



Natural Gas STAR Program Overview and Accomplishments

Producers Technology Transfer Workshop
Glenwood Springs, Colorado
September 11, 2007



Agenda

- 🔥 **Background**
- 🔥 **Natural Gas STAR Program Overview & Highlights**
- 🔥 **Program Resources and Tools**

2



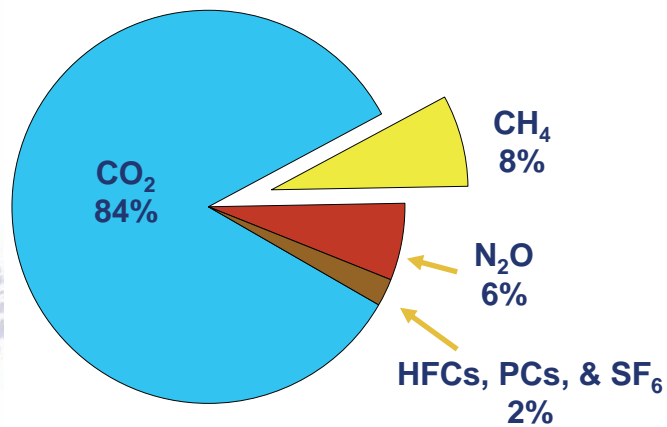
Background



3



U.S. Greenhouse Gas Emissions All Sources

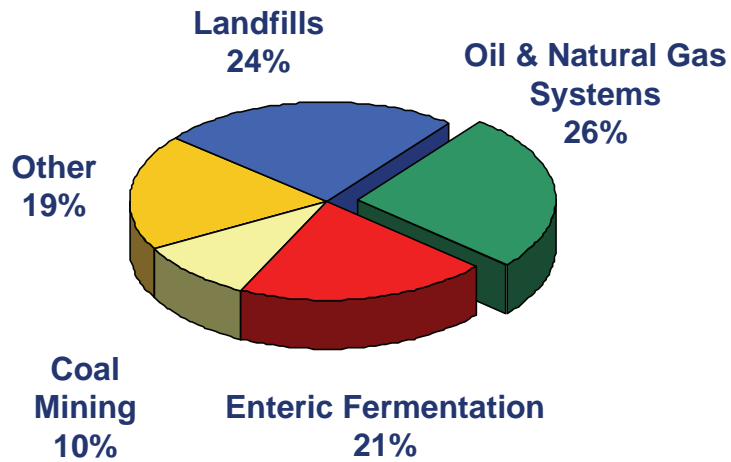


Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2005, USEPA, April, 2007

4



U.S. Methane Emissions



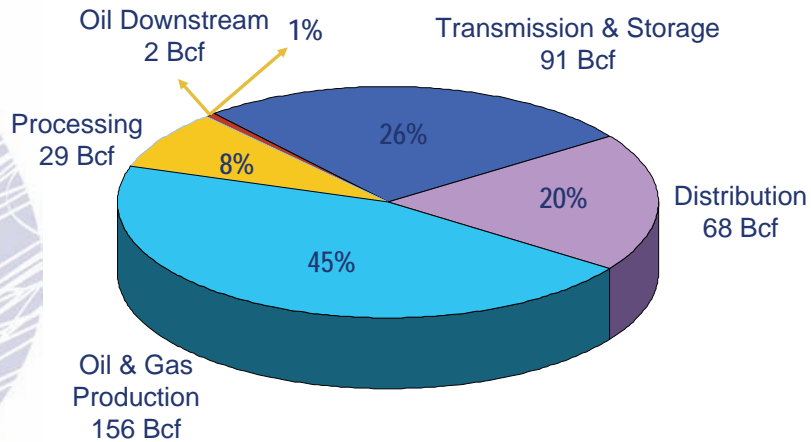
Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2005, USEPA, April, 2007

5



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)



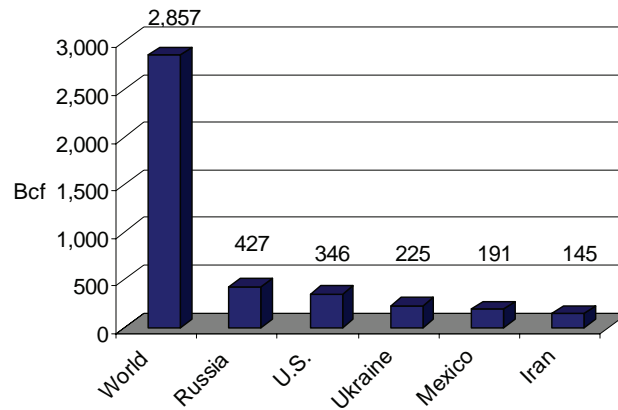
Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2005, USEPA, April, 2007

6



Oil and Gas Industry Methane Emissions: U.S. & International

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



*Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2005, USEPA, April, 2007
Global Anthropogenic Non-CO₂ Greenhouse Gas Emissions: 1990 – 2020, USEPA, June 2006*

7



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
 - Greenhouse gas emissions of approximately 30,250,000 average passenger cars over a period of one year
 - Carbon equivalent of electricity used by 17,943,906 homes for one year
 - 116,486,782 acres of pine or fir forests storing carbon for one year
- U.S. oil and gas industry has an opportunity to *cost-effectively* reduce these impacts

8



Overview & Program Highlights



9



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 110 Program Partners across four sectors
 - ⚡ Eight International Partners
 - ⚡ 19 Endorser Associations

10

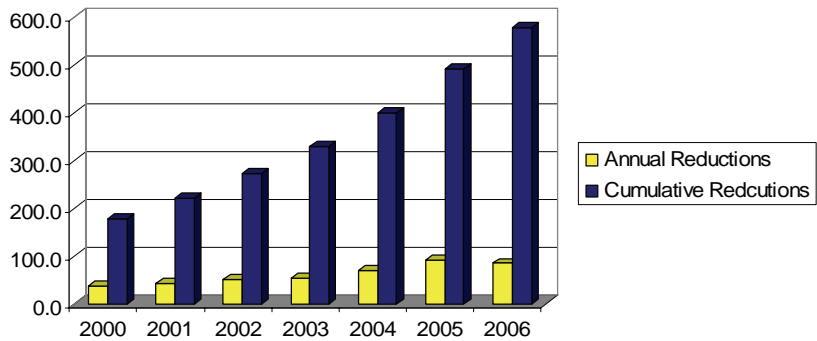


2006 Another Successful Year for Methane Emission Reductions

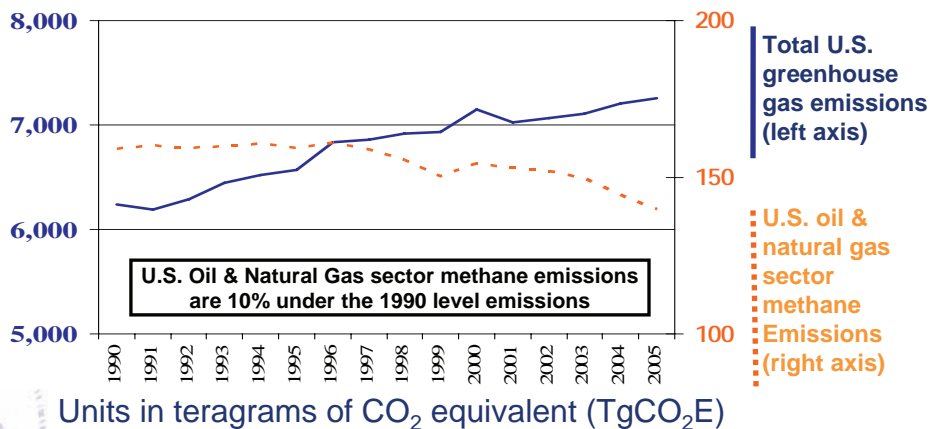
Gas STAR Partners reduced methane emissions by 86 Bcf in 2006

578 Bcf in cumulative reductions since 1990

Natural Gas STAR Methane Reductions (Bcf)



Natural Gas STAR Partner Accomplishments (1990 – 2005)



Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2005, USEPA, April, 2007

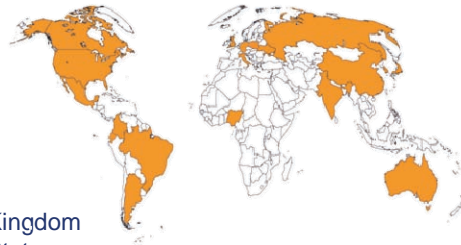


International Activities: White House “Methane to Markets” Initiative

- 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	Japan
Australia	Korea
Brazil	Mexico
Canada	Poland
Colombia	Nigeria
China	Russia
Ecuador	Ukraine
Germany	United Kingdom
India	United States
Italy	Vietnam



13



Natural Gas STAR International

- 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



Oil and Gas Subcommittee



14



Natural Gas STAR International

🔥 Natural Gas STAR International launched September 26, 2006 now has eight partners

ConocoPhillips

devon



ENBRIDGE™

ExxonMobil

MARATHON
Marathon Oil Company



TransCanada
In business to deliver

15



Program
Resources and
Tools



16



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



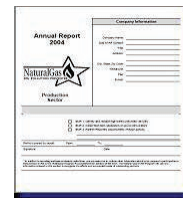
Technical Information



Project Demonstrations



Workshops



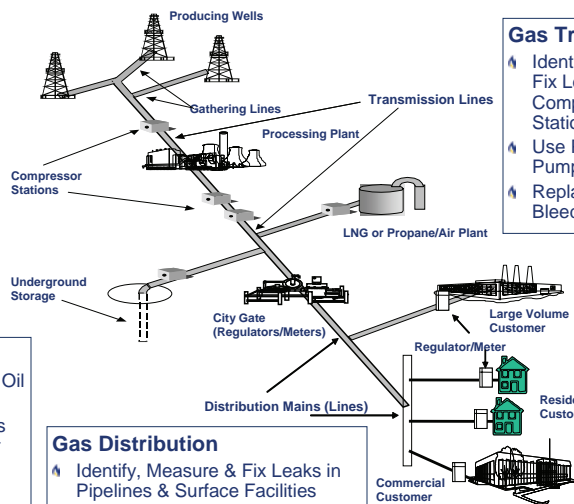
Annual Reports



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

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



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

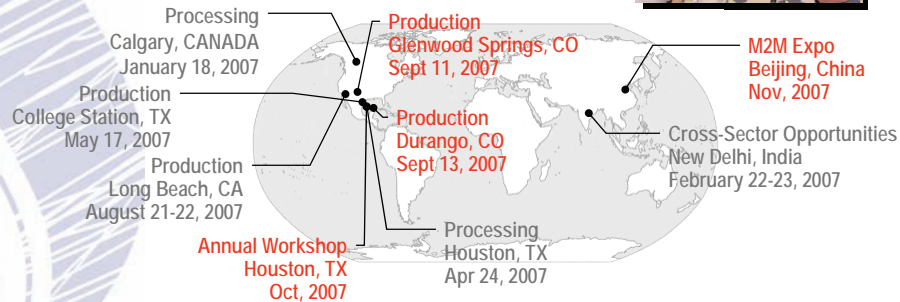
- Gas Distribution**
- 🔦 Identify, Measure & Fix Leaks in Pipelines & Surface Facilities
 - 🔦 Use Pipeline Pumpdown Techniques to Minimize Venting

Picture courtesy of American Gas Association 18



2007 Technology Transfer Workshops

Natural Gas STAR will host, with partner organizations, the following Technology Transfer workshops in 2007



For more information, visit <http://www.epa.gov/gasstar/workshops.htm>



New Tool: Emission Reduction Calculation Guidance

Guidance for quantifying methane emission reductions from recommended technologies and practices

Technology/Prac	Quantification Method 1	Quantification Method 2
Composite wrap for non-leaking pipeline defects	Engineering Calculation	Emissions Factor
Processing	Installing composite wrap opposed to replacing pipelines with defects saves the methane that would otherwise be vented to the atmosphere during replacement.	The volume of methane emissions saved by composite wrap is very sensitive of the operation - pipeline length, pipeline diameter, and system pressure. If known it is suggested to use the engineering calculation for better accuracy report composite wrap can save 3,960 Mcf/installment.
Transmission	Calculate emissions reductions by summing over all pipeline diameters and pressures: $ER = \sum (D^2 \cdot P \cdot [L/1,000] \cdot 0.372) / 1,000 \cdot XCH4$	Calculate emissions reductions using the following equation: $ER = AF \cdot 3,960 \text{ Mcf/installment}$
Distribution	Where, ER = Emissions Reductions (Mcf/year) D = Inside diameter of pipeline (inches) L = Length of pipeline between shutoff valves (feet) P = Pipeline pressure (psia for less than 50psia, psig for more than 50psia) XCH4 = Mole fraction of methane in the gas (decimal) - default is 0.07 (Processing), 0.934 (Transmission/Distribution)	Where, ER = Emissions Reductions (Mcf/year) AF = Activity Factor (number of installations/year) (EF assumed repair of a 6" defect on a 24" diameter pipeline at 350psig will shutoff valves.)
	References Composite Wrap for Non-Leaking Pipeline Defects Lessons Learned http://www.epa.gov/gasstar/pdfs/lessons/fl_compwrap.pdf	References Composite Wrap for Non-Leaking Pipeline Defects Lessons Learned http://www.epa.gov/gasstar/pdfs/lessons/fl_compwrap.pdf
Identify and	Engineering Calculation	Emissions Factor

http://www.epa.gov/gasstar/docs/quantifying_ngs_methane_reductions.xls



Communications Tools/Materials

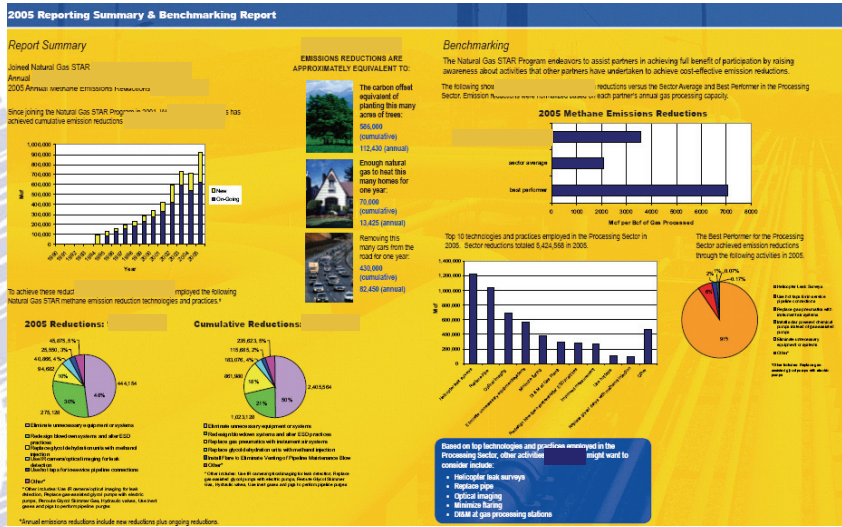
- 🔥 Effort underway to revise and update Gas STAR communications tools and materials
 - 🔥 PowerPoint presentations
 - 🔥 Program Implementation Guidance
 - 🔥 Press releases
- 🔥 Goal: to make the tools and resources more useful to Partners
- 🔥 Your feedback is important!



21



Feedback to Partners: Post-Reporting Benchmarking



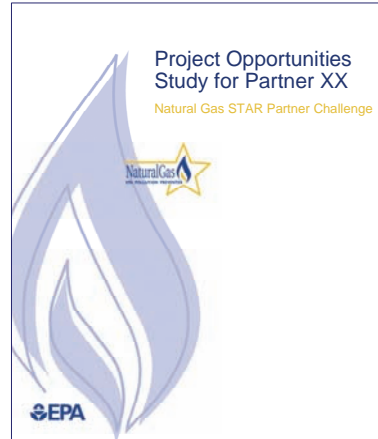
22



Natural Gas STAR “Partner Challenge”

♣ 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



23



Contact Information

- ♣ Jerome Blackman
202-343-9630
blackman.jerome@epa.gov
- ♣ Carey Bylin
202-343-9669
bylin.carey@epa.gov
- ♣ Roger Fernandez
202-343-9386
fernandez.roger@epa.gov
- ♣ Suzie Young
202-343-9544
young.suzanne@epa.gov
- ♣ www.epa.gov/gasstar
- ♣ www.methanetomarkets.org

24