



Methane to Markets Partnership

Methane to Markets Partnership and Oil and Natural Gas-Sector Emissions Reduction Project Development

Natural Gas STAR Program Annual Workshop

**Houston, TX
October 27, 2004**



Overview

- ★ Background on World-Wide Methane Emissions
- ★ Methane to Markets Partnership
- ★ Natural Gas Sector Emissions Reduction Opportunities



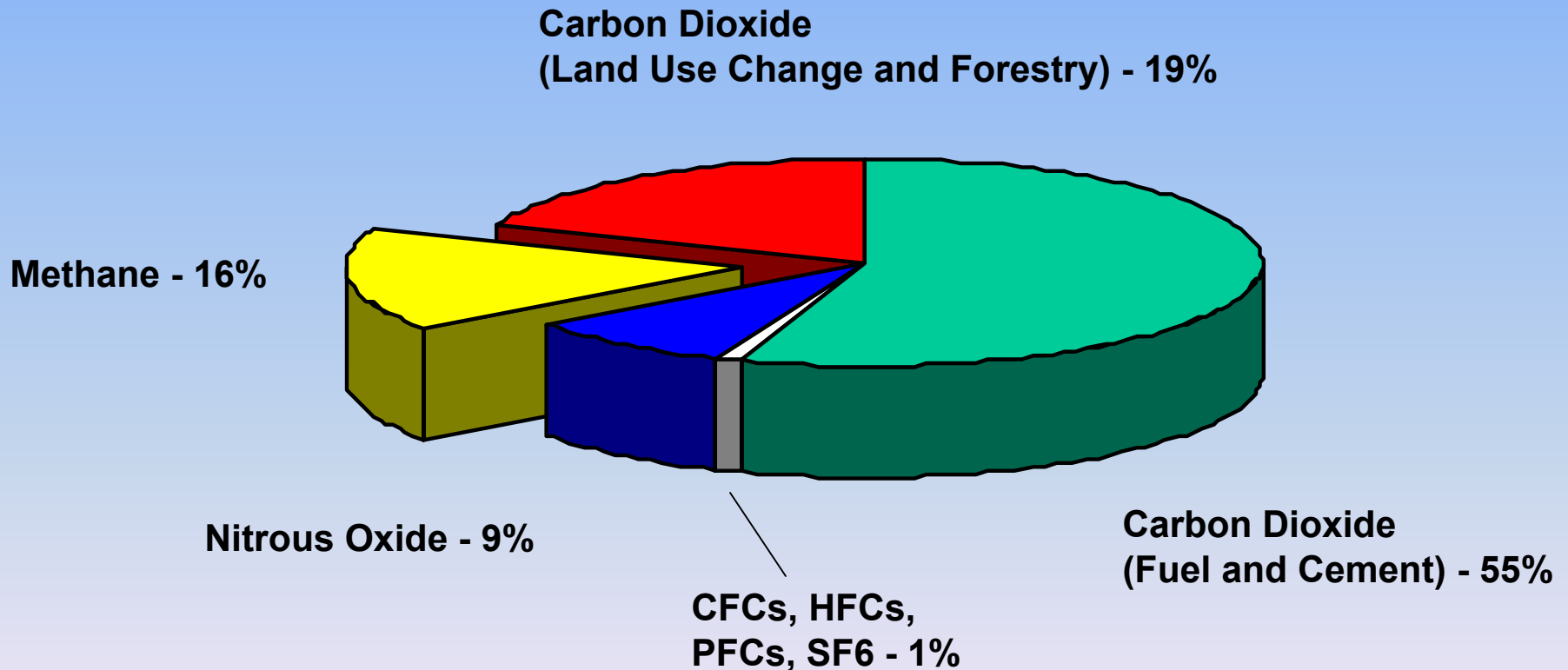
Methane Characteristics

- ★ A potent greenhouse gas
 - 100-year GWP = 23
 - Short atmospheric lifetime (~12 years)
- ★ Emitted by many sources in energy, agriculture & waste sectors
- ★ Primary constituent of natural gas
 - Serves as a valuable, clean-burning energy source



Global Greenhouse Gas Emissions in 2000

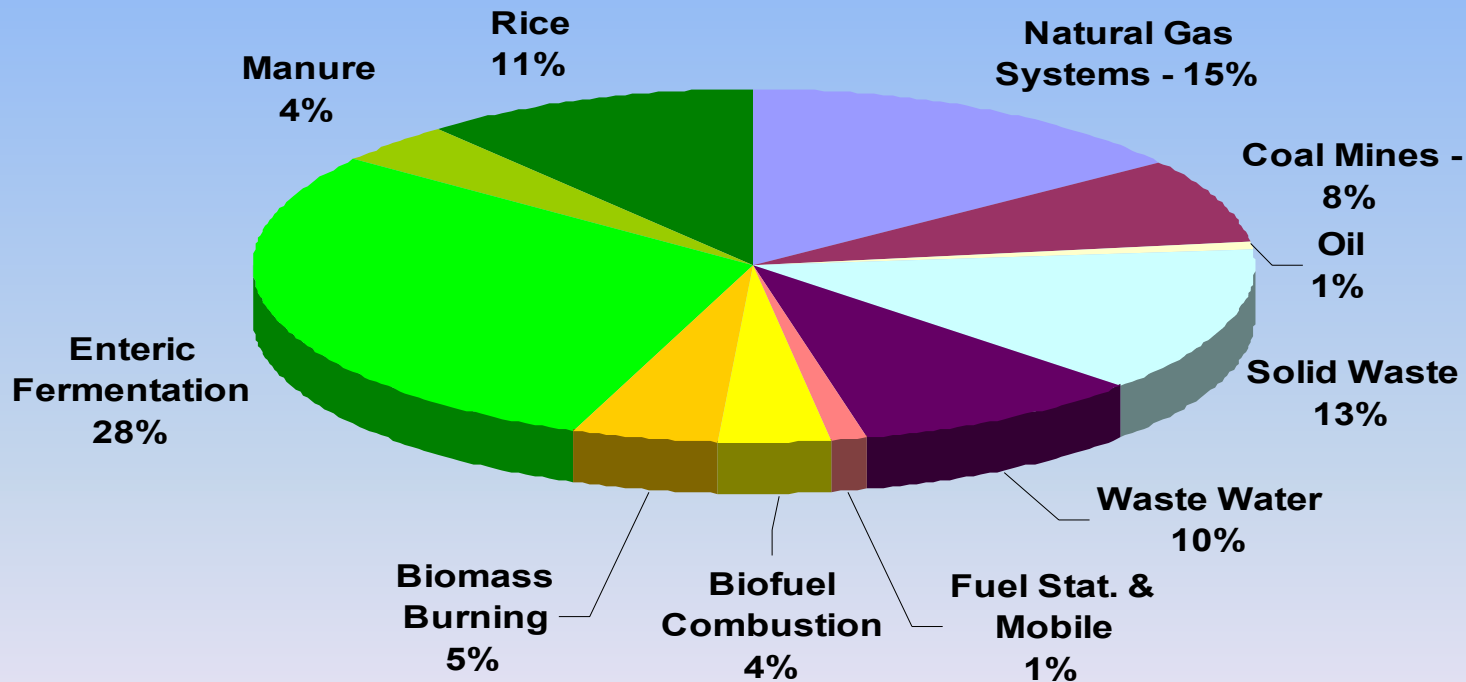
Total = 40,702 Million tons CO₂ equivalents (MtCO₂e)





Global Anthropogenic CH₄ Budget by Source in 2000

Total emissions in 2000 = 5,933 MtCO₂e



Source: US EPA



Many Ways to Reduce CH₄...



Coal Mines



Oil and Gas Systems



Landfills



Methane Reduction Provides Significant Benefits

- ★ **Local energy production, often resulting in lower CO₂ emissions through fuel switching**
- ★ **Improved air quality**
- ★ **Improved safety**
- ★ **Improved efficiency & reduced down-time**
- ★ **Consistency with sustainable development goals**
- ★ **Short atmospheric lifetime makes methane an excellent candidate for mitigating near-term climate impacts**



Methane to Markets Partnership



Methane to Markets Partnership Mission

- ★ **Deliver measurable, near-term climate protection through cost-effective actions such as oil and gas system methane emissions reduction projects**
- ★ **Support international and sustainable development goals (i.e., clean energy, ghg reductions)**
- ★ **Conduct technology transfer and build capacity in developing and countries with economies in transition with clear focus on methane emissions reduction activities**
- ★ **Leverage existing international expertise and activities**
- ★ **Directly involve private sector**



Methane to Markets Activities

- ★ **Identify cost-effective opportunities for capturing methane emissions**
 - Source and project identification
 - Feasibility studies

- ★ **Technology Transfer**
 - Workshops and conferences
 - Technology demonstration
 - Clearinghouses



Methane to Markets Activities

- ★ **Inventory systems support to identify and monitor methane emissions**
- ★ **Private and multilateral project financing assistance**



Methane to Markets Partnership

- ★ **Started as White House initiative**
- ★ **Initial terms include**
 - **Five year plan**
 - **\$53 million in U.S. government committed funds**
 - **U.S. EPA lead with Department of Energy and U.S. Agency for International Development participation**
 - **Additional funding from other developed countries**
- ★ **Ministerial Meeting November 15-17, 2004 to finalize terms**



Methane to Markets Countries

Founding Partner Countries

Australia, Brazil, Canada, China,
Colombia, India, Italy, Japan, Mexico,
Nigeria, South Africa, Russia, Ukraine,
United Kingdom, United States



Methane to Markets & Oil and Natural Gas Sector Methane Emissions Reduction Projects



Methane to Markets and Coal Mine Methane Projects

★ Benefits of Oil and Gas Sector Methane Emissions Reduction Projects

- Increased revenue through gas sales and/or greenhouse gas emissions credits
- Greenhouse gas emissions reductions
- Increased energy independence
- Decreased O&M costs



Methane to Markets

Selected Potential
Project Countries



Country-Reported Methane Emissions from Natural Gas Infrastructure

Country	Methane Emissions (MMTCO ₂ E)		
	1990	2000	2010
<u>Russia</u>	335.3	252.9	273.5
<u>United States</u>	121.2	116.4	138.7
<u>Ukraine</u>	71.6	60.2	39.4
Venezuela	40.2	52.2	68.0
Uzbekistan	27.2	33.7	42.9
<u>India</u>	12.9	24.4	54.9
<u>Canada</u>	17.1	23.3	23.8
<u>Mexico</u>	11.1	15.4	22.1
<u>China</u>	0.9	1.5	4.9



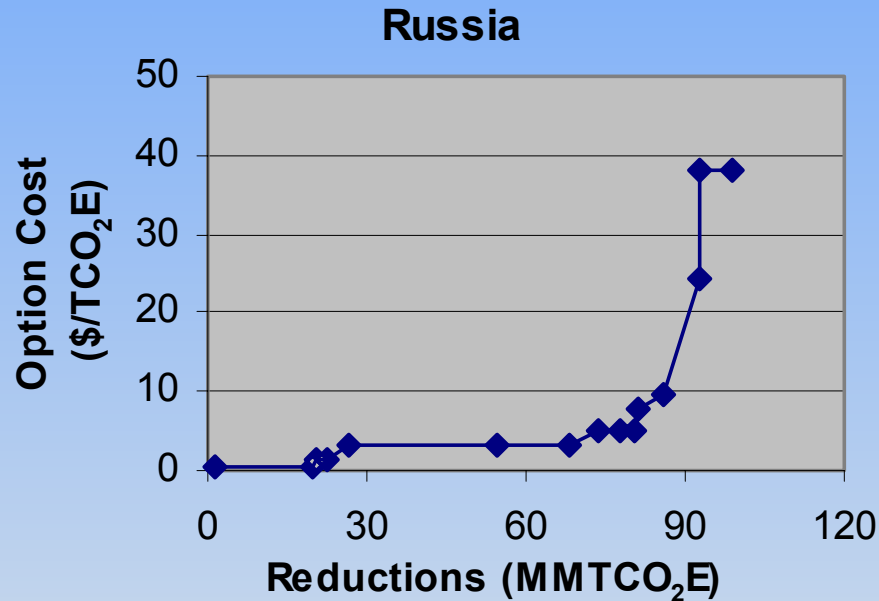
Russia

- ★ Analysis based on 5-yr discounted cash flow, 10% discount rate, and 0% tax rate
- ★ Capital and labor costs based on information from EPA (1999) and **Natural Gas STAR Program**
- ★ Capital and labor costs adjusted using regional cost ratios
- ★ Russia and U.S. – mature natural gas systems
- ★ Applicability of options for mature systems based on U.S. inventory and **Natural Gas STAR Program** data

Option	Mitigation Cost		
	Green Completion	Composite Wrap Repairs	DI&M at Compressor Stations
Russia	<u>4.5</u> 9.5	<u>2.2</u> 5.1	<u>.1</u> 0.2
United States	<u>4.6</u> 10.7	<u>6.6</u> 15.4	<u>.86</u> 2.0



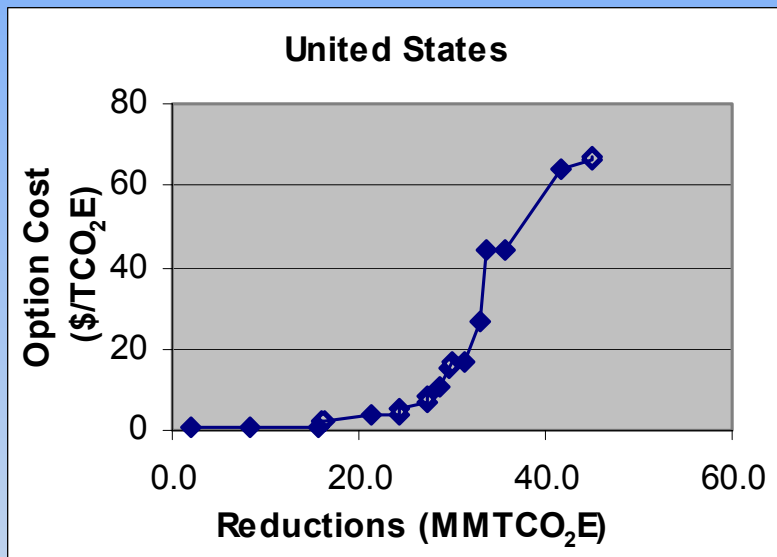
Marginal Abatement Opportunities for Russia



- ★ Under \$10 per TCO₂E, nearly 31 percent of NG-related methane emissions can be abated
- ★ Cost effective technologies and practices include:
 - Conversion of high bleed to low bleed pneumatic devices
 - Glycol flash tank separators
 - Green completions
 - Fuel gas retrofits of blowdown valves
 - Composite wrap repair activities



Marginal Abatement Opportunities for United States



★ Under \$10 per TCO₂E, nearly 20 percent of NG-related methane emissions can be abated

★ Below \$10 per TCO₂E, the options with the lowest cost emission reduction potential are:

- Fuel gas retrofits of blowdown valves
- Installation of vapor recovery units on oil storage tanks
- Conversion of high bleed to low bleed pneumatic devices



Methane to Markets

- ★ These Methane to Markets partner countries are also potential locations for oil and gas sector methane emissions reduction projects

Brazil, China, Colombia, India,
Mexico, Nigeria, Poland,
Ukraine, South Africa



Gas STAR & Methane to Markets

What can you do?

- ★ Gas STAR will soon welcome partners to submit emissions reductions achieved at overseas operations
- ★ Partner companies with operations in Methane to Markets countries are encouraged to consider projects under the Partnership



Private / Public Partnerships

What can you do?

★ Project development

- Consider excellent opportunities and build teams

★ Technology transfer

- Workshops and conference participation
- Technology demonstration



Methane to Markets

For further information on the Natural Gas STAR Program and Methane to Markets, contact:

Roger Fernandez

1-202-343-9386

fernandez.roger@epa.gov

www.methanetomarkets.org

www.epa.gov/gasstar