# Oil and Gas Systems

Methane is emitted during normal operation and routine maintenance within the oil and natural gas industry, as well as during system disruptions. Emissions vary greatly from facility to facility and are largely a function of operation and maintenance procedures and equipment conditions. Reducing methane emissions from the oil and gas industry, however, can yield substantial economic and environmental benefits. Implementing available, cost-effective methane emission reduction opportunities can lead to reduced product losses, lower methane emissions, and increased revenues.

In 2010, global methane emissions from oil and gas systems were estimated at more than 1,595 $MMTCO_2E$, which is approximately 22 percent of total anthropogenic methane emissions.[20] Over the next decade, methane emissions from oil and gas systems are estimated to increase by 12 percent.[21] However, significant potential exists for methane recovery from oil and gas systems.

The United States has participated in GMI to encourage Partner Countries to implement proven, cost-effective technologies and practices that can minimize methane losses. In 2010, the U.S. government spent more than $3.7 million to support the deployment of these measures. Some of the U.S. government's notable 2010 accomplishments and ongoing activities in this sector are discussed in this section.

**12 percent**

*estimated increase in oil and gas emissions by 2020*

[20] U.S. EPA, 2011.

[21] Idem.

# Conducting Workshops in Russia, China, and Mexico

An important element of all work conducted through EPA's Natural Gas STAR International Program and GMI is highlighting the effectiveness and specific advantages of identifying cost-effective methane emission reduction opportunities and institutionalizing a corporate emissions management program. With that goal in mind, EPA co-hosted several technical workshops in the following GMI Partner Countries.

## *Russia*

In early 2010, the Environmental Defense Fund; EPA's Natural Gas STAR International Program; and Gazprom, the world's largest producer of natural gas, co-hosted a production facility site tour and a technical workshop in Novy Urengoy, located above the Arctic Circle. The workshop included a two-day tour of Gazprom's Yamburg gas production and processing sites and a technical workshop to exchange information on methane emission reduction strategies and climate policy.

Gas valves at Russia's Yamburg gas production and processing site.

In late 2010, WWF Russia, Pacific Northwest National Laboratory, and EPA's Natural Gas STAR International Program held a seminar with oil and natural gas producers in Russia to discuss best practices for methane emission reduction. The seminar drew participants from companies such as Lukoil, TNK-BP, and Gazprom VNIIGAZ. The one-day workshop in Moscow addressed methane emissions from both the production and processing sectors—well completions/workovers, liquids unloading, storage tanks, pneumatic devices, dehydrators, reciprocating/centrifugal compressors—and covered programs such as directed inspection and maintenance to help detect, prioritize, and repair leaks. Several companies also gave presentations on their related experience in both methane mitigation technologies and emissions accounting and reporting.

## *Mexico*

In February 2010, GMI joined with representatives from the World Bank's Global Gas Flaring Reduction (GGFR) Partnership, PEMEX, the government of Mexico, and other oil and natural gas companies for the "Gas Flaring Reduction Best Practice Workshop." The workshop was well attended by more than 300 participants from PEMEX (e.g., key high-level officials from Corporate Operations; Safety, Health and Environment; Exploration and Production [E&P]; Planning; Asset Managers) and staff from SENER (i.e., officials from International Affairs, E&P Hydrocarbons Office, National Hydrocarbons Commission), in addition to GMI, GGFR, and other international participants. The workshop focused on sharing gas flaring and venting reduction best practices that apply to Mexico as well discussing and formulating concrete actions and tasks to be incorporated into Mexico's 2010–2012 venting and flaring reduction policies. GMI presented on the long history of collaboration with PEMEX and highlighted the many methane emission reduction opportunities that have been identified by numerous GMI-PEMEX methane emission measurement studies.

## Capacity-Building and Technology Transfer in India

India's Oil and Natural Gas Corporation (ONGC), a state-owned oil and gas company, is one of Asia's largest exploration and production companies, operating more than 11,000 kilometers of pipeline and contributing 77 percent of India's crude oil production and 81 percent of India's natural gas production. Since joining Natural Gas STAR International (see text box) and GMI in 2007, ONGC has made significant efforts to build a strong program, focusing on engaging management, raising awareness of Natural Gas STAR within the company, providing specialized training to personnel on Natural Gas STAR-recommended technologies and practices, and building internal capacity to identify and implement methane emission reduction opportunities within ONGC operations.

### Natural Gas STAR International Overview

In support of GMI, in 2006 the EPA's Natural Gas STAR Program expanded to include oil and natural gas companies with international operations. The launch of Natural Gas STAR International significantly increases opportunities to reduce methane emissions from oil and natural gas operations worldwide and creates a framework for global application of the Program's principles, including cost-effective methane emission reduction technology and practice implementation.

In 2010, Natural Gas STAR International reported actual annual emission reductions of more than 2.7 MMTCO$_2$E.

EPA and ONGC have collaborated on prefeasibility studies to identify and estimate major methane emission sources from several ONGC sites. Based on the study results, measurement studies were carried out at seven ONGC sites. The company is now implementing methane mitigation projects at several locations. In 2009, working with Natural Gas STAR and GMI, ONGC completed a detailed study to measure emissions from tank vents. The study objective was to accurately measure the tank vent emissions and identify possible emission reduction opportunities. The study results identified vapor recovery units (VRUs) as a cost-effective option for reducing emissions. As a direct result of this work, ONGC rehabilitated non-working VRUs on storage tanks at its Uran onshore oil and natural gas processing plant—an activity that will save a significant amount of methane emissions. Most recently, ONGC delegates participated in GMI's North American study tour, linking delegates with peer companies that have implemented emission reduction technologies of interest, as well as technology and service providers.

ONGC was also instrumental in organizing and sponsoring the 2010 Methane to Markets Partnership Expo in New Delhi, India, and featured two projects at the Expo. In November 2010, ONGC was named the Natural Gas STAR International Partner of the Year. This award is based on methane emission reductions achieved, implementation of a variety of technologies and practices, and support of overall Program activities, initiatives, and outreach. Each year, EPA recognizes the efforts and achievements of outstanding partners.

Since joining GMI and Natural Gas STAR International, ONGC has made considerable progress in advancing its GHG management program, and continues to build its internal expertise to enable ONGC to share technical information with all affiliates.

ONGC staff with EPA Natural Gas STAR Program representatives.