Petroleum and Natural Gas Systems: 2011 Data Publication

United States Environmental Protection Agency

Greenhouse Gas Reporting Program

Highlights

- In February 2013, the U.S. Environmental Protection Agency (EPA) released for the first time greenhouse gas (GHG) data for petroleum and natural gas systems collected under the Greenhouse Gas Reporting Program (GHGRP).

- The data show 2011 greenhouse gas emissions from over 1,800 facilities conducting petroleum and natural gas system activities, such as production, processing, transmission, and distribution. In total, these facilities accounted for greenhouse gas emissions of 225 million metric tons of carbon dioxide equivalent.

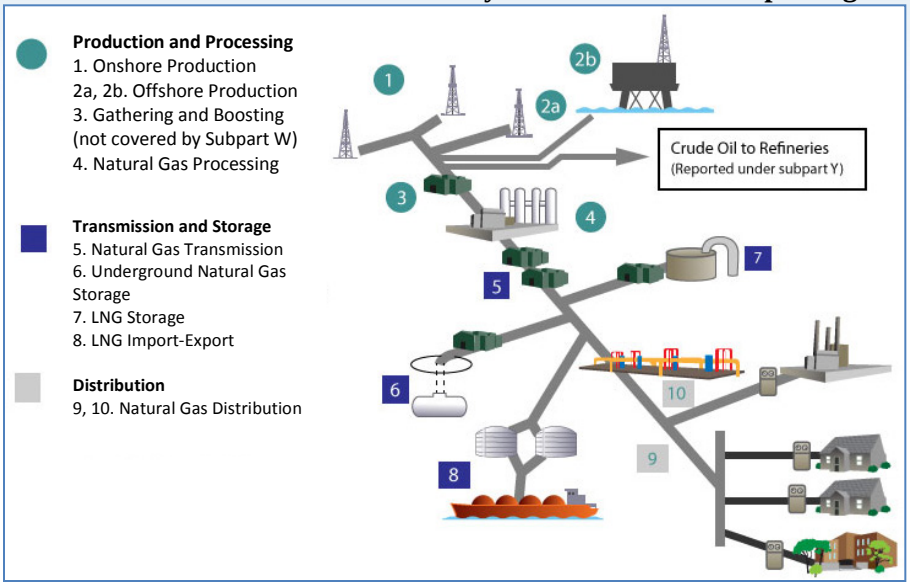
- These data represent a significant step forward in better understanding greenhouse gas emissions from petroleum and natural gas systems. EPA is working to improve the quality of data from this sector and expects that the GHGRP will be an important tool for the Agency and the public to analyze emissions, identify opportunities for improving the data, and understand emissions trends.

- EPA's easy-to-use Facility Level Information on GreenHouse gas Tool (FLIGHT), accessible at http://epa.gov/ghgreporting/ghgdata/index.html allows users to view GHG data from petroleum and natural gas systems in a variety of ways.

Petroleum and Natural Gas Segments Covered in the GHG Reporting Program

- The petroleum and natural gas industry is one of several industries covered by the Greenhouse Gas Reporting Program. The following eight segments comprise the petroleum and natural gas systems source category (Subpart W).
    - *Onshore Production:* Emissions from onshore production of petroleum and natural gas associated with production wells and related equipment.
    - *Offshore Production:* Production of petroleum and natural gas from offshore production platforms.
    - *Natural Gas Processing:* Processing of field quality gas to produce pipeline quality natural gas.
    - *Natural Gas Transmission:* Compressor facilities used to transfer natural gas through transmission pipelines.
    - *Underground Natural Gas Storage:* Facilities that store natural gas in underground formations.
    - *Natural Gas Distribution:* Natural gas distribution systems that deliver gas directly to the consumer.
    - *LNG Import/Export*: Liquified Natural Gas import and export terminals.
    - *LNG Storage:* Liquified Natural Gas storage equipment.

Illustration of Petroleum and Natural Gas Systems in the GHG Reporting Program



Adapted from American Gas Association and EPA Natural Gas STAR Program

- The GHGRP also includes other segments of the petroleum and natural gas industry that were covered by the program beginning in 2010:
  - Petroleum Refineries (Subpart X)
  - Petrochemical Production (Subpart Y)
  - Suppliers of Petroleum Products (Subpart MM)
  - Suppliers of Natural Gas and Natural Gas Liquids (Subpart NN)

- The GHGRP covers a subset of emissions from the petroleum and natural gas industry. For example, the GHGRP does not currently cover the gathering and boosting segment, which is located between wellheads, but before gas processing.

- Facilities in the industry segments that comprise the petroleum and natural gas systems source category are required to report in the GHGRP if their emissions exceed 25,000 metric tons CO_2 equivalent (CO_2e). Facilities with emissions below this threshold are not required to report to the GHGRP.

Data Collection and Verification

- Petroleum and natural gas systems is one of the more complex source categories within the GHGRP because of the number of emission sources covered, technical complexity, and variability across facilities. EPA used the best available information to develop GHG reporting requirements that would maintain data quality while minimizing burden to facilities. One of the strengths of the data is that it provides a better understanding of sources in the petroleum and natural gas industry for which the public previously had little information.

- Facilities used uniform methods prescribed by the EPA to calculate GHG emissions, such as direct measurement, engineering calculations, or emission factors derived from direct measurement. In some cases, facilities had a choice of calculation methods for an emission source.

- In order to provide facilities with time to adjust to the requirements of the GHGRP, EPA made available the optional use of Best Available Monitoring Methods (BAMM) for unique or unusual circumstances. Where a facility used BAMM, it was required to follow emission calculations specified by the EPA, but was allowed to use alternative methods for determining inputs to calculate emissions. In 2011, facilities were allowed to use BAMM for the petroleum and natural gas systems source category and these facilities were required to specify in their GHG annual reports when BAMM was used for an emission source.

- EPA has a multi-step data verification process, including automatic checks during data-entry, statistical analyses on completed reports, and staff review of the reported data. Based on the results of the verification process, EPA follows up with facilities to resolve any mistakes that may have occurred. Because of the nature of the petroleum and natural gas industry, there can be a wide variation in emissions from facility to facility.

- EPA anticipates that the overall data quality will increase over time as facilities become familiar with the calculation methods and begin using more direct measurement. EPA anticipates BAMM use will decline and the Agency may have additional information to conduct verification, including certain inputs to emissions equations. The Agency will also carefully review regulatory requirements, methods, and the quality of the information reported to identify areas were improvements are needed.

Summary of the 2011 GHG Data for Petroleum and Natural Gas Systems

- For the 2011 reporting year, the EPA received annual reports from over 1,800 facilities that conduct petroleum and natural gas systems activities. The annual reports cover emissions from eight different segments and over twenty unique emission sources.

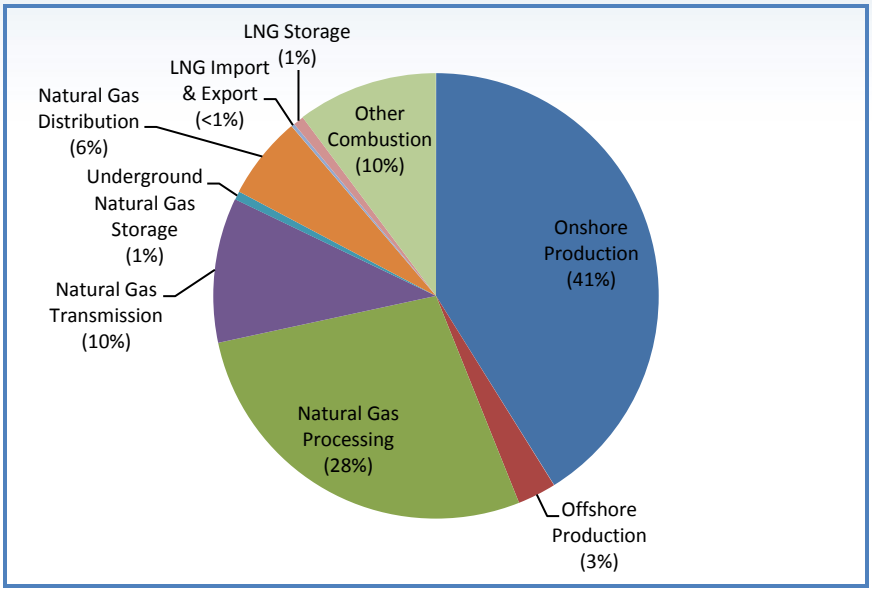
- Total emissions reported to the GHGRP for petroleum and natural gas systems were 225 million metric tons CO_2e for 2011.

- Onshore petroleum and natural gas production was the largest segment of emissions reported to the GHGRP from petroleum and natural gas systems, covering approximately 41% of reported emissions from the sector. Onshore production includes equipment used in the production of petroleum and natural gas, such as well drilling and completion equipment. Natural gas processing, which includes emissions from equipment used to separate field quality gas and produce pipeline quality natural gas, was the second largest segment of emissions reported to the GHGRP, covering approximately 28% of reported emissions from petroleum and natural gas systems.

- In total for facilities with petroleum and natural gas systems, carbon dioxide (CO_2) emissions reported to the GHGRP accounted for 142 million metric tons CO_2e and methane (CH_4) emissions reported to the GHGRP accounted for 83 million metric tons CO_2e. Emissions from onshore production were primarily methane (such as leaks from equipment and vented emissions) while emissions from natural gas transmission and natural gas processing were primarily carbon dioxide (such as combustion emissions associated with compressors).

- EPA is currently in the process of reviewing the GHGRP data to determine whether all facilities subject to the requirements submitted annual reports. As part of this process EPA will review applicable information to identify facilities that may have missed the reporting deadline and assist those facilities in submitting reports.

Reported Emissions from Petroleum and Natural Gas Systems – 2011



Uses of the GHG Data for Petroleum and Natural Gas Systems

- The data collected by the GHGRP can be used to identify nearby sources of GHG emissions, help business track emissions and find cost-savings efficiencies, and provide important information to the finance and investment communities.

- Data on emissions can be used to inform a number of different types of analyses. For example, it can be integrated with life cycle analyses, complement atmospheric GHG studies, and inform updates to emission inventories. Numerous activity data are collected that can be used to improve understanding of the occurrence of emissions from a variety of sources.

Opportunities for Input

- If you identify any errors in EPA's published data set, you may submit the information (e.g. facility name and a description of the potential error) to the GHGRP help desk at ghgreporting@epa.gov.

- The EPA will be hosting a technical webinar on natural gas systems in the GHG Reporting Program and Inventory of U.S. GHG Emissions and Sinks on February 27, 2013 at 2pm Eastern. For more information, visit: http://www.epa.gov/ghgreporting/reporters/subpart/w.html.

More Information

- View GHGRP data: http://epa.gov/ghgreporting/ghgdata/index.html

- Download GHGRP data through EnviroFacts (available Spring 2013): http://www.epa.gov/enviro

- Data shown in this document reflects any resubmitted reports from facilities as of January 16, 2013.