%)
- **Processing**: 35 Bcf (19%)
- **Oil & Gas Production**: 159 Bcf (43%)
- **Distribution**: 67 Bcf

*Bcf (billion cubic feet)*

U.S. Oil & Natural Gas Opportunities

- 358 Bcf of methane emissions per year amounts to:
  - $2.51B in lost revenue at $7/Mcf natural gas
  - Global warming equivalent of putting over 31 million additional cars on the road in the U.S.
  - Gas supply capable of heating over 5 million U.S. households for a year
  - Approximately 10,000 new gas wells worth of methane in the U.S.

- U.S. oil and gas industry has an opportunity to cost-effectively reduce these impacts
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.
Natural Gas STAR Partners & Endorsers

놓침 110 Program Partners across all four sectors
- Recommended technologies and practices come directly from partner companies and industry experts

놓침 18 endorser associations, including
- Gas Processors Association (GPA)
- American Petroleum Institute (API)
- Domestic Petroleum Council (DPC)
- Independent Producers Association of Mountain States (IPAMS)
- Interstate Oil & Gas Compact Commission (IOGCC)
- Southern Gas Association (SGA)
- Colorado Oil & Gas Association (COGA)
- Petroleum Association of Wyoming (PAW)
- Petroleum Technology Transfer Council (PTTC)
- Independent Producer’s Association of America (IPAA)
Natural Gas STAR Partner Accomplishments

Natural Gas STAR Partners have reduced methane emissions by cumulative 403 Bcf since 1990
Natural Gas STAR Partner Accomplishments (1990 – 2004)

Natural gas sector reduced emissions while increasing intensity

U.S. Oil & Natural Gas sector methane emissions are 10% under the 1990 level emissions

Units in teragrams of CO₂ equivalent (TgCO₂E)

Oil & Gas Methane Emissions and Natural Gas STAR Reductions (2004)

- **Processing**
  - Emissions: 35 Bcf
  - Reductions: 2 Bcf

- **Distribution**
  - Emissions: 67 Bcf
  - Reductions: 4 Bcf

- **Transmission / Storage**
  - Emissions: 95 Bcf
  - Reductions: 28 Bcf

- **Production**
  - Emissions: 159 Bcf
  - Reductions: 34 Bcf

- **Oil Downstream**
  - Emissions: 2 Bcf
  - Reductions: 2 Bcf

Emissions
Reductions
Methane Emission Reduction Opportunities

- Partners have reported over 80 technologies and practices for achieving cost-effective methane emission reductions

<table>
<thead>
<tr>
<th>Best Practices - Processing</th>
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<tr>
<td>- Eliminate Unnecessary Equipment and/or Systems</td>
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<tr>
<td>- Use of Composite Wrap Repair</td>
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<td>- Conduct aerial leak surveys</td>
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<td>- Acid gas removal options</td>
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<td>- Directed Inspection &amp; Maintenance and IR Leak Detection</td>
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Program Resources

- Guidance on recommended practices & technologies
  - Detailed implementation guides, including partner case studies
- Economic analysis tools
- Communication tools
- Available on www.epa.gov/gasstar
- Technology Transfer workshops
- Free and open to the public
- Annual record of Partner methane savings
- One-on-one technical assistance
Workshops

International

- Technology Transfer Workshop & Plant Tour
  - Co-hosted by Pemex, Villahermosa, Mexico; April 25-26, 2006
- IPIECA Annual Meeting / Technology Transfer Workshop
  - September 26, 2006, Washington, DC

Domestic

- Technology Transfer Workshops
  - Kenai, AK – May 25, 2006 (ConocoPhillips Alaska)
  - Fort Worth, TX – June 6, 2006 (Devon and PTTC)
  - Midland, TX – June 8, 2006 (Occidental, PTTC, and NMOGA)
- Annual Implementation Workshop
  - Houston, TX – October 23-25, 2006
White House “Methane to Markets” Initiative

- Initiative to develop verifiable methane emissions reduction projects at landfills, coal mines and natural gas systems.
- Goal is to build long-term capacity within developing countries and economies in transition.
- Countries include: Argentina, Australia, Brazil, Canada, China, Colombia, Ecuador, Germany, India, Italy, Japan, Mexico, Nigeria, Republic of Korea, Russia, Ukraine, U.K. and U.S.
- Natural Gas STAR will lead natural gas system-related activities, including upcoming launch of international program.
- www.methanetomarkets.org
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