



# Methane to Markets

*An International Framework to Advance the Recovery and Use of Methane as a Clean Energy Source*

SME Luncheon Meeting  
October 11, 2005  
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US EPA





## Methane to Markets

### Overview

- Why Methane?
- Methane Recovery and Use Opportunities
- M2M International Partnership Goals
- EPA / USG Involvement
- Conclusions

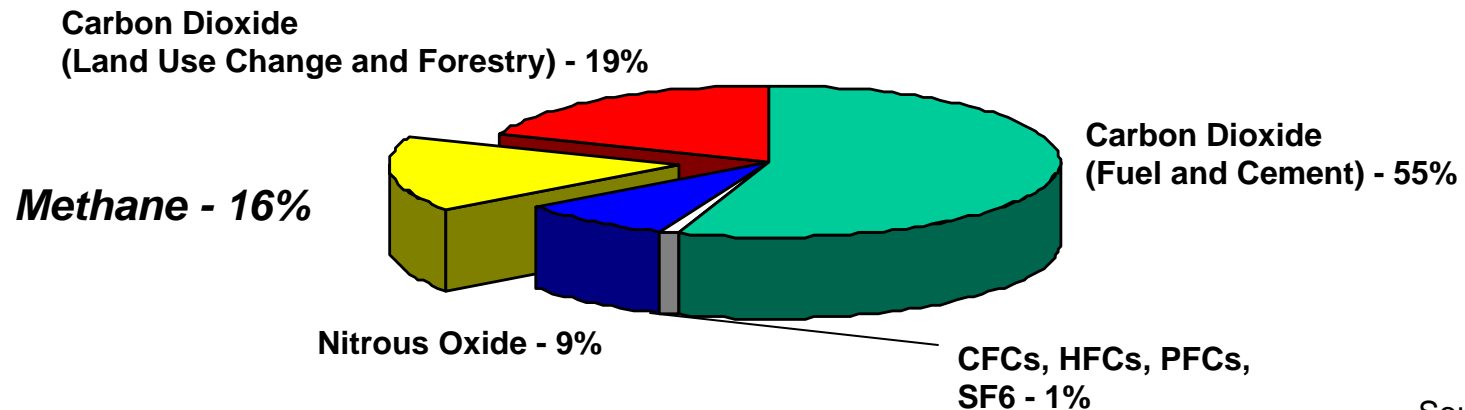


## Methane to Markets

### Why focus on Methane?

- ✓ A potent GHG (100-year GWP of 23; atmospheric lifetime of ~12 years)
- ✓ The 2nd most important GHG accounting for ~18% of total climate forcing
- ✓ A primary constituent of natural gas and a valuable, clean-burning energy source

Global Greenhouse Gas (GHG) Emissions in 2000 = 40,702 MtCO<sub>2</sub>e



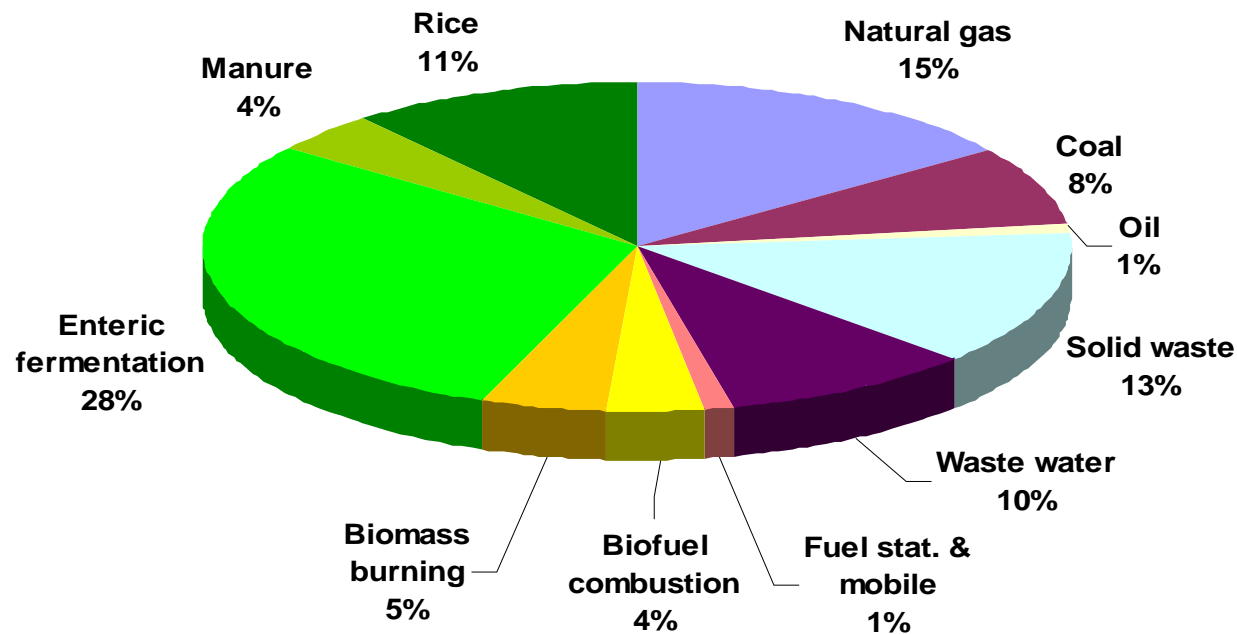
Source: US EPA



## Methane to Markets

# Global Anthropogenic CH<sub>4</sub> Budget by Source - 2000

Total CH<sub>4</sub> emissions in 2000 = 1618.4 MtC



Source: EPA compilation 2002



# Methane to Markets

## Cost-Effective Projects Recover and Use Methane

Coal Mines



Oil and Gas Systems



Landfills



Livestock Waste



## Methane to Markets

### Reducing Emissions from Oil and Gas Systems



- CH<sub>4</sub> from leaks, system upsets, and process venting.
- Reduce fugitives through enhanced inspection and maintenance, capture/prevent vented emissions.
- Key emission reduction technologies/options
  - *Technology Upgrades* - instrument air systems, replacing high-bleed pneumatic devices, dry seal systems for compressors, flash tank separators
  - *Operational Improvements* - directed inspection and maintenance programs, reduce system pressure, pipeline pump-downs



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### Reducing Landfill Methane

- CH<sub>4</sub> from waste decomposition
- Collect & combust gas; electricity generation or direct utilization of the gas
- Key emission reduction technologies/options
  - *Electricity Generation* - reciprocating engines, gas turbines, micro-turbines, fuel cells
  - *Direct Gas Use* - medium-high BTU fuel (boilers), vehicle fuel





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### Reducing Coal Mine Methane

- CH<sub>4</sub> contained in coal, emitted during mining
- Drain gas before mining; Use ventilation air
- Key emission reduction technologies/options
  - *Degasification* - pipeline injection, power generation, and fuel for thermal coal drying
  - *Catalytic Oxidation* - ventilation air is oxidized







## Methane to Markets

### Benefits of Methane Recovery and Use Projects

- Important local energy source
- Improved industrial safety and productivity
- Improved air quality and reduced odors
- Reduced greenhouse gas emissions
- Progress toward sustainable development goals
- Economic growth and energy security
- Reduced waste of a valuable fuel



## Methane to Markets

### Barriers to Methane Recovery

- Lack of awareness of emission levels and value of lost fuel
- Lack of information on and training in new technologies and practices
- Traditional industry practices
- Regulatory and legal issues
- Limited methane markets and infrastructure
- Uncertain investment climate

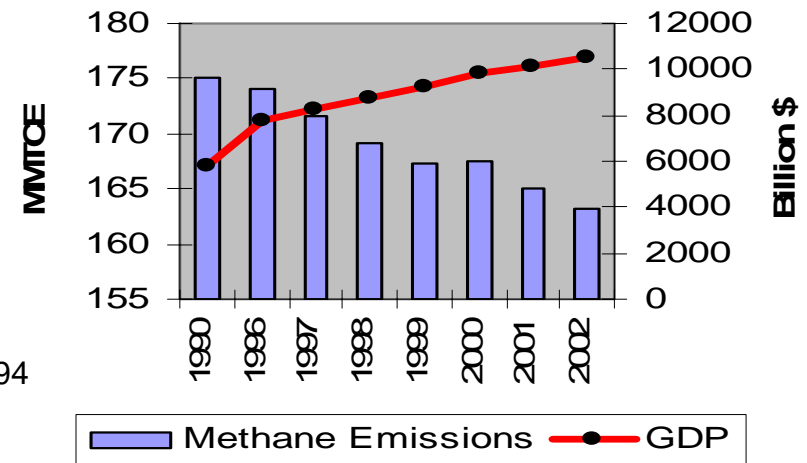


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# EPA Voluntary Actions Produce Results

- Natural Gas STAR
  - over 100 companies (65% of industry) in program
  - part of API's Climate VISION commitment
- Coalbed Methane Outreach Program
  - 90% of mine degasification CH<sub>4</sub> is used (up from 25% in 1993)
  - industry effort to demonstrate use for ventilation air methane
- Landfill Methane Outreach Program
  - Over 360 US landfill projects -- tripled since 1994
  - Strong corporate interest in use of landfill gas
- AgSTAR
  - strong state and Farm Bill support for methane digesters

**Changes in US Methane Emissions and Economic Growth 1990 - 2002**





## Methane to Markets

### How Does M2M Fit USG Climate Policy?

- M2M is an important component of the US Climate Change Strategy
  - Near-term
  - Voluntary
  - Public-private
  - Multiple benefits (energy, economic, environmental)
- Compliments long-term R&D climate initiatives



## Methane to Markets

### M2M Purpose and Goals

- ***International Framework*** -- to advance the recovery and use of methane as a valuable clean energy source
- ***Cost-effective and Near-term Focus*** – on facilitating methane recovery and use projects in developing countries and countries with economies in transition
- ***Private Sector Involvement*** – involve private companies, multilateral development banks and other relevant organizations in M2M implementation and activities through the project network
- ***Key Methane Sources*** -- natural gas & oil; coal mines; landfills; (agriculture under consideration)



## Methane to Markets

### Partner Countries

- Argentina
- Australia
- Brazil
- Canada\*
- China
- Colombia
- India
- Italy
- Japan
- Mexico
- Nigeria
- Russia
- South Korea\*
- Ukraine
- United Kingdom
- United States

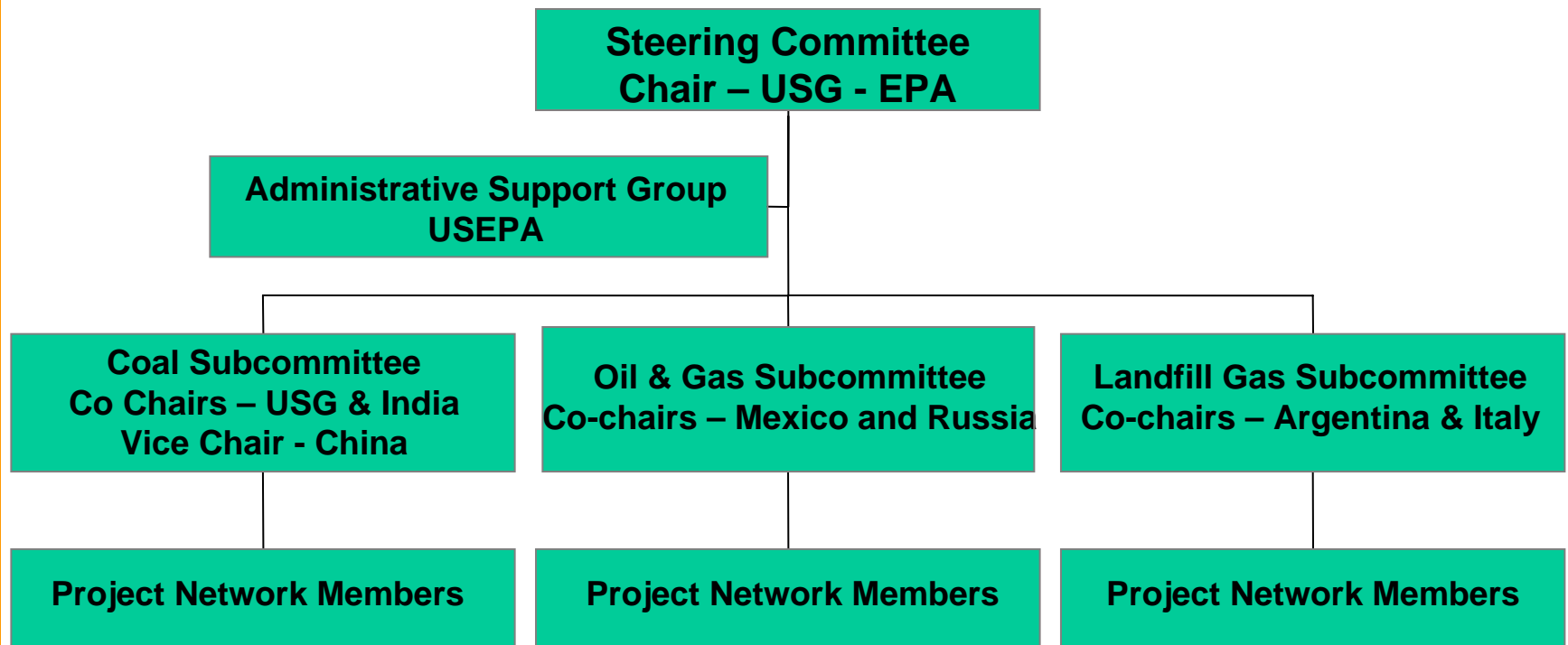


*Signing Ceremony, November 16, 2004*



## Methane to Markets

# Partnership Organization





## Methane to Markets

### Methane to Markets Activities

- Action oriented – focus on project development
- Participating countries and Project Network members work collaboratively to:
  - Build on inventory systems to quantify methane emissions
  - Identify cost-effective opportunities for capturing methane emissions for energy production
  - Conduct training, technical exchange, and demonstrations to support project development
  - Identify and remove legal, regulatory, financial, and other barriers to the profitable capture and use of methane
  - Develop sector-specific action plans and a process for evaluating their implementation
- Developed countries commit to assist developing countries and countries in transition in undertaking these activities





## Methane to Markets

### Project Network is a Key to Success

- Approximately 150 organizations have joined the Project Network since the November Ministerial Meeting
- Project Network members include leading private sector (project developers, equipment manufactures, oil/gas and coal producers, etc.), financing, and other organizations in the US and abroad
  - US Trade Associations: American Petroleum Institute, Solid Waste Association of North America, National Mining Association
  - Oil and Gas: BP, Devon Energy, etc.
  - Coal: UK Coal, Anglo Coal Australia, International Energy Agency Clean Coal Centre, Japan Coal Energy Center
  - Landfills: SCS Engineers, CES-Landtec
  - Equipment Manufacturers: Caterpillar, Inc., Solar Turbines
  - Other: United Nations Commission for Economic Development, World Bank, Russian Academy of the Sciences



## Methane to Markets

### M2M Progress is Measurable

- By 2015 potential reductions of up to 50 MMTCE annually (~500 billion cubic feet (Bcf) of natural gas)
  - Equivalent to eliminating emissions from fifty 500 MW coal-fired power plants
  - Assumes significant global participation (65% of global CH<sub>4</sub> emissions – current partner base represents 57%)
  - Does not include US reduction opportunities
- Emissions reductions and energy generation can be easily measured and quantified



## Methane to Markets

### US Government Commitment

- White House committed up to \$53 million over the next 5 years
- Resources will
  - Facilitate USG leadership and participation in Partnership
  - Support development and implementation of methane projects in Partner Countries
  - Assist EPA in exporting and implementing key components of our successful domestic voluntary methane programs
  - Support key functions of the Partnership as administered by the Administrative Support Group (ASG)



## Methane to Markets

### USG Coordination on M2M

- US participation in the Partnership is led by EPA through ongoing inter-agency coordination with other government actors
  - CEQ, USAID, State, DOE, USDA, TDA
- EPA has two broad areas of responsibility
  - Serve as the Administrative Support Group (ASG) and maintain the core administrative, coordination, and communication functions
    - Policy Neutral secretariat function
    - Other partners may take on this function after 2 years
  - Advance project development
    - Export US Voluntary Programs (Gas STAR, LMOP, CMOP)
    - Conduct feasibility assessments, technology transfer workshops and technology demonstrations, which would lead directly to greater use of US technologies and methane reductions



## Methane to Markets

### Conclusions

- Methane to Markets supports multiple international and sustainable development goals (i.e., climate change, solid waste management, air quality, mine safety, clean energy)
- Successful ministerial meeting held Nov. 2004 has established a strong foundation for the Partnership
- US is initiating follow up actions for FY 05 and FY 06
  - Developing the M2M infrastructure through the ASG
  - Supporting work of the Partnership committees
  - Implementing methane recovery and use activities
- The Partnership will deliver measurable, near-term climate protection through cost-effective, voluntary action