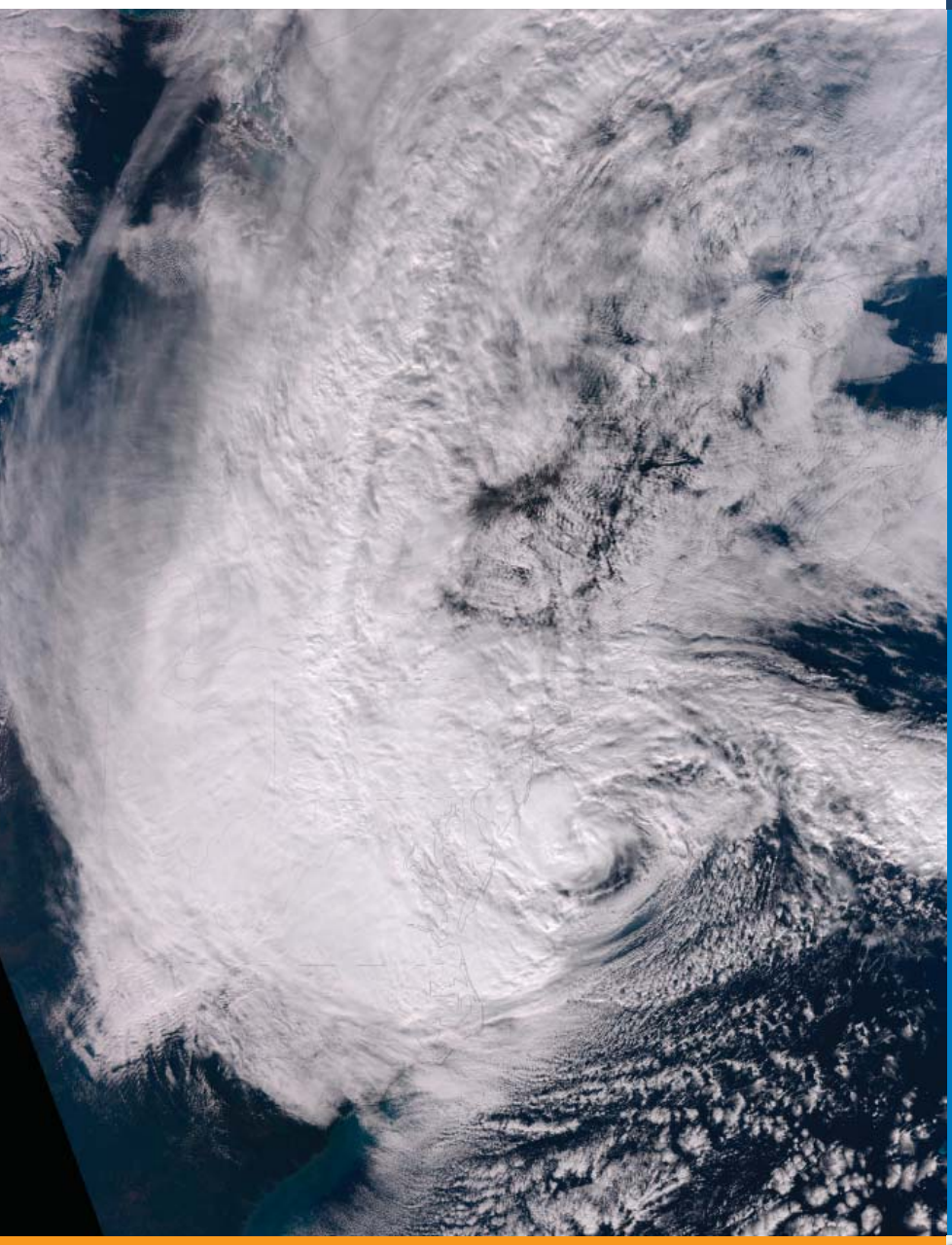
Global Methane Initiative



The U.S. Government's Global Methane Initiative Accomplishments

ANNUAL REPORT

December 2014

USAID FROM THE AMERICAN PEOPLE

USDA

CONTENTS

Letter from the Acting Assistant Administrator 1

Introduction 3

Agriculture 9

Coal Mines 11

Municipal Solid Waste. 13

Oil and Gas Systems 15

Wastewater 17

Looking Forward 19

December 2014

Dear Colleagues,

2014 was the tenth year of our international collaboration through the Global Methane Initiative (GMI), a year in which the importance of reducing methane domestically and internationally has been brought into sharp focus for the U.S. government. In March 2014, the White House released the "Strategy to Reduce Methane Emissions" as part of the President's Climate Action Plan. This document provides a comprehensive interagency strategy to cut domestic and global methane emissions, outlining actions targeting methane with a potential of reducing 90 million metric tons of greenhouse gas emissions in 2020.

A key component of the President's strategy is providing U.S. leadership to reduce global methane emissions. GMI is one of the primary vehicles mentioned in the plan as a critical mechanism for leveraging U.S. technical expertise to advance cost-effective near-term solutions around the globe. This report covers the U.S. government's GMI accomplishments for the year 2013, with a few key highlights from 2014. GMI now boasts a ten-year track record of producing results and—as this report outlines—our work continues to advance this important mission. In 2013, GMI continued to provide critical technical tools and resources to Brazil, China, Colombia, Indonesia, and Kazakhstan. The annual emission reductions achieved as a result of GMI activities now approach 30 million metric tons of carbon dioxide equivalent, and U.S. government efforts to support GMI over the past 10 years have achieved more than 200 million metric tons of cumulative methane reductions.

At the same time, we know more can and must be done to tackle the climate challenges we face. In the coming year, we will continue to explore opportunities to advance global methane mitigation and support other international efforts such as the Climate and Clean Air Coalition. It will be an important time to discuss new opportunities to reduce global methane emissions within a changing international policy landscape. Toward this end, we are planning to hold an international methane forum in Washington, D.C., in early 2016. I am sure GMI's successful model of international collaboration will continue to produce results, and I'm excited to think about how we can improve and build on its experience in the future.

As the chair of the GMI Steering Committee and as a representative of EPA, I look forward to the United States' continued leadership in global methane mitigation. We are well positioned to continue to work effectively with our international partners to meet the critical challenge of mitigating methane emissions globally.

Sincerely,

Janet G. McCabe

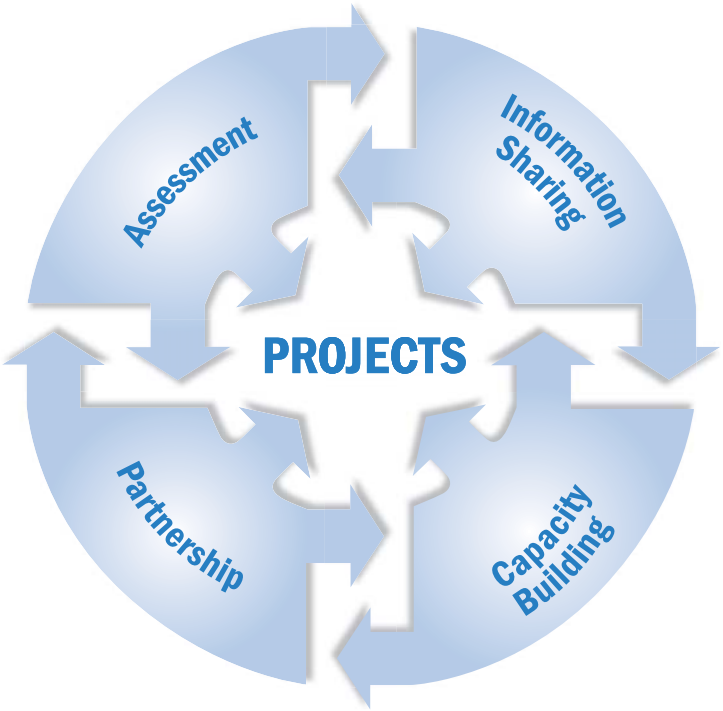
Acting Assistant Administrator for Air and Radiation, U.S. EPA
Steering Committee Chair, Global Methane Initiative

INTRODUCTION

In 2014, the Global Methane Initiative (GMI) celebrated a decade of methane mitigation efforts worldwide. U.S. government efforts to support GMI over the past 10 years have achieved more than 200 million metric tons of cumulative methane reductions.

GMI works with Partner Countries and a Project Network of private and public sector organizations to advance methane abatement, recovery, and use in five sectors: agriculture, coal mines, municipal solid waste (MSW), oil and gas systems, and wastewater. GMI supports project identification and development through assessment (resource assessments and feasibility studies), capacity building (leveraging funding and creating Methane Action Plans), information sharing (hosting subcommittee meetings, workshops, and demonstrations), and partnership (networking with Partner Countries and Project Network members) (see Figure 1).

Figure 1: GMI's Project Development Cycle



Methane Matters

Methane is the second most prevalent manmade greenhouse gas (GHG) after carbon dioxide (CO_2).

While methane is emitted in smaller quantities than CO_2 and remains in the atmosphere for a shorter period, its ability to trap heat in the atmosphere—called "global warming potential" or "GWP"—is 28 times greater than that of CO_2.[1] These characteristics make methane reductions particularly effective at mitigating global warming in the near term.

By 2015, it is anticipated, methane will account for nearly nine percent[2] of global manmade GHG emissions. GMI targets sectors responsible for more than half of these emissions, or about 4,057 million metric tons of carbon dioxide equivalent ($MMTCO_2E$).

Significant methane reductions are possible in these sectors using currently available, cost-effective technologies. For more information on methane emission sources, trends, and global abatement potential, see EPA's *Global Mitigation of Non-CO_2 Greenhouse Gases* report at: www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html.

[1] The fifth report of the Intergovernmental Panel on Climate Change (IPCC), released in the last year, included methane GWP values of 28 to 34. The United States and other developed countries are currently using the fourth report's GWP value of 25 to quantify the climate impact of U.S.-government-supported methane reduction projects.

[2] U.S. Environmental Protection Agency (U.S. EPA), *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2012* (EPA 430-R-14-003), April 2014. www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Main-Text.pdf.

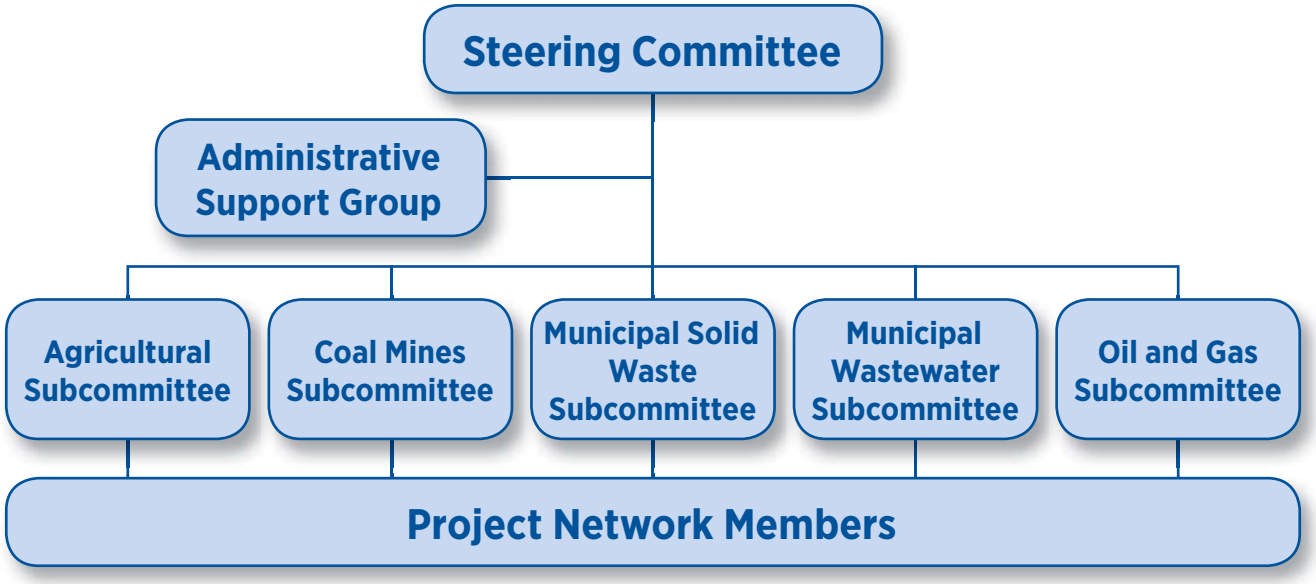
Since 2004, GMI has provided technical assistance on more than 1,000 projects around the world. This global collaboration yields important mutual co-benefits beyond GHG emission reductions, as shown in Figure 2.

Figure 2. Co-Benefits from Methane Projects

GMI ORGANIZATION

GMI is composed of an international network of national governments, industry, development banks, universities, and non-governmental organizations (NGOs), united in advancing methane emission reduction projects across the globe. GMI provides project development support, with active engagement from the private sector. GMI's organizational framework consists of a steering committee; an Administrative Support Group, led by the U.S. Environmental Protection Agency (EPA); five technical sector subcommittees covering the agriculture, coal mines, MSW, municipal wastewater, and oil and gas sectors; and more than 1,300 private- and public-sector Project Network members (see Figure 3). As of December 2014, GMI includes 42 Partner Countries and the European Commission, with Project Network organizations spanning six continents and multiple industries.

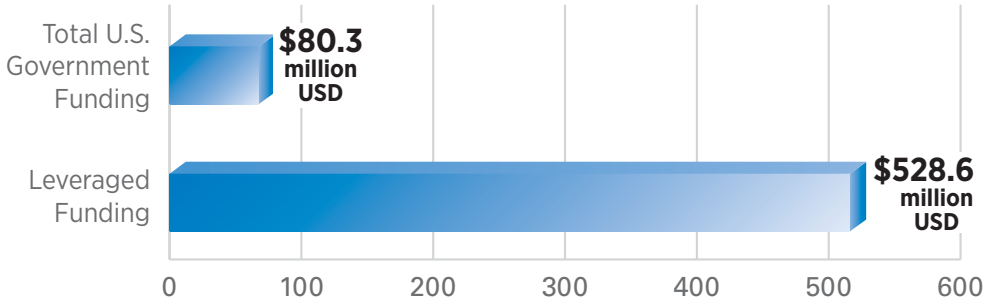
Figure 3. GMI Organizational Structure



U.S. LEADERSHIP

EPA leads the U.S. government's GMI efforts, with participation from other federal agencies and departments, including the U.S. Agency for International Development (USAID); the U.S. Departments of Agriculture, Energy, and State; and the U.S. Trade and Development Agency. Since GMI's inception in 2004, the United States has invested about $80 million in the Initiative, helping to leverage nearly $529 million in contributions and/or in-kind services from other Partners or Project Network members (see Figure 4).

Figure 4. U.S. Government Funding and Leveraged Funding, FY 2005–2013



In 2013, the United States supported more than 100 GMI project-development-related activities across 20 Partner Countries in all regions (see Figure 5). These included information sharing (attending subcommittee meetings within each sector, conferences, participating in various stakeholder meetings), assessment (pre-feasibility and measurement field studies) and capacity building activities (technical workshops to disseminate sector-specific best practices, study tours to demonstrate these best practices in action) around the world (see Figure 6). These activities ultimately facilitate project development and/or technology replication in GMI Partner Countries. Examples of these activities in specific countries are described for each sector in this report.

Figure 5: FY 2013 U.S. Expenditures by Region

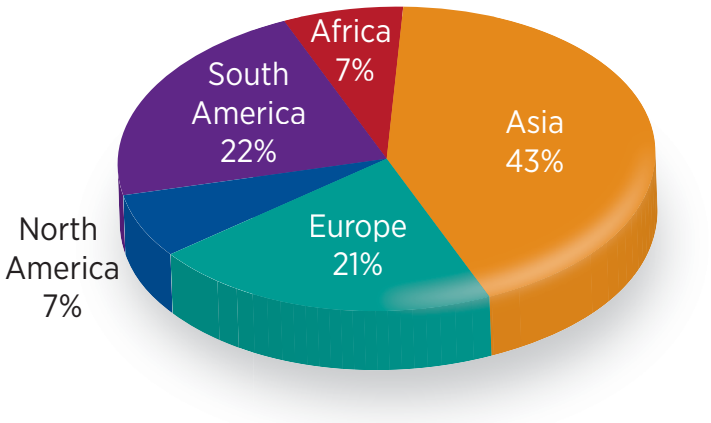
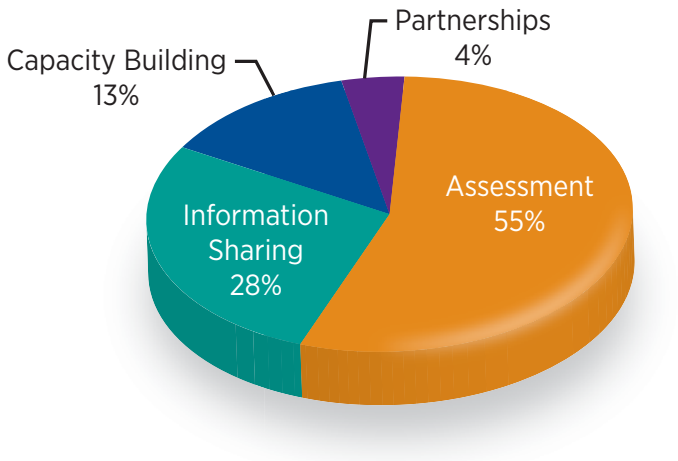
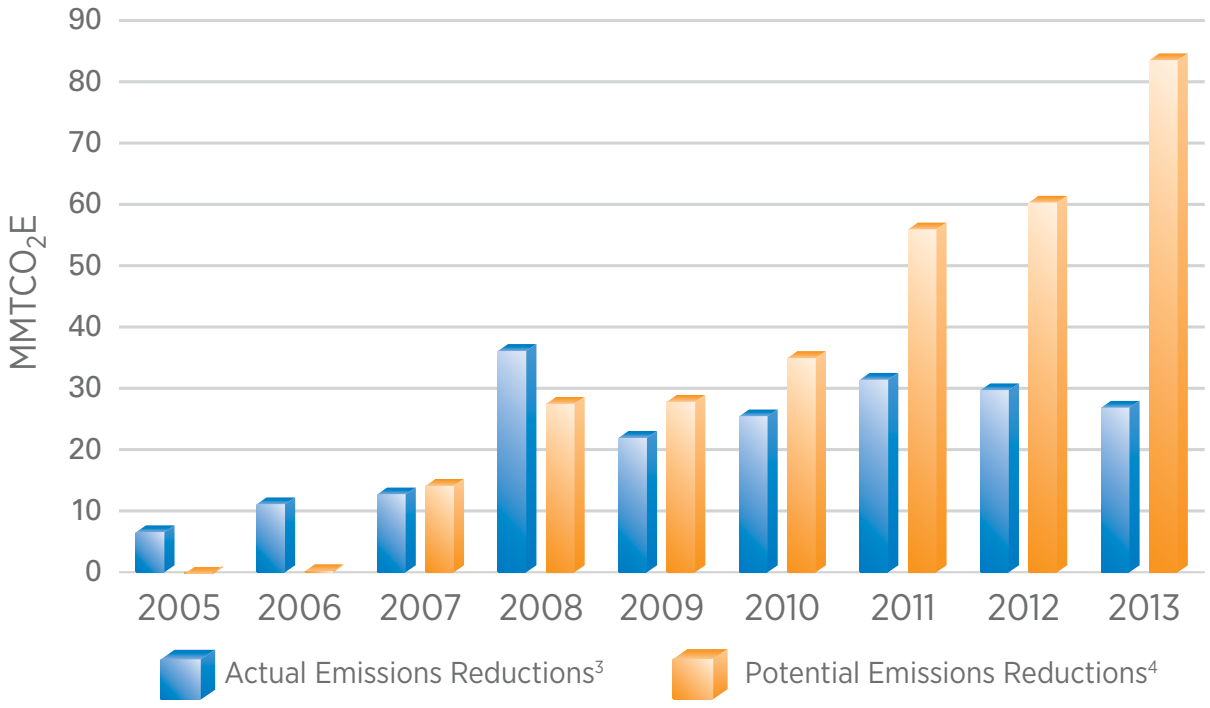


Figure 6: FY 2013 U.S. Expenditures by Activity



U.S. support for GMI-related efforts helped achieve the following methane emission reduction results (i.e., actual) and opportunities (i.e., potential) as shown in Figure 7.

Figure 7: Annual Methane Emission Reductions from U.S.-Supported Projects, 2005–2013



NOTE: This chart uses a global warming potential (GWP) of 25 for methane, per the Intergovernmental Panel on Climate Change's Fourth Assessment Report, for the entire time series.

[3] "Actual emission reductions" are those that have been achieved and measured from implemented projects in any given year.

[4] "Potential emission reductions" have been identified through GMI capacity-building activities (e.g., prefeasibility or feasibility studies) as additional reductions that could be realized if potential emission reduction project(s) were fully implemented.

Collaboration with CCAC

The United States continues to support the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC), including three CCAC initiatives that have a methane reduction focus: Agriculture, MSW, and Oil and Gas. These CCAC initiatives are complementary to GMI's successes in these sectors.

GMI and CCAC seek opportunities to synergize their methane activities and resources where applicable. CCAC's methane reduction activities often build on GMI's technical assistance. For example, in early 2013, EPA technical experts conducted a scoping mission in the city of Rio de Janeiro, Brazil, in support of the CCAC MSW Initiative, which aims to reduce methane by securing city and country commitments to undertake a variety of waste management best practice policies and strategies. In this way, GMI and CCAC's activities complement one another. Additionally, CCAC has hosted side meetings at past GMI events.

EPA also supported the development and launch of CCAC's Oil and Gas Methane Partnership by sharing its experience working with the oil and gas sector to identify and deploy practical and cost-effective technologies to minimize methane emissions.

Methane Expo 2013

Methane Expo 2013—held in March 2013 in Vancouver, Canada—attracted more than 450 participants representing 44 countries from around the world, including delegates from GMI's Partner governments, private sector representatives, NGOs, and academia. Convened for the first time since 2010, the Expo featured high-level plenary sessions (including one with a speech by the Honorable Peter Kent, Canada's Environment Minister), programming from all five subcommittees, and more than 90 posters detailing successful projects, as well as project opportunities.

CCAC also participated in the Expo alongside GMI by hosting side meetings. The steering group of the CCAC MSW Initiative gave cities around the world a chance to work together on action plans to mitigate methane and black carbon from the MSW sector, and consider solutions like organics management and methane capture from landfills.

Methane Expo 2013 proceedings can be found at: www.globalmethane.org/expo_canada13/proceedings.html.

GMI HOSTS TRI-SECTOR MEETING IN BRAZIL

GMI's three biogas-related sectors—agriculture, MSW, and wastewater—organized a two-day biogas workshop and joint subcommittee meeting in Florianópolis, Brazil, in March 2014. The primary Brazilian organizer for this event was the state of Santa Catarina environment agency (Fundação do Meio Ambiente or FATMA), working with a broad support team of the state agriculture and fisheries extension agency (EPAGRI), the state legislative assembly, and the Federal University of Santa Catarina (UFSC). At the workshop, more than 300 people participated in several technical sessions showcasing best practices and opportunities for recovery and mitigation of methane emissions across all three sectors.

FATMA hosted this event with the goal of facilitating a broader state-level and international dialogue on biogas project development opportunities in the agriculture, MSW, and wastewater sectors. GMI and the Brazilian hosts succeeded in attracting a diverse audience from all levels of government and industry within the state and other regions of Brazil. The primary outcome of this event was greatly increased knowledge across all sectors on the benefits of methane reduction. More importantly, it also renewed the commitment by FATMA and others to organize a methane committee across Santa Catarina to develop and deploy biogas technologies and encourage continued project development within the state.

Tri-Sector Meeting in Brazil

The tri-sector meeting, held at UFSC, attracted participants from 12 countries (Argentina, Brazil, Canada, Chile, Colombia, Dominican Republic, Finland, India, Mexico, the United States, and Vietnam), along with Project Network and other industry participants from Brazil.

Subcommittee proceedings are available on GMI's website at: www.globalmethane.org/news-events/event_detailsByEventId.aspx?eventId=438.

The following sections highlight examples of the U.S. government's support to GMI to assess project development opportunities, share information among key stakeholders, build in-country capacity, and create and enhance partnerships in each sector throughout 2013.

AGRICULTURE

In 2015, global methane emissions from manure management will be about 235 MMTCO$_2$E, accounting for 3 percent of total global methane emissions.[5]

CONTINUING WORK IN CHINA

The United States is a core team member in the World Bank Agriculture Project in Guangdong Province. The project focuses on reducing methane and surface water pollution using anaerobic and other processes as pollution control technologies, and is part of Guangdong's efforts to achieve its agricultural pollution reduction targets required by the national and provincial 12th Five-Year Plan on Environmental Protection. The latest efforts are an expansion of the Livestock Waste Management in East Asia Program (LWMEAP), which operated from 2006 to 2012 in China, Thailand, and Vietnam.

In 2013, experts from the World Bank, the United Nations Food and Agriculture Organization (FAO), and EPA conducted an appraisal mission for the Guangdong Non-Point Source (NPS) Pollution and Control Project. The mission included information-sharing meetings and a series of visits to crop farms, pork production facilities, and waste processing industries. Mission findings showed that high-rise pig barns[6] are an important technical option for new and expanding pig farms. The mission also observed ongoing technology transfer and adoption, including demonstration of a covered anaerobic lagoon digester at a commercial farrow-to-finish farm in Hunan Province.

Also in 2013, EPA assessed several farms near Guangzhou for program participation and technical design and is now engaging with potential private sector partners interested in projects using covered anaerobic lagoon technologies.

Covered lagoon transferred from GMI demonstration project in Hunan Province

[5] U.S. EPA, *Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases: 1990–2030* (EPA430-R-12-006), December 2012. www.epa.gov/climatechange/Downloads/EPAactivities/EPA_Global_NonCO2_Projections_Dec2012.pdf.

[6] A slatted floor is installed on the second floor of a barn where pigs are raised. Swine waste passes through these slats to the ground floor, where sawdust bedding absorbs the organic material and initiates an aerobic composting process.

ONGOING PROJECTS IN THE PHILIPPINES

With support from the Land Bank of the Philippines, EPA has developed bag digester demonstration projects on small swine farms belonging to the Buklod-Unlad Multi-Purpose Cooperative. These projects were highly successful and built a knowledge base among the Cooperative members that has promoted additional project development. To date, Buklod-Unlad has deployed dozens of tubular anaerobic digestion (AD) systems to their member farms.

The Land Bank of the Philippines included the Buklod-Unlad projects as a Clean Development Mechanism Program of Activities through the United Nations Framework Convention on Climate Change. The projects' GHG reductions are yielding Certified Emission Reduction credits, which have been purchased by the Spanish Carbon Fund in fulfillment of international commitments.

CAPACITY BUILDING ACROSS THE PARTNERSHIP

In 2013, the GMI Agriculture Subcommittee began developing a report on policies and incentives that can facilitate the use of anaerobic digesters worldwide. With EPA's coordination, the subcommittee provided information on government policies, incentives, and programs to identify best practices and lessons learned from GMI and non-GMI countries. The final report supported the following goals:

- Promote AD policy development in both GMI and non-GMI countries; encourage national leaders to improve existing policies and incentives.
- Create a resource library for international policies, programs, and incentives that impact AD projects.
- Support future research and resource development to advance AD project development and support beneficial policies and incentives.

COAL MINES

In 2015, global methane emissions from coal mines will be about 630 $MMTCO_2E$, accounting for 8 percent of total global methane emissions.[7]

METHANE PROJECT ASSESSMENT

Throughout 2013, the United States supported assessment activities in the coal mines sector, including pre-feasibility studies in Kazakhstan, Mongolia, Russia, and Ukraine and site visits to Russia and Ukraine. This work showcased the important potential for emission reductions in this sector.

Kazakhstan: EPA completed a pre-feasibility study to investigate the potential for a coal mine methane (CMM) recovery and utilization project at six mines in the Karaganda Coal Basin. The study concluded that power generation using reciprocating engines would be the best use of CMM recovery at these mines, with the option of adding waste heat recovery if enough demand exists at mine operations.

Mongolia: EPA completed a pre-feasibility study for CMM recovery and utilization at the Baganuur mine that evaluated on-site utilization of pre-drained CMM to fuel an internal combustion engine. The study estimated the proposed power generation project would reduce CMM emissions by more than 100,000 $MTCO_2E$ over the project's 10-year lifetime.

Ukraine: A pre-feasibility study at the Komsomolets Donbassa mine sought to assess the technical and economic viability of installing a CMM degasification system, as well as options for using this gas to produce electricity. The study provided a site-specific recommendation for the most effective gas drainage program.

CAPACITY BUILDING AND INFORMATION SHARING IN MULTIPLE COUNTRIES

EPA continued its partnership with the Guizhou International Cooperation Center for Environmental Protection (GZICCEP), which is building institutional capacity to address CMM in southwest China and identify barriers—primarily lack of financing capacity—for improving CMM drainage and utilization. GZICCEP is now working to build a network of CMM drainage and utilization practitioners in southwest China to accelerate CMM project development and investment. The network will continue to operate as a regional methane emission reduction informational and advisory center.

Attendees at the southwest China CMM drainage and utilization workshop

[7] U.S. EPA, *Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases: 1990–2030*, December 2012.

In October 2013, GZICCEP sponsored a workshop that included a review of technical and policy factors driving CMM recovery and utilization project development in southwest China. The workshop featured project development business models and best practices, new low-concentration CMM purification technologies, region-specific CMM extraction challenges, and CMM drainage and utilization case studies, as well as a site visit to the Qinglong coal mine.

India: The United States continues to support collaboration with the government of India to address the challenges of reducing CMM emissions in one of the world's largest coal producing nations. In November 2013, the Central Mine Planning & Design Institute (CMPDI) held an international workshop on "Development of Coal Based Non-Conventional Energy Resources in India." Attended by about 150 top government officials, international technical experts, project operators, and representatives from academia and research organizations, the workshop focused on policy issues, emerging technologies, research trends, and project development opportunities and challenges.

The United States helped establish India's "Coal Mine Methane Clearinghouse" several years ago and continues that collaboration. In 2013, the Clearinghouse translated the first technical book on coalbed methane in Hindi, titled *Coal Bed Methane: A Clean Energy Source*.

Mongolia: The United States continued to support efforts of Mongolian officials regarding legal and regulatory treatment of CMM worldwide and how to develop policy framework to facilitate and encourage development of CMM projects in Mongolia. EPA developed a white paper assessing Mongolia's legal and regulatory administration of CMM, including several case studies of CMM regulatory and ownership conventions in the United States and other key coal-producing countries.

Plenary session presenters at the CMPDI workshop

Ukraine: In 2013, the United States sponsored a seminar featuring panel discussions on implementation of CMM legislation, legal definitions of CMM-based energy, and policy options for supporting CMM projects. Speakers included representatives from Ukrainian state and national governments, EPA, NGOs, and the private sector.

MUNICIPAL SOLID WASTE

In 2015, global methane emissions from landfills will be about 876 MMTCO$_2$E, accounting for 11 percent of total global methane emissions.[8]

PILOT DEMONSTRATION IN ARGENTINA

The Argentina Solid Waste Association (ARS), with support from the United States, identified several landfills for a potential pilot project; after evaluation, it chose the Neuquen Landfill. During the project's first phase, ARS conducted a pump test to confirm the available landfill gas (LFG). Since there was enough LFG for the project, ARS installed seven horizontal wells and began flaring the LFG. The second phase entailed the installation of the distributed generator system and the official project startup.

Neuquen Landfill methane collection, burning, and power generation plant

ONGOING EFFORTS IN BRAZIL

With U.S. support, the Appalachian State University Energy Center undertook efforts to utilize LFG from the Maracanau Landfill in Brazil, create local economic opportunities for small business, and create jobs for 75 families of "catadores" (wastepickers). These efforts are part of the ongoing planning and design of a community-based LFG utilization project at the landfill that will facilitate construction of a cost-effective collection system at the site, and explore potential for other solid waste management systems such as anaerobic digestion and/or gasification.

Through this collaboration, plans for separate plastics recycling and a recycled glass processing plant were proposed as essential elements for the Maracanau Landfill, and ongoing efforts will evaluate whether LFG can be used to provide power for these plants.

In July 2013, EPA gathered data for proposed solid waste management projects under CCAC's Rio work plan. EPA visited diverse waste management facilities, including two wood waste processors and the VideVerde Mage composting facility.

ASSESSMENT AND CAPACITY BUILDING IN PARTNER COUNTRIES

Throughout 2013, the Unites States supported a variety of assessment activities including site visits, scoping missions, data collection, and prefeasibility studies) at landfills and waste management facilities in Ghana, Indonesia, Mexico, Turkey, and Ukraine.

[8] U.S. EPA, *Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases: 1990–2030*, December 2012.

Ghana: EPA and the Clinton Climate Initiative, partners in CCAC's MSW Initiative, conducted a preliminary scoping mission to Accra to collect data for an assessment of the city's waste management. That assessment, in turn, will facilitate additional analysis to identify opportunities for short-lived climate pollutant (SLCP) abatement and mitigation. For example, the mission assessed food waste at the Arbogbloshie Market as part of an effort to evaluate feedstocks for potential composting operations.

Indonesia: The United States supported the city-specific CCAC MSW Initiative by working with the city of Jakarta and other key stakeholders including the World Bank and the Indonesia Ministry of Public Works; as a result, Jakarta signed a formal agreement to participate in the MSW Initiative. The meetings also provided an important venue for progress reports on about landfill operations, the development of a technical manual on LFG management, and the World Bank's solid waste loan programs.

Mexico: Throughout 2013, EPA evaluated the technical feasibility—as well as the institutional and political framework—of capturing and using methane gas at the 1113 Landfill in Cancun, including preparation of a final pre-feasibility study translated into Spanish.

Turkey: In 2013, EPA collected site data to evaluate the technical feasibility of capturing and using methane gas at three landfills in Turkey. These assessments will assist in the early methane collection at the landfills and in determining electricity generation potential.

Agbogbloshie Market, Accra's largest open food market, was evaluated for potential composting opportunities

Ukraine: In 2013, EPA evaluated the feasibility of capturing and using methane gas at the Dergachi Landfill, and produced a final assessment report that was translated into Russian.

EPA also conducted nearly a dozen workshops and training sessions in Brazil, China, Colombia, Ethiopia, Mexico, Russia, and Turkey, offering training to almost 1,000 people. Among the topics were landfill operation and maintenance (e.g., cover materials, stormwater control, leachate management), how to assess MSW landfills for LFG recovery, and proper operation of LFG recovery and utilization systems.

OIL AND GAS

In 2015, global methane emissions from oil and natural gas systems will be about 1,778 MMTCO$_2$E, accounting for 24 percent of total global methane emissions.[9]

ONGOING ASSESSMENT, CAPACITY BUILDING, AND PARTNERSHIPS

The United States is proud of its leadership in supporting and advancing methane emission reduction efforts in partnership with oil and natural gas companies worldwide in 2013. The program especially made great progress in Asia, Latin America, and the Middle East. As a result, many companies in these regions have developed mature, robust programs; they have purchased field measurement equipment, developed internal technical resources, and considered implementing cutting-edge emission reduction technology identified through GMI-sponsored measurement campaigns. EPA staff also continued to promote a better understanding of U.S. upstream oil and gas regulations that identify, measure, and mitigate methane emissions in hopes that experience might be transferable and/or adopted by oil and natural gas companies.

New Natural Gas STAR International Members in 2013

- **Kuwait Oil Company**
- **Odessagaz (Ukraine)**
- **OGX Petroleo e Gas Ltda (Brazil)**
- **PTT (Thailand)**
- **VICO Indonesia**

Asia

In March 2013, EPA teams provided training for Chinese oil and natural gas companies on methodologies for estimating and prioritizing operational methane emissions as well as identifying and implementing emission reduction technologies and practices. The growth of Natural Gas STAR International (NGSI) in 2013 reflected this regional enthusiasm, with the addition of PTT (Thailand) and VICO Indonesia as new Partners. EPA teams conducted methane emission measurement/capacity building field studies at various PTT Thailand facilities and at VICO Indonesia's Badak facilities—both are major regional natural gas producers. The identified emission reduction opportunities included flare gas recovery, use of instrument air for pneumatic devices, and reciprocating compressor rod packing replacement.

EPA further expanded its technical training and outreach to Asia through workshops and conference presentations in Indonesia, Malaysia, and India. In 2013, the Oil and Natural Gas Corporation of India (ONGC) hosted a highly successful first all-India NGSI workshop and plans to conduct workshops to continue promoting methane reductions from the oil and gas industry in India.

[9] U.S. EPA, *Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases: 1990–2030*, December 2012.

Latin America

Throughout 2013, the United States continued outreach and promotion in the Latin American region. Working with EPA, Colombia's Ecopetrol is developing a directed inspection and maintenance training program, estimating emissions from casing head gas, and supporting the design of a vapor recovery unit capture system. EPA also continued its long collaboration with PEMEX, Mexico's state-owned oil and gas company. This effort has led to identification of new projects that manage emissions from storage tanks, which strategically positions PEMEX for an open, competitive marketplace after the implementation of Mexico's energy reform.

Middle East

EPA is expanding the reach of GMI and the NGSI into Middle East countries through technical workshops and one-on-one meetings with key oil and gas operators in Kuwait, Saudi Arabia, and Qatar. Regional successes in 2013 included first-time Expo attendance by eight Kuwaiti, three Saudi, and one Qatari oil and gas company representatives. EPA also continued its dialog with key Middle East oil and gas companies that have expressed interest in technology transfer and reducing methane emissions from their oil and gas industries by traveling to Kuwait, Oman, Qatar, and Saudi Arabia in late 2013. Saudi Arabia joined GMI as result of these efforts, and the Kuwait Oil Company joined NGSI.

Kuwait Oil Company Chief Executive Officer and U.S. Ambassador to Kuwait signing the official NGSI Memorandum of Understanding

WASTEWATER

In 2015, global methane emissions from municipal wastewater systems will be about 539 MMTCO$_2$E, accounting for 7 percent of total global methane emissions.[10]

CAPACITY BUILDING WITHIN SECTOR

Draft U.S. Wastewater Sector Methane Action Plan: Throughout 2013, EPA developed the draft U.S. Wastewater Sector Methane Action Plan to characterize the municipal wastewater sector in the United States, thus helping to guide the mitigation, recovery, and use of methane emissions in the sector. This plan is a wastewater-specific companion plan to the overarching U.S. GMI Methane Action Plan.

Sector-Specific Fact Sheet: As one of the key subcommittee documents identified in the Wastewater Sector Methane Action Plan, EPA led development of a sector-specific GMI fact sheet that summarized the municipal wastewater sector and the activities the subcommittee plans to pursue.

EFFORTS IN MEXICO

The United States' activities in the municipal wastewater sector have been aimed at engaging stakeholders from the public and private sectors (including academia) in an effort to raise awareness of methane capture and use opportunities within wastewater treatment facilities (WWTFs). In 2013, EPA focused its effort in Mexico through meetings with the Secretariat for Environment and Natural Resources of Mexico (SEMARNAT), the National Institute of Ecology and Climate Change (INECC), and the Mexico water ministry (CONAGUA) from the public sector, along with academia and private sector entities such as the National Autonomous University of Mexico (UNAM) and Water and Wastewater Association of Mexico (ANEAS).

From the private sector perspective, EPA engaged ANEAS to discuss opportunities for future collaboration in the area of biogas recovery in the municipal wastewater sector, given the association's extensive capacity to reach operators and decision-making officials across Mexico. EPA also engaged with UNAM to discuss ongoing evaluation of Mexican WWTFs and efforts to develop a GHG emission factor for these facilities—work that could be transferable to other Latin American countries.

U.S.-SUPPORTED PARTNERSHIPS

Chile: The University of Tennessee received U.S. support to study and assess methane emission reduction opportunities in Chile's wastewater sector, with specific focus on municipal WWTFs. Project results will provide much-needed guidance for selecting environmentally and economically sustainable technologies for waste treatment and methane recovery in Chile. Additional anticipated outcomes include promotion of U.S. technology and expertise for enhanced methane capture and use in Chile, as well as within the world clean energy market and other economies in transition.

[10] U.S. EPA, *Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases: 1990–2030*, December 2012. .

China: With EPA support, West Virginia University initiated collaboration with Tianjin University (TU) to develop an inventory of wastewater and municipal WWTFs in the major Chinese cities, as well as identify ways to recover and use methane from these systems. This effort has included data collection and a successful TU-hosted workshop on methane digester gas production, treatment, and application, including a visit to the Jizhuangzi WWTF and a water reclamation plant in Tianjin.

Attendees of Digester Gas Workshop at Tianjin University

LOOKING FORWARD

For more than a decade, GMI has sought to reduce global methane emissions and advance the abatement, recovery, and use of methane as a valuable clean energy source. The U.S. government continues to lead this effort by conducting assessments, building capacity, sharing information, and establishing partnerships to facilitate project development in GMI Partner Countries. Recognizing methane mitigation is critical to reducing climate change impacts, the United States will continue its leadership of international methane mitigation efforts.

Specific upcoming efforts include:

- **Enhanced cross-initiative collaboration.** The United States will work to harmonize methane mitigation efforts conducted under GMI and CCAC, especially in the agriculture, MSW, and oil and gas sectors. For example, the United States will collaborate with its GMI and NGSI Partners through CCAC's Oil and Gas Methane Partnership, which is designed to help corporate oil and gas industry leadership better understand and manage methane emission reductions over time and receive recognition for their progress.
- **Roadmap for GMI Post-2015.** GMI's charter—established in 2010—sunsets in 2015. The United States will work with key GMI Partners to develop a new GMI charter that takes into account the changing international policy landscape.
- **International Methane Forum.** The United States will organize this forum, anticipated in early 2016.

NOTES

Global Methane Initiative

www.globalmethane.org

Recycled/Recyclable • Printed on 100% Postconsumer, Process Chlorine Free Recycled Paper that has been manufactured with Wind Power.
Printing was provided by the U.S. Environmental Protection Agency.