



Greenhouse Gas Reporting Program Petroleum and Natural Gas Systems

U.S. Environmental Protection Agency
November 2019

Agenda



- Background on Greenhouse Gas Reporting Program (GHGRP)
- GHGRP Petroleum and Natural Gas Systems: Reporting Year 2018 Data Summary



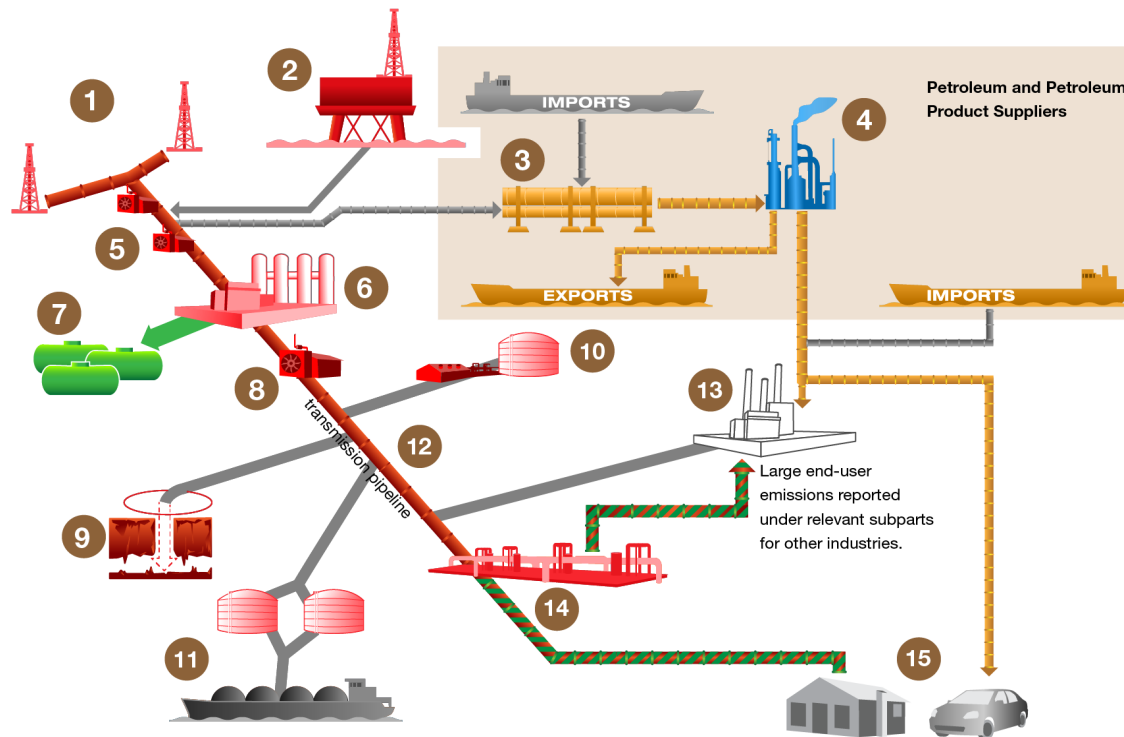
Background on Greenhouse Gas Reporting Program (GHGRP)

Overview of GHG Reporting Program



- Launched in response to FY 2008 Consolidated Appropriations Act
- Annual reporting of GHGs by 41 source categories
 - 33 types of direct emitters
 - 6 types of suppliers of fuel and industrial GHGs
 - Facilities that inject CO₂ underground for geologic sequestration, enhanced oil recovery, or any other purpose
- Most source categories began collecting data in 2010
 - An additional 12 source categories began collecting data in 2011
 - We now have 9 years of data for 29 source categories and 8 years of data for 12 source categories
- Facilities use 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 have a choice of calculation methods for an emission source
- Direct reporting to EPA electronically
- EPA verification of GHG data

GHGRP and the Oil and Gas Industry



Production & Processing

1. Onshore Petroleum & Natural Gas Production
2. Offshore Petroleum & Natural Gas Production
3. Total Crude Oil to Refineries
4. Petroleum Refining
5. Gathering and Boosting
*Data collection began in RY 2016
6. Gas Processing Plant
*May contain NGL Fractionation equipment
7. Natural Gas Liquids (NGL) Supply

Natural Gas Transmission & Storage

8. Transmission Compressor Stations
9. Underground Storage
10. Liquefied Natural Gas (LNG) Storage
11. LNG Import-Export Equipment
12. Natural Gas Transmission Pipeline
*Data collection began in RY 2016

Distribution

13. Large End Users
14. Natural Gas Distribution
15. Natural Gas & Petroleum Supply to Small End Users

■	Subpart W: Emissions from petroleum & natural gas systems
■	Subpart Y: Emissions from petroleum refineries
■	Subpart MM: CO ₂ associated with supplies of petroleum products
■	Subpart NN: CO ₂ associated with supplies of natural gas & natural gas liquids
■	Not reported under GHGRP

What is a Facility?



- In general, a “facility” for purposes of the GHGRP means all co-located emission sources that are commonly owned or operated
- However, certain industry segments within the Petroleum and Natural Gas Systems source category have unique “facility” definitions
 - Onshore production: the “facility” includes all emissions associated with wells owned or operated by a single company (the permit holder) in a specific hydrocarbon producing basin (as defined by the geologic provinces published by the American Association of Petroleum Geologists)
 - Natural gas distribution: the “facility” is a local distribution company as regulated by a single state public utility commission
 - Gathering and boosting: a “facility” means all gathering pipelines and other equipment located along those pipelines that are under common ownership or common control by a gathering and boosting system owner or operator and that are located in a single hydrocarbon
 - Natural gas transmission pipeline, a “facility” means the total U.S. mileage of natural gas transmission pipelines, owned and operated by an onshore natural gas transmission pipeline owner or operator
- The other industry segments in the Petroleum and Natural Gas Systems source category follow the general GHGRP definition of “facility”

Reporting Year 2019 Subpart W Preview Materials



- Draft versions of the RY2019 Subpart W reporting materials were made available for comments and suggestions
 - Subpart W reporting form
 - Optional calculation workbook
 - XML schema
- Changes to the Subpart W Reporting Form and Optional Calculation Workbook were limited to changes to improve usability and support use of the form for multiple reporting years. There are no Subpart W schema changes this year.
- Please note that preview versions of the reporting form and schema are subject to review and correction and may change prior to final release.
- Access the preview materials here:
<https://ccdsupport.com/confluence/display/help/RY2019+Subpart+W+Preview+Materials>

Future GHGRP Revisions



- As discussed at last year's stakeholder workshop, GHGRP has undertaken a comprehensive program review to inform potential burden reduction opportunities
- EPA is currently developing a proposed rule that would reduce burden, simplify and streamline implementation of the rule, improve the quality and consistency of the data collected, and clarify or provide minor technical updates to certain provisions that have been the subject of questions from reporting entities
- Link to regulatory agenda:
<https://www.reginfo.gov/public/do/eAgendaViewRule?publId=201904&RIN=2060-AU35>



Petroleum and Natural Gas Systems Data (Subpart W) Summary

Reporting Year 2018 Data Release

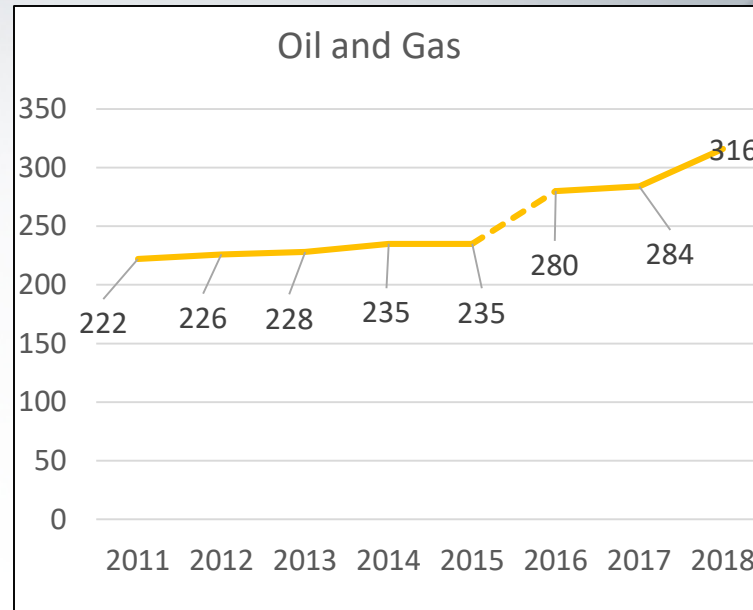


- Reporting Year 2018 data released in Oct. 2019
- Total reported direct emissions increased slightly compared to 2017, however the long-term trend has been a decrease in emissions since 2011
- This longer-term decline in emissions is primarily driven by a reduction in emissions from power plants of nearly 20% from 2011 to 2018
- There is a 10.8% increase in emissions from oil and gas from 2017 to 2018, which is a largely a result of increased flaring emissions from onshore production activities

Oil and Gas – Overall Trend



- EPA collected data from 2,319 facilities conducting oil and gas activities across the value chain, such as production, gathering and boosting, processing, transmission and distribution
- Total reported GHG emissions were 316 MMT CO₂e, an increase of 10.8% from 2017 to 2018



% Change
RY 17-18

10.8%

% Change
RY 11-18

N/A*

* Facilities in the Gathering and Boosting and Transmission Pipeline industry segments began reporting in 2016.

Reported GHG Emissions by Industry Segment



- EPA received annual reports from 2,319 facilities
- Reported emissions totaled 316 Million Metric Tons (MMT) CO₂e
- Largest segments in terms of reported GHG emissions were onshore production, gathering and boosting, and natural gas processing

Segment	Number of Facilities	2018 Reported Emissions (Million Metric Tons CO ₂ e)
Onshore Production	500	109
Offshore Production	144	7
Gathering and Boosting	334	81
Natural Gas Processing	455	57
Natural Gas Transmission Compression	563	28
Natural Gas Transmission Pipeline	41	3
Underground Natural Gas Storage	48	1
LNG Import/Export	9	7
LNG Storage	5	<1
Natural Gas Distribution	161	13
Other Oil and Gas Combustion	82	9
Total	2,319	316

Changes in Reported Emissions by Industry Segment: 2011-2018

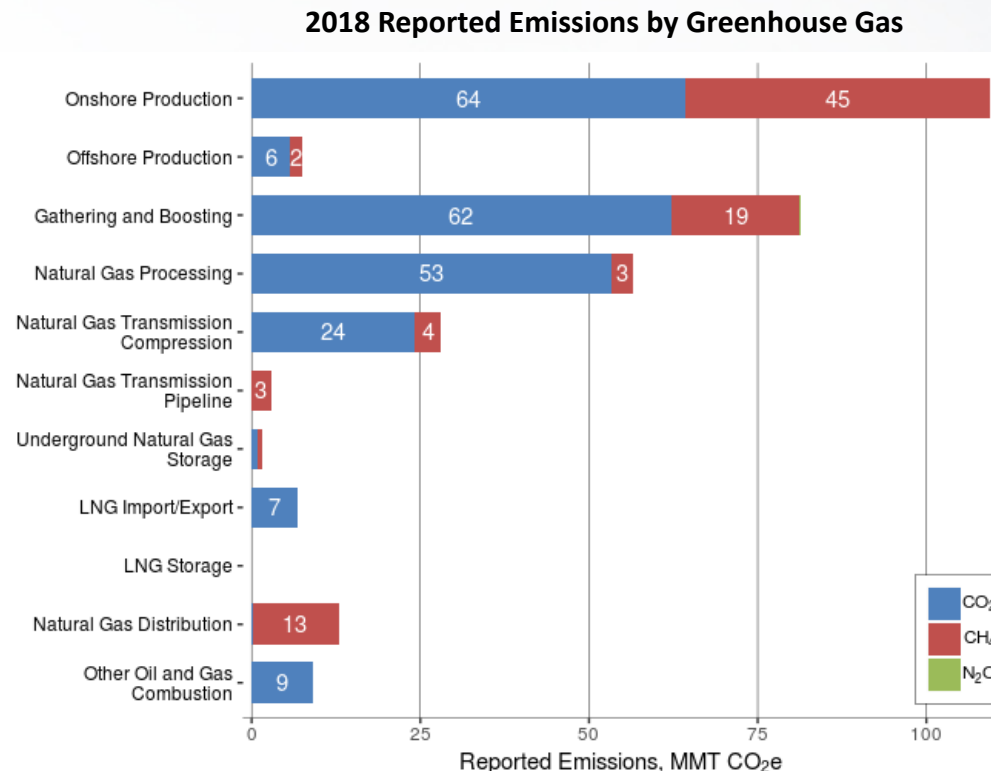


Industry Segment	Reported Emissions (MMT CO ₂ e)							
	2011	2012	2013	2014	2015	2016	2017	2018
Onshore Production	92	93	98	102	102	86	95	109
Offshore Production	6	7	6	7	7	7	7	7
Gathering and Boosting	N/A	N/A	N/A	N/A	N/A	81	74	81
Natural Gas Processing	59	60	59	60	59	55	56	57
Natural Gas Transmission Compression	24	24	23	22	23	22	24	28
Natural Gas Transmission Pipeline	N/A	N/A	N/A	N/A	N/A	3	3	3
Underground Natural Gas Storage	2	2	2	2	2	1	1	1
LNG Import/Export	1	1	<1	1	1	2	4	7
LNG Storage	<1	<1	<1	<1	<1	<1	<1	<1
Natural Gas Distribution	16	15	15	15	14	14	14	13
Other Oil and Gas Combustion	23	25	25	28	29	7	7	9
Total	222	226	228	235	236	279	285	316

Reported Emissions by Greenhouse Gas



- Carbon dioxide (CO₂) emissions accounted for 226 MMT CO₂e and methane (CH₄) emissions accounted for 89 MMT CO₂e
- Emissions from natural gas distribution were primarily methane while emissions from natural gas transmission compression, natural gas processing, and gathering and boosting contained more carbon dioxide

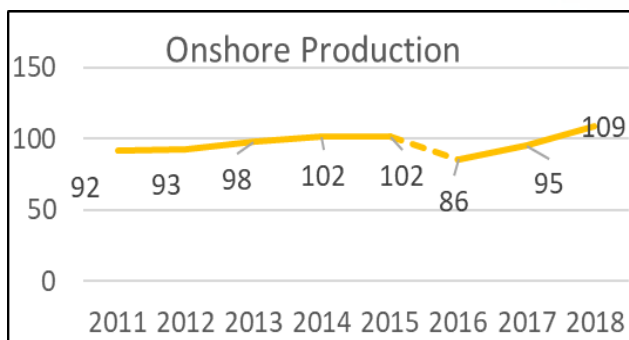
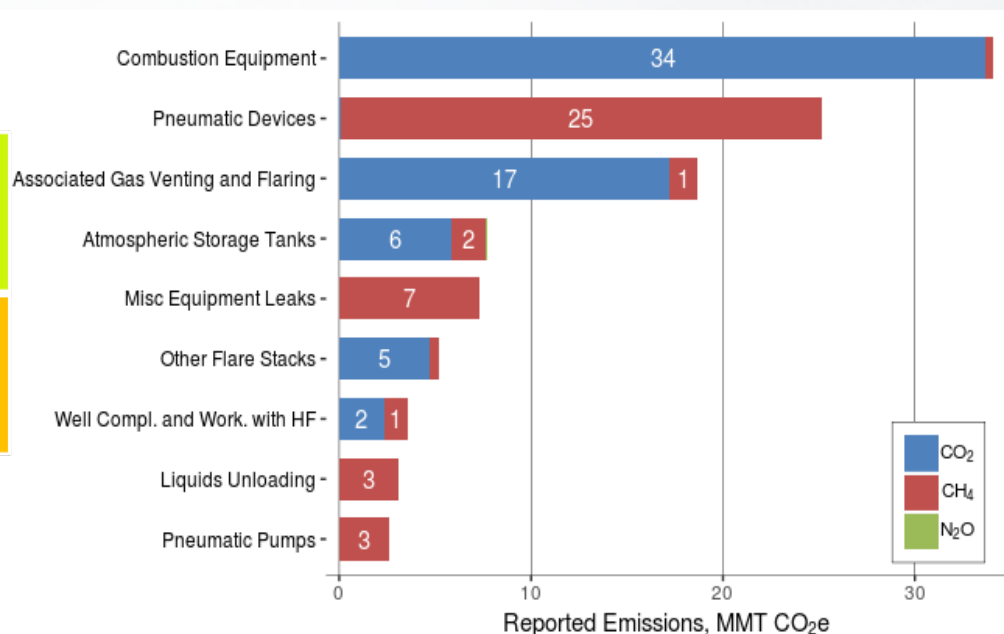


Onshore Production



- Reported emissions in onshore production totaled 109.4 MMT CO₂e
- Methane emissions totaled 45.2 MMT CO₂e and carbon dioxide emissions totaled 64.2 MMT CO₂e
- Combustion equipment (34.1 MMT CO₂e) and pneumatic devices (25.2 MMT CO₂e) were the top reported emission sources in onshore production

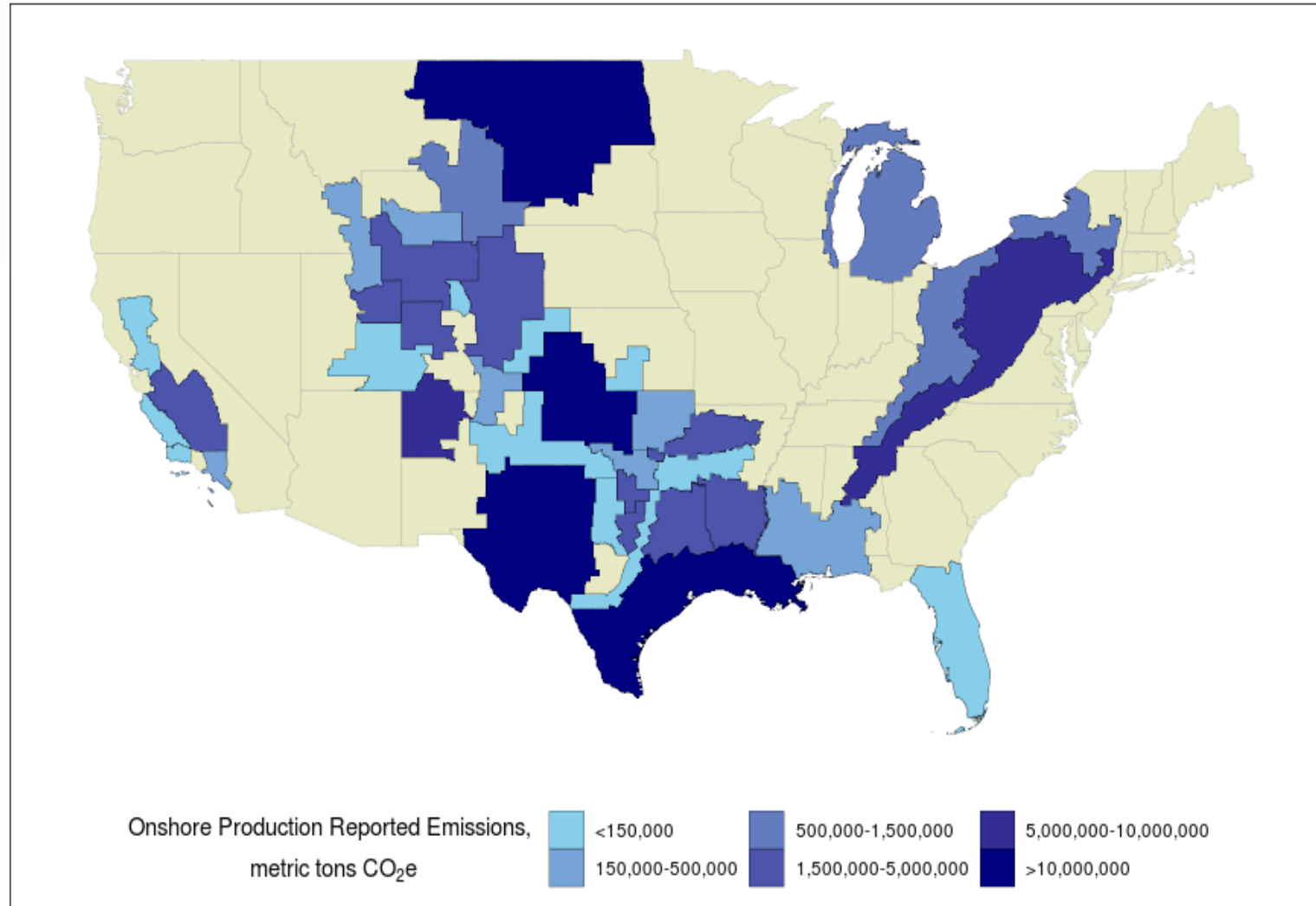
2018 Onshore Production: Top Reported Emission Sources



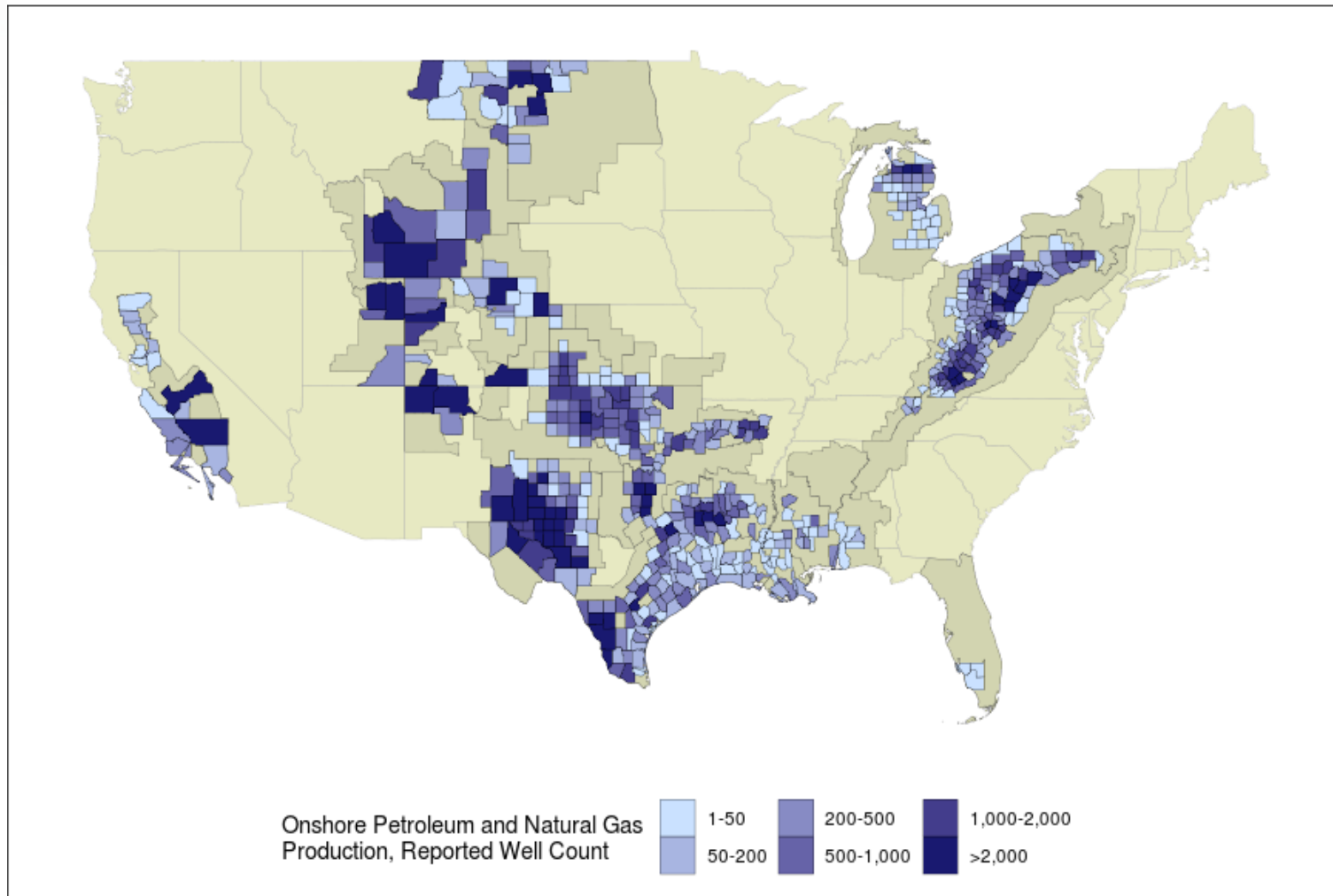
% Change RY
17-18
16.3%

% Change RY
11-18
N/A*

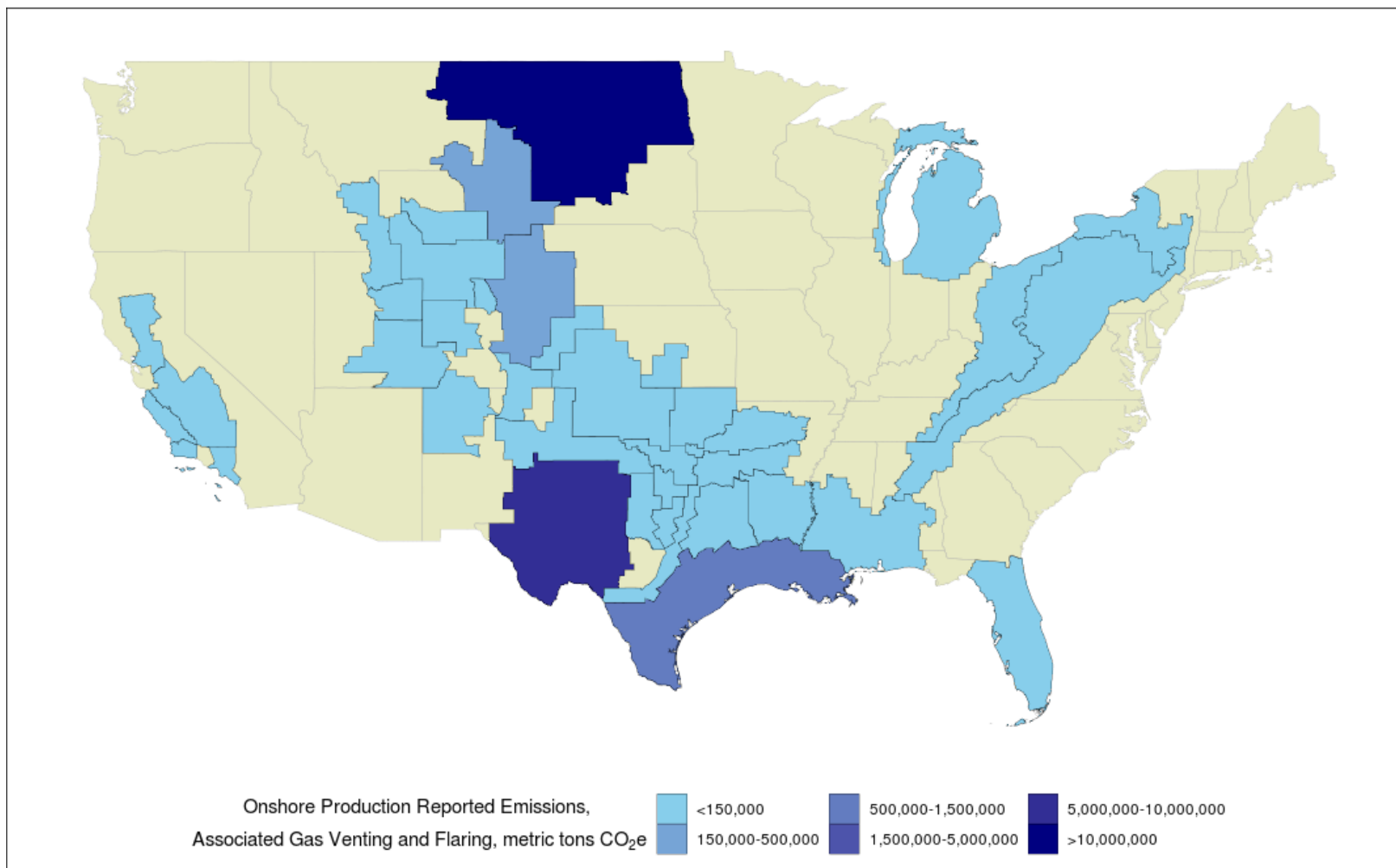
Onshore Production Basins



Onshore Production Well Count by County



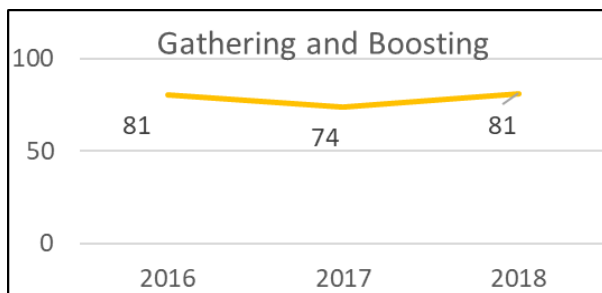
Associated Gas Venting and Flaring, Onshore Production: Reported Emissions by Basin



Gathering and Boosting

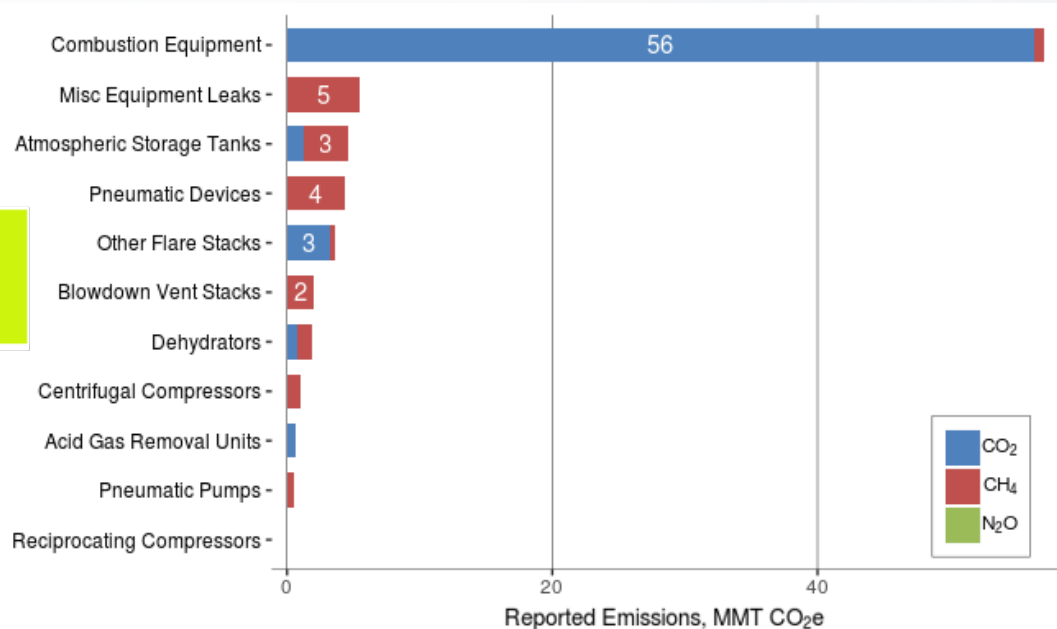


- The gathering and boosting segment was first reported in 2016
- Reported emissions from gathering and boosting totaled 81.3 MMT CO₂e
- Methane emissions totaled 19.1 MMT CO₂e and carbon dioxide emissions totaled 62.2 MMT CO₂e
- The top reported emission sources were combustion equipment (57.1 MMT CO₂e), miscellaneous equipment leaks (5.5 MMT CO₂e), and atmospheric storage tanks (4.6 MMT CO₂e)



% Change RY
17-18
9.7%

2018 Gathering and Boosting: Top Reported Emission Sources

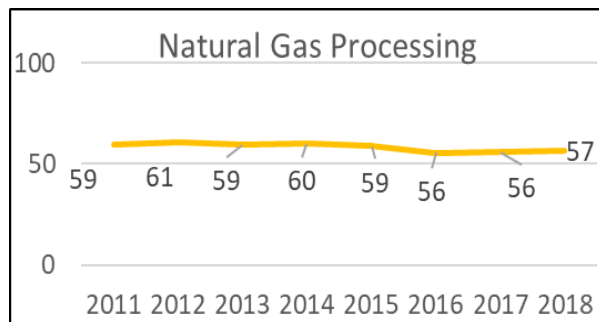
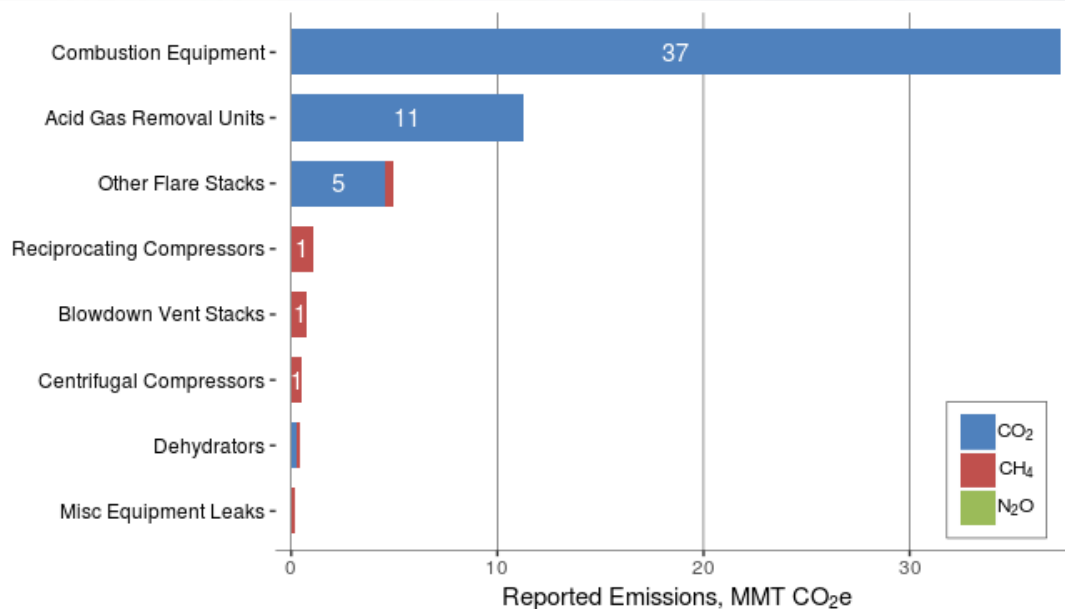


Natural Gas Processing



- Reported emissions from natural gas processing totaled 56.6 MMT CO₂e
- Methane emissions totaled 3.2 MMT CO₂e and carbon dioxide emissions totaled 53.4 MMT CO₂e
- The top reported emission sources were combustion equipment (37.4 MMT CO₂e), acid gas removal units (11.3 MMT CO₂e), and other flare stacks (5.0 MMT CO₂e)

2018 Natural Gas Processing: Top Reported Emission Sources



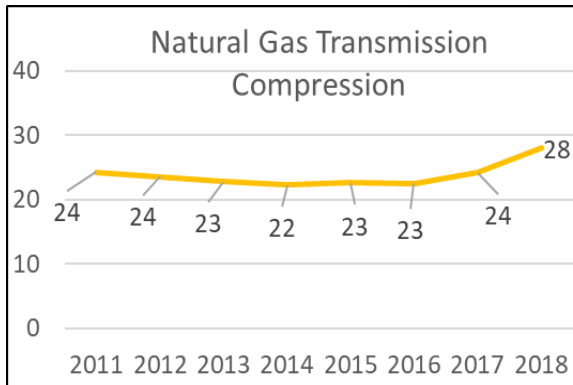
% Change RY
17-18
1.3%

% Change RY
11-18
-4.6%

Natural Gas Transmission Compression



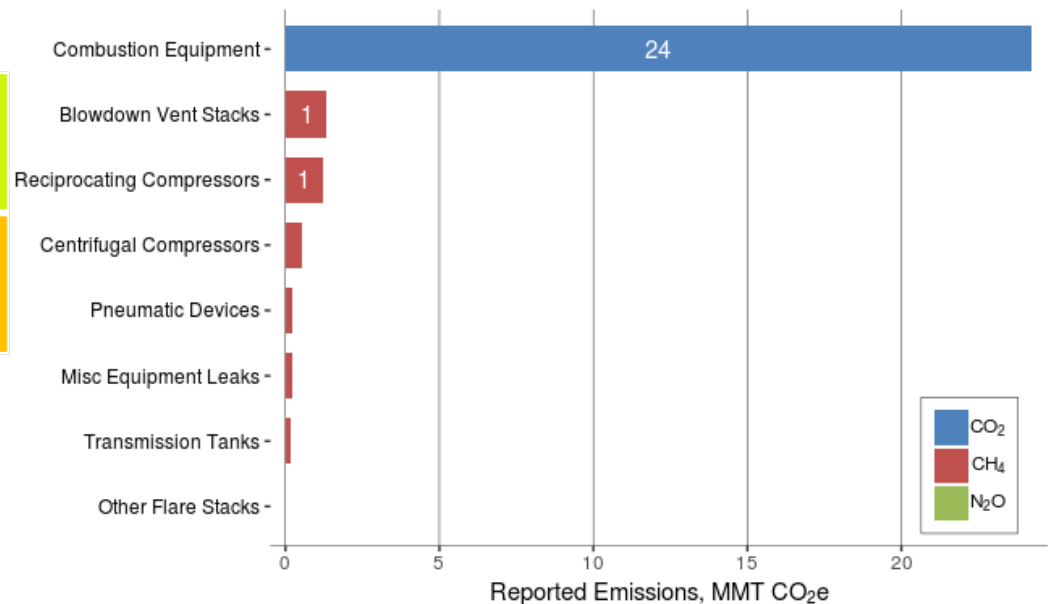
- Reported emissions from natural gas transmission compression totaled 28.0 MMT CO₂e
- Methane emissions totaled 3.7 MMT CO₂e and carbon dioxide emissions totaled 24.2 MMT CO₂e
- Top reported emission source was combustion equipment (24.2 MMT CO₂e)



% Change RY
17-18
15.7%

% Change RY
11-18
15.2%

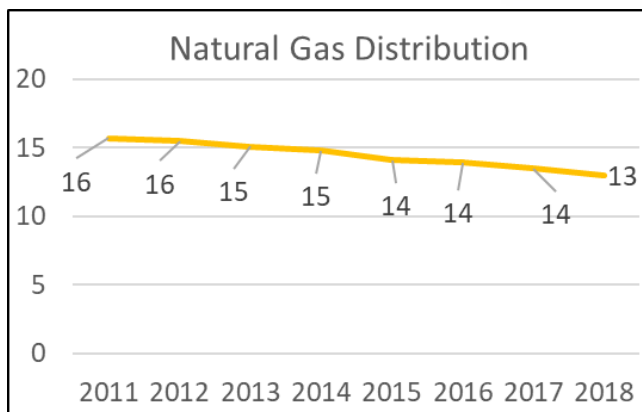
2018 Natural Gas Transmission Compression: Top Reported Emission Sources



Natural Gas Distribution



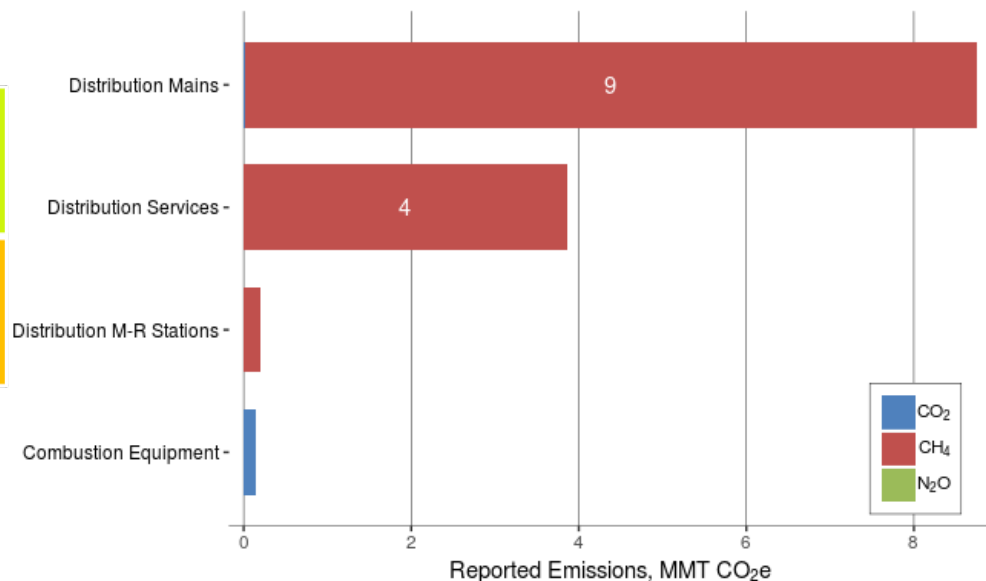
- Reported emissions from natural gas distribution totaled 13.0 MMT CO₂e
- Methane emissions totaled 12.8 MMT CO₂e and carbon dioxide emissions totaled 0.2 MMT CO₂e
- Distribution mains (8.8 MMT CO₂e) and distribution services (3.9 MMT CO₂e) accounted for the majority of reported emissions



**% Change RY
17-18
-3.8%**

**% Change RY
11-18
-17.2%**

2018 Natural Gas Distribution: Top Reported Emission Sources





For More Information

How to Access GHGRP Data on Petroleum and Natural Gas Systems



- EPA has several data portals to access data collected by the GHGRP on Petroleum and Natural Gas Systems
- EPA's easy-to-use Facility Level Information on GreenHouse gas Tool (FLIGHT) allows users to view GHG data from Petroleum and Natural Gas Systems in a variety of ways
 - View GHG data reported by individual facilities
 - Aggregate reported emissions based on industry segment or geographic level
 - Search for facilities by name, location, corporate parent, or NAICS code
 - Visit FLIGHT: <http://ghgdata.epa.gov>
- Detailed non-CBI data is available on the Envirofacts
 - Access GHG data on Envirofacts: <http://www.epa.gov/enviro/facts/ghg/search.html>

Other GHGRP Resources



- GHGRP Subpart W website:
<http://www.epa.gov/ghgreporting/subpart-w-petroleum-and-natural-gas-systems>
- GHGRP Help Desk: GHGReporting@epa.gov