Methane to Markets

U.S. Government Accomplishments in Support of the Methane to Markets Partnership

October 2006

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October 2006

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Dear Colleagues:

In 2004, the United States, along with 13 other countries, launched the Methane to Markets Partnership. The goal of this international public-private Partnership is to reduce emissions of methane, a potent greenhouse gas, by advancing the development of projects that recover and use methane as a clean energy source.

Since its inception, the Methane to Markets Partnership has enjoyed strong support from the highest levels of the U.S. government, with President Bush pledging up to $53 million dollars over five years. Together with our international partners, we have established a strong infrastructure for the Partnership and created a vibrant global community of governments, private sector and non-governmental organizations, and financing institutions that are committed to promoting methane capture and use projects worldwide.

Thanks to this commitment and our collective efforts, we are seeing tangible results. For example, in less than two years, four additional countries have joined the Partnership and more than 350 private sector and non-governmental organizations have signed on to participate in the Project Network. More importantly, the Methane to Markets Partnership is launching projects and activities on the ground that are already reducing methane emissions. This report describes the U.S.-supported projects and activities, and it documents their contribution to energy security, clean development, and the environment.

As the Chair of the Methane to Markets Steering Committee and as a representative of the U.S. Environmental Protection Agency, I am very proud of our accomplishments in supporting the Partnership. I look forward to continued U.S. commitment to the Methane to Markets Partnership and to working with our public and private sector partners to develop near-term methane recovery projects that will yield significant economic, clean energy, and environmental benefits.

Sincerely,

William L. Wehrum
Acting Assistant Administrator, Office of Air and Radiation
U.S. Environmental Protection Agency
Steering Committee Chair, Methane to Markets Partnership

Executive Summary

The launch of the Methane to Markets Partnership in November 2004 committed the United States, along with 13 other countries, to advancing cost-effective, near-term methane recovery and use as a clean energy source. Public and private sector organizations around the world are now working together with government agencies to facilitate project development at agricultural operations, coal mines, landfills, and oil and gas systems. This collaboration is yielding important benefits, including enhanced economic growth and energy security, improved air quality and industrial safety, and reduced greenhouse gas (GHG) emissions.

The U.S. government plays a leading role in the Partnership. Six major agencies and departments across the federal government are providing technical expertise and leadership on the Partnership's Steering Committee and subcommittees; facilitating communication and outreach activities by serving as the Partnership's Administrative Support Group (ASG); and working with other Partner Countries, the private sector, and other organizations to develop and support methane recovery projects around the world. In fiscal year 2005, the U.S. government provided $5.4 million for Methane to Markets projects and activities. This contribution has leveraged significant resources from other Partner Countries, development banks, the private sector, and members of the Project Network. For example, a coal mine methane (CMM) project in Jincheng, China, received funding from the U.S. government for pre-feasibility and planning studies and is now set for full-scale implementation with international investments totalling $235 million.

To date, our resources have been used in creating the foundation for future project development as well as advancing near-term methane recovery and use opportunities. The United States is supporting technology demonstrations and pre-feasibility and feasibility studies at potential project sites; addressing market, institutional, and other barriers to project development; and building capacity through technology transfer and training. These efforts are directly leading to the future implementation of full-scale projects in numerous countries, which, if fully implemented, will result in estimated annual emission reductions of approximately 5 million metric tons of carbon dioxide equivalent ($MMTCO_2E$).

In the landfill sector, the U.S. government is developing a global database of landfill gas (LFG) project opportunities to help countries and project developers from around the world identify potential project sites. In addition, the United States has trained Russian professionals in LFG project development and provided seed funding for LFG projects in Mexico and Brazil. These projects are expected to reduce emissions by 45,000 and 500,000 metric tons of carbon dioxide equivalent ($MTCO_2E$) per year, respectively.

In the coal mining sector, the U.S. government has developed a global overview document profiling key coal producing nations and opportunities for coalbed methane (CBM) and CMM project development. The United States is also compiling data for a global database on coal mine project opportunities, providing training in China, and funding a Ukrainian coal mine safety and emission reduction project that is expected to reduce emissions by an estimated 100,000 $MTCO_2E$ per year.

In the oil and gas sector, the U.S. government, in cooperation with industry partners, is sharing its technical expertise and

The Methane to Markets Partnership Expo, Fall 2007

The Methane to Markets Partnership Expo will showcase the Partnership s achievements and global opportunities for methane recovery and use. The event will provide a forum to:

- Highlight methane capture and use technologies and services.
- Showcase project opportunities to potential investors.
- Discuss the key technical, policy, financing, and regulatory issues related to project development.

experience by sponsoring technology transfer workshops in Colombia and Russia. The United States is also working with Petróleos Mexicanos (PEMEX) in Mexico to launch two pilot projects that have the potential to reduce methane emissions by approximately 120,000 $MTCO_2E$ per year. These efforts not only bring local project opportunities to the international community but also build local capacity to advance project development.

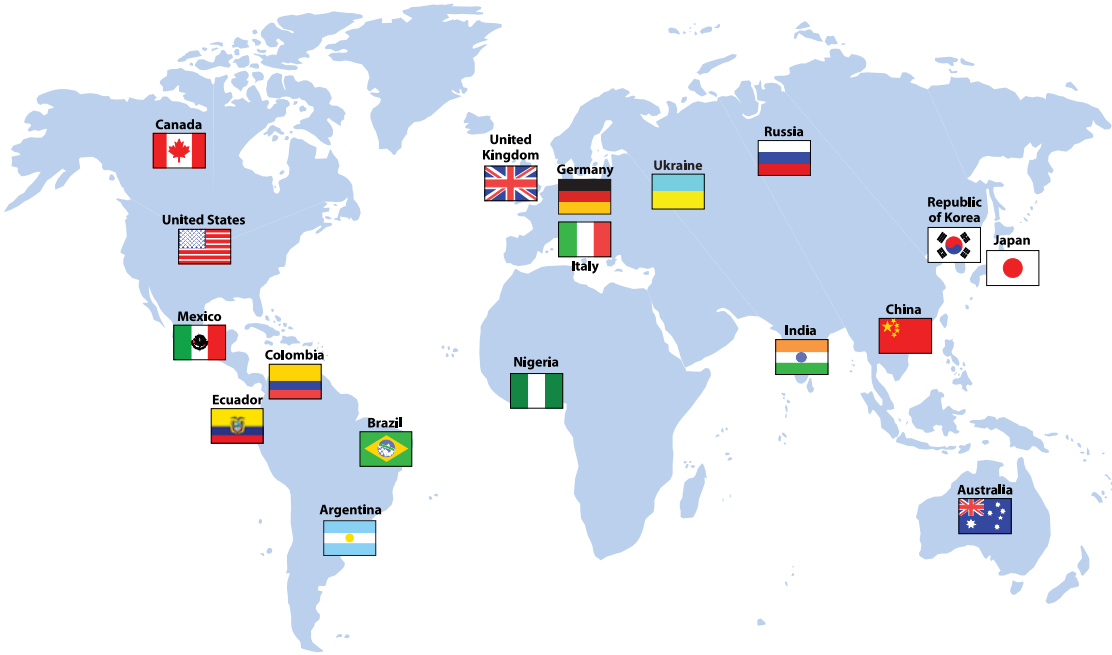
The U.S. government is also involved in an array of demonstration projects in the agriculture sector, ranging from large industrial-scale manure waste management systems in China to smaller household- and village-scale systems in Thailand and Vietnam. As well as methane emissions, these projects will reduce water and air pollution caused by confined livestock production and improve public health in areas that may be affected by livestock production.

Active involvement by experts from private sector entities, financial institutions, and non-governmental organizations is essential to the success of the Partnership. Currently, more than 350 experts from these organizations are participating as Project Network members, whose expertise and experience have been vital to fostering development of methane capture and use projects.

In the coming year, the United States will work to expand collaboration with Partner Countries and Project Network members to accelerate methane recovery and use throughout the world. One important focus of these efforts will be to ensure the successful development of the 2007 Methane to Markets Partnership Expo, an event that will bring together the investment, project development, and government communities. In addition, the United States will work with other Partners to enhance our ability to track our collective progress and communicate our results.

Sustained effort and focus on methane recovery and use by the U.S. government, Partner Countries, and the Project Network will lead to significant, near-term progress in reducing emissions. By working collaboratively with the public and private sector, we can reduce global methane emissions while developing new sources of clean energy that provide economic, environmental, and health benefits.

The Methane to Markets Partnership



Methane to Markets Partner Countries represent more than 60 percent of the world's anthropogenic methane emissions.

The Methane to Markets Partnership is a multilateral initiative uniting public and private interests to advance the recovery and use of methane as a clean energy source. Currently, 18 national governments and over 350 Project Network member organizations have joined the Partnership. By engaging public and private sector partners, this initiative brings together the technical and market expertise, financing, and technology necessary for project development.

The Methane to Markets Partnership focuses on developing projects in four major methane emission source areas: agriculture, landfills, underground coal mines, and natural gas and oil systems. In each of these areas, cost-effective methane emission reduction technologies are currently available to capture and use the methane gas as a fuel for electricity generation, onsite energy needs, or offsite gas sales. Despite the availability of proven technologies and the benefits of collecting and using this gas instead of releasing it into the atmosphere, methane recovery and use is not widespread. In many countries, project development has been stymied by legal, regulatory, financial, institutional, informational, and other barriers. By addressing these barriers,

the Partnership will advance methane recovery and use.

The Steering Committee guides the work of the Methane to Markets Partnership. Playing a supporting role is the Administrative Support Group (ASG), or secretariat, which is currently housed at the U.S. Environmental Protection Agency (EPA). Four subcommittees (Agriculture, Coal Mines, Landfills, Oil and Gas Systems) are responsible for the technical work in each of the Partnership's target sectors. These subcommittees have developed action plans that identify key barriers and issues for project development, plan the actions needed to overcome these barriers, address market assessment and reform issues, facilitate investment and financing opportunities, and report on progress to the Steering Committee.

Each subcommittee operates as a partnership between government representatives and the Project Network, which comprises private sector entities, financial institutions, and other governmental and non-governmental organizations. The Methane to Markets Partnership encourages the active involvement of the Project Network in all meetings and activities of the Partnership as a means of building capacity, transferring technology, and promoting private investment. To this end, the Partnership's Project Network serves as an informal mechanism to reach out to and facilitate communication and coordination among these organizations.

To date, over 350 organizations have joined the Partnership. Currently, about half of the Project Network members are U.S.-based companies with an interest in expanding business opportunities internationally.

The Methane to Markets Partnership expects to achieve significant economic, environmental, and energy benefits. The United States estimates that by 2015, the Partnership could be delivering annual reductions in methane emissions of up to 180 $MMTCO_2E$. This is the equivalent of recovering 500 billion cubic feet of natural gas. If achieved, these reductions could lead to stabilized or even declining levels of global atmospheric concentrations of methane. These reductions would be equivalent to the annual emissions from 33 million cars or 50 500-megawatt (MW) coal-fired power plants.

Why Is Methane Important?

Methane (CH_4) is a hydrocarbon and the primary component of natural gas. It is also a potent GHG that is over 20 times as effective at trapping heat in the atmosphere as carbon dioxide (CO_2). Methane also has a much shorter atmospheric lifetime than CO_2 (about 12 years compared to about 200 years). As a result, reducing methane emissions can achieve significant climate benefits over the next 25 years.

Methane accounts for 16 percent of all GHG emissions globally, with about 60 percent of total methane emissions coming from anthropogenic (human-related) activities, including agriculture (manure waste and enteric fermentation), rice cultivation, coal mining, landfills, and oil and natural gas systems. Non-anthropogenic sources include wetlands, gas hydrates, permafrost, and termites.

For many of the major emission sources, collection and utilization of methane is possible using currently available technologies. Methane recovery and use provides multiple environmental, energy, and economic benefits by capturing a valuable, clean-burning fuel while reducing GHG emissions.

U.S. Government Leadership in Reducing Methane Emissions

In support of the Methane to Markets Partnership, the United States has committed up to $53 million over a 5-year period to facilitate the development and implementation of methane projects in both developing countries and countries with economies in transition. The U.S. government funding is implementing a range of activities, such as the export of the successful U.S. voluntary programs (see sidebar), training and capacity building, market development, feasibility assessments, and technology demonstrations. Central to the U.S. commitment will be leveraging the efforts of fellow Partner Countries along with the expertise and investment of the United States and the international private sector.

U.S. government efforts under the Methane to Markets Partnership are led by EPA and involve the collective efforts of six agencies and departments across the federal government. Each organization plays an important role in the Partnership and provides unique expertise.

- EPA is the lead U.S. agency and is coordinating and administering Partnership activities, both domestically and internationally. EPA plays a lead technical role through the international expansion of its domestic methane partnership programs, in addition to hosting the ASG.

EPA's Voluntary Domestic Methane Partnership Programs

Over the past decade, EPA has initiated several successful voluntary programs to find cost-effective ways to reduce methane emissions. These programs help public and private sector partners overcome a wide range of informational, technical, and institutional barriers to reducing methane emissions while creating profitable opportunities for the agricultural, coal, landfill, and oil and natural gas industries. As of 2004, these programs have been successful in helping the United States reduce methane emissions 10 percent below 1990 levels. For more information on EPA's domestic methane reduction programs, please visit www.epa.gov/methane/voluntary.html.

- U.S. Department of State ensures that the U.S. participation in the Methane to Markets Partnership is complementary and consistent with U.S. international policy objectives. The State Department coordinates with Partner Countries to help build a commitment at all levels of government to actively support and promote Methane to Markets.

- **U.S. Agency for International Development (USAID)** provides important technical expertise in the economic reform of energy sectors to create markets that support private sector projects in developing countries. USAID funds and provides technical expertise to support methane capture and use projects through its programs and network of international offices.

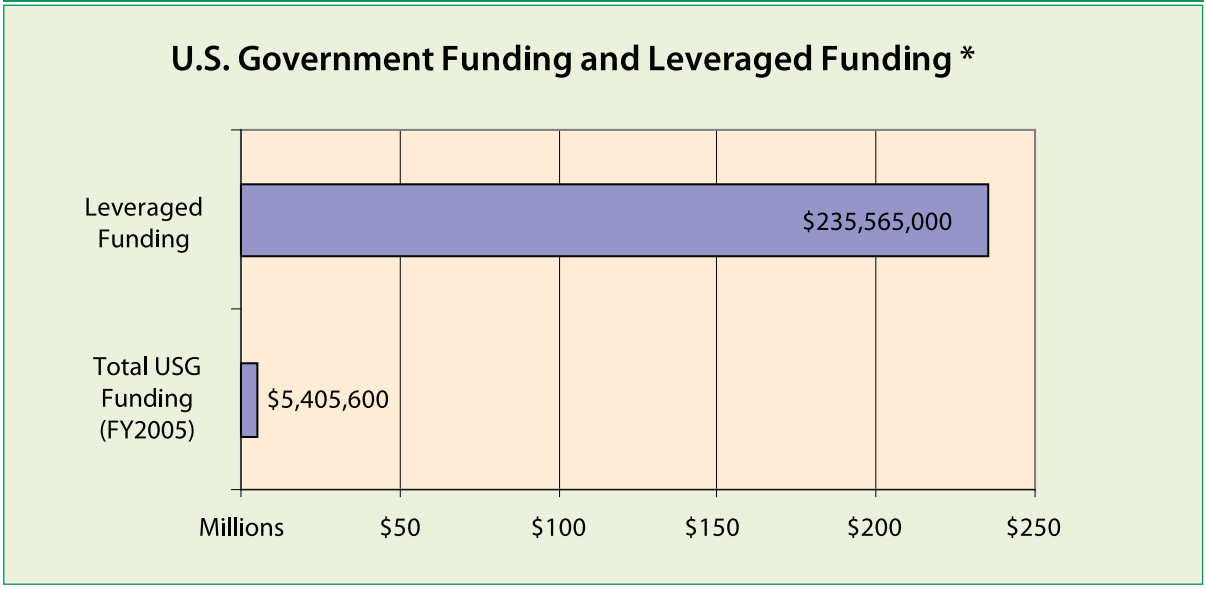
- **U.S. Department of Energy (DOE)** has valuable expertise in natural gas and CMM and funds the International Utility Efficiency Program (IUEP), which in turn supports methane projects.

- **U.S. Trade and Development Agency (USTDA)** facilitates development in emerging markets by promoting U.S. partnerships in overseas projects. To this end, USTDA funds various forms of technical assistance, feasibility studies, training, orientation visits, and business workshops that support the development of modern infrastructure, an open trading environment, and U.S. technology export.

- **U.S. Department of Agriculture (USDA)** provides technical expertise in animal waste management and promotes methane recovery and use in the agriculture sector.

An important focus of U.S. efforts is to build partnerships and leverage resources to stimulate investment from the private sector. In fiscal year 2005, the U.S. government provided $5.4 million for Methane to Markets projects and activities. To date, investment in methane projects that have been supported at some stage by the U.S. government is more than $235 million (see Figure 1).

Figure 1



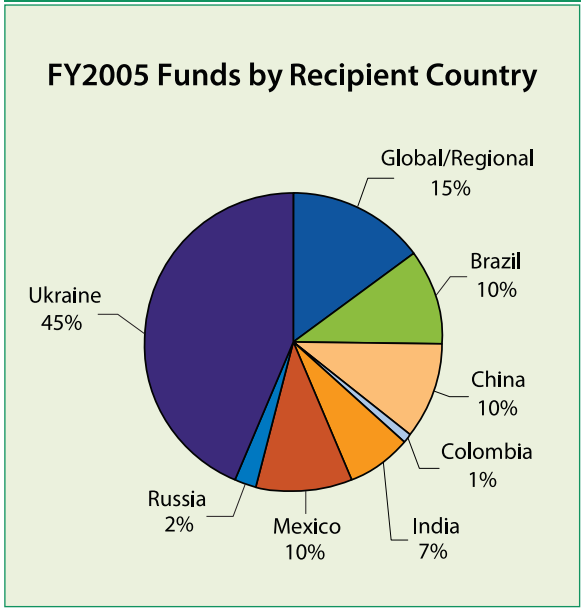
** Leveraged funds include financial support provided for activities by non-U.S. government entities, including other national governments or Project Network members. They also include project investment through loans or other financing instruments.*

Sector Highlights

The United States, in cooperation with Methane to Markets Partner Countries and Project Network members, has participated in the Partnership's subcommittees to develop action plans to guide the implementation of activities and projects in the target sectors. These action plans identify and address key barriers and issues for methane recovery and use, address market assessment and reform issues, facilitate investment and financing opportunities, and report on progress to the Steering Committee.

U.S.-backed projects and activities directly support the action plans and focus on promoting project development in developing countries and those with economies in transition, including Brazil, China, Colombia, India, Mexico, Russia, and Ukraine (see Figure 2).

Figure 2



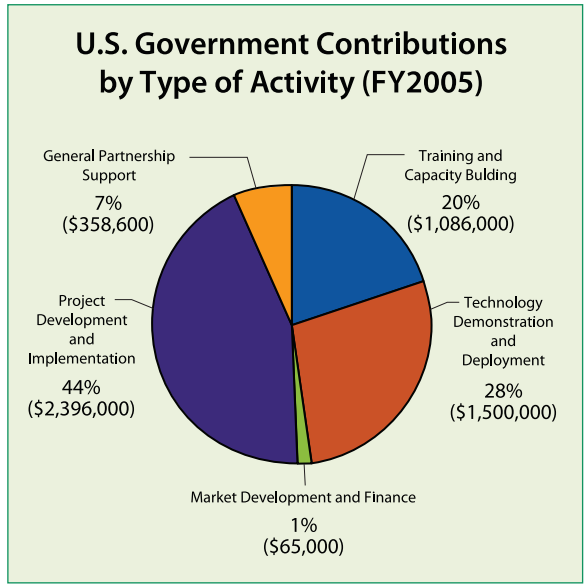
U.S. efforts are targeting near-term methane recovery and use project development by using partnerships and employing innovative approaches that leverage U.S. expertise and yield measurable results. U.S. activities are focused in the following areas:

- **Training and Capacity Building**—Creating the institutional, financial, and technical knowledge and infrastructure necessary to ensure successful short- and long-term project development.

- **Technology Demonstration and Deployment**—Showcasing available, cost-effective methane recovery and use technologies and facilitating their adoption in the global marketplace.
- **Market Development and Finance**—Ensuring the development of fully functional financial and energy markets, addressing legal and regulatory barriers to project development, and matching available investment to sound project opportunities.
- **Project Development and Implementation**—Identifying and characterizing specific project opportunities and providing technical assistance to ensure successful development.
- **General Partnership Support**—Providing support for the ASG, outreach and communication, and meetings.

Figure 3 provides a summary of U.S. government-supported activities under the Methane to Markets Partnership in FY2005.

Figure 3



Agriculture

The agriculture sector is the newest sector in the Partnership. Efforts in this area focus on capturing methane being released from liquid animal waste management systems and using it as a clean energy source to produce electricity. Gas-fired equipment such as engines, boilers, or chillers can be used to meet a portion of a farms energy requirements. The U.S. government has already been an active participant in the agriculture sector, working to identify and implement improved technologies and management practices and promoting economically viable projects in targeted geographic regions across the globe. As activities in the agriculture sector gain momentum, the U.S. government is poised to make significant contributions. Some key activities and accomplishments in this sector are described below.

Livestock Waste Management in East Asia

EPA is providing technical support to a project promoting livestock waste management in East Asia. The Global Environment Facility and the World Bank are providing a $7 million grant over 5 years to support a comprehensive approach to reduce the significant environmental and health impacts from increasingly concentrated livestock production in China, Thailand, and Vietnam. This project integrates policy development and implementation, technological solutions, capacity building, and regional connections. The grant supports demonstration of cost-effective livestock waste management techniques at selected farms in these countries.

Methane to Markets Expands to Realize Opportunities in Agriculture

In November 2005, the Partnership established a new Agriculture Technical Subcommittee to promote methane capture and use opportunities in livestock waste management. EPA, USAID, and USDA will play active roles on this subcommittee by identifying project opportunities; assisting with the development of the action plan; and recruiting participants from the private sector, development banks, and other governmental and non-governmental organizations.

An array of projects are under development, ranging from large, modern methane recovery and waste stabilization systems in China, to smaller household and village-scale systems in Thailand and Vietnam. Multimedia-based, these projects reduce water and air pollution caused by confined livestock production. They also improve public health through the biological treatment of fecal material with anaerobic digestion technologies. These technologies are designed to recover methane that is used in energy applications such as electricity generation, lighting, cooking, shaft power, and water pumping.

Demonstration Farms in Mexico

USAID and EPA are working with the government of Mexico to develop a set of demonstration projects to showcase best practices for the capture and use of methane in large- and small-scale pig farms. EPA will train participants to install and operate biogas recovery systems and to use biogas in energy applications such as electricity generation, lighting, cooking, and water pumping. The lessons learned from these initial demonstration projects will be incorporated into planning efforts for upcoming demonstration farms in Latin America. The projects demonstrate technologies to reduce water and air pollution caused by confined livestock production, thereby improving public health in affected areas.

Coal Mining

Methane gas released due to coal mining can be captured and used as a clean energy source, yielding significant energy, environmental, and mine safety benefits. The United States remains a global leader in the CBM and CMM sector and is working with partners to share expertise, information, and technology to advance project development. Some key U.S. activities and highlights in the coal mine sector include:

Coal Mine Safety and Emission Reductions in Ukraine

USAID provided $1.5 million in funding to the Partnership for Energy and Environmental Reform (PEER)—a non-governmental organization—and REI Drilling—a U.S.-based drilling company—to implement the Coal Mine Safety Program. PEER and REI purchased a U.S.-manufactured horizontal drill for use at two Ukrainian mines to demonstrate safe drilling techniques and to train Ukrainian crews on how to maintain and operate such equipment. After the training, the drill will remain in Ukraine and will be used to drill drainage holes at other mines in the country. The program is being managed by the U.S. Department of Labor and counterparts in Ukraine, including the Ministry of Coal, the State Committee on Labor Safety, and selected mines. This project is expected to yield potential emission reductions equivalent to 100,000 $MTCO_2E$ per year and contribute to increased coal mine safety and decreased coal mine mortality.

UNECE Project to Facilitate Project Financing

EPA initiated a 3-year project with the United Nations Economic Commission for Europe to address financial barriers in the development, promotion, and sale of CMM recovery and use projects in Eastern Europe. Beginning in Russia, sector experts will organize workshops and provide support to coal mine staff to develop bankable documents and project-specific business

plans to encourage investor interest in several mines. The workshops will provide a model to be replicated in countries throughout the region.

Technology Transfer in China and India

China has some significant opportunities for CMM projects. EPA co-sponsored a workshop in Beijing in December 2005 along with the Australia Greenhouse Office, Japan's New Energy and Industrial Development Organization, and the People's Republic of China State Administration of Worker Safety to share cost-effective technologies with staff from Chinese mines. The workshop featured presentations on CMM utilization and mitigation technologies; resource, economic, and risk assessment strategies; and experiences at specific Chinese mines.

EPA provided technical and financial support to help establish the China Coalbed Methane Clearinghouse in 1994 and has provided technical and financial support to the Clearinghouse since that time. The China Coal Information Institute, which manages the activities of the Clearinghouse, serves as a focal point for foreign and domestic investors and project developers to gather data and information regarding project opportunities for methane capture and use.

Using the experience in China as a model, EPA and USTDA plan to work with the India Ministry of Coal and the India Ministry of Petroleum and Natural Gas to establish a similar CBM and CMM Clearinghouse in India. The development of this information center will help to increase India's base of clean energy resources and improve mine safety.

World's Largest Coal Mine Methane Project to Be Implemented in China

Caterpillar, Inc., was recently awarded a contract to supply all the power generation equipment for the worlds largest CMM-fueled power plant. Under this contract, Caterpillar will provide 60 gas generator sets—manufactured in Lafayette, Indiana—to the Jincheng Anthracite Coal Group in Shanxi Province, China. This power plant will produce 120 MW of electricity plus heat that will be recovered to produce usable hot water/steam (i.e., combined heat and power) for mining operations. Over the 20-year lifetime of this project, it is estimated, 40 $MMTCO_2E$ emissions will be avoided. The full-scale implementation of the project involves a total investment of $235 million and is being financed by Japan Bank for International Cooperation, Asian Development Bank, the Jincheng municipal government, and the World Bank Prototype Carbon Fund.

USTDA provided a $500,000 technical assistance grant to support the mine during the final design and procurement phase. EPA provides support to the China Coalbed Methane Clearinghouse, which is housed within the China Coal Information Institute (CCII).

Landfills

Capturing and using methane emitted from landfills is a reliable and renewable fuel option that represents a largely untapped environmental and energy opportunity at thousands of landfills around the world. Many nations lack essential information about their landfill gas-to-energy potential as well as the funding and technical expertise necessary for project development. The United States is working with its partners to ensure that more LFG reaches energy markets. The U.S. government is providing expertise in landfill data collection, developing technical capacity, and funding pre-feasibility studies to catalyze projects. Some of the U.S. governments support activities and accomplishments are highlighted below.

Promoting LFG Projects in Latin America

EPA collaborated with the World Bank to host the Latin American LFG Project Expo in July 2005, in Montevideo, Uruguay. The objective of the event was to discuss the pre-feasibility study results for 10 Latin American landfills developed by the World Bank with financial support from the Canadian International Development Agency (CIDA). The goal of the Expo was to encourage landfill representatives from the 10 sites to engage the private sector to seek investment opportunities for LFG projects. At least five of the 10 landfills featured at the event are proceeding to implement full-scale methane recovery projects.

Identifying Landfill Gas-to-Energy Project Opportunities

EPA has spearheaded development of a global database of disposal sites and LFG project opportunities in Partner Countries. The database will identify landfill candidates for technical evaluation, project development opportunities, and investment opportunities.

The database will be launched by 2007 on an easily accessible, Web-based platform enabling project developers from any country to easily identify LFG project opportunities and bring more projects online quickly. This will present a crucial tool for the 2007 Partnership Expo, enabling project owners to overcome some of the key challenges to landfill project development.

Landfill Gas-to-Energy Training and Capacity Building

A major barrier to project development in the landfill sector is a lack of knowledge about the opportunities and benefits of LFG capture and use projects by local landfill operators and municipalities. To overcome this barrier and build local capacity in Partner Countries, EPA developed and co-sponsored a number of workshops and training seminars on landfill methane recovery, project planning, technology options, and financing. Some of these included:

- A 2-day LFG workshop in Moscow in May 2005, which attracted more than 80 solid waste professionals from the region.
- LFG workshops in Delhi and Mumbai, India, in March 2006, co-sponsored by the Federation of Indian Chambers of Commerce and Industry (FICCI).

Landfill Gas-to-Energy in Brazil

In Brazil, 84 percent of methane emissions come from municipal solid waste. Landfills across Brazil have an estimated overall generation rate of 303 to 578 million cubic meters per year, capable of providing 60 to 144 MW of electricity. Nevertheless, very little methane is recovered from landfills. USAID is supporting the implementation of a LFG-fired power plant in the city of Fortaleza, Ceará State. As part of this project, USAID is providing technical assistance, conducting a feasibility study, promoting social inclusion activities to benefit the communities of waste scavengers living at the landfill surroundings, and organizing a workshop directed to other municipalities that have landfills with potential use for methane recovery. As a result of this project, an amount equivalent to 2.5 $MMTCO_2E$ emissions will be avoided from 2007 through 2012.

Landfill Gas Project Development in Mexico

On March 24, 2006, EPA, USAID, and the Mexican Secretariat of Environment and Natural Resources (SEMARNAT) signed a Letter of Cooperation stating their commitment to collaborate on Methane to Markets activities in Mexico. Under this agreement, two landfills along the U.S.-Mexico border were identified for project development. These agencies, in addition to the North American Development Bank, and the Border Environmental Cooperation Commission, subsequently visited the cities of Nuevo Laredo and Ensenada to gather more information and meet with local officials.

These LFG projects are expected to reduce emissions by more than 45,000 $MTCO_2E$ each year. USAID estimates that annual emission reductions of more than 300,000 $MTCO_2E$ could be achieved if projects are implemented in the 14 most important landfills in the region. Replication of similar landfill projects on a national scale could reduce GHG emissions by 3 $MMTCO_2E$ per year.

Oil and Natural Gas

Methane is emitted from oil and gas systems as a result of normal operations, routine maintenance, and system disruptions. These emissions can be reduced by upgrading technologies or equipment and by improving management practices and operational procedures. U.S. technical expertise and leadership in this sector is well recognized around the world. In support of the Methane to Markets Partnership, the U.S. government is sharing its technical expertise and experience and working with governments and the private sector to identify and share best practices and cost-effective techniques for reducing methane emissions, improving system efficiency, and delivering more gas to market. Some of the U.S. government's accomplishments in this sector include:

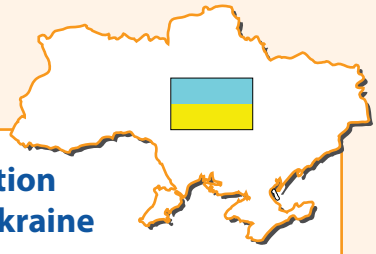
Project Development in Mexico

In 2006, USAID funded two pilot projects with PEMEX, Mexico's state-owned oil company, with significant potential for methane emission reductions. These projects will upgrade compressors used in the gas pipeline transmission system and implement a technology that captures fugitive gas emissions from oil storage tanks. Implementing these two technologies will result in estimated annual emission reductions of just over 120,000 $MTCO_2E$. As a first step, PEMEX and USAID are currently gathering baseline measurements at selected locations. PEMEX is also conducting a larger, company-wide analysis to inventory all oil and gas process components and equipment—including wells, dehydrators, pneumatic controls, and valves—and measuring their effectiveness. These pilot projects will shed light on project opportunities in Mexico and serve as model procedures and best practices for other Methane to Markets countries. It is estimated that replication of the pilot projects and other methane emission reductions measures throughout PEMEX can result in lowering annual emissions by more than 4 $MMTCO_2E$.

Technology Transfer in Colombia and Russia

To facilitate project development in the oil and natural gas sector, EPA has coordinated and co-sponsored a number of technology transfer workshops on cost-effective emission reduction technologies and pipeline maintenance and repair. Some of these included:

- A 2-day workshop in Bogotá, Colombia, in October 2005, co-sponsored by the Colombian Ministries of Energy and Environment and Occidental Petroleum. This workshop consisted of a series of presentations by oil and natural gas experts. As a direct result of the event, EPA is working with private industry to develop a methane emission reduction project in Latin America. Attendees have also approached EPA to promote similar events in other Methane to Markets Partner Countries, which EPA is actively pursuing.
- A 3-day workshop in Tomsk, Russia, in September 2005, hosted by the Russian Academy of Sciences. The workshop focused on identifying and quantifying oil and gas methane emissions from the Russian and Ukrainian oil and natural gas industry.



Leak Reduction Project in Ukraine

Ukraine has the second largest natural gas transmission system in Europe—35,000 kilometers long, with 171 compressor stations—and a large potential for methane emission reduction projects. Cherkasytransgas, one of the six Ukrainian gas transmission companies, recently won a grant from IUEP to evaluate and implement methane emission reduction technologies and practices at all 23 of its compressor stations. The project will provide an excellent model of best management practices on Soviet equipment for other Byelorussian, Russian, and Ukrainian natural gas companies.

Government Industry Partnerships to Reduce Emissions

The Natural Gas STAR program is a flexible, voluntary partnership between EPA and the U.S. oil and natural gas industry. Through the Program, EPA works with companies that produce, process, transmit, and distribute natural gas to identify and promote cost-effective methane reduction opportunities. Because of the growing importance of global GHG emission reductions and the development of the Methane to Markets Partnership, EPA is launching the Natural Gas STAR International Program, expanding its domestic focus to work with Methane to Markets Partner Countries and international gas companies to identify methane emission reduction opportunities worldwide.

Looking Forward

The U.S. government is committed to remaining a world leader in supporting methane capture and use projects through the Methane to Markets Partnership. In 2006, the U.S. government plans to commit up to $12 million to Methane to Markets activities and projects. Our efforts in 2006 and beyond will focus on the following guiding goals and objectives:

- **Developing projects that achieve direct and rapid methane emission reductions.** The United States will continue to identify potential project opportunities and provide funding for pre-feasibility and feasibility studies for methane projects in all four sectors. By providing this upfront capital for initial site characterizations, we will continue to expand the number of high-quality methane project opportunities available for private sector investment. As project opportunities become available, the United States will work to facilitate full-scale project implementation in cooperation with the private sector and development banks. The United States is already planning to conduct pre-feasibility studies for a number of landfills in Argentina, Brazil, China, and Ecuador and to identify additional project opportunities in the oil and gas sector in Colombia, Ecuador, Russia, and Ukraine. In the coal sector, the United States will be supporting pre-feasibility studies for CMM projects for mines in Argentina, Mexico, Russia, and Ukraine and will be funding a feasibility study for a ventilation air methane project in China.

- **Building capacity, providing training, and overcoming technical, policy, and market barriers.** The United States will focus on overcoming the barriers to project development in each sector and Partner Country. A key element of this effort is building in-country expertise and capacity through training, technology demonstrations, and supporting in-country information clearinghouses. For example, in the coal sector, the United States will continue to provide financial and technical support for the China Coalbed Methane Clearinghouse, and plans to launch a similar CBM/CMM Clearinghouse in India. In addition, training events are being planned in India that will cover the oil and gas and

landfill sectors. We are also planning a study tour for Russian oil and gas experts in collaboration with Japan. A similar study tour covering the oil and gas sector is planned for Ecuador, and LFG workshops also are being planned for Mexico and Ukraine. The United States is developing technical documents and tools that will provide information to facilitate project development over the long term. Examples include a project database of all ongoing CMM projects worldwide, a paper on regulatory issues and barriers to CMM projects, translation of key technical documents in the landfill sector, and development of a series of "Lessons Learned" documents for LFG projects.

- **Planning the Methane to Markets Partnership Expo.** The U.S. government, through its role acting as the ASG, will be organizing logistics and programs for the Expo in 2007 along with the host Partner, China. The goal of the Expo is a near-term focal point for the Methane to Markets Partnership's goal of matching projects and technologies to the international investment community. The United States will provide funding for project site managers to attend the Expo so that they can market project opportunities to investors and secure funding for full-scale implementation.
- **Tracking the progress of the Partnership.** The U.S. government is working with its public and private sector partners to establish and implement a comprehensive, Web-based, publicly accessible database to track project opportunities and results. Over the long term, this system will be used to track the results of this initiative and the emission reductions that result from it.
- **Expanding participation in the Project Network.** Project Network members provide hands-on expertise in a range of fields and are integral to the Partnerships success. With approximately half of the current Project Network members based in the United States, we will be working with member countries to share successful recruiting strategies and help expand international participation.

The United States looks forward to continuing to report on the collective successes of this important partnership, which promises significant economic, clean energy, and environmental benefits throughout the world.

Partnership Milestones

2004

July

President Bush announces the intent to begin a voluntary, international effort to create clean energy solutions to global methane emissions

November

The World Bank Group joins as a Project Network member

The Methane to Markets Partnership is launched at a ministerial meeting in Washington, D.C.; 14 national governments sign on as partners, committing to work collaboratively to minimize methane emissions from key sources for capture and use projects, especially in developing countries and countries with economies in transition

2005

May

Project Network members total 100

June

South Korea joins the Methane to Markets Partnership

Private Sector Outreach Workshop, Washington, D.C.

Landfill Methane to Markets Workshop, Moscow, Russia

July

Project Network members total 150

Canada joins the Partnership

Asia-Pacific Partnership on Clean Development and Climate announces its support for voluntary, practical measures to foster methane capture and use projects

September

Oil and Gas Methane Emissions Reduction Workshop, Tomsk, Russia

October

Methane Emissions Reduction Workshop, Bogotá, Colombia

November

Ecuador joins the Methane to Markets Partnership

International Solid Waste Association joins the Project Network

Project Network members total 200

2nd Annual Methane to Markets Meeting, Buenos Aires, Argentina

December

Methane to Markets Coal Mine Methane Regional Workshop, Beijing, China

2006

March

Landfill Gas to Energy Workshop, Delhi, India

Mexico and the United States collaborate to energize Methane to Markets projects: U.S. agencies and Mexico's SEMARNAT formalize commitment

April

Petróleos Mexicanos (PEMEX) hosts Oil and Gas Technology Transfer Workshop, Villahermosa, Mexico

May

Methane to Markets exhibits at Carbon Expo 2006, Cologne, Germany

Project Network member Caterpillar Inc. announces contract to provide engines for world's largest coal mine methane project in Shanxi Province, China

June

Project Network members total 300

July

Germany joins the Methane to Markets Partnership

November

Launch of Natural Gas STAR International Program

2007

October

Methane to Markets Partnership Expo, Beijing, China

Methane to Markets

October 2006
To learn more, visit *www.methanetomarkets.org*

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