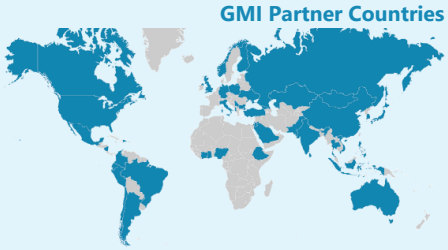
2019 Accomplishments

in Methane Mitigation, Recovery, and Use through U.S.-Supported International Efforts

The Global Methane Initiative (GMI) is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a clean energy source. GMI's 45 Partner Countries and more than 700 Project Network members exchange information and technical resources to advance methane mitigation in three key sectors: Oil & Gas, Biogas, and Coal Mines. This report outlines accomplishments of U.S.-funded GMI activities in 2019.



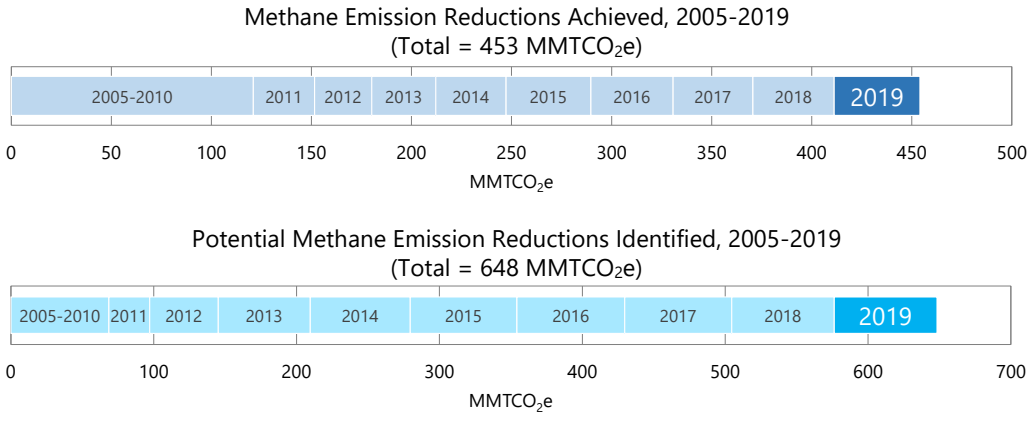
GMI aims to:

- Achieve economic, environmental, and public health benefits of methane emission reductions
- Advance the capture and beneficial use of all methane emissions globally

Methane Emission Reductions

The United States provides key leadership, funding, and technical expertise for international methane emission reduction efforts, resulting in the implementation of more than 1,130 methane mitigation projects through GMI as of 2019. These projects have reduced methane emissions by more than 450 million metric tonnes of carbon dioxide equivalent ($MMTCO_2e$), including approximately 42 $MMTCO_2e$ in 2019, as shown in Figure 1. U.S. efforts under the auspices of GMI have also identified additional possible mitigation projects with an estimated cumulative potential to reduce another almost 650 $MMTCO_2e$.

Figure 1. Methane Emission Reductions from U.S.-Supported International Efforts



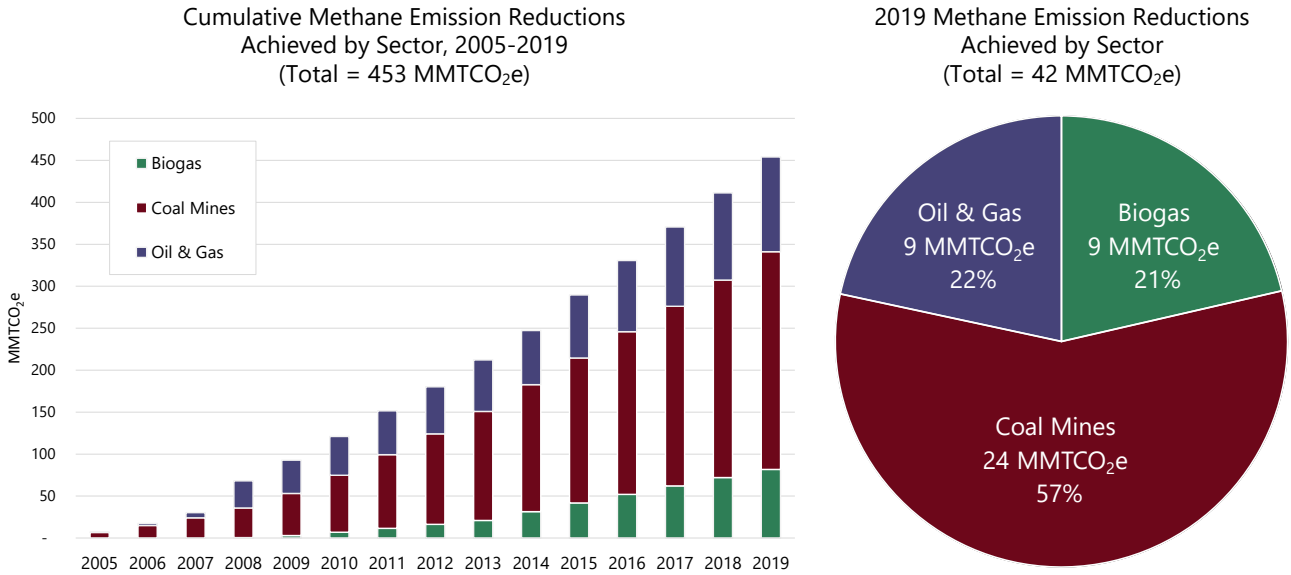
42
$MMTCO_2e$
reductions achieved in 2019

72
$MMTCO_2e$
potential reductions identified in 2019

Note: Data are compiled from GMI's database of project activities. These data represent the best available yet conservative estimates of emission reductions, including actual emission reductions from projects supported by the U.S. Government and potential emission reductions from other projects identified through U.S. Government efforts.

Figure 2 shows the methane emissions reductions by GMI's key industry sector. These activities benefit the United States because they reduce methane emissions to the atmosphere, create opportunities for U.S. businesses and investors, and support U.S. diplomatic efforts.

Figure 2. Methane Emission Reductions by Industry Sector from U.S.-Supported International Efforts through 2019



Methane Mitigation Activities

Since 2005, U.S. Government funding from the State Department and the U.S. Environmental Protection Agency (EPA) has supported and advanced a variety of methane mitigation activities, including technical assessments of emission reduction opportunities, information sharing and capacity building on methane emissions management, and GMI partnership-related activities, including in-person and virtual meetings and workshops. Every U.S. dollar invested into GMI to date leveraged more than $6 in investments from other stakeholders, with a cumulative total of nearly $656 million leveraged. On average, each U.S. dollar spent reduced approximately 4 metric tonnes of carbon dioxide equivalent ($MTCO_2e$) of emissions and identified potential opportunities to achieve more than 5.5 $MTCO_2e$ of additional emission reductions (see Figure 3). Figure 4 provides a summary of technical and outreach support provided through GMI in 2019 for a variety of methane mitigation activities around the world.

Figure 3. Leveraged Resources and Outcomes Achieved from U.S. Investments in GMI through 2019

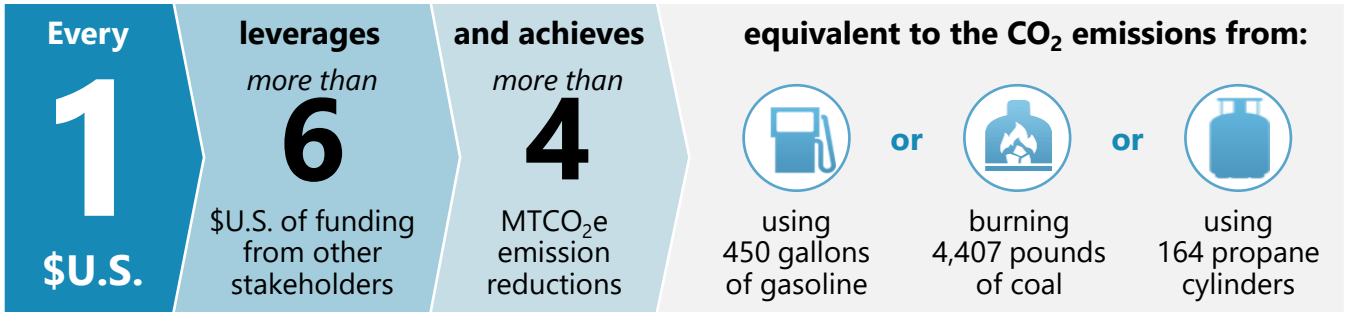


Figure 4. International Methane Mitigation Activities and Impacts Supported by the U.S. Government in 2019

Capacity Building/Information Sharing:
fostering best practices

17 Workshops/Trainings
China, Colombia, France, India, Kazakhstan, Mexico, Poland, Serbia, Switzerland, Turkey, Ukraine, United States

37 Manuals/Websites/Other Outreach
All Partners

Assessments:
identifying opportunities for emission reductions

6 Reports/Tools/Models
India, Switzerland, Ukraine, and Partnership-wide

15 Study Tours/Other Studies
China, India, Kazakhstan, Brazil, Colombia, Mexico

17 Pre-Feasibility Studies
Brazil, China, Colombia, India, Kazakhstan, Mexico

Partnerships:
building relationships to foster action

4 GMI Meetings (Steering Committee/Subcommittees)
France, Switzerland, and Online

6 Conferences
China, Kazakhstan, Switzerland, United States

14 Site Visits
China, India, Kazakhstan

47 Informational Meetings and Presentations
China, India, Serbia, United States, Canada, Kazakhstan, Mexico, Colombia, France, Poland, Serbia, Switzerland, Turkey, Ukraine

In 2019:

13
countries
hosted activities where more than

2,000
people
received a total of approximately

13,000
hours
of training about reducing methane emissions and capturing methane for productive uses

2019 Project Highlights

(* Read more about these projects in Case Studies on page 4)

Serbia*
Biogas

Supported capacity building efforts, including a Center of Excellence for Circular Economy and Climate Change to support municipalities with outreach, capacity building, project preparation, tools and resources, and financing.

Poland
Coal Mines

Partnered with the United Nations Economic Commission for Europe (UNECE) and the Climate and Clean Air Coalition (CCAC) to deliver a seminar on "Coal Mine Methane as a Valuable Energy Source" that brought together stakeholders and international experts.

Ukraine
Oil & Gas

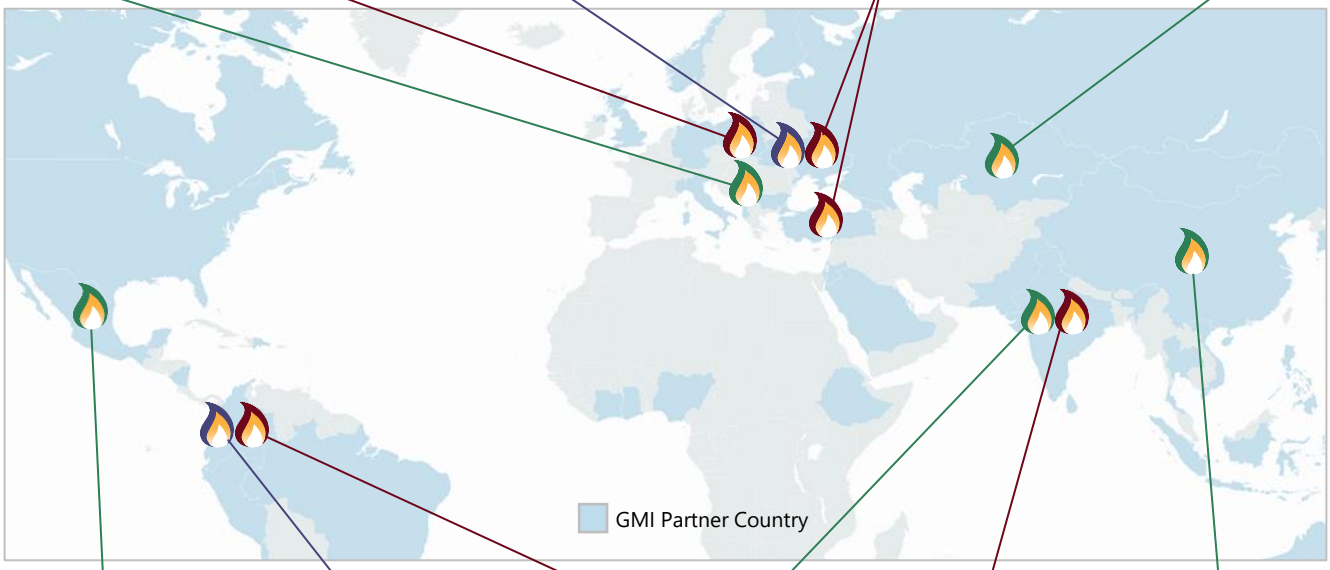
Provided expert review to improve, expand, and enhance the formal leak detection and repair (LDAR) management program in Ukraine, documented in "Rehabilitation and Expansion of the Ukraine Management Program."

Ukraine and Turkey
Coal Mines

Coordinated with UNECE, national ministries, academic institutions, and private sector organizations to present two workshops—one in Ukraine and one in Turkey—about "Best Practices in Coal Mine Methane Capture and Utilization." The workshops addressed the current state of the sector, regulatory and enforcement issues, safety and risk assessment, drainage, ventilation, and development and financial considerations of Coal Mine Methane (CMM) projects.

Kazakhstan*
Biogas

Presented the findings of two pre-feasibility studies that assessed potential methane capture at wastewater facilities as part of a broader panel that discussed biogas production and methane recovery from wastewater.



Mexico
Biogas

Hosted a technical training workshop to present technologies and techniques for methane capture and use that can be implemented at wastewater treatment facilities throughout Mexico.

Colombia
Oil & Gas

Provided technical assistance to review and make recommendations for Ecopetrol's Climate & Clean Air Coalition's Oil and Gas Methane Partnership (CCAC OGMP) implementation plan.

Colombia*
Coal Mines

Provided expert technical presentations at the "Workshop on the Measurement and Analysis of Reservoir Properties Governing CBM/CMM Production" to help increase interest and advance successful projects in Colombia.

India
Biogas

Assessed market opportunities in India for biogas and anaerobic digestion that formed the basis for "Market Opportunities for Anaerobic Digestion of Livestock and Agro-Industrial Wastes in India."

India
Coal Mines

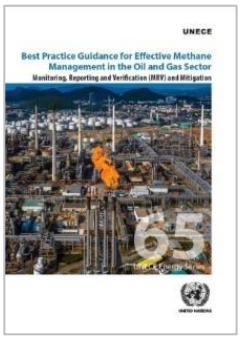
Collaborated with the Government of India and the Central Mine Planning and Design Institute to host a two-day workshop featuring five technical sessions, case studies, roundtable discussions, and opportunities for experts to network with stakeholders.

China
Biogas

Conducted a roundtable with experts to collect feedback about a guide being developed to document best practices and lessons learned in China about methane mitigation, capture, and utilization in the municipal solid waste (MSW) and wastewater sectors.

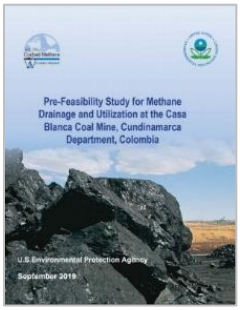
2019 Activity Case Studies

Oil & Gas Best Practice Guidance



Funded by the State Department and developed with technical expertise from EPA, the "Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector: Monitoring, Reporting and Verification (MRV) and Mitigation," illustrates cost-effective opportunities for facility owners, operators, and government policymakers to detect and mitigate methane emissions across the entire oil and gas value chain. Oil and gas operations account for 24% of global methane emissions, and nearly 50% of oil and gas sector methane emissions can be eliminated at no net cost. The document covers both company- and national-level reporting, offers various options to develop policies focused on methane reduction, and provides case studies from around the world. This guidance's "principle-based" framework allows readers to tailor best practices to a wide range of facility, legal, political, and institutional conditions. Learn more and view the guide here.

COAL Mine Pre-Feasibility Study, Colombia



In September 2019, EPA conducted and published a pre-feasibility study for CMM capture and utilization at the Casa Blanca Mine in central Colombia. The study identified cost-effective project opportunities through a detailed assessment of geological parameters, end-use options, and emissions reduction potential. The Casa Blanca Mine is one of the largest mining complexes in Colombia and its management views methane management as a crucial element to ensure the safety of its workers. The study identified a methane use option for onsite power that could potentially reduce net emission by more than 340,000 tons of carbon dioxide equivalent (tCO_2e) and have a payback period of 3.5 or fewer years. EPA continues to cooperate with stakeholders in Colombia to find ways for this project to come to fruition.
Learn more and view the study here.

BIOGAS Technical Workshop about Wastewater, Kazakhstan

In May 2019, EPA presented a training on "Technical Aspects of Biogas Production at Wastewater Treatment Plants (WWTPs): International Experience and Opportunities for Kazakhstan" in Nur-Sultan, Kazakhstan. The training increased awareness of the techniques and technologies available for the capture and use of methane from municipal wastewater treatment plants in Kazakhstan. EPA organized a stakeholder session at the IX International Exhibition and Conference, "SU ARNASY - Water EXPO Central Asia 2019," a water supply and sanitation conference held in Central Asia. At the session, Kazakhstani government officials, wastewater treatment plant biogas operators, biogas researchers, and company representatives discussed preliminary results of a pre-feasibility study for two Kazakhstani WWTPs, case studies of operational biogas units at WWTPs, and legislation affecting the industry. Learn more about the workshop here.

BIOGAS Municipal Solid Waste Center of Excellence Business Plan, Serbia

EPA collaborated with the University of Novi Sad and the Serbian Solid Waste Association to support the launch of a regional center for waste management – The Center of Excellence for Circular Economy and Climate Change (CECC), in Novi Sad Serbia. The CECC will help build capacity and facilitate the exchange of solid waste management knowledge between local and national governments in South East Europe, the Middle East, and Central Asia. EPA collaborated with the German Corporation for International Cooperation (GIZ) to develop a business plan that will provide direction on good governance, mission, and sustainable financing. EPA also provided technical guidance and capacity training to set up a composting center to perform quality control for surrounding municipalities. The project has brought together international organizations, public and private companies, national and local governments, and experts to reduce methane emissions from the municipal waste sector. Learn more about the CECC.

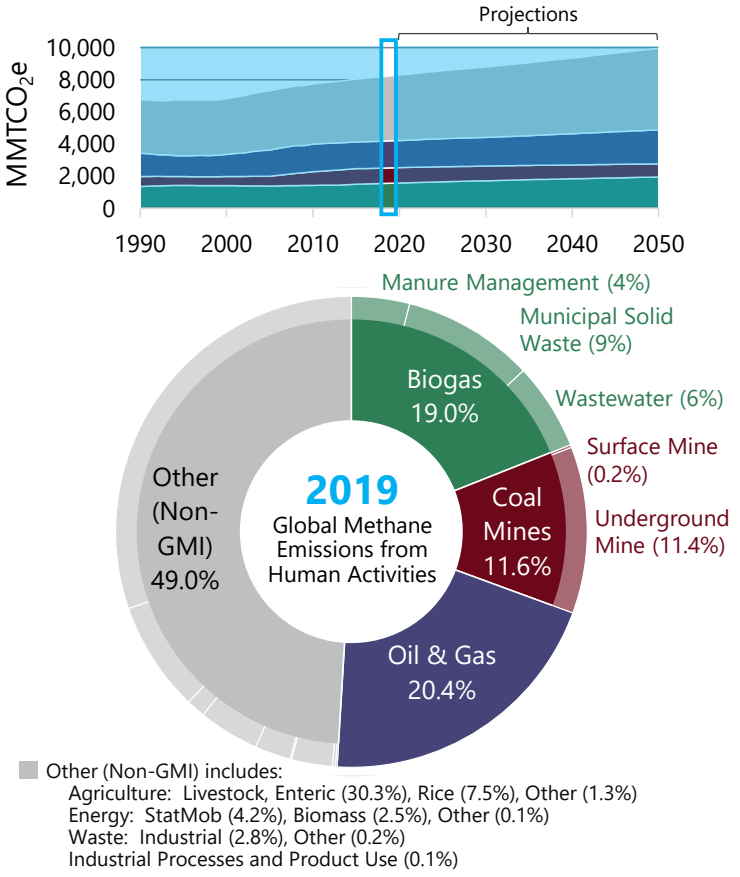
Future Methane Emission Challenges and Opportunities

As shown in Figure 5, GMI's target sectors accounted for approximately 51 percent of all estimated methane emissions from human activities in 2019. There is an urgent and ongoing need to reduce growing methane emissions. Under the auspices of GMI, the U.S. will continue helping Partner countries and stakeholders recover and use methane as a clean energy source, sharing technical expertise and information on best practices, and collaborating with other international organizations focused on methane recovery and use.

Learn more about GMI by visiting **globalmethane.org**

- Find tools and resources on methane mitigation best practices
- Learn more about GMI Partner countries and international collaboration
- Explore events, GMI project sites and activities, and methane emissions data
- Engage with the GMI Sectors: Oil & Gas, Coal Mines, and Biogas

Figure 5. Global Methane Emissions from Human Activities (1990 and Projected through 2050) and Summary of 2019



Other (Non-GMI) includes:
Agriculture: Livestock, Enteric (30.3%), Rice (7.5%), Other (1.3%)
Energy: StatMob (4.2%), Biomass (2.5%), Other (0.1%)
Waste: Industrial (2.8%), Other (0.2%)
Industrial Processes and Product Use (0.1%)

Source: *Global Non-CO_2 Greenhouse Gas Emission Projections & Mitigation Potential: 2015-2050*, U.S. EPA 2019