Natural Gas STAR Program

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

Producers Technology Transfer Workshop

Devon Energy and EPA’s Natural Gas STAR Program
Fort Worth, TX
June 6, 2006
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
The “So What” – Why are we here?

- 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

- CO$_2$ 85%
- CH$_4$ 8%
- N$_2$O 5%
- HFCs, PCs, & SF$_6$ 2%

U.S. Methane Emissions

- Landfills: 25%
- Oil & Natural Gas Systems: 26%
- Enteric Fermentation: 20%
- Coal Mining: 10%
- Other: 19%

U.S. Oil & Natural Gas Industry

- Methane losses from the U.S. oil & natural gas industry total 358 billion cubic feet (Bcf)
- Accounts for 2% of total U.S. greenhouse gas emissions

- Oil & Gas Production: 159 Bcf (44%)
- Processing: 35 Bcf (10%)
- Oil Downstream: 2 Bcf (0.5%)
- Transmission & Storage: 95 Bcf
- Distribution: 67 Bcf

U.S. Oil & Natural Gas Opportunities

- 358 Bcf of methane emissions per year amounts to:
  - $2.51 Billion 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

- U.S. oil and gas industry has an opportunity to cost effectively reduce these impacts
Natural Gas STAR Partner Accomplishments: Years 1990 - 2004

Natural gas sector reduced emissions while increasing throughput

Units in teragrams of CO₂ equivalent (TgCO₂E)

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.
Gas STAR Partners & Endorsers

- 114 Program partners across all four sectors
  - Recommended technologies and practices come directly from partner companies and industry experts
- 18 endorser associations, including
  - American Petroleum Institute (API)
  - Colorado Oil & Gas Association (COGA)
  - Domestic Petroleum Council (DPC)
  - Gas Processors Association (GPA)
  - Interstate Oil & Gas Compact Commission (IOGCC)
  - Independent Producer’s Association of America (IPAA)
  - Independent Producers Association of Mountain States (IPAMS)
  - Petroleum Association of Wyoming (PAW)
  - Petroleum Technology Transfer Council (PTTC)
  - Southern Gas Association (SGA)
Natural Gas STAR Partner Accomplishments

- Natural Gas STAR partners have reduced methane emissions by 403 Bcf
- Methane emissions from U.S. oil and gas sector below 1990 levels
Oil & Gas Methane Emissions Without Natural Gas STAR Program (2004)

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

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

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

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

- **Oil Downstream**
  - Emissions: 2 Bcf
  - Reductions: 2 Bcf
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 - Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Perform reduced emission completions</td>
</tr>
<tr>
<td>♦ Install vapor recovery units</td>
</tr>
<tr>
<td>♦ Install plunger lifts</td>
</tr>
<tr>
<td>♦ Install instrument air systems</td>
</tr>
<tr>
<td>♦ Eliminate unnecessary equipment and/or systems</td>
</tr>
<tr>
<td>♦ Install electric compressors</td>
</tr>
</tbody>
</table>
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

- **Upcoming Technology Transfer Workshops (5 to 6 per year)**
  - **Producers Technology Transfer Workshop**
    - Sponsored by Occidental Oil and Gas, PTTC, and NMOGA
    - June 8 & 9, 2006
    - Midland, TX
  - **Producers Technology Transfer Workshop**
    - Sponsored by Occidental Oil and Gas, PTTC, and NMOGA
    - June 8 & 9, 2006
    - Midland, TX
  - **Processors Technology Transfer Workshop**
    - Sponsored by Targa Resources, GPA, and NMOGA
    - July 27, 2006
    - Hobbs, NM
  - **Annual Implementation Workshop**
    - October 23-25, 2006
    - Houston, TX
White House “Methane to Markets” Initiative

- Five year activity 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
Contact Information

Carey Bylin
202-343-9669
bylin.carey@epa.gov

epa.gov/gasstar