Natural Gas STAR Program
Overview and Accomplishments

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Agenda

- Background
- Natural Gas STAR Program Overview & Highlights
- Program Resources and Tools
Background
U.S. Greenhouse Gas Emissions
All Sources

U.S. Methane Emissions

U.S. Oil and Gas Methane Emissions Breakdown by Sector

- **2005 U.S. methane emissions from oil and natural gas industry:**
  - 346 Bcf (2% of total U.S. greenhouse gas emissions)

**Breakdown by Sector:**

- **Transmission & Storage:** 91 Bcf (26%)
- **Distribution:** 68 Bcf (20%)
- **Oil & Gas Production:** 156 Bcf (45%)
- **Processing:** 29 Bcf (8%)
- **Oil Downstream:** 2 Bcf (1%)

U.S. contributes 12% of worldwide methane emissions from oil and gas systems.

U.S. Oil & Natural Gas Opportunities

- 346 Bcf of methane emissions per year amounts to
  - $2.42B in lost revenue at $7/Mcf natural gas
  - Global warming equivalent of putting over 30 million additional cars on the road in the U.S.
  - Gas supply capable of heating almost 5 million U.S. households for a year

- U.S. oil and gas industry has an opportunity to *cost-effectively* reduce these impacts
Overview & Program 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 110 Program Partners across four sectors
- Seven International Partners
- 19 Endorser Associations
2005 Another Record Year for Natural Gas STAR Emission Reductions

Gas STAR Partners reduced methane emissions by 74 Bcf in 2005
470 Bcf in cumulative reductions since 1990

Natural Gas STAR Emissions Reductions

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Reductions</th>
<th>Cumulative Reductions Since 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>37 Bcf</td>
<td>50 Bcf</td>
</tr>
<tr>
<td>2001</td>
<td>44 Bcf</td>
<td>94 Bcf</td>
</tr>
<tr>
<td>2002</td>
<td>53 Bcf</td>
<td>147 Bcf</td>
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<tr>
<td>2003</td>
<td>55 Bcf</td>
<td>202 Bcf</td>
</tr>
<tr>
<td>2004</td>
<td>64 Bcf</td>
<td>266 Bcf</td>
</tr>
<tr>
<td>2005</td>
<td>74 Bcf</td>
<td>332 Bcf</td>
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</tbody>
</table>

470 Bcf total cumulative reduction since 1990
Natural Gas STAR Partner Accomplishments (1990 – 2005)

Units in teragrams of CO₂ equivalent (TgCO₂E)

Total U.S. greenhouse gas emissions (left axis)

U.S. oil & natural gas sector methane emissions (right axis)

International Activities: 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
- Natural Gas STAR will lead natural gas system-related activities, including launch of Natural Gas STAR International

- 20 partner countries
  - Argentina
  - Australia
  - Brazil
  - Canada
  - Colombia
  - China
  - Ecuador
  - Germany
  - India
  - Italy
  - Japan
  - Korea
  - Mexico
  - Poland
  - Nigeria
  - Russia
  - Ukraine
  - United Kingdom
  - United States
  - Vietnam
Under the Methane to Markets Partnership, U.S. EPA is expanding Natural Gas STAR internationally. EPA is encouraging existing partners to engage their international operations to voluntarily reduce methane emissions. Companies world-wide are welcome to join Gas STAR International.
Natural Gas STAR International

Natural Gas STAR International launched September 26, 2006 with seven charter partners:

- ConocoPhillips
- devon
- ENBRIDGE
- ExxonMobil
- Marathon Oil Company
- OXY
- TransCanada
Program Resources and Tools
Natural Gas STAR Resources

- Guidance on new practices & technologies
  - Technical information and training
  - Assistance identifying cost-effective methane emission reduction opportunities
- Technology Transfer workshops
  - Free and open to the public
- Annual record of Partner voluntary actions and methane savings
- One-on-one technical assistance

Technical Information

Workshops

Project Demonstrations

Annual Reports
Methane Emission Reduction Technologies & Practices

**Gas Production & Processing**
- Reduced Emission Well Completions
- Install Plunger Lifts on Gas Wells
- Identify, Measure & Fix Leaks in Processing Plants
- Install Flash Tank Separators on Dehydrators

**Gas Transmission**
- Identify, Measure & Fix Leaks in Compressor Stations, Pipelines
- Use Pipeline Pumpdown
- Replace High-Bleed Pneumatics

**Oil Production**
- Install VRUs on Crude Oil Storage Tanks
- Route Casinghead Gas to VRU or Compressor for Recovery & Use or Sale

**Gas Distribution**
- Identify, Measure & Fix Leaks in Pipelines & Surface Facilities
- Use Pipeline Pumpdown Techniques to Minimize Venting

*Picture courtesy of American Gas Association*
Natural Gas STAR will host, with partner organizations, the following Technology Transfer workshops in 2007:

- **Processing**
  - Calgary, CANADA
  - January 18, 2007

- **Production**
  - College Station, TX
  - May 17, 2007

- **Annual Workshop**
  - Houston, TX
  - Oct, 2007

- **Production**
  - Glenwood Springs, CO
  - Sept 12, 2007

- **Processing**
  - Houston, TX
  - Apr 24, 2007

- **M2M Expo**
  - Beijing, China
  - Nov, 2007

- **Cross-Sector Opportunities**
  - New Delhi, India
  - February 22-23, 2007

For more information, visit [http://www.epa.gov/gasstar/workshops.htm](http://www.epa.gov/gasstar/workshops.htm)
New Tool: Emission Reduction Calculation Guidance

Guidance for quantifying methane emission reductions from recommended technologies and practices

http://www.epa.gov/gasstar/docs/quantifying_ngs_methane_reductions.xls
Communications Tools/Materials

- Effort underway to revise and update Gas STAR communications tools and materials
  - PowerPoint presentations
  - Program Implementation Guidance
  - Press releases
  - Goal: to make the tools and resources more useful to Partners
  - Your feedback is important!
Feedback to Partners: Post-Reporting Benchmarking

2005 Reporting Summary & Benchmarking Report

Report Summary

Joined Natural Gas STAR

2005 Annual methane emissions reductions:

- Achieved cumulative emission reductions:

2005 Reductions:

Cumulative Reductions:

- Emission reductions are approximately equivalent to:
  - The carbon offset equivalent of planting this many acres of trees: 561,000
  - Cumulative: 112,430 (annual)
  - Enough natural gas to heat this many homes for one year: 75,000
    - Cumulative: 13,435 (annual)

- Removing this many tons from the atmosphere per year:
  - 432,460
    - Cumulative: 82,490 (annual)

To achieve these results, employed the following
Natural Gas STAR methane emission reduction technologies and practices:

- [List of technologies and practices]

Benchmarking:

The Natural Gas STAR Program endeavors to assist partners in achieving full benefit of participation by raising awareness about activities that other partners have undertaken to achieve cost-effective emission reductions.

Following show reductions versus the sector average and best performer in the Processing Sector. Emission reductions were in total emission of each partner’s annual gas processing capacity.
EPA offers assistance quantifying partners’ methane emissions and corresponding emission reduction opportunities

- Uses customized data
- Quantifies emission reductions and environmental benefits
- Details economic and operational benefits of reduction technologies & practices
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