

# GREENHOUSE GAS REPORTING PROGRAM PETROLEUM AND NATURAL GAS SYSTEMS

U.S. Environmental Protection Agency

November 2021

# OVERVIEW OF GHG REPORTING PROGRAM (GHGRP)

- Launched in response to Fiscal Year 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 CO<sub>2</sub> 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 11 years of data for 29 source categories and 10 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

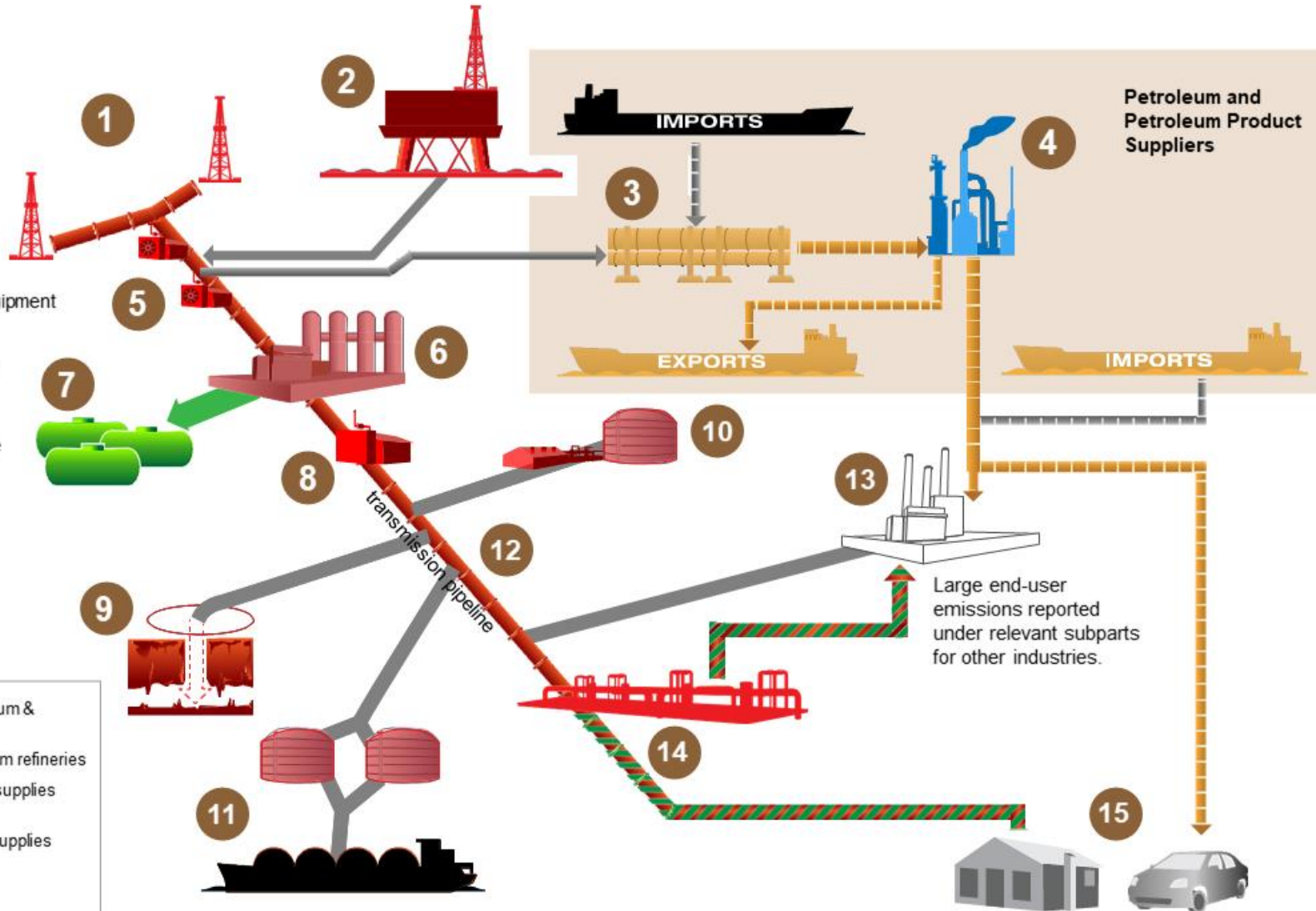
## Natural Gas Transmission & Storage

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<sub>2</sub> associated with supplies of petroleum products
- **Subpart NN:** CO<sub>2</sub> associated with supplies of natural gas & natural gas liquids
- Not reported under GHGRP



# REPORTING YEAR 2021 SUBPART W PREVIEW MATERIALS

- Draft versions of the RY2021 Subpart W reporting materials were made available for comments and suggestions
  - Subpart W reporting form
  - Optional calculation workbook
  - XML schema
- There are no Subpart W reporting form or schema changes for Reporting Year 2021
- Changes to the Optional Calculation Workbook are limited to changes to improve usability
- 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:  
<https://ccdsupport.com/confluence/display/help/RY2021+Subpart+W+Preview+Materials>

# FUTURE GHGRP REVISIONS

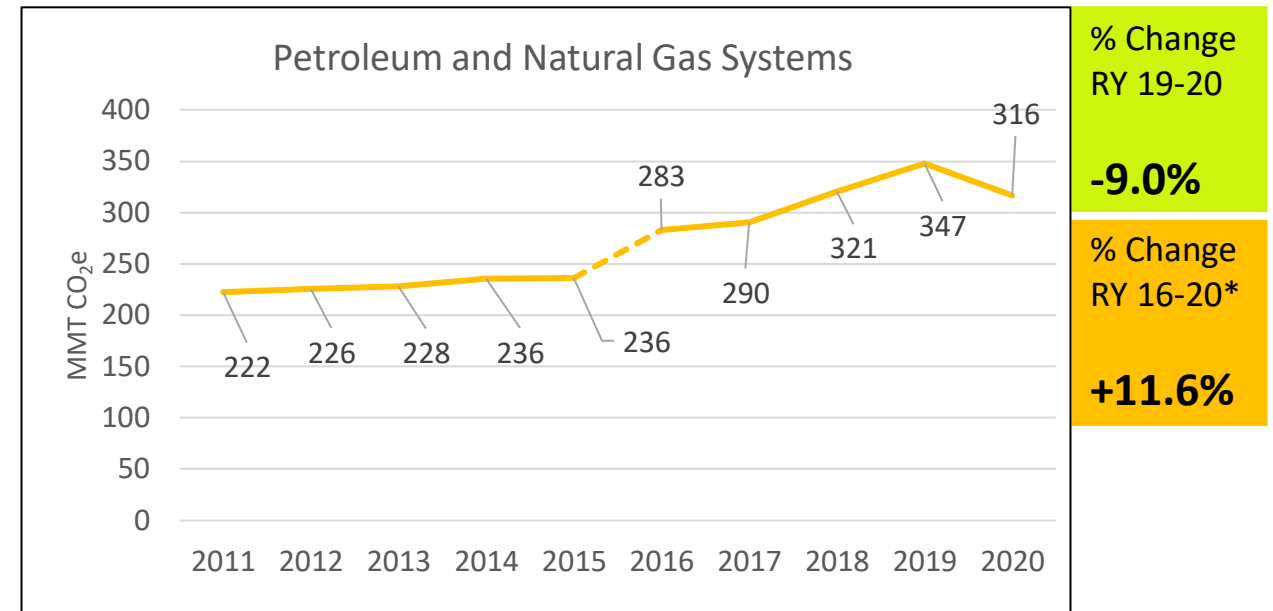
- GHGRP data represent a significant step forward in understanding GHG emissions from the US economy and serve as an important tool for analyzing emissions, understanding emissions trends, and tracking the efficacy of mitigation policies
- EPA is planning to strengthen the GHGRP through proposed rule revisions that will promote further transparency of greenhouse gas emissions, improve the quality and consistency of the data collected, and clarify or provide minor technical updates
- EPA's regulatory agenda:  
<https://www.epa.gov/laws-regulations/regulatory-agendas-and-regulatory-plans>

# REPORTING YEAR 2020 DATA RELEASE

- Reporting Year 2020 data was released in October 2021
- In 2020, reported emissions were approximately 9% lower than 2020
  - Reflects both the economic slowdown due to the COVID-19 pandemic, and ongoing, long-term industry trends
- Power plants were the largest stationary source of GHG emissions reporting to GHGRP
  - Reported emissions in 2020 declined by 10% between 2019 and 2020, and nearly 33% since 2011
  - Reflects both changes in electricity use during the pandemic, as well as long-term shifts in power sector fuel-stock from coal to natural gas
- Petroleum and natural gas systems were the second largest stationary source of GHG emissions
  - Reported emissions for 2020 were 9% lower than in 2019, but 11.6% higher than 2016
  - 2016 is the earliest year of comparable data, as new industry segments began reporting that year
- Reported emissions from other large sources in the industrial and waste sectors were down 8.9% from 2019, and down 26% since 2011
  - All sectors reported emissions reductions, with the largest reductions in the metals and refineries sectors
  - Reflects the reduced demand for automobiles and gasoline during the COVID-19 pandemic
- With this year's data publication, GHGRP added a new demographic mapping layer to EPA's user-friendly online tool, the Facility Level Information on Greenhouse gases Tool (FLIGHT)

# PETROLEUM AND NATURAL GAS SYSTEMS: OVERALL TREND

- EPA received annual reports from 2,377 facilities conducting petroleum and natural gas systems activities
- Total reported GHG emissions were 316 million metric tons (MMT) CO<sub>2</sub> equivalent (CO<sub>2</sub>e)
- In early 2020, COVID-related reductions in demand contributed to unusual market conditions that caused the contraction of global oil prices and production



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

# REPORTED GHG EMISSIONS BY INDUSTRY SEGMENT

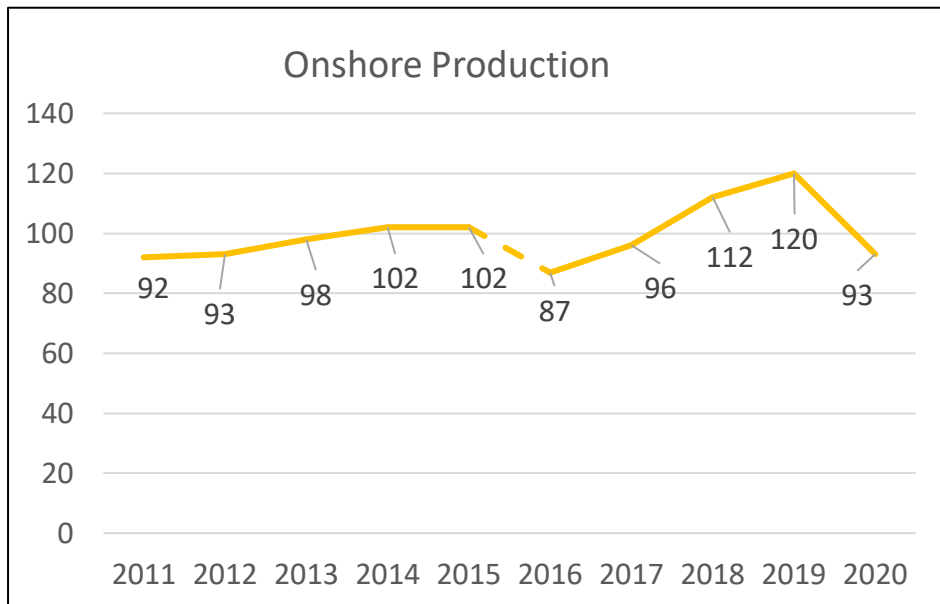
- EPA received annual reports from 2,377 facilities
- Reported emissions totaled 316 Million Metric Tons (MMT) CO<sub>2</sub> equivalent (CO<sub>2</sub>e)
- Largest segments in terms of reported GHG emissions were onshore production, gathering and boosting, and natural gas processing

Segment	Number of Facilities	2020 Reported Emissions (Million Metric Tons CO <sub>2</sub> e)
Onshore Production	468	93
Offshore Production	134	7
Gathering and Boosting	361	90
Natural Gas Processing	462	59
Natural Gas Transmission Compression	640	30
Natural Gas Transmission Pipeline	49	3
Underground Natural Gas Storage	52	1
LNG Import/Export	11	12
LNG Storage	5	<1
Natural Gas Distribution	164	13
Other Oil and Gas Combustion	56	8
<b>Total</b>	<b>2,377</b>	<b>316</b>



# ONSHORE PRODUCTION

- Reported emissions in onshore production totaled 93.5 MMT CO<sub>2</sub>e
- Methane emissions totaled 38.1 MMT CO<sub>2</sub>e and carbon dioxide emissions totaled 55.4 MMT CO<sub>2</sub>e
- Combustion equipment (32.7 MMT CO<sub>2</sub>e) and pneumatic devices (21.5 MMT CO<sub>2</sub>e) were the top reported emission sources in onshore production
- Decrease in reported GHG emissions were driven by decreases from associated gas venting and flaring; decreased emissions coincided with declines in oil production due to COVID-19



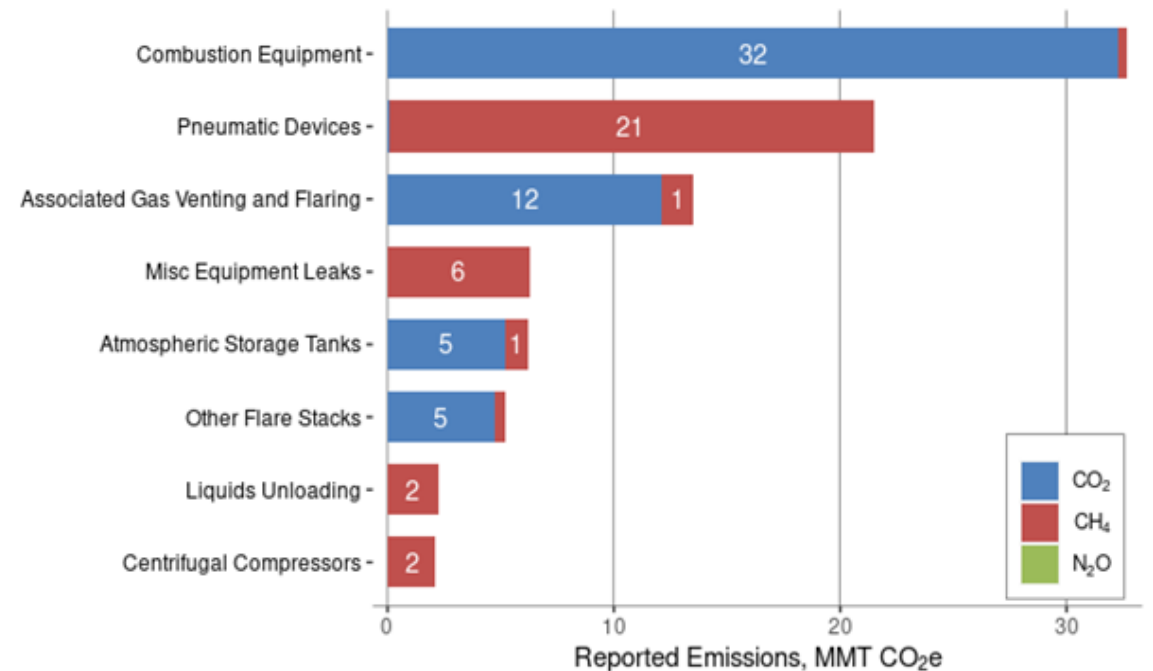
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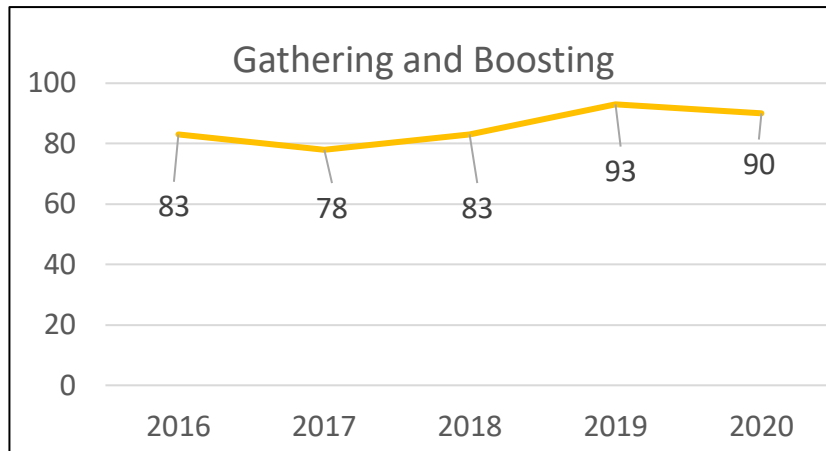
2020 Onshore Production: Top Reported Emission Sources



\* 2016-2020 not comparable with 2011-2015 due to changes in coverage of the segment

# GATHERING AND BOOSTING

- Reported emissions from gathering and boosting totaled 90.0 MMT CO<sub>2</sub>e
- Methane emissions totaled 19.8 MMT CO<sub>2</sub>e and carbon dioxide emissions totaled 70.2 MMT CO<sub>2</sub>e
- The top reported emission sources were combustion equipment (65.1 MMT CO<sub>2</sub>e) and miscellaneous equipment leaks (5.5 MMT CO<sub>2</sub>e)



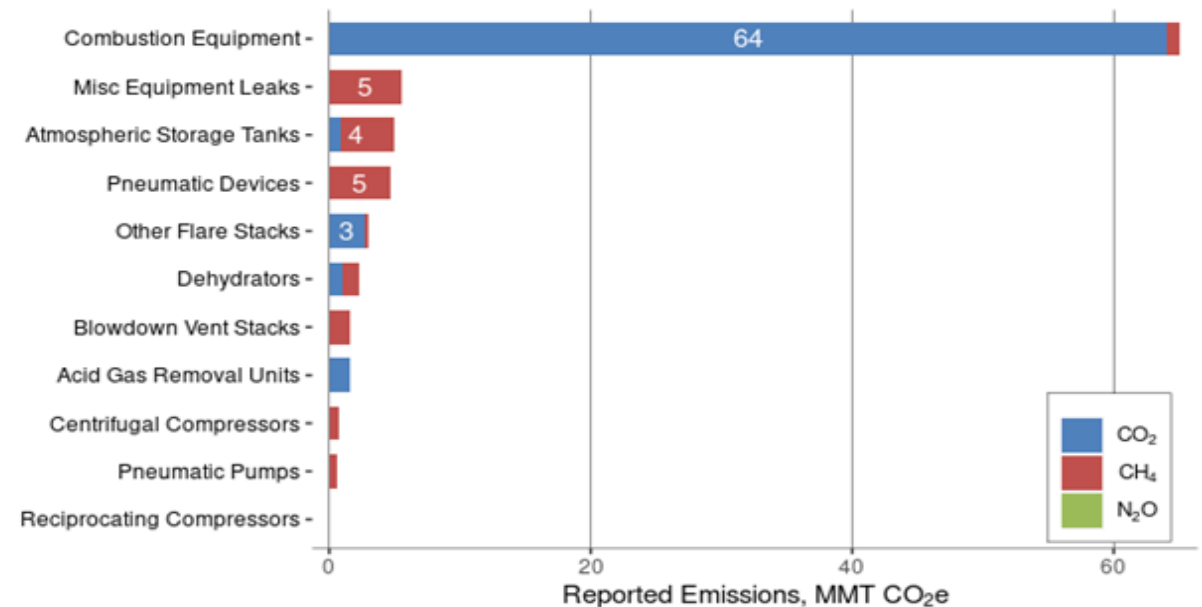
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2020 Gathering and Boosting: Top Reported Emission Sources

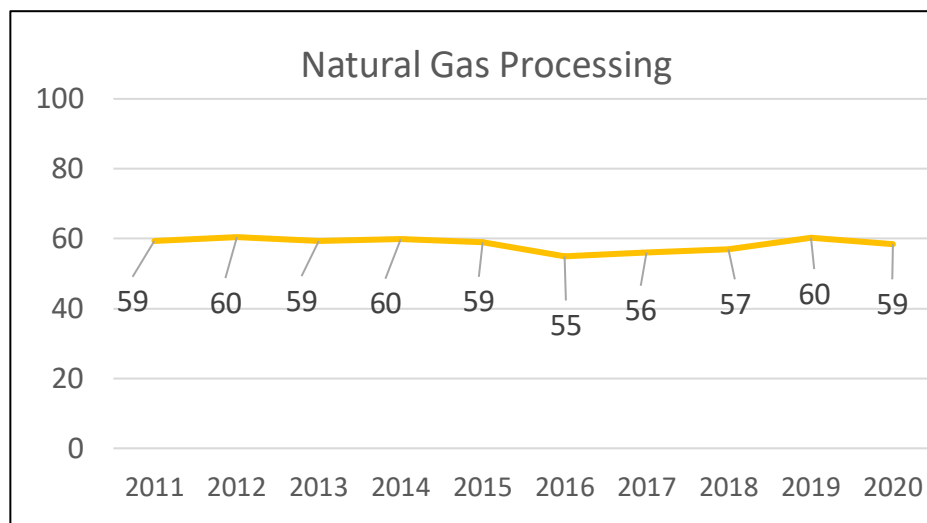


\*Gathering and boosting segment was first reported in 2016

GHGRP data as of 8/7/2021

# NATURAL GAS PROCESSING

- Reported emissions from natural gas processing totaled 58.9 MMT CO<sub>2</sub>e
- Methane emissions totaled 2.6 MMT CO<sub>2</sub>e and carbon dioxide emissions totaled 56.3 MMT CO<sub>2</sub>e
- The top reported emission sources were combustion equipment (38.7 MMT CO<sub>2</sub>e), acid gas removal units (12.2 MMT CO<sub>2</sub>e), and other flare stacks (5.9 MMT CO<sub>2</sub>e)



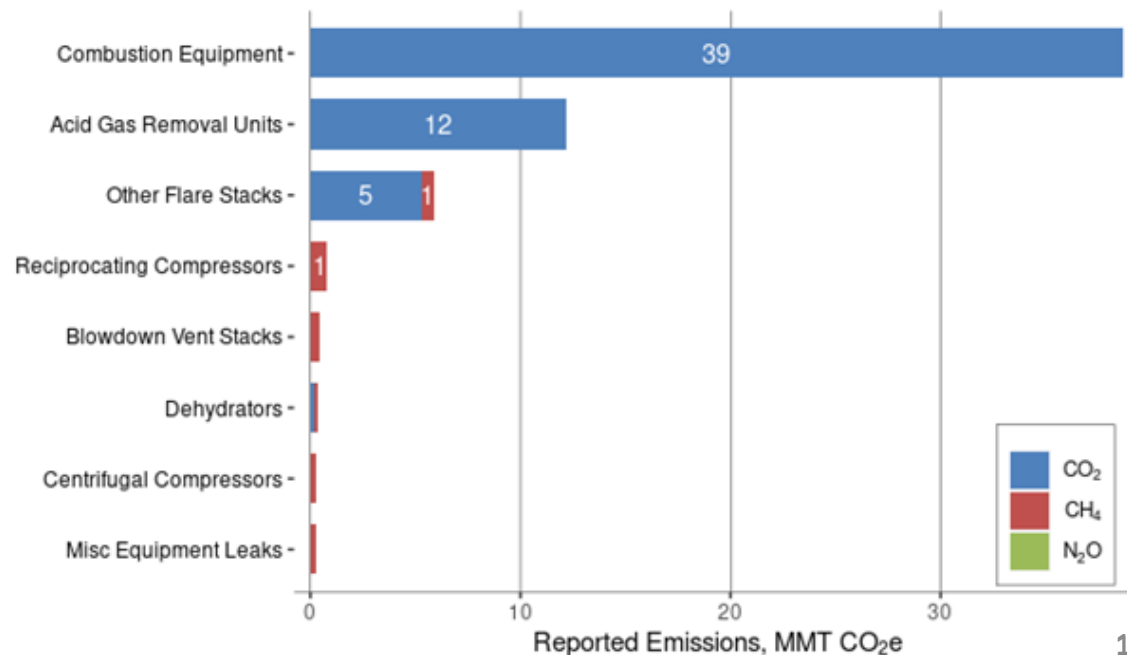
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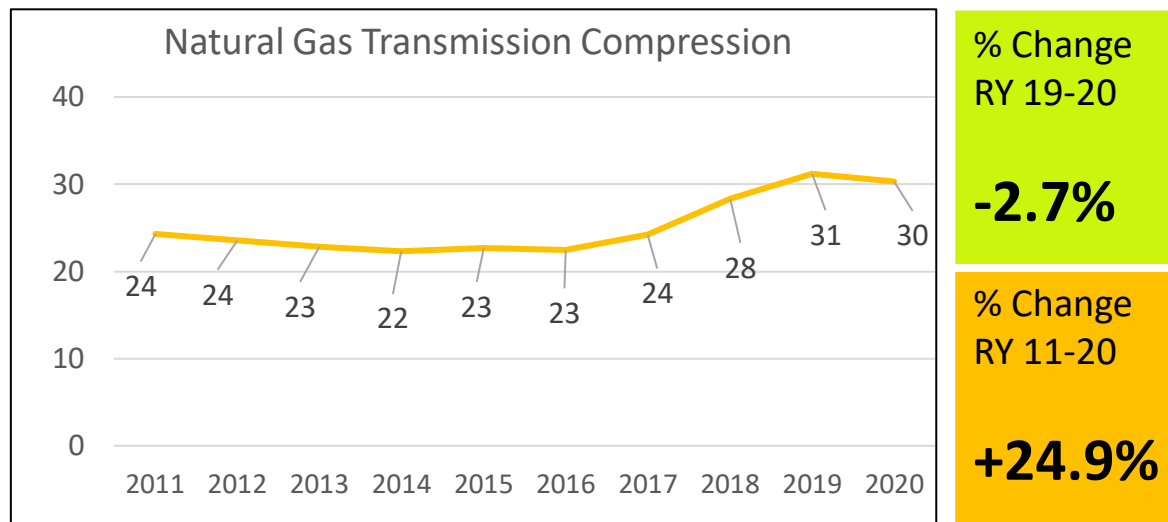
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2020 Natural Gas Processing: Top Reported Emission Sources

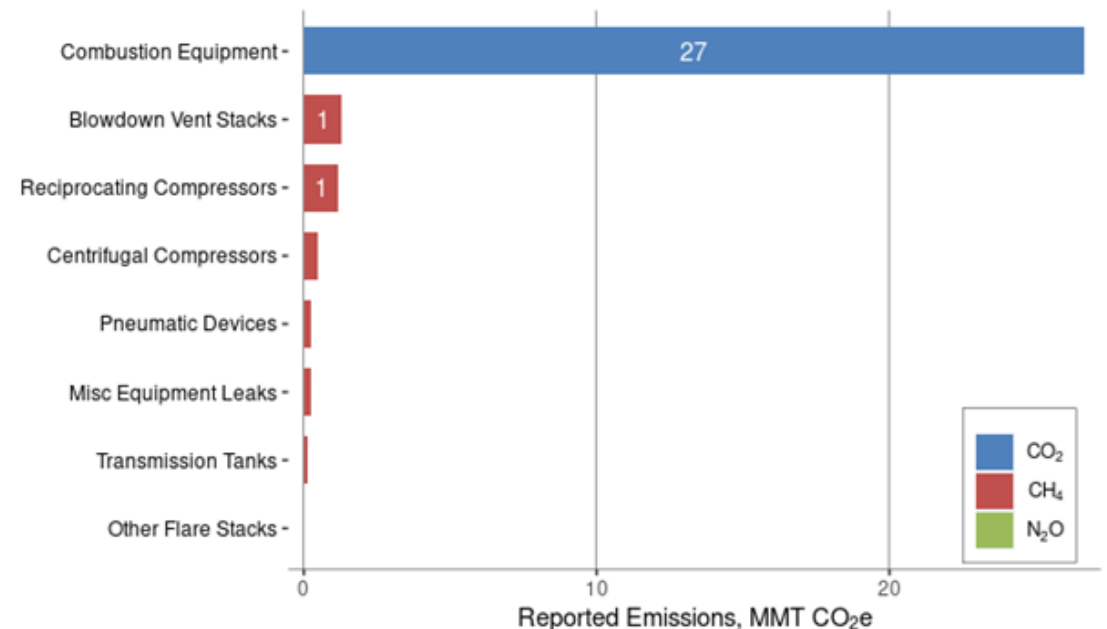


# NATURAL GAS TRANSMISSION COMPRESSION

- Reported emissions from natural gas transmission compression totaled 30.3 MMT CO<sub>2</sub>e
- Methane emissions totaled 3.6 MMT CO<sub>2</sub>e and carbon dioxide emissions totaled 26.7 MMT CO<sub>2</sub>e
- Top reported emission source was combustion equipment (26.7 MMT CO<sub>2</sub>e)

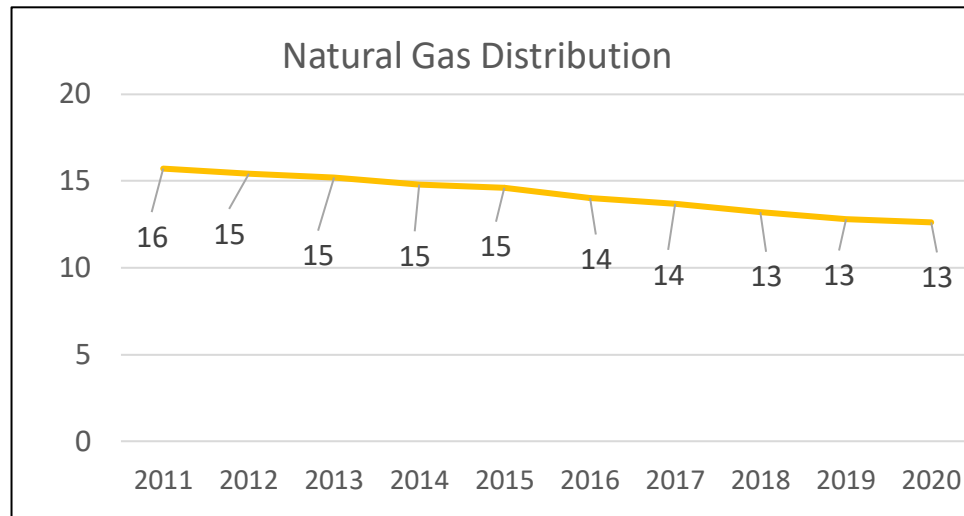


2020 Natural Gas Transmission Compression: Top Reported Emission Sources



# NATURAL GAS DISTRIBUTION

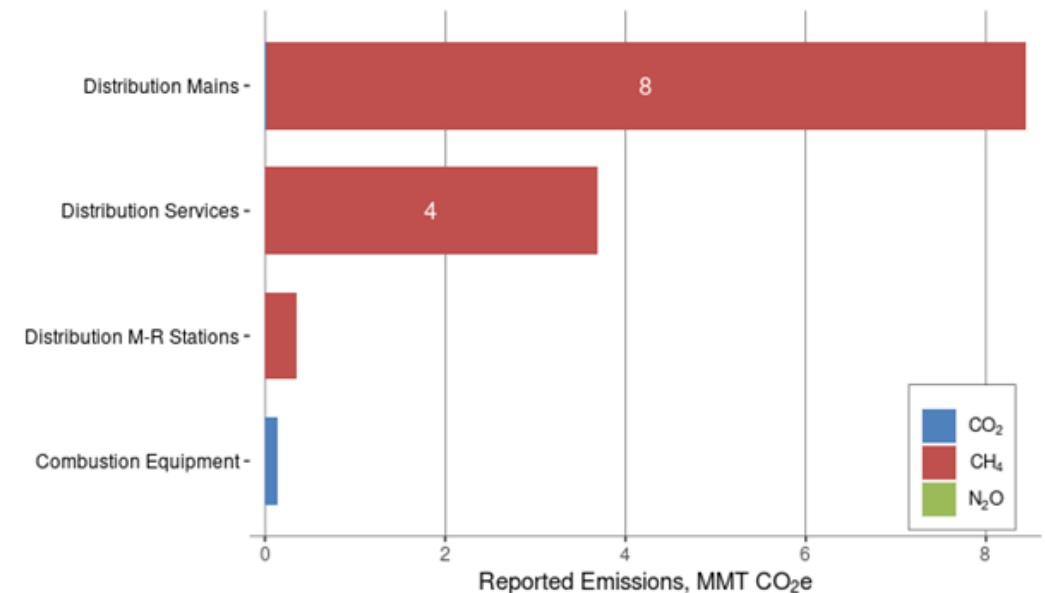
- Reported emissions from natural gas distribution totaled 12.6 MMT CO<sub>2</sub>e
- Methane emissions totaled 12.5 MMT CO<sub>2</sub>e and carbon dioxide emissions totaled 0.2 MMT CO<sub>2</sub>e
- Distribution mains (8.4 MMT CO<sub>2</sub>e) and distribution services (3.7 MMT CO<sub>2</sub>e) accounted for the majority of reported emissions



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2020 Natural Gas Distribution: Top Reported Emission Sources



# 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: <https://ghgdata.epa.gov/ghgp/main.do>
- Detailed publicly available data are provided in Envirofacts in a searchable, downloadable format
  - <https://www.epa.gov/enviro/greenhouse-gas-customized-search>

# OTHER GHGRP RESOURCES

- GHGRP Subpart W website: <https://www.epa.gov/ghgreporting/subpart-w-petroleum-and-natural-gas-systems>
- GHGRP Help Desk: [GHGReporting@epa.gov](mailto:GHGReporting@epa.gov)