

Minimizing Fugitive Methane Emissions: *Building Global Capacities*

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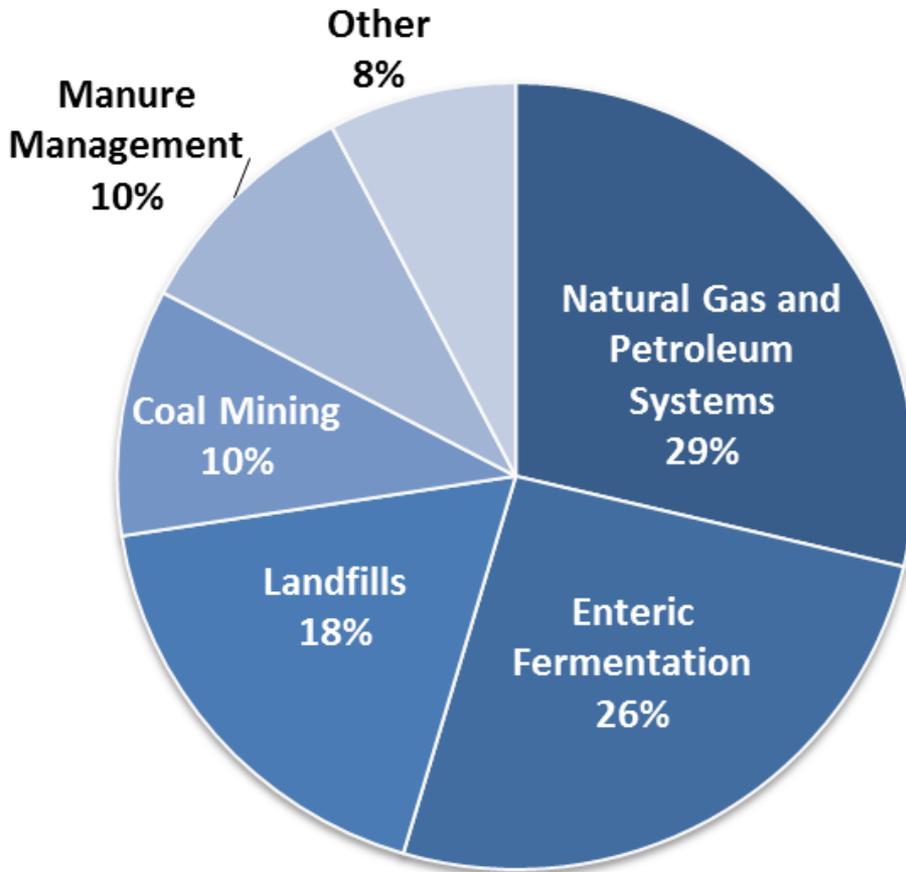


Overview

- US Approach – Methane Strategy
 - Improving methane emissions data and leading reduction efforts
- Cooperating with Partners to Develop and Deploy Best Practices:
 - PTT (Thailand)
 - VICO Indonesia
 - ONGC (India)
 - Targa Resources (U.S.)
- Conclusions

Why is methane (CH₄) important?

U.S. Methane Emissions Profile

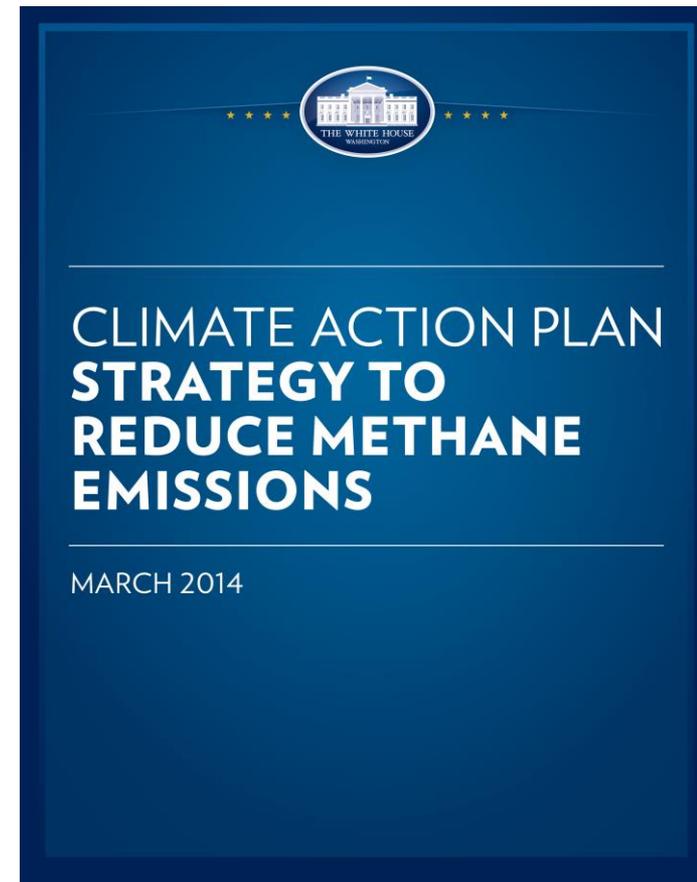


More than 60% of total CH₄ emissions come from human activities.

Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2013.

The U.S. Interagency Methane Strategy

- In June 2013, President Obama issued Climate Action Plan that included:
 - Steps to cut greenhouse gas pollution
 - Steps to prepare U.S. for impacts of climate change
 - Continue U.S. leadership in international efforts to combat climate change
- Called for Administration to develop a comprehensive, interagency strategy to cut methane emissions (released March 2014)
 - Summarizes the sources of methane emissions,
 - Commits to new steps to cut emissions of this potent GHG, and
 - Outlines the Administration's efforts to improve the emissions measurement from key sectors including: landfills, coal mines, agriculture, and oil and gas



Improving Methane Data & Measurements

- Identifies key actions to improve methane emissions data for all sectors, particularly oil and gas
- Enhancing the GHG Inventory and GHGRP
 - EPA will continue to update and enhance the annual GHG Inventory as new data and information emerge and make ongoing improvements to the GHGRP regulatory requirements
- Improving Global Emissions Monitoring and Estimates
 - EPA will continue to collect emission reduction data through GMI and will continue to update and publish detailed emissions estimates through the Global Mitigation of Non-CO₂ GHGs and Global Anthropogenic Non-CO₂ GHG Emissions
 - Also highlights NOAA, DOE, and NASA activities
- Other Activities:
 - Building our National Methane Monitoring Network (NOAA)
 - Encouraging the Development of Cost-Effective Measurement Technologies (DOE's ARPA-E) program new fund to develop methane sensing



U.S. Leadership to Reduce Global Methane Emissions

- **Global Methane Initiative** – voluntary public private partnership
 - 43 Partner countries, more than 1000 private sector participants
 - Five sectors: agriculture, oil & gas, MSW, coal mining, wastewater
 - On the ground, best practices implementation, country-level action plans
 - U.S. chairs steering committee
 - EPA hosts the Administrative Support Group (ASG)
- **Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (SLCPs)** – HFCs, methane, black carbon
 - More than 75 partners and over \$50 million in donor country contributions
 - Tackling methane through sector-specific initiatives such as Municipal Solid Waste, Oil & Gas, Agriculture
- **Arctic Council Task Force on Black Carbon and Methane**
 - U.S. is working with other Arctic countries (Canada, Russia, Norway, Finland, Sweden, Denmark) to address / work to achieve enhanced emissions reductions in the Arctic



Managing Fugitive Methane – U.S. Proposal

- Based on the significance of emissions from the oil and gas sector, U.S. EPA recently proposed regulations that require monitoring and repair of fugitive emissions at well sites and compressor stations
- Proposed requirements are among others proposed to reduce methane and VOC emissions from the oil and gas industry
- Comment period on proposed rule open until November 17, 2015
- More information:

<http://www3.epa.gov/airquality/oilandgas/>



What are the Benefits of Managing Methane Emissions?

- Attractive payback period
- Reduced maintenance costs
- Reduced downtime
- Improved process efficiency
- Safer work environment
- Cleaner environment
- Resource conservation

EPA Field Study / Training with PTT NGV-GTM Nam Phong



EPA Field Study / Training with VICO Indonesia



Direct Inspection and Maintenance Programs

2013

- Bought FLIR on Aug
- Six (6) persons from ERT (Emergency Response Team) are trained to use FLIR
- 1st Joint Inspection with USEPA on Sept
- Solo ERT team inspection
- Inspection report given to each area manager

2014

- Implement twice/year inspection to each facility
- Miss interpretation between ERT report and follow up action → **Solution:** Involving maintenance and production in the inspection team
- Onsite maintenance for simple leak by maintenance
- 2nd joint inspection with USEPA on Aug

2015

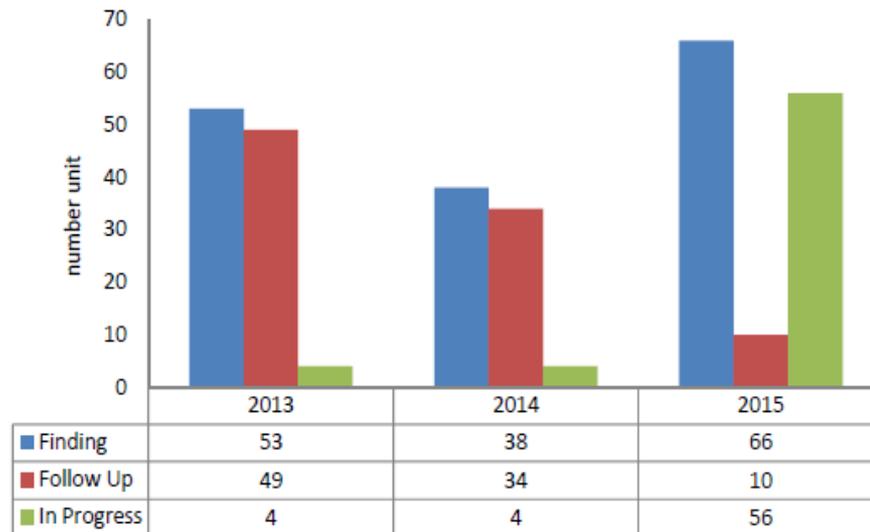
- Schedule problem with ERT & maintenance team → **Solution :** FLIR inspection's schedule follow routine PM (Plan Maintenance) schedule
- Onsite maintenance for simple leak by maintenance team
- Verification will be conducted after the completion of follow up action



Direct Inspection and Maintenance Programs

- Average follow up action (maintaining) for leak in Badak is
 - 2013 = 98% ;
 - 2014 = 89 %,
 - 2015 = inspection already conducted → in progress maintenance

Result FLIR Inspection in Badak Field



- Incomplete action mostly caused by:
 1. Waiting for materials
 2. Need plant shutdown
- Improvement opportunity:
 - a. Pipeline inspection – additional camera
 - b. methane emission reductions – methane flow rate meter

ONGC Develops Dedicated Methane Management Team



- Conducted seven onsite collaborative measurement studies with EPA during May 2008 & November 2009
- ONGC in-house team conducted leak surveys at 65 installations
- Identified over 500 leaking points
- Quantified over 50 million m³ (MMSCM) of fugitive hydrocarbons
- Reduced methane emissions by over 14 MMSCM:
 - 2008-09: 3.20 MMCM
 - 2009-10: 4.72 MMCM
 - 2010-11: 0.63 MMCM
 - 2011-12: 1.99 MMCM
 - 2012-13: 2.44 MMSCM
 - 2013-14: (Under audit)
- Environmental benefit: reductions over **185,000 tCO₂e**



ONGC's Reported Outcomes



- ONGC benefitted substantially from identifying and repairing equipment leaks using DI&M at more than 60 of its facilities.
- Total capital costs for a DI&M program included primary equipment costs and man hour costs.
- Annual costs include the labor and repair necessary to repair all leaks at each facility.
- Taking into account capital and annual costs, this project is very cost effective.
- Since DI&M is an operating practice, continual surveys are necessary to maintain the benefits.

Targa Resources (U.S.)

- Surveyed components in two processing plants: 23,169 components
- Identified leaking components: 857 (about 3.6%)
- Reported repairs on 80 to 90% of the identified leaking components
- Annual methane emissions reductions: 5.6 million m³/year
- Annual savings: \$1,386,000/year*



Source: Targa Resources



Conclusions and Lessons Learned

- Leak *identification* and *measurement* are important for establishing a cost effective and sustainable methane management program
- A relatively small number of large leaks are typically responsible for the majority of fugitive emissions
- Technical innovations are dramatically improving our ability to find, measure, and repair methane leaks – saving money and protecting our environment

2016 Global Methane Forum

- Global Methane Forum: 28 March – 1 April 2016 in Washington, DC, hosted by EPA, GMI and Climate and Clean Air Coalition (CCAC)
- High-level policy and technical dialogue on methane mitigation opportunities
- Highlight over ten years of accomplishments in methane mitigation efforts through GMI and CCAC
- Platform for launching GMI's new charter, coordination with CCAC and UNECE



Additional Information

- EPA / GMI oil and gas sector resources
 - www.epa.gov/gasstar/international
 - www.globalmethane.org/oil-gas

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