



Methane to Markets

US Efforts to Advance the Recovery and Use of Methane as a Clean Energy Source

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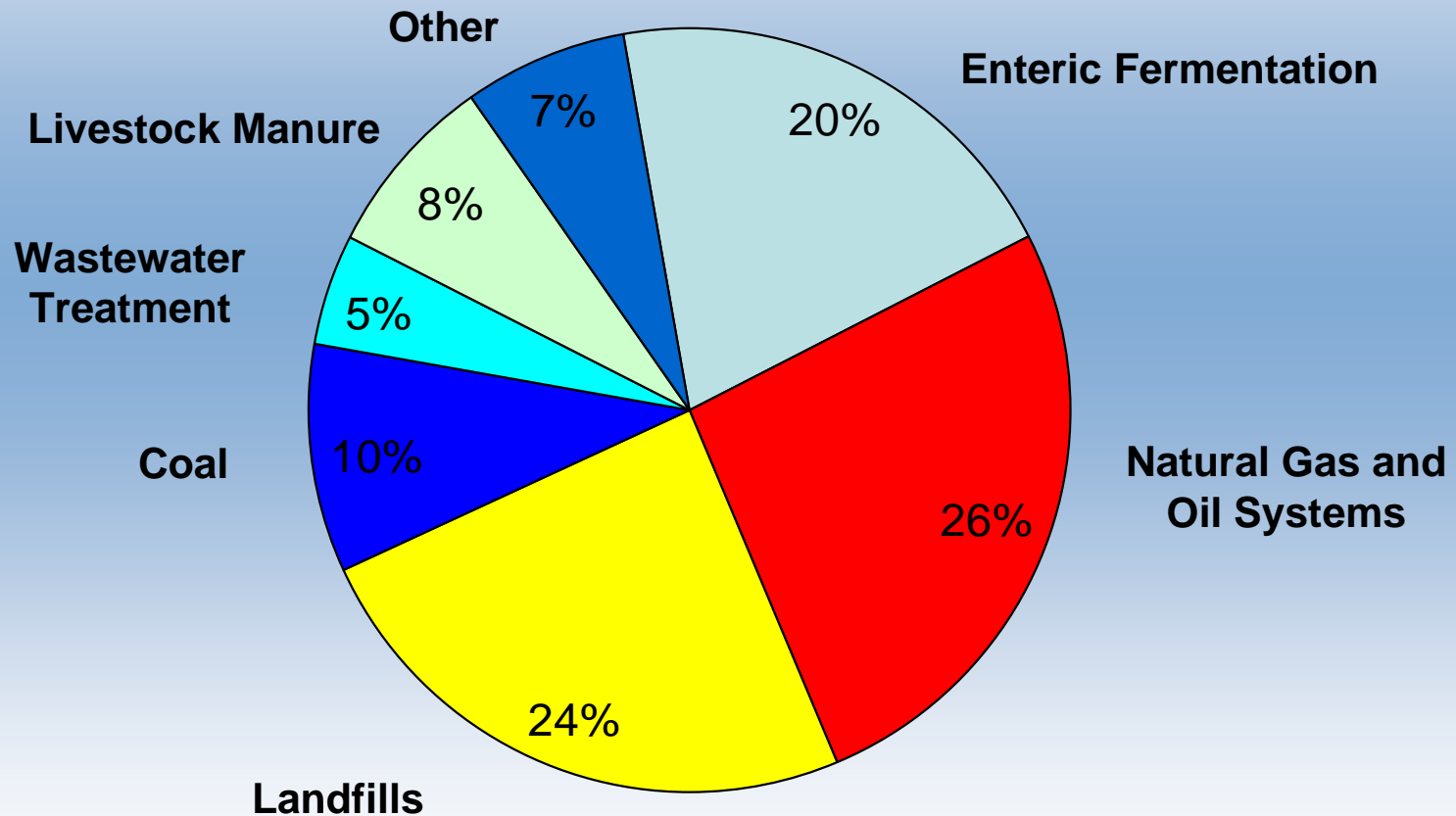


Overview

- Methane in the United States
- US Domestic Efforts to Reduce Methane
- US Commitment to Methane to Markets
- Concluding Thoughts

Methane Emissions in the US

Methane accounts for about 8 percent of US GHG emissions

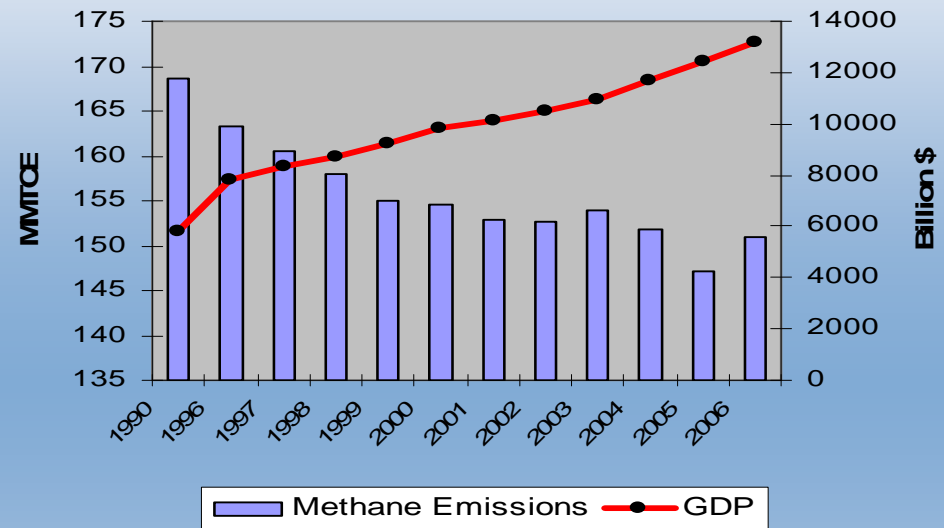


Total = 539 Tg CO₂-eq

Domestic Methane Partnerships

- Natural Gas STAR
 - over 100 companies (57% of industry) in program
 - Since 1993, companies have reported reductions of 63 MMTCE, valued at over \$4.2 billion USD.
- Coalbed Methane Outreach Program
 - 86% of mine degasification CH₄ is used (up from 25% in 1993)
 - industry effort to demonstrate use for ventilation air methane
- Landfill Methane Outreach Program
 - Over 445 US projects -- tripled since 1994
 - Strong corporate interest in use of landfill gas
- AgSTAR
 - Since 1994, the number of biogas recovery systems has doubled; over 180 projects - generating about 300 million kWh per year.

Changes in US Methane Emissions and Economic Growth 1990 - 2006



Policies are Evolving

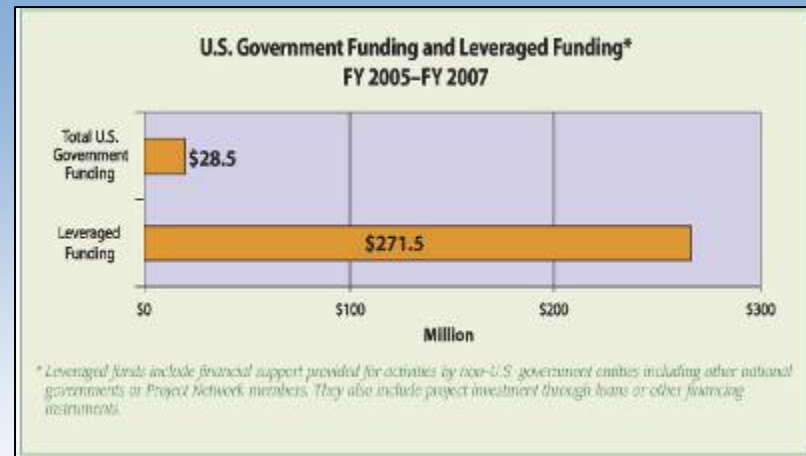
President Obama has a comprehensive plan to invest in alternative and renewable energy, address the global climate crisis and create millions of new jobs

- Ensure 10 percent of our electricity comes from renewable sources by 2012, and 25 percent by 2025.
- Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050

US M2M Commitment



- Pledged \$53 million over five years at Partnership launch in 2004. To date:
 - Provided over \$28 million to support a wide range of projects and activities
 - Leveraged over \$270 million in public and private sector contributions
 - **New M2M grant solicitation - up to \$7 million**
- Providing significant support to the Partnership through the ASG and technical support in all 4 sectors
 - Supporting projects in Argentina, Brazil, China, Colombia, Ecuador, India, Korea, Mexico, Mongolia, Nigeria, Poland, Philippines, Russia, Thailand, Ukraine and Vietnam.

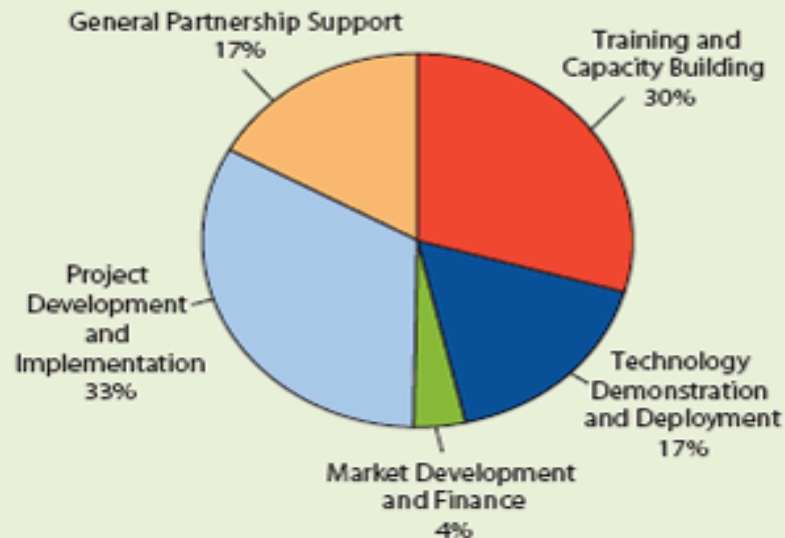


US Activities

- US activities directly support the sector and country action plans and focus on advancing project development in developing countries
- EPA is exporting the expertise from our domestic programs

US Government Funded Activities and Projects - 2007

FY 2007 U.S. Expenditures by Type of Activity



Landfill Gas to Energy

- Strategic Focus
 - Target technical assistance and services to countries with greatest project potential
 - Initiate capacity building and outreach efforts w/ all M2M countries
 - Leverage relationship with PN to advance projects (World Bank, ISWA)
- Key Activities
 - Technical Assistance and Project Identification
 - Data collection, assessment reports, pre-feasibility studies
 - Tool Development and Technology Transfer
 - LFG generation model, database
 - Training and Capacity Building
 - Training workshops, study tours, peer matching



Landfill Sector Highlights

Project Identification and Assessment

EPA has identified and analyzed over **40 potential landfill gas energy projects** across the world. These analyses were presented at the 2007 Partnership Expo in Beijing.

Tools to Advance LFG Project development

EPA is developing a suite of tools that will help landfill owners and operators collect the data they need to determine the feasibility of their sites and market them more efficiently to project developers.

- Country Specific LFG Recovery Models (Mexico, Ecuador, C. America, Argentina)
- International Landfill Database.

Training and Capacity Building

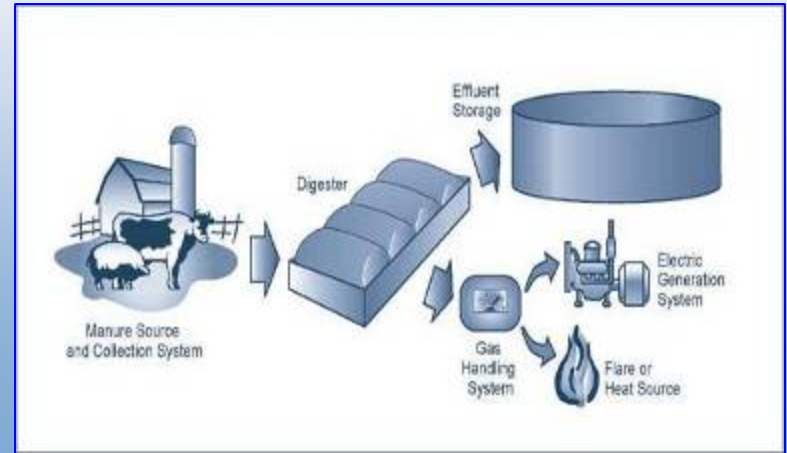
EPA and its Partners held capacity-building workshops in Brazil, China, Colombia India, Russia, Ecuador and Turkey. EPA offers technical support and training focused on landfill operations and maintenance, LFG collection systems, gas modeling, and project development



Agriculture - Biogas

- Strategic Focus

- Target technical assistance and services to countries with greatest project potential (Mexico, China)
- Initiate near-term project development
- Build long-term capacity and leverage PN activity (i.e. WB)



- Key Activities

- Technical Assistance and Project Development
 - Data collection and site assessment, demonstration farms
 - Training and Capacity Building
 - Workshops, expert exchange
- Technology Transfer
 - Extension events, documents and analytical tools
- Action plan implementation
 - Barrier analysis, country profiles, project network recruitment

Agriculture Sector Highlights

Southeast Asia

EPA and the World Bank are supporting livestock waste management projects in Southeast Asia; 2 operational projects, 6 under construction, 100 more in planning stages (China, Thailand, and Vietnam) – Reductions of 500,000 MTCO₂e

Mexico

EPA and USAID are working throughout Mexico to capture and use methane from livestock waste management systems by promoting technology transfer and demonstration projects; strengthening capacity of local institutions; and developing supportive policies to nurture the methane capture industry

Colombia

EPA is analyzing current livestock waste management practices to determine the livestock sector and regions with the greatest opportunity for emission reduction project opportunities.



Oil and Natural Gas

- **Strategic Focus**

- Natural Gas STAR International
 - Leverage existing relationships with multinational companies (BP, Shell, ExxonMobil, Oxy, Marathon, etc.)
 - Engage nationally owned oil and gas operators (i.e., PEMEX, ONGC)
- Provide targeted training, project development and technical assistance
- Leverage regional opportunities to facilitate technology transfer



- **Key Activities**

- Technical Assistance and Project Identification
 - Data collection and site assessment, cost-benefit analysis, market assessment
- Technology Transfer
 - Workshops , expert exchange, documents and analytical tools
- International Program Support
 - Partner support and communication, data tracking

Ukraine

EPA is working with Cherkasytransgas, a Ukrainian branch company of Ukrtransgas, and the Ukrainian government to support methane emission reduction projects in the Ukrainian natural gas transmission and distribution sectors.

India

Through Natural Gas STAR International EPA is working with India's Oil and Natural Gas Company Ltd. and the Ministry of Petroleum and Natural Gas to conduct measurement studies, provide training and project development support

Russia

EPA is working with Gazprom to share information on methane reduction practices and technologies – a joint technology transfer workshop was held in Fall 2008

Mexico

EPA and USAID are working with PEMEX to identify and implement large-scale methane-reduction projects at their production facilities. PEMEX invested \$1.3 million in methane emission-reduction efforts through 2006 and is now evaluating a \$22 M effort to install dry seals on compressors



Coal Mine Methane

- Strategic Focus
 - Address key global barriers and cross-cutting issues (ownership, project finance)
 - Target project development and technical assistance to countries with greatest potential (China, India, Russia, Ukraine)
 - Initiate capacity building and outreach efforts w/ other Partners (ie., Mexico)
- Key Activities
 - Technical Assistance and Project Identification
 - Data collection, pre-feasibility studies
 - Training and Capacity Building
 - Training workshops, expert exchange, Clearinghouse development/support
 - Technology Transfer
 - Workshops, technical tools and materials
 - Address Key Project Barriers
 - Finance training and guidance
 - Gas ownership (legal/regulatory analysis)



Coal Sector Highlights

Project Development Support

EPA is supporting 3 major project feasibility studies in China. EPA, Trade & Development Agency, Asian Development Bank, and World Bank (WB) collaborated to develop the world's largest CMM power project (120 MW) in China.

Training and Capacity Building in India

EPA, TDA and the Government of India have established a coal mine methane (CMM) information center. The clearinghouse is managed by India's Ministry of Coal and the Ministry of Petroleum and Natural Gas and facilitates and promotes the development of CMM/CBM projects in India.

Addressing Financial Barriers

EPA is working with the UNECE to address financial barriers to CMM recovery and use in Russia and Eastern Europe. This project will also encourage investor interest in the region and help mine owners identify international investment opportunities

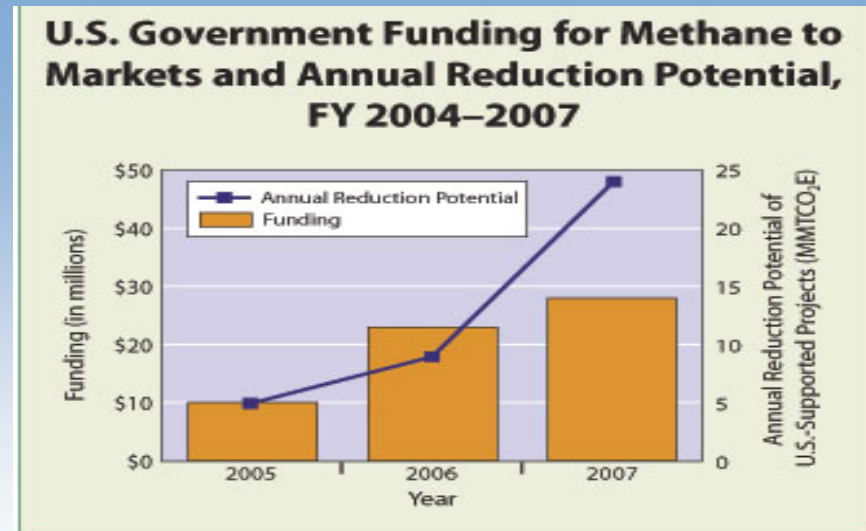
Overcoming Key Information Barriers

EPA has developed an International Project Database and as well as several key technical resources – i.e., CMM Global Overview, project case studies



Key Successes

- Providing significant support to the Partnership through the ASG and technical support in all 4 sectors
- US investment has leveraged over \$270 million in public and private sector contributions
- Ongoing projects and activities are expected to achieve annual emission reductions of 24 MMTCO₂E.



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