

# 2017 GHGRP DATA HIGHLIGHTS

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## GHGRP 2017: Reported Data

For reporting year (RY) 2017, over 8,000 facilities and suppliers reported to the greenhouse gas reporting program. Among these reporters,

- 7,544 facilities in nine industry sectors reported direct emissions.
- Reported direct emissions totaled 2.91 billion metric tons carbon dioxide equivalent (CO<sub>2</sub>e), about half of total U.S. greenhouse gas emissions;
- 967 suppliers of fossil fuels and industrial gases reported; and
- 98 facilities reported injecting CO<sub>2</sub> underground.

Summary GHGRP data has been broken into several sections.

### Greenhouse Gas Reporting Program Background

As directed by Congress, EPA's Greenhouse Gas Reporting Program (GHGRP) collects annual greenhouse gas information from the top emitting sectors of the U.S. economy (Table 1). The GHGRP is the only dataset containing facility-level greenhouse gas (GHG) emissions data from large industrial sources across the United States. With seven consecutive years of reporting for most sectors, GHGRP data are providing important new information on industrial emissions—showing variation in emissions across facilities within an industry, variation in industrial emissions across geographic areas, and changes in emissions over time at the sector and facility level. EPA is using this facility-level data to improve estimates of national greenhouse gas emissions in the [U.S. Greenhouse Gas Inventory](#).

All greenhouse gas data presented here reflect the information reported to EPA as of August 19, 2018. The reported emissions **exclude biogenic CO<sub>2</sub>**. GHG data displayed are in units of carbon dioxide equivalent (CO<sub>2</sub>e) and reflect the global warming potential (GWP) values from [Table A-1](#), which is generally based on the Intergovernmental Panel on Climate Change (IPCC)'s [Fourth Assessment Report \(AR4\)](#). The GWPs for some fluorinated GHGs that did not have GWPs in the AR4 are from the IPCC's Fifth Assessment Report.

This document summarizes national industrial sector emissions and trends.

**Table 1: GHGRP Sector Classifications**

Industry Sector	Number of Reporters	Emissions (Million Metric Tons CO <sub>2</sub> e)
<a href="#">Power Plants</a>	1,369	1,792.8
<a href="#">Petroleum and Natural Gas Systems</a>	2,253	284.4
Onshore Petroleum & Nat. Gas Prod.	497	93.8
Offshore Petroleum & Nat. Gas Prod.	141	7.0
Onshore Pet. & Nat. Gas Gathering & Boosting	321	75.0
Natural Gas Processing	449	55.8
Natural Gas Transmission/Compression	529	24.2
Onshore Natural Gas Transmission Pipelines	33	2.6
Underground Natural Gas Storage	48	1.5
Natural Gas Local Distribution Companies	169	13.5

**Table 1: GHGRP Sector Classifications**

Industry Sector	Number of Reporters	Emissions (Million Metric Tons CO <sub>2</sub> e)
Liquefied Natural Gas Import/Export Equip.	6	3.8
LNG Storage	6	**
Other Petroleum & Natural Gas Systems	79	7.4
<b><u>Refineries</u></b>	144	177.4
<b><u>Chemicals</u></b>	456	184.1
Non-Fluorinated Chemicals		
Adipic Acid Production	3	9.1
Ammonia Manufacturing	29	33.1
Hydrogen Production	114	46.0
Nitric Acid Production	32	9.5
Petrochemical Production	67	53.7
Phosphoric Acid Production	11	1.4
Silicon Carbide Production	1	0.1
Titanium Dioxide Production	6	2.3
Other Chemicals	206	19.1
Fluorinated Chemicals		
Fluorinated GHG Production	14	4.7
HCFC-22 Prod./HFC-23 Dest.	4	5.2
<b><u>Waste</u></b>	1,496	105.6
Industrial Waste Landfills	171	8.1
MSW Landfills	1,134	86.5
Solid Waste Combustion	61	9.2
Industrial Wastewater Treatment	137	1.9
<b><u>Metals</u></b>	291	88.5
Aluminum Production	7	2.7
Ferroalloy Production	9	1.9
Iron and Steel Production	122	72.6
Lead Production	11	1.0
Magnesium Production	7	0.5
Zinc Production	5	0.6
Other Metals	130	9.2
<b><u>Minerals</u></b>	374	114.3
Cement Production	94	66.8
Glass Production	100	7.8
Lime Manufacturing	75	29.3
Soda Ash Manufacturing	4	5.4
Other Minerals	103	5.0
<b><u>Pulp and Paper</u></b>	222	35.8
Chemical Pulp and Paper Production	115	10.4
Other Paper Producers	107	25.5

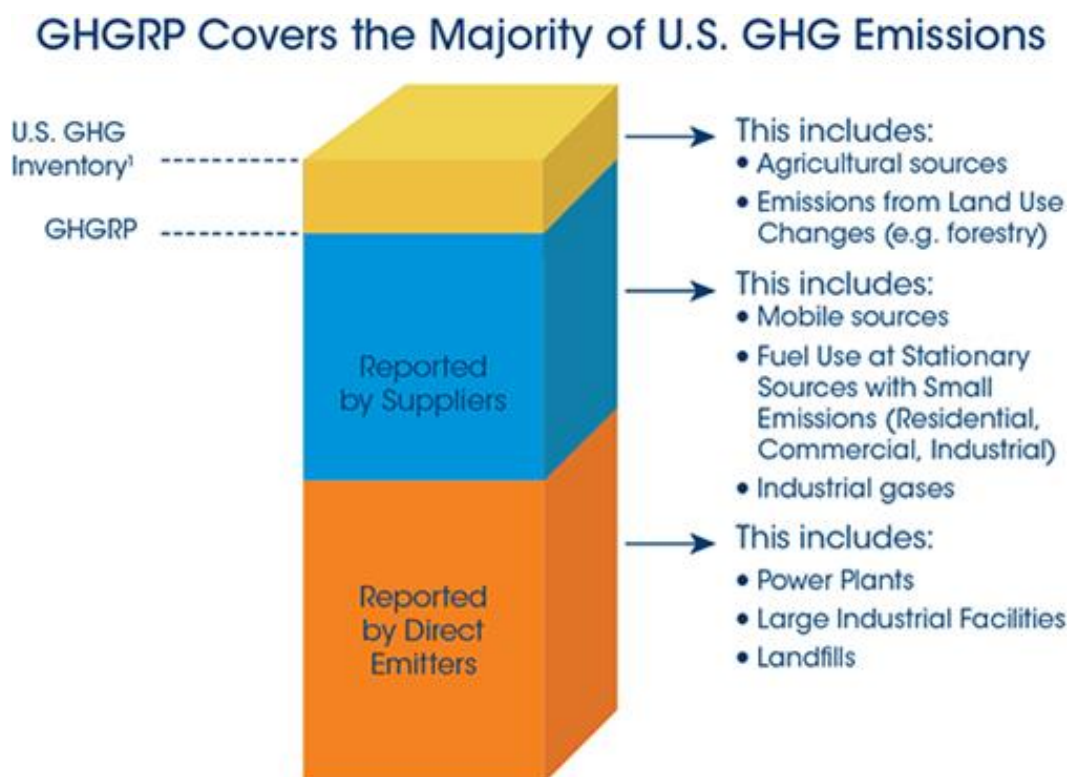
**Table 1: GHGRP Sector Classifications**

Industry Sector	Number of Reporters	Emissions (Million Metric Tons CO <sub>2</sub> e)
<b>Other</b>	1,308	130.1
Food Processing	331	29.4
Ethanol Production	173	19.4
Other Manufacturing	275	14.5
Universities	114	8.6
Military	33	1.7
Other Combustion	164	10.3
Underground Coal Mines	78	37.5
Electronics Manufacturing	51	6.1
Electrical Equipment Manufacturers	6	0.2
Use of Electrical Equipment	83	2.5

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

The GHGRP does not represent total U.S. GHG emissions, but provides facility level data for large sources of direct emissions, thus representing the majority of U.S. GHG emissions. The GHGRP data collected from direct emitters represent about half of all U.S. emissions. When including greenhouse gas information reported to the GHGRP by suppliers, emissions coverage reaches approximately 85–90% (See Figure 1). The [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016](#) contains information on all GHG emissions sources and sinks in the United States.

[Learn more](#) about the differences between the Inventory and the GHGRP.

**Figure 1: U.S. Greenhouse Gas Inventory and the Greenhouse Gas Reporting Program**

¹ Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014. April 2016.

Suppliers report the quantity of GHGs that would be emitted if the fuels and industrial GHGs that they place into the economy each year are used/released. Reporting by suppliers helps account for the greenhouse gas emissions by the numerous low-emitting sources that are not required to report emissions under the GHGRP (e.g., mobile sources, residential sources).

**Table 2: Overview of GHG Data Reported (2017)**

<b>Direct emitters</b>	
Number of facilities reporting	7,544
Reported direct emissions (billion metric tons CO <sub>2</sub> e)	2.91
<b>Suppliers of fuel and industrial gases</b>	
Number of suppliers	967
<b>Underground injection of carbon dioxide</b>	
Number of carbon dioxide injection facilities	98

### Who reports?

For 2017, 7,544 direct emitters submitted a GHG report. The Petroleum and Natural Gas Systems sector had the largest number of reporting facilities, followed by the Waste Sector and the Power Plants Sector. Among suppliers, Suppliers of Natural Gas and Natural Gas Liquids had the largest number of reporting facilities.

**Table 3: Number of Direct Emitters that Reported (2017)**

Industry Sector	Number of Reporters <sup>1</sup>
Power Plants	1,369
Petroleum and Natural Gas Systems	2,253
Refineries	144
Chemicals	456
• <i>Fluorinated Chemicals</i>	15
• <i>Non-fluorinated Chemicals</i>	441
Waste	1,496
Metals	291
Minerals	374
Pulp and Paper	222
Other	1,308
• <i>Underground Coal Mines</i>	78
• <i>Electrical Equipment Production &amp; Use</i>	89
• <i>Electronics Manufacturing</i>	51
• <i>Other Combustion</i>	1,090

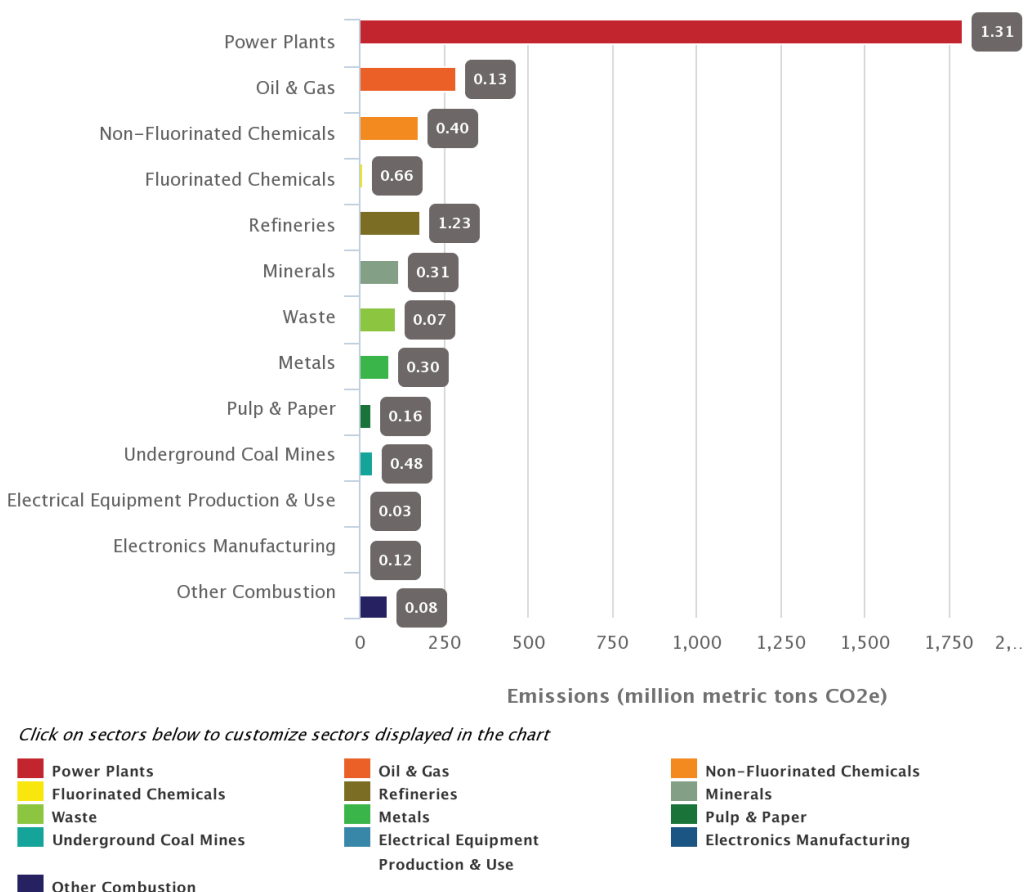
**Reported Emissions**

In 2017, 2.91 billion metric tons CO<sub>2</sub>e were reported by direct emitters. The largest emitting sector was the Power Plants Sector with 1.8 billion metric tons CO<sub>2</sub>e, followed by the Petroleum and Natural Gas Systems Sector with 284 million metric tons (MMT) CO<sub>2</sub>e and the Chemicals Sector with 184 MMT CO<sub>2</sub>e (non-fluorinated and fluorinated chemicals combined). This information, as well as average emissions per reporter, is shown in the following chart.

<sup>1</sup> Totals sum to more than 7,544 because facilities whose activities fall within more than one sector are counted multiple times.



**Figure 2: Direct GHG Emissions Reported by Sector (2017)**  
**2017 Direct GHG Emissions Reported by Sector**



[View this information in FLIGHT.](#)

## Emissions Trends

National level trends in greenhouse gas emissions are available through [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016](#). The Greenhouse Gas Reporting Program is different from the U.S. GHG Inventory in that it collects information from the largest stationary sources in the U.S. and provides nearly complete emissions coverage for many of the largest emitting industries. Trends in emissions reported for individual industries are discussed in the industry-specific reports.

Total U.S. emissions decreased by 1.9 percent from 2015 to 2016, based on the U.S. GHG Inventory. For sources reporting to the GHGRP, excluding emissions from the oil and gas sector (which reported new source in 2016), emissions decreased by 4.0 percent from 2015 to 2016.

The U.S. GHG Inventory is not yet available for 2017. For sources reporting to the GHGRP, emissions decreased by 2.6 percent from 2016 to 2017. Over the past six reporting years (2011-2017), GHGRP reported direct emissions from sectors other than oil and gas (also excluding suppliers) declined by 15.1 percent. This decline is primarily caused by a 19.3 percent decline in reported power plant emissions since 2011.

**Table 4: Emissions Trends for U.S. GHG Inventory and GHGRP (2011-2017)**

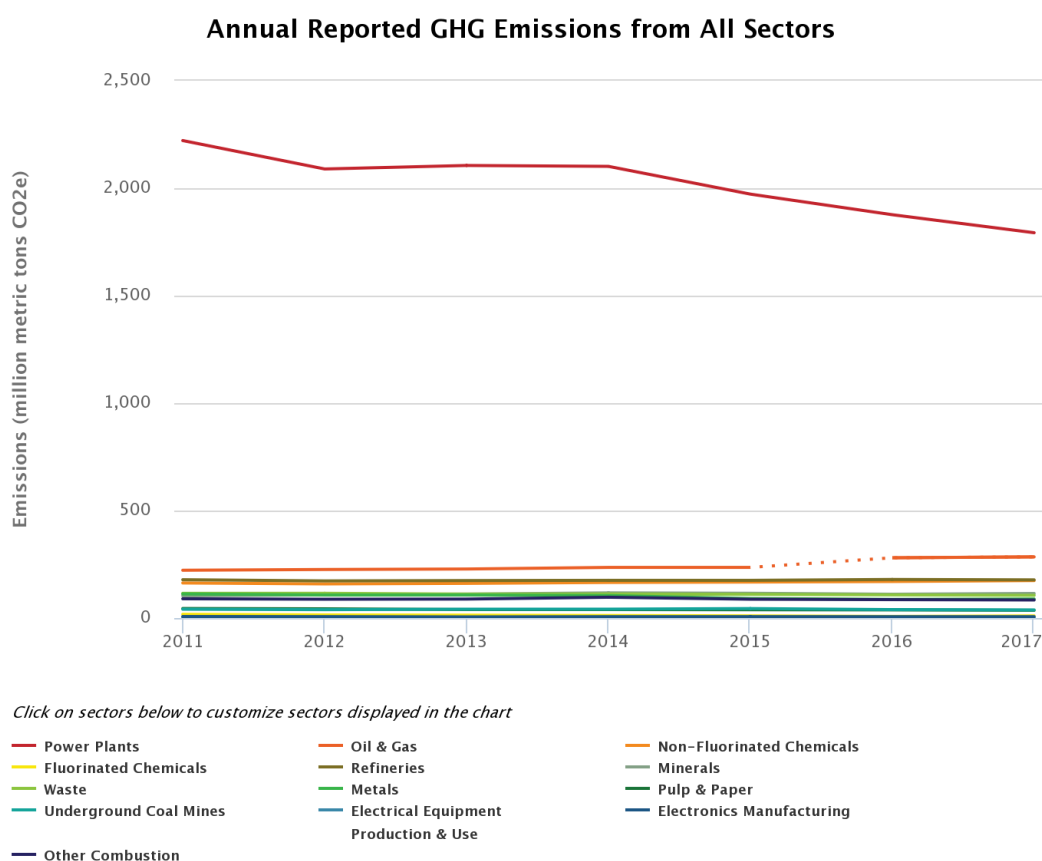
	2011	2012	2013	2014	2015	2016	2017
<b>U.S. GHG Inventory</b>							
Total emissions (million metric tons CO <sub>2</sub> e)	6,771.1	6,528.8	6,709.1	6,763.1	6,638.13	6,511.3	Not available
Percent change in emissions from previous year	—	-3.6%	2.8%	0.8%	-1.8%	-1.9%	Not available
<b>GHGRP</b>							
Number of direct-emitting facilities	7,645	7,896	7,982	8,205	8,041	7,672	7,544
Direct emissions (million metric tons CO <sub>2</sub> e)	3,318.4	3,169.3	3,189.4	3,203.3	3,055.7	2,990.4 <sup>2</sup>	2,913.1 <sup>2</sup>
Percent change in emissions from previous year	—	-4.5%	0.6%	0.4%	-4.6%	-2.1%	-2.6%

**Table 5: Emission Trends by Sector (2011-2017)**

Sector	2011 Emissions (MMT CO <sub>2</sub> e)	2012 Emissions (MMT CO <sub>2</sub> e) <sup>3</sup>	2013 Emissions (MMT CO <sub>2</sub> e)	2014 Emissions (MMT CO <sub>2</sub> e)	2015 Emissions (MMT CO <sub>2</sub> e)	2016 Emissions (MMT CO <sub>2</sub> e)	2017 Emissions (MMT CO <sub>2</sub> e)
Power Plants	2,221.7	2,089.5	2,105.8	2,101.7	1,972.5	1,876.7	1,792.8
Oil & Gas	222.3	225.7	228.0	235.5	235.5	280.2 <sup>2</sup>	284.4 <sup>2</sup>
Chemicals	180.4	173.0	174.5	177.1	177.3	177.3	184.1
• <i>Fluorinated Chemicals</i>	17.3	14.4	13.4	11.7	10.1	7.5	9.9
• <i>Non-fluorinated Chemicals</i>	163.1	158.6	161.1	165.4	167.3	169.8	174.2

<sup>2</sup> GHG data for the Petroleum and Natural Gas Systems source category is not directly comparable between 2011-2015 and 2016 onward. Facilities in the Onshore Oil & Gas gathering & Boosting and Onshore Gas Transmission Pipelines industry segments began reporting in 2016.

Sector	2011 Emissions (MMT CO <sub>2</sub> e)	2012 Emissions (MMT CO <sub>2</sub> e) <sup>3</sup>	2013 Emissions (MMT CO <sub>2</sub> e)	2014 Emissions (MMT CO <sub>2</sub> e)	2015 Emissions (MMT CO <sub>2</sub> e)	2016 Emissions (MMT CO <sub>2</sub> e)	2017 Emissions (MMT CO <sub>2</sub> e)
Refineries	178.2	172.6	174.3	175.3	175.3	179.3	177.4
Waste	114.9	115.0	111.2	111.8	110.3	107.6	105.6
Metals	112.0	106.8	106.9	104.4	90.8	86.8	88.5
Minerals	103.2	107.8	111.5	117.0	115.1	110.6	114.3
Pulp & Paper	44.2	42.8	39.4	39.3	38.4	37.7	35.8
Other	141.6	136.0	137.7	141.4	140.5	134.1	130.1
• <i>Underground Coal Mines</i>	40.9	38.8	41.0	41.2	43.9	39.2	37.5
• <i>Electrical Equipment Production &amp; Use</i>	4.3	3.4	3.4	3.3	2.8	3.2	2.7
• <i>Electronics Manufacturing</i>	7.0	6.4	5.2	6.2	6.3	6.2	6.1
• <i>Other Combustion</i>	89.5	87.4	88.1	90.6	87.4	85.5	83.9

**Figure 3: Trends in Direct GHG Emissions (2011-2017)<sup>3,4</sup>**

[View this information in FLIGHT.](#)

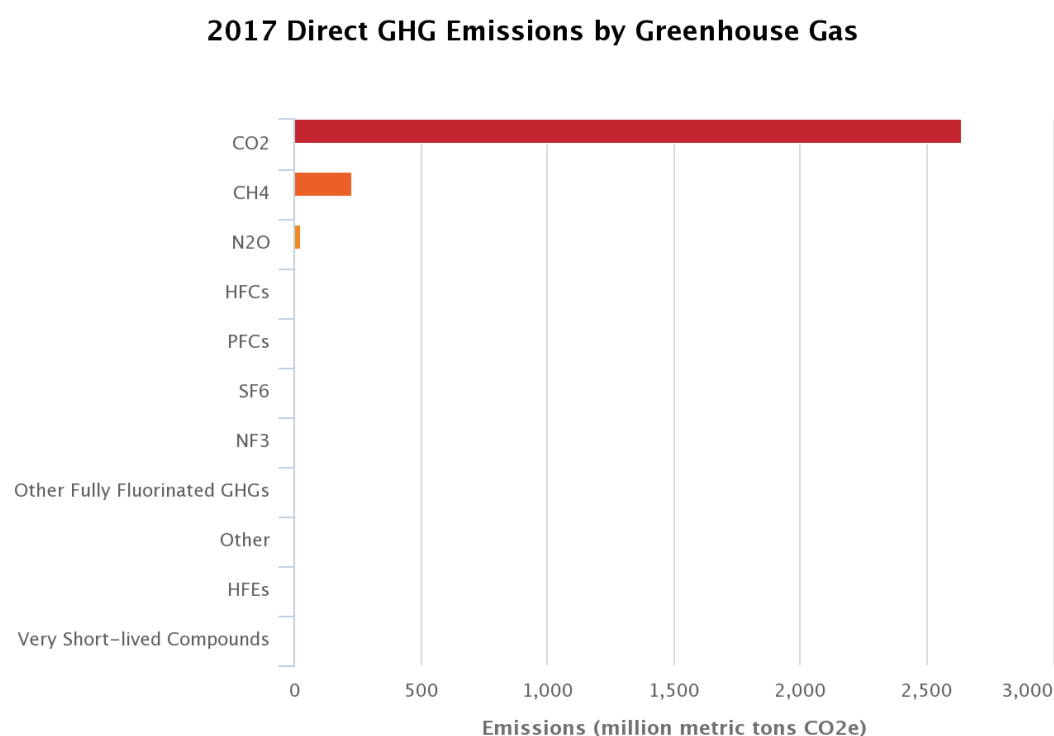
### Emissions by GHG

Carbon dioxide is the GHG emitted in the largest quantities. The 2.6 billion metric tons of CO<sub>2</sub> reported for 2017 represent 90.7 percent of the GHGs reported in 2016.<sup>5</sup> Methane emissions represent 7.7 percent of reported 2017 GHG emissions, N<sub>2</sub>O represents 0.9 percent, and fluorinated gases (HFCs, PFCs, SF<sub>6</sub>) represent 0.6 percent (Figure 4).

<sup>3</sup> Non-fluorinated Chemicals and Fluorinated Chemicals are components of “Chemicals” in FLIGHT.

<sup>4</sup> Other Combustion, Underground Coal Mines, Electronics Manufacturing and Electrical Equipment Production & Use comprise “Other” in FLIGHT.

<sup>5</sup> The Inventory of U.S. Greenhouse Gas Emissions And Sinks for 2017 is not yet available. In 2016, CO<sub>2</sub> represented 82 percent of total U.S. GHG emissions.

**Figure 4: Direct Emissions by GHG (2017)**

Click on gases below to customize gases displayed in the chart



The table below lists the primary sectors emitting each GHG.

**Table 6: Largest Sources of GHG Emissions**

Greenhouse Gas	Source Categories Contributing Most to Emissions <sup>6</sup>	Sectors Contributing Most to Emissions
CO <sub>2</sub>	Electricity Generation (D), Stationary Combustion (C)	Power Plants, Petroleum and Natural Gas Systems
CH <sub>4</sub>	Petroleum & Natural Gas Systems (W), Municipal Landfills (HH)	Petroleum and Natural Gas Systems, Waste
N <sub>2</sub> O	Nitric Acid Production (V), Adipic Acid Production (E), Electricity Generation (D)	Chemicals, Power Plants
SF <sub>6</sub>	SF <sub>6</sub> from Electrical Equipment (DD), Electronics Manufacturing (I)	Other, Metals
NF <sub>3</sub>	Electronics Manufacturers (I), Fluorinated Gas Production (L)	Other, Chemicals

<sup>6</sup> These source categories account for 75 percent or more of the reported emissions of the corresponding GHG. The subpart under which the emissions were reported is shown in parentheses.

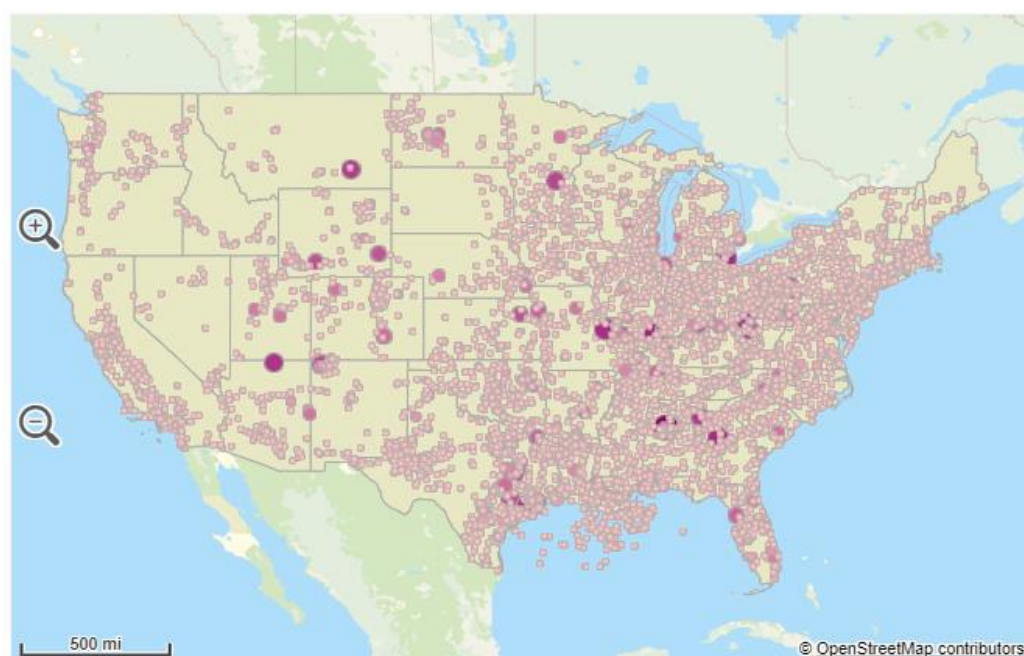
Table 6: Largest Sources of GHG Emissions

Greenhouse Gas	Source Categories Contributing Most to Emissions <sup>6</sup>	Sectors Contributing Most to Emissions
HFCs	HCFC-22 Production and HFC-23 Destruction (O), Fluorinated Gas Production (L)	Chemicals
PFCs	Electronics Manufacturers (I), Fluorinated Gas Production (L)	Chemicals, Other

### Geographic Distribution of Emissions

**Figure 5: Location and Total Reported Emissions from GHGRP Facilities (2017)**

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**All Sectors**  
**(metric tons CO<sub>2</sub>e)**

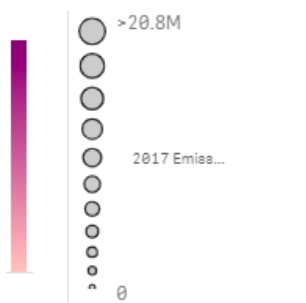


Choose an option from the  
dropdown menu to change  
the focus of the map.

Continental U.S. ▼

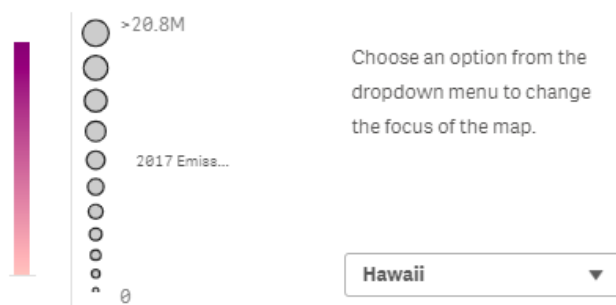


**Alaska**  
**GHGRP, 2017**  
**All Sectors**  
**(metric tons CO<sub>2</sub>e)**

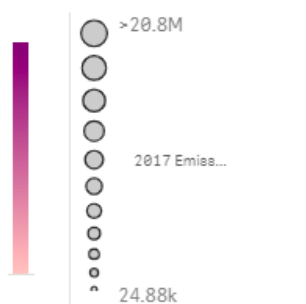
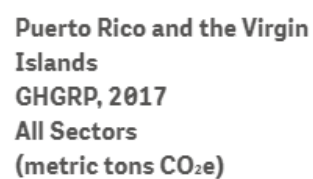


Choose an option from the  
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the focus of the map.

Alaska ▼

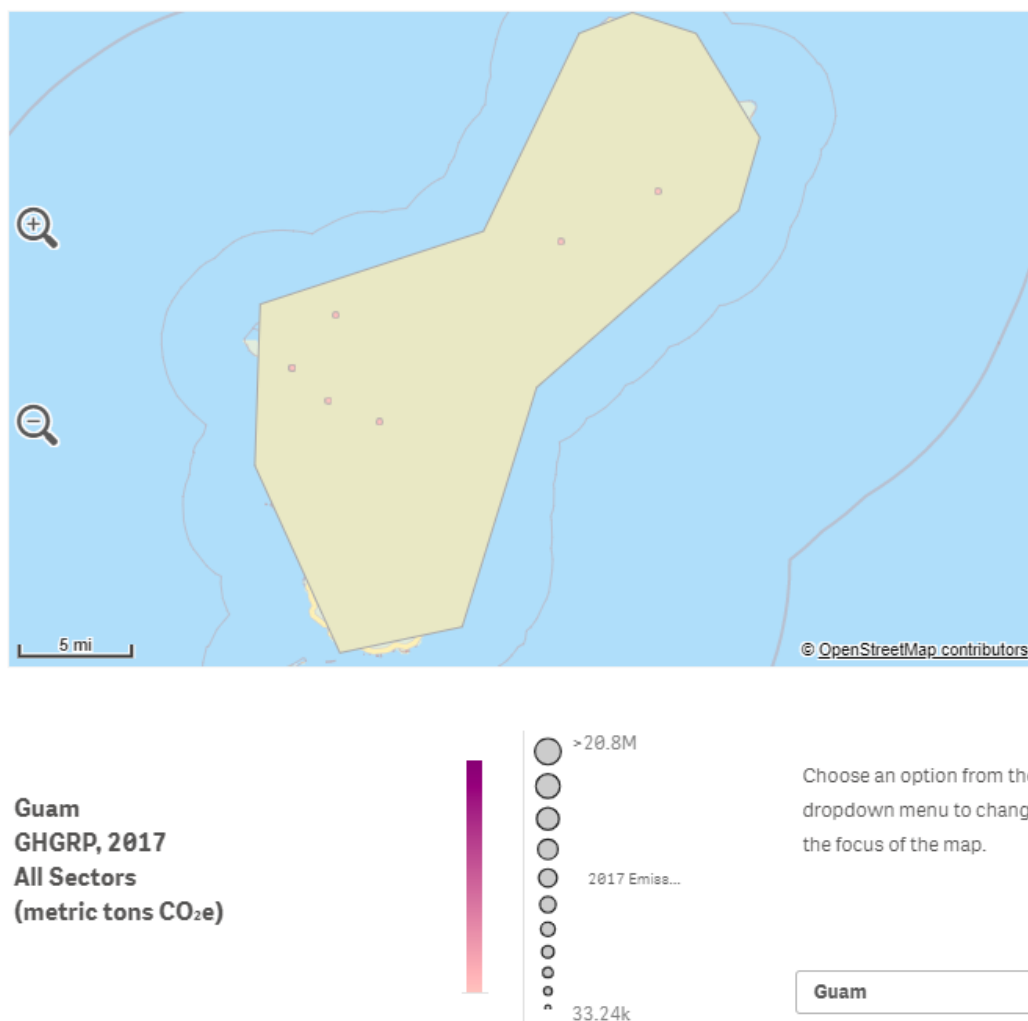






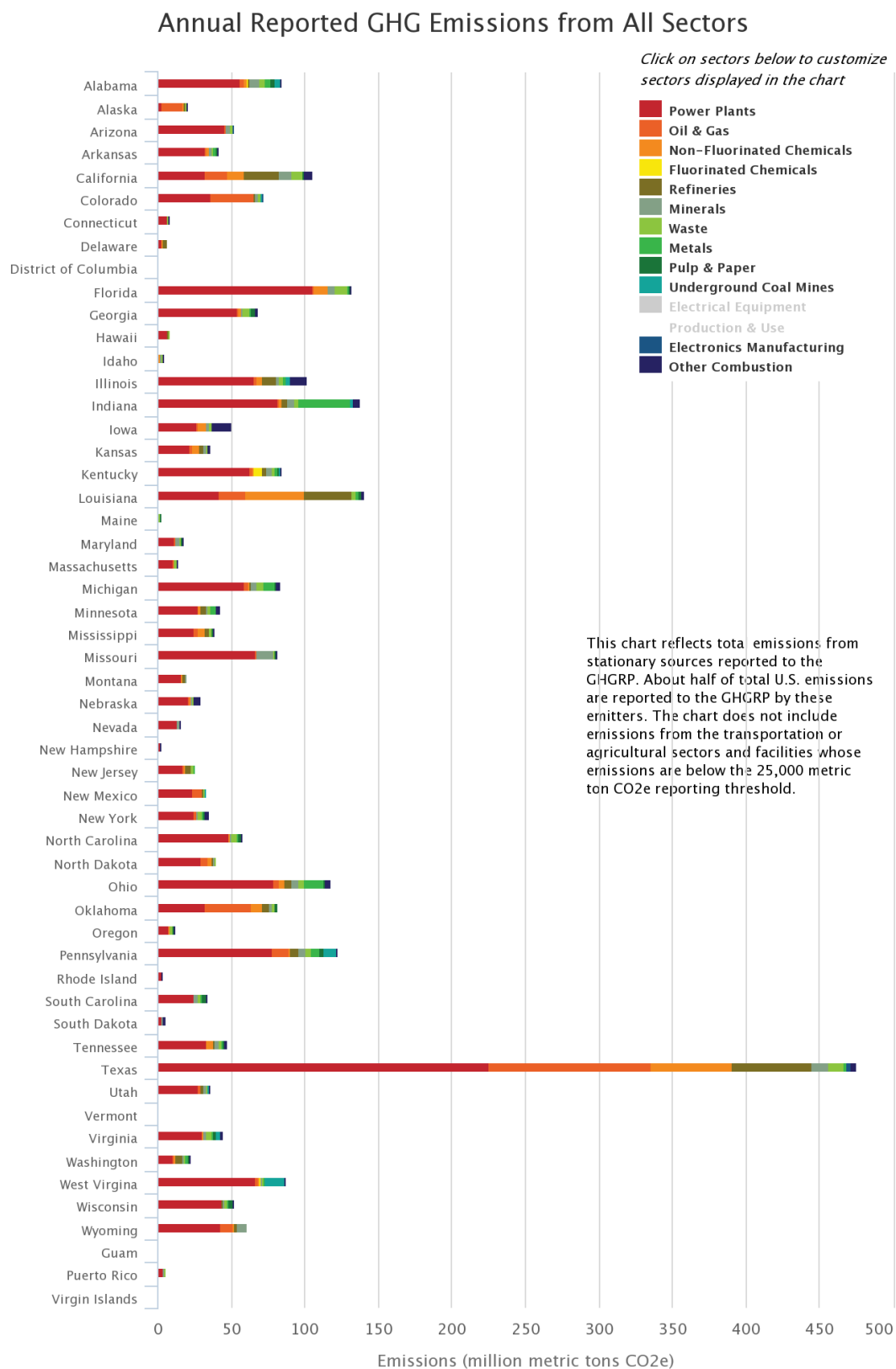
Choose an option from the dropdown menu to change the focus of the map.

Puerto Rico &amp; USVI



Readers can identify facilities in their state, territory, county, or city by visiting the Facility Level Information on GreenHouse gases Tool ([FLIGHT](#)).

Because it generally applies to facilities that emit greater than 25,000 metric tons CO<sub>2</sub>e per year, the GHGRP provides total reported emissions from large stationary sources in each state. Figure 6 shows the reported emissions in each state broken out by industrial sector.

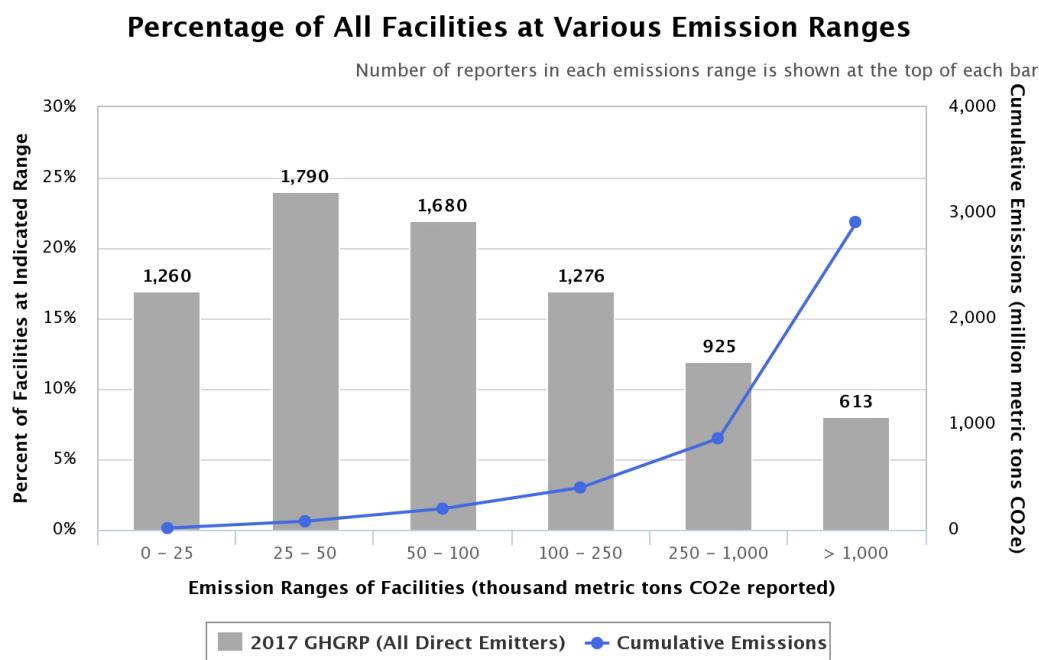
**Figure 6: Direct GHG Emissions by State and Sector (2017)**

[View this information in FLIGHT.](#)

## Emissions Range

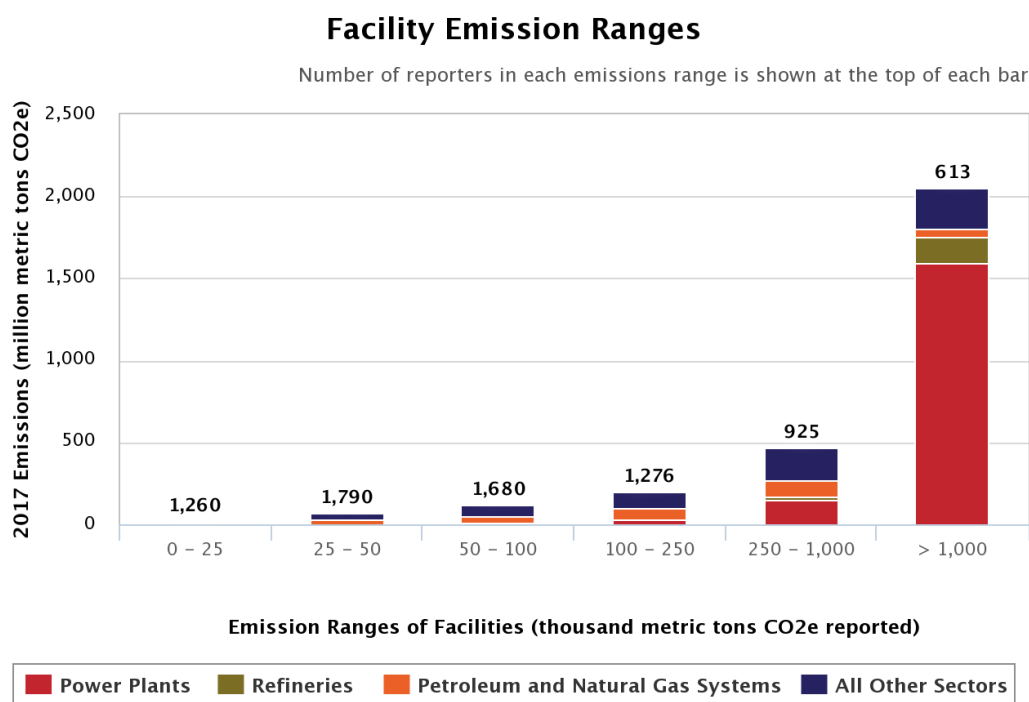
The GHGRP provides a comprehensive dataset that can be used to determine the number of facilities at various emissions levels in many industry sectors. The GHGRP can also be used to determine the total GHG emissions from individual facilities, including emissions from fossil fuel combustion and other processes.

**Figure 7: Percentage of All Reporting Facilities at Various Emission Ranges (2017)**



Eighty percent of reporting facilities had emissions less than 250,000 metric tons CO<sub>2</sub>e. In 2017, the 613 largest-emitting facilities—those emitting more than one million metric tons CO<sub>2</sub>e—accounted for 2.05 billion metric tons CO<sub>2</sub>e. These emissions represent 70.4 percent of the total 2.91 billion metric tons CO<sub>2</sub>e reported. These high-emitting facilities are mainly power plants, but they also include facilities in all other direct emitter sectors.

You can use FLIGHT to [list and sort facilities based on total reported emissions](#). This tool also allows you to sort facilities by specific industry types.

**Figure 8: Facility Emission Ranges (2017)**

### GHGRP Calculation Methods Used

The GHGRP prescribes methodologies that must be used to determine GHG emissions from each source category. Reporters generally have the flexibility to choose among several methods to compute GHG emissions. The decision of which method to use may be influenced by the existing environmental monitoring systems in place and other factors. Reporters can change emission calculation methods from year to year and within the same year, as long as they meet the requirements for use of the method selected.

Additional information on the [methodologies that reporters use to determine GHG emissions](#).

### Report Verification

All reports submitted to EPA are evaluated by electronic validation and verification checks. If potential errors are identified, EPA will notify the reporter, who can resolve the issue either by providing an acceptable response describing why the flagged issue is not an error or by correcting the flagged issue and resubmitting their annual GHG report.

Additional information describing [EPA's verification process in more details](#).

### For More Information

For more detailed information from each industrial sector, view the industry sections below.

Use [FLIGHT](#) to view maps of facility locations, obtain summary data for individual facilities, create customized searchers, and display search results graphically.

Downloadable spreadsheets containing summary data reported to the GHGRP from each reporter are available on the [Data Downloads](#) page.

All other publicly available data submitted to the GHGRP are available for download through [Envirofacts](#).

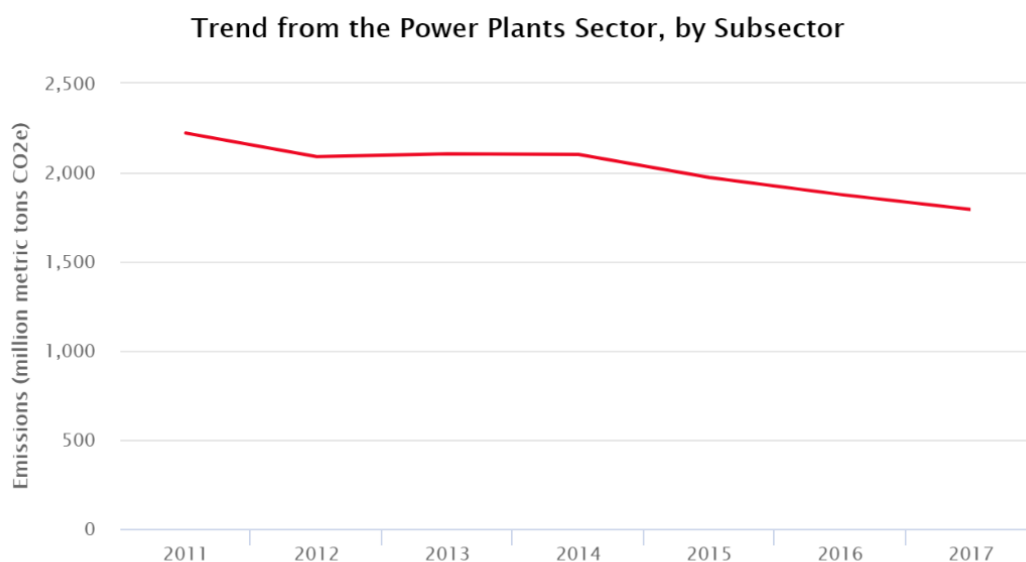
The [U.S. Greenhouse Gas Inventory](#) contains information on all sources of GHG emissions and sinks in the United States from 1990 to 2016.

All GHG emissions data reflect the global warming potential (GWP) values from the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (*Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland, 2007*). The AR4 values also can be found in the current version of Table A-1 in subpart A of 40 CFR part 98.

## GHGRP 2017: Power Plants

The power plant sector consists of facilities that produce electricity by combusting fossil fuels and/or biomass. The sector includes units that are subject to the Acid Rain Program and any other electricity generators that are otherwise required to report to the EPA CO<sub>2</sub> mass emissions year-round according to 40 CFR part 75. This sector also includes combustion units serving electricity generators that are located at facilities with primary NAICS codes of 221330 (Steam and Air-Conditioning Supply<sup>7</sup>) or 2211xx (Electric Power Generation, Transmission and Distribution), which includes some part 75 reporters that report heat input to the EPA on a year-round basis. The emissions from this sector are solely from stationary fuel combustion sources.

### Trend of Annual Reported GHG Emissions in the Power Plant Sector (as of 8/19/18)

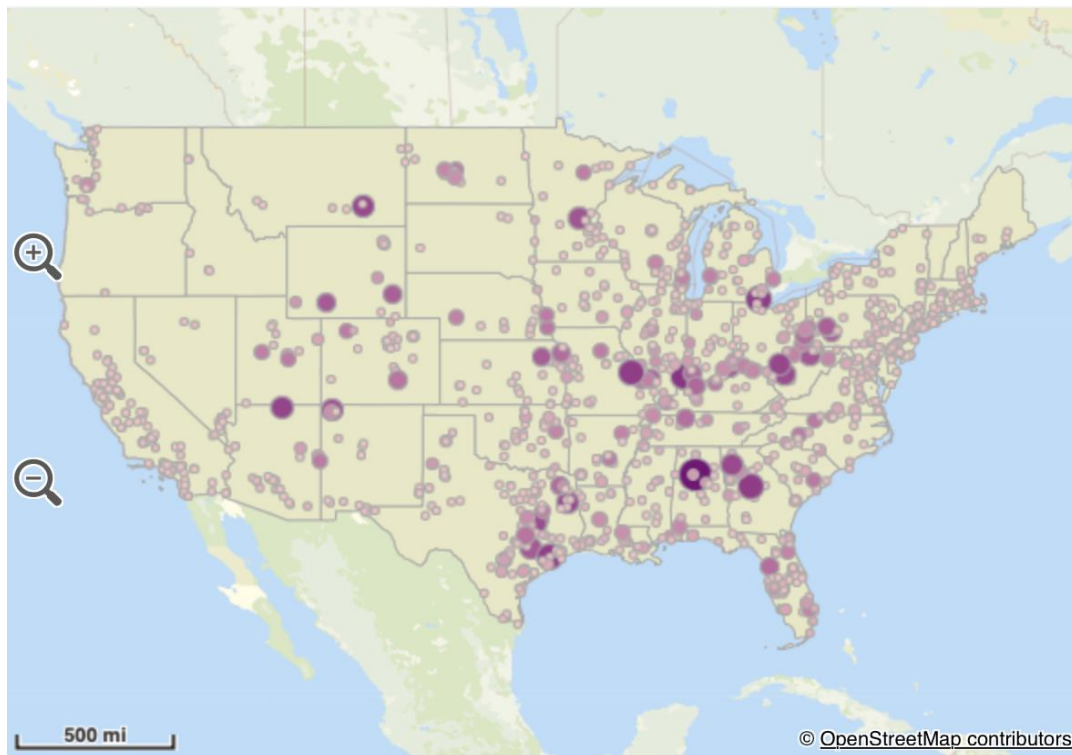


What factors influenced the [trend in emissions for power plants](#)?

### Location and emissions range for each reporting facility in the power plant sector (as of 8/19/18)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.

<sup>7</sup> Establishments primarily engaged in providing steam, heated air, or cooled air. The steam distribution may be through mains.



**GHGRP, 2017**  
**Power Plants**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Continental U.S. ▼



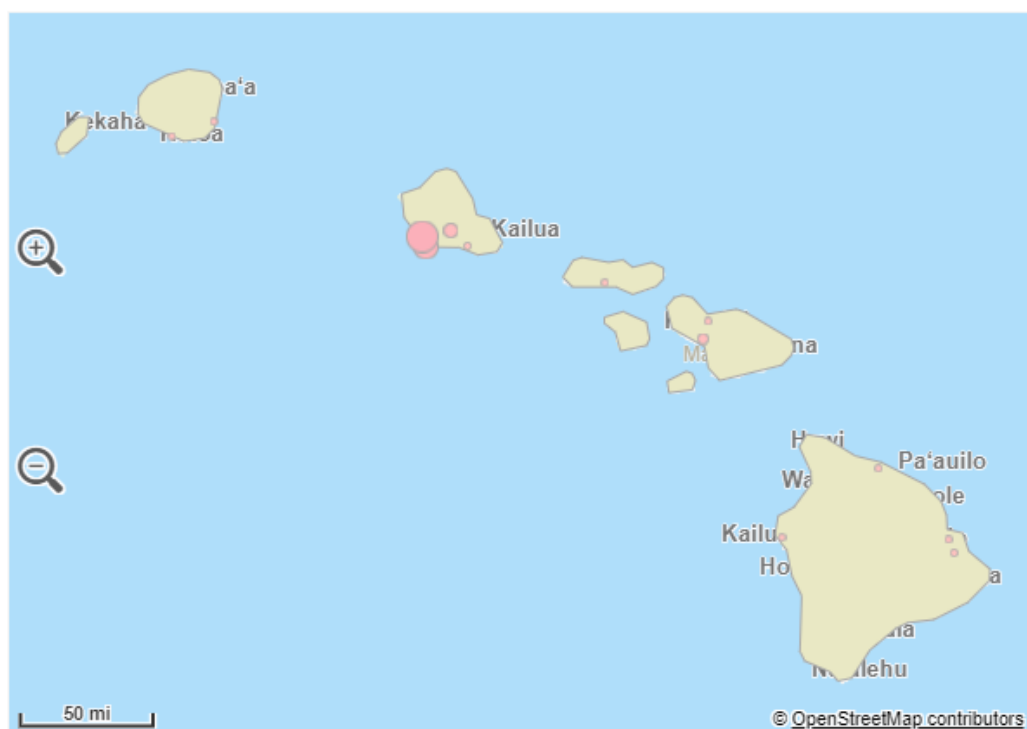


**Alaska**  
**GHGRP, 2017**  
**Power Plants**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from  
the dropdown menu to  
change the focus of the  
map.

Alaska ▼



**Hawaii**  
**GHGRP, 2017**  
**Power Plants**  
**(metric tons CO<sub>2</sub>e)**

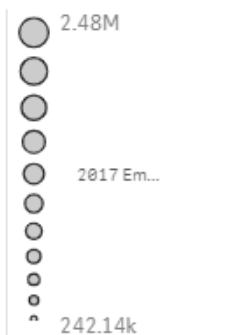


Choose an option from the dropdown menu to change the focus of the map.

Hawaii ▼

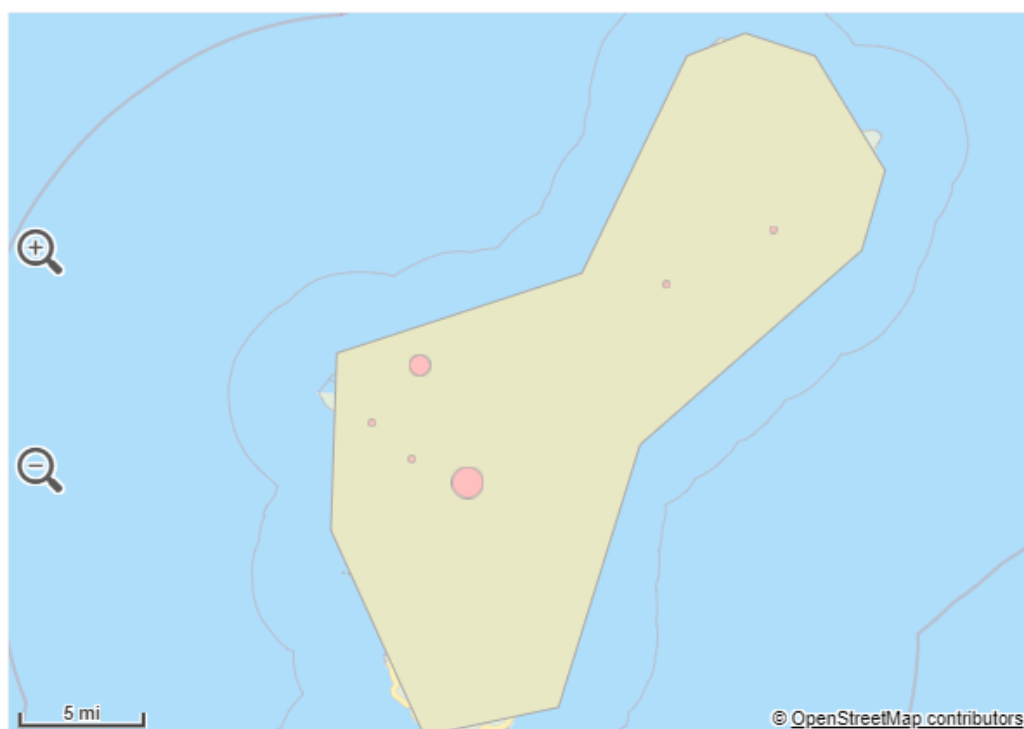


**Puerto Rico and the  
Virgin Islands  
GHGRP, 2017  
Power Plants  
(metric tons CO<sub>2</sub>e)**



Choose an option from  
the dropdown menu to  
change the focus of the  
map.

Puerto Rico & USVI ▼



Guam  
GHGRP, 2017  
Power Plants  
(metric tons CO<sub>2</sub>e)



Choose an option from  
the dropdown menu to  
change the focus of the  
map.

Guam ▼

### Number of reporters and emissions in the power plant sector (as of 8/19/18)

Power Plants Sector – Greenhouse Gas Emissions Reported to the GHG (all emissions values presented in million metric tons CO <sub>2</sub> e unless otherwise noted)							
	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	1,592	1,609	1,577	1,547	1,485	1,411	1,369
<b>Total emissions (CO<sub>2</sub>e):</b>	2,221.7	2,089.5	2,105.8	2,101.7	1,972.5	1,876.7	1,792.8
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	2,208.3	2,077.6	2,093.6	2,089.3	1,961.4	1,866.6	1,783.0
• Methane (CH <sub>4</sub> ):	4.2	3.7	3.7	4.0	3.6	3.3	3.2
• Nitrous oxide (N <sub>2</sub> O):	9.2	8.2	8.4	8.4	7.4	6.8	6.6

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

## Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)

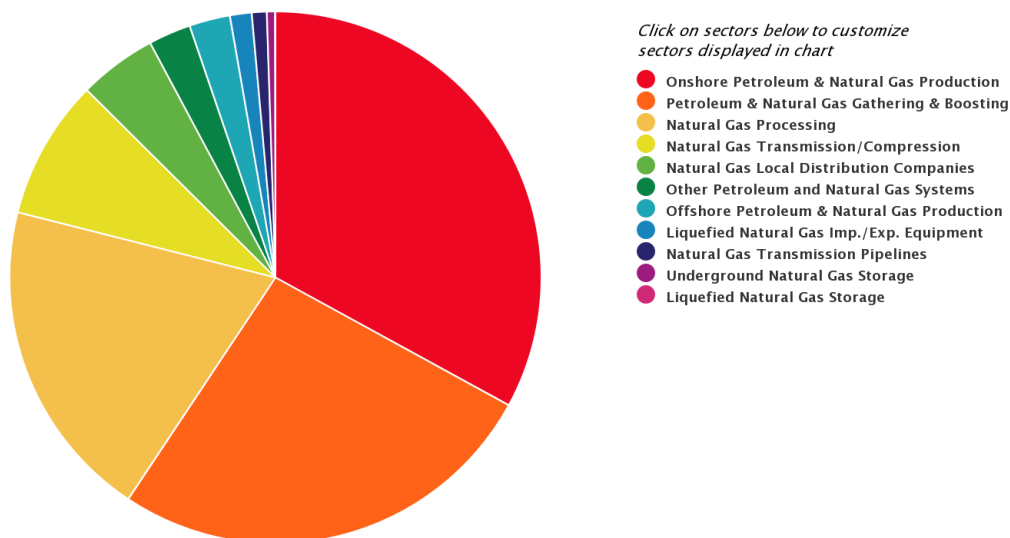
## GHGRP 2017: Petroleum & Natural Gas Systems

This sector consists of the following industry segments of the petroleum and natural gas industry.

- **Onshore Production.** Production of petroleum and natural gas associated with onshore production wells and related equipment.
- **Offshore Production.** Production of petroleum and natural gas from offshore production platforms.
- **Gathering and Boosting.** Gathering pipelines and other equipment that collect petroleum/natural gas from onshore production gas or oil wells and then compress, dehydrate, sweeten, or transport the petroleum and/or natural gas.
- **Natural Gas Processing.** Processing of field quality gas to produce pipeline quality natural gas, natural gas, and fractionation of gas liquids.
- **Natural Gas Transmission Compression.** Compressor stations used to transfer natural gas through transmission pipelines.
- **Natural Gas Transmission Pipeline.** A rate-regulated interstate or intrastate pipeline, or a pipeline that falls under the "Hinshaw Exemption" of the Natural Gas Act.
- **Underground Natural Gas Storage.** Facilities that store natural gas in underground formations.
- **Liquefied Natural Gas (LNG) Import/Export.** Liquefied Natural Gas import and export terminals.
- **LNG Storage.** Liquefied Natural Gas storage equipment.
- **Natural Gas Distribution.** Distribution systems that deliver natural gas to customers.
- **Other Petroleum and Natural Gas Systems.** Stationary fuel combustion emissions from petroleum and natural gas source categories that are not otherwise listed.

## 2017 Total Reported Direct Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector (as of 8/19/18)

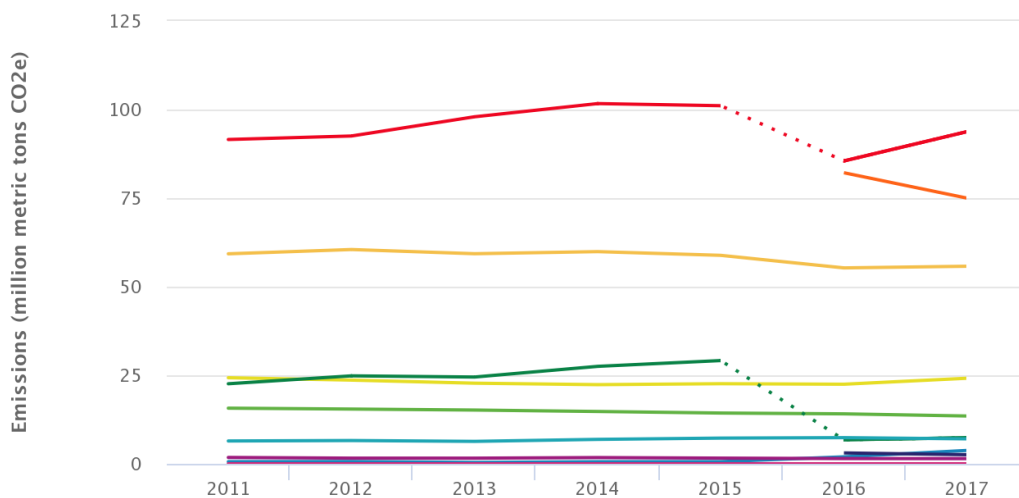
### 2017 Total Reported Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector



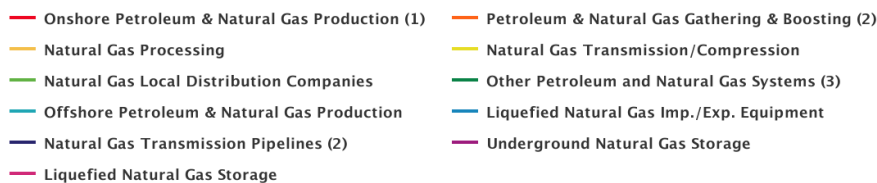
Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported Direct Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector (as of 8/19/18)

### Trend from the Petroleum and Natural Gas Systems Sector, by Subsector



Click on sectors below to customize sectors displayed in chart



(1) Beginning in Reporting Year 2016, Onshore Production facilities began reporting emissions from oil well completions and workovers with hydraulic fracturing. These emissions were not reported for prior reporting years.

(2) This industry segment began reporting data for the first time in Reporting Year 2016.

(3) Beginning in Reporting Year 2016, facilities that met the definition of Gathering and Boosting reported emissions for applicable sources. This includes certain stationary and portable fuel combustion equipment emissions that may have been published for Reporting Years 2011-2015 as Other Petroleum and Natural Gas Systems.

### Number of Reporters and Emissions in the Petroleum and Natural Gas Systems Sector (as of 8/19/18)

<b>Petroleum and Natural Gas Systems Sector — Greenhouse Gas Emissions Reported to the GHGRP</b>							
(all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016 <sup>8</sup>	2017
<b>Number of facilities:</b>	1,921	2,096	2,187	2,419	2,419	2,256	2,253
<b>Total emissions (CO<sub>2</sub>e):</b>	222.3	225.7	228.0	235.5	235.5	280.2	284.4
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	138.4	145.5	150.8	162.1	164.6	185.4	195.9
• Methane (CH <sub>4</sub> ):	83.7	80.1	77.2	73.2	70.8	94.7	88.4
• Nitrous oxide (N <sub>2</sub> O):	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

<b>Number of reporters and 2017 emissions (CO<sub>2</sub>e) per petroleum and natural gas systems industry subsector</b>		
<b>Industry Sector</b>	<b>2017 Number of Reporters</b>	<b>2017 Emissions (million metric tons CO<sub>2</sub>e)</b>
Onshore Production	497	93.8
Offshore Production	141	7.0
Gathering and Boosting	321	75.0
Natural Gas Processing	449	55.8
Natural Gas Transmission Compression	529	24.2
Natural Gas Transmission Pipelines	33	2.6
Underground Natural Gas Storage	48	1.5
Liquefied Natural Gas (LNG) Import/Export	6	3.8
LNG Storage	6	**
Natural Gas Distribution	169	13.5

<sup>8</sup> Facilities in the Gathering and Boosting and Transmission Pipeline industry segments began reporting in 2016.

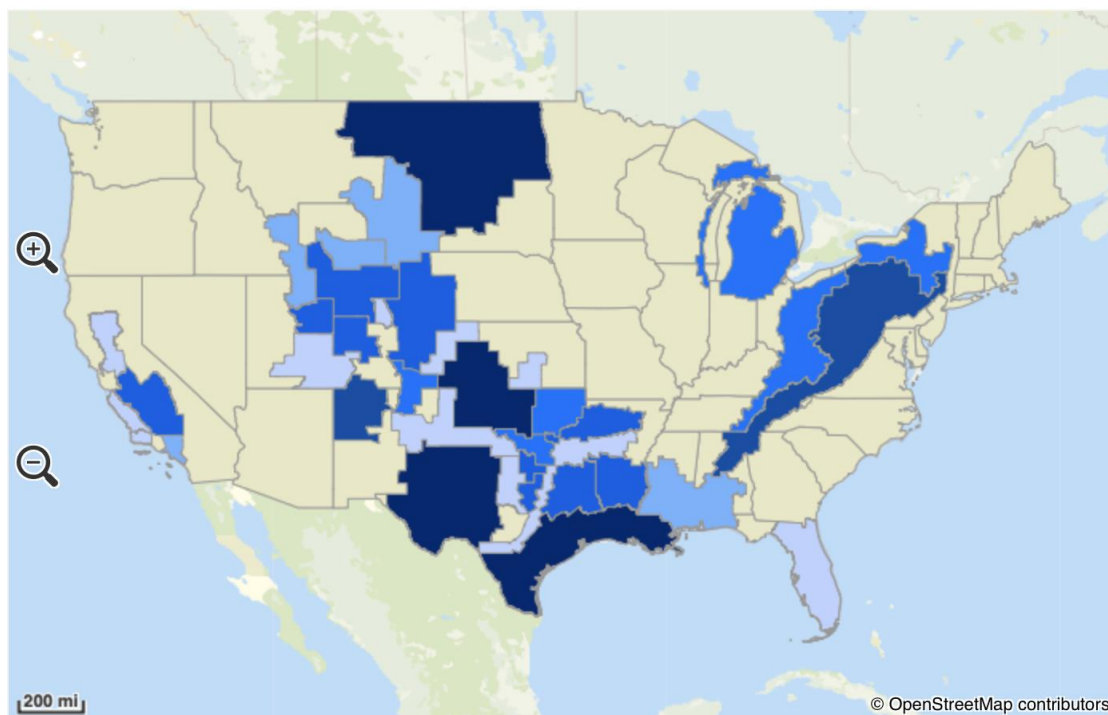


**Number of reporters and 2017 emissions (CO<sub>2</sub>e) per petroleum and natural gas systems industry subsector**

Industry Sector	2017 Number of Reporters	2017 Emissions (million metric tons CO <sub>2</sub> e)
Other Petroleum and Natural Gas Systems	79	7.4

Totals may not equal sum of individual GHGs due to independent rounding.

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

**Reported emissions (CO<sub>2</sub>e) and well count by county for onshore production facilities**


GHGRP 2017

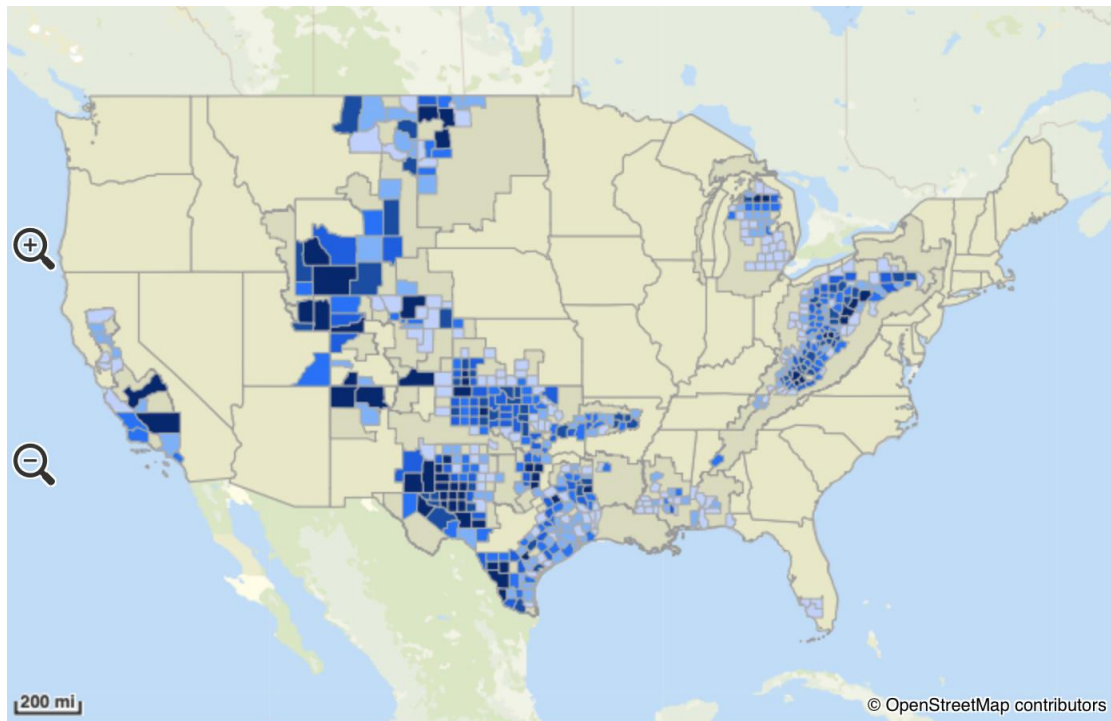
Emissions by Basin\*

Onshore Petroleum and Natural Gas Production  
(metric tons CO<sub>2</sub>e)

\* Basin refers to the geologic provinces as published by the American Association of Petroleum Geologists (AAPG)

Data Source: 2017 Greenhouse Gas Reporting Program as of 8/19/2018

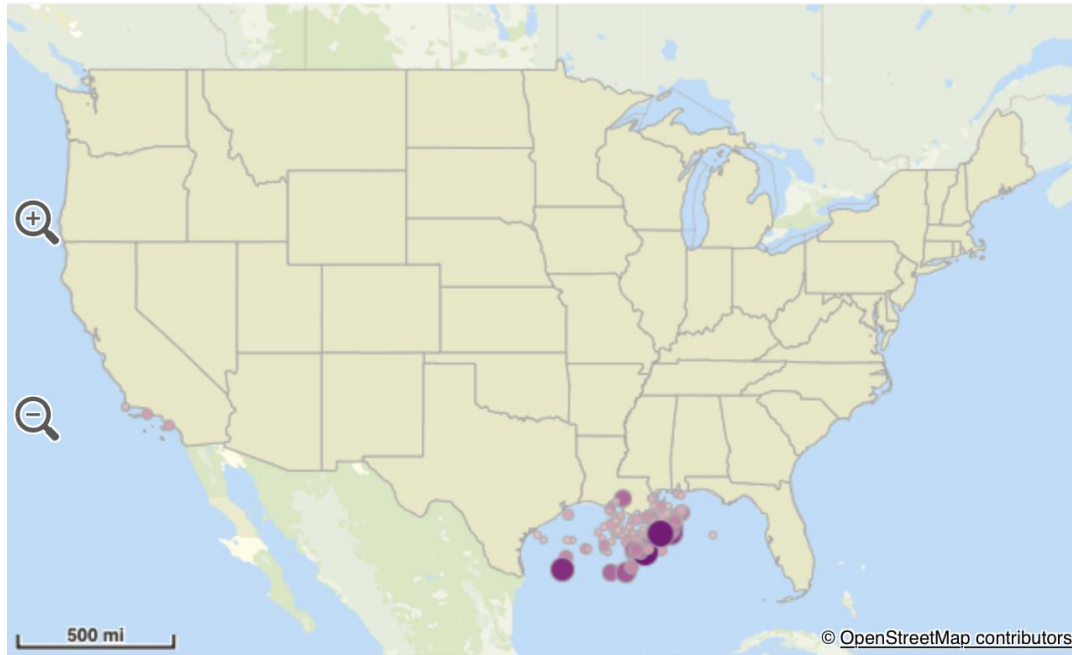
Range
1,000 - 150,000
150,000 - 500,000
500,000 - 1,500,000
1,500,000 - 5,000,000
5,000,000 - 10,000,000
10,000,000 - 15,000,000



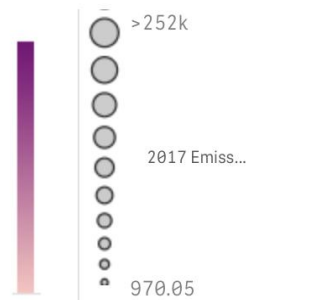
GHGRP 2017  
Well Count by County  
Onshore Petroleum and Natural Gas  
Production  
(wells)

Data Source: 2017 Greenhouse Gas Reporting  
Program as of 8/19/2018

Range	
1 - 50	
50 - 200	
200 - 500	
500 - 1,000	
1,000 - 2,000	
> 2,000	

**Facility locations and reported emissions (CO<sub>2</sub>e) for offshore production**

**GHGRP, 2017**  
**Offshore Production**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change  
the focus of the map.

Continental U.S. ▼



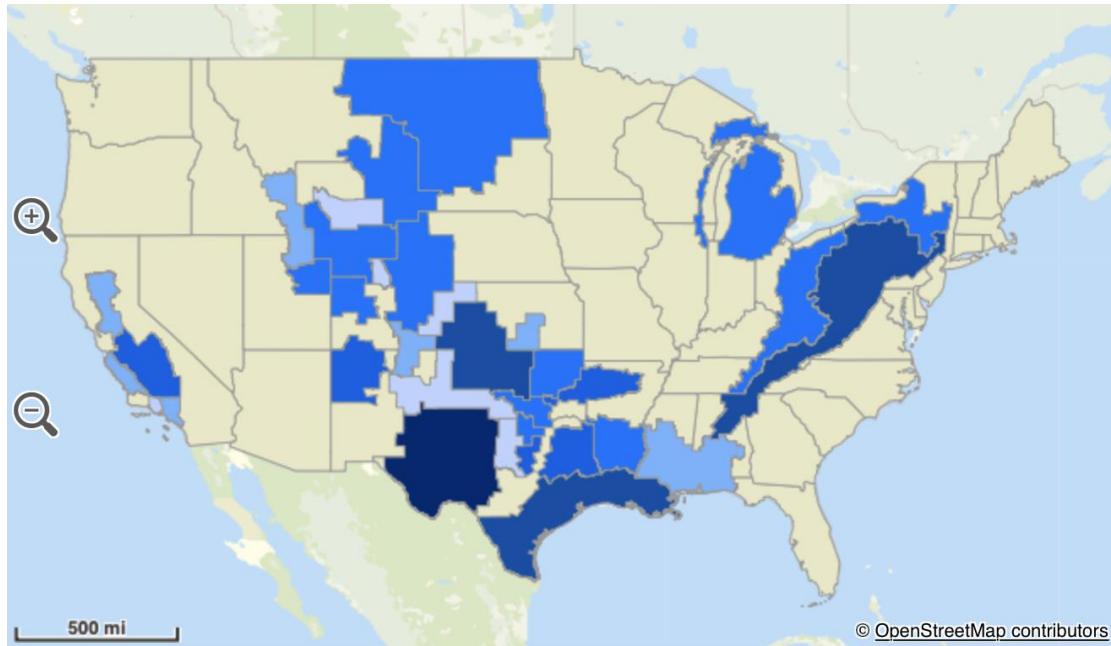
**Alaska**  
**GHGRP, 2017**  
**Offshore Production**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change  
the focus of the map.

Alaska ▼

### Reported emissions (CO<sub>2</sub>e) by geologic basin for gathering and boosting facilities



**GHGRP, 2017**  
**Emissions by Basin\***  
**Onshore Petroleum and**  
**Natural Gas**  
**Gathering and Boosting**  
**(metric tons CO<sub>2</sub>e)**

Range	
1,000 - 150,000	
150,000 - 500,000	
500,000 - 1,500,000	
1,500,000 - 5,000,000	
5,000,000 - 10,000,000	
10,000,000 - 15,000,000	

Reported emissions (CO<sub>2</sub>e) and facility locations for industry types: natural gas processing, natural gas transmission, underground natural gas storage, LNG storage, LNG import/export



**GHGRP,  
2017  
Facility  
Locations  
and  
Emissions  
(metric  
tons CO<sub>2</sub>e)**

Subsector

NG Transmission and Compression  
NG Processing  
NG Underground Storage  
LNG Storage  
LNG Import and Export

>1M

</



**Alaska  
GHGRP,  
2017  
Facility  
Locations  
and  
Emissions  
(metric  
tons CO<sub>2</sub>e)**

Subsector
NG Transmission and Compression
NG Processing
NG Underground Storage
LNG Storage
LNG Import and Export



Choose an option from  
the dropdown menu to  
change the focus of the  
map.

Alaska ▼



Puerto Rico and  
the Virgin  
Islands  
GHGRP, 2017  
Facility  
Locations and  
Emissions  
(metric tons  
CO<sub>2</sub>e)

Subsector

NG Transmission and Compression

NG Processing

NG Underground Storage

LNG Storage

LNG Import and Export

>1M

2017 Emiss...

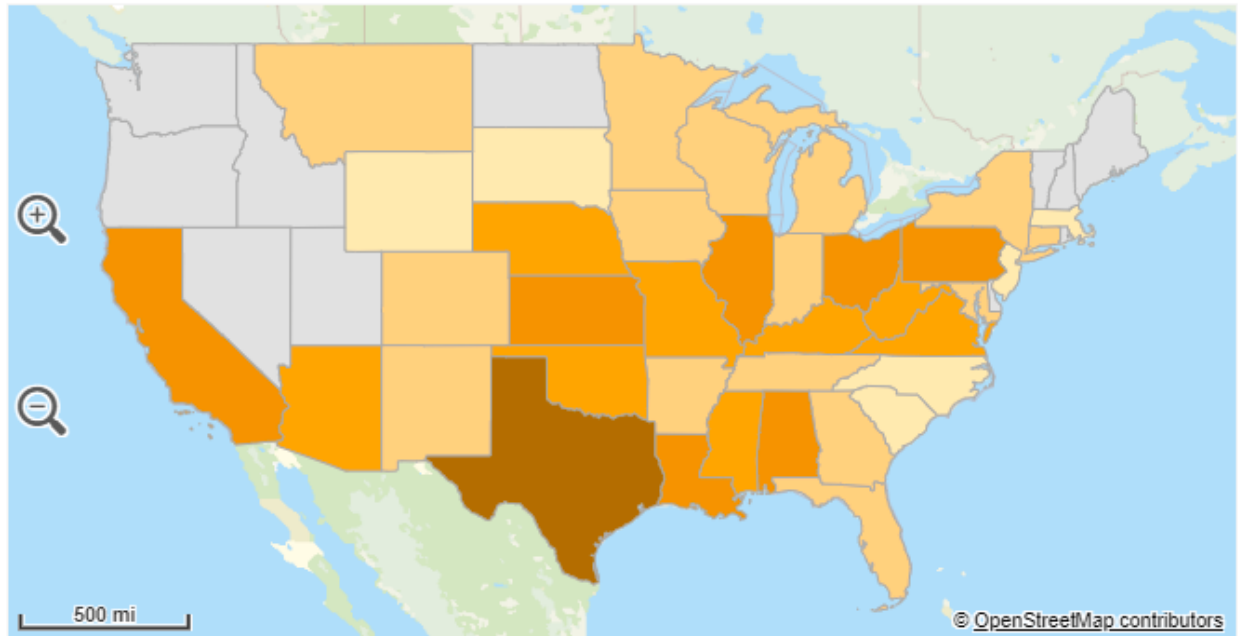
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Choose an option from  
the dropdown menu to  
change the focus of the  
map.

Puerto Rico & U... ▼



## Reported emissions (CO<sub>2</sub>e) by state for onshore gas transmission pipelines



**GHGRP, 2017**  
**Onshore Gas Transmission**  
**Pipeline Emissions by State**  
**(metric tons CO<sub>2</sub>e)**

Range	
1 - 5,000	
5,000 - 50,000	
50,000 - 125,000	
125,000 - 300,000	
300,000 - 500,000	
> 500,000	
No reported emissions	

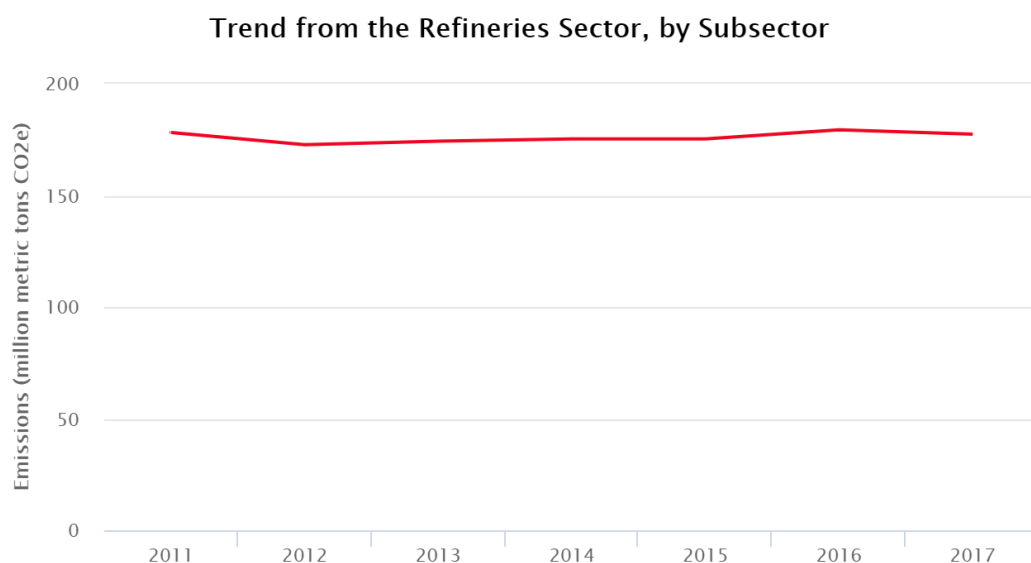
## Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)
- [GHGRP Subpart W - Petroleum and Natural Gas Systems](#)

## GHGRP 2017: Refineries

The refinery sector consists of facilities that produce gasoline, gasoline blending stocks, naphtha, kerosene, distillate fuel oils, residual fuel oils, lubricants, or asphalt (bitumen) by the distillation of petroleum or the re-distillation, cracking, or reforming of unfinished petroleum derivatives. GHG process emissions from this sector include emissions from venting, flares, and fugitive leaks from equipment (e.g., valves, flanges, pumps). In addition to emissions from petroleum refining processes, the sector includes combustion emissions from stationary combustion units located at these facilities. Process emissions from hydrogen production plants and petrochemical manufacturing facilities located at refineries are included in the chemical manufacturing sector. Emissions from industrial waste landfills and industrial wastewater treatment at these facilities are included in the waste sector.

### Trend of Annual Reported GHG Emissions in the Refinery Sector (as of 8/19/18)



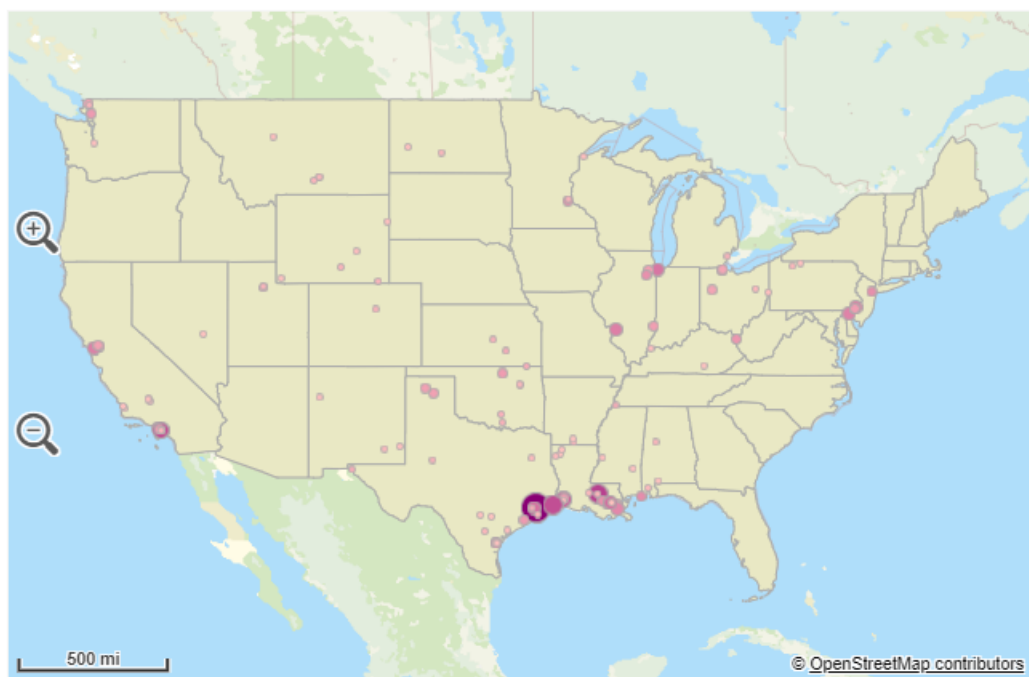
*Click on sectors below to customize sectors displayed in chart*

— Petroleum Refineries

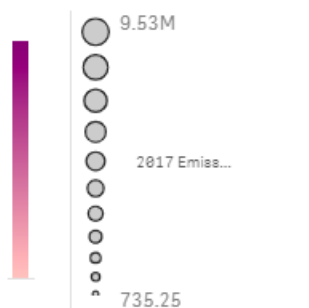
What factors influenced the [trend in emissions for refineries](#)?

### Location and emissions range for each reporting facility in the refinery sector (as of 8/19/18)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Refineries**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change  
the focus of the map.

Continental U.S. ▼

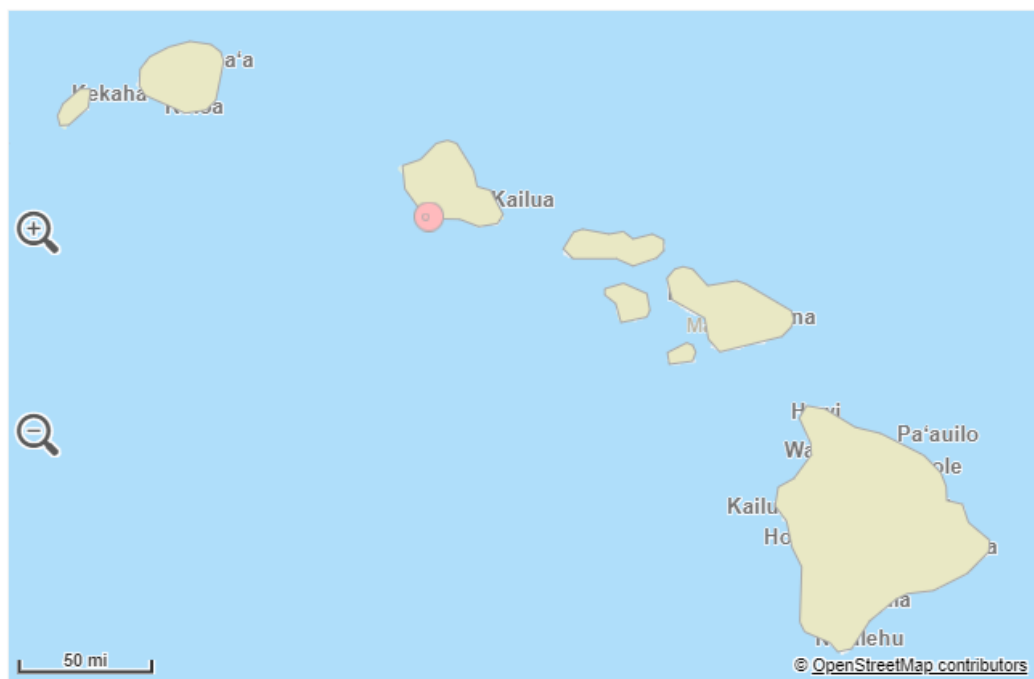


**Alaska**  
**GHGRP, 2017**  
**Refineries**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Alaska ▼



**Hawaii**  
**GHGRP, 2017**  
**Refineries**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Hawaii ▼



Puerto Rico and the Virgin  
Islands  
GHGRP, 2017  
Refineries  
(metric tons CO<sub>2</sub>e)



2017 Emis...

Choose an option from the  
dropdown menu to change  
the focus of the map.

Puerto Rico & USVI ▼

### Number of reporters and emissions in the refinery sector (as of 8/19/18)

Refineries Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	150	147	146	142	144	144	144
<b>Total emissions (CO<sub>2</sub>e):</b>	178.2	172.6	174.3	175.3	175.3	179.3	177.4
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	176.8	171.3	173.0	174.0	173.9	178.0	176.1
• Methane (CH <sub>4</sub> ):	0.9	0.8	0.8	0.8	0.8	0.8	0.8
• Nitrous oxide (N <sub>2</sub> O):	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

### Other EPA Resources

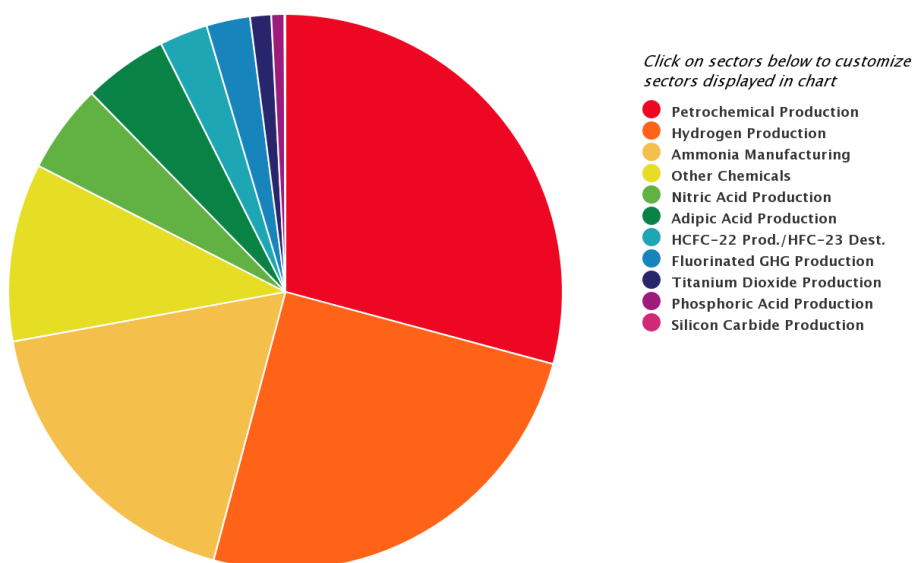
- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Chemicals

The chemical manufacturing sector consists of facilities that manufacture organic or inorganic chemicals. For this summary, the sector is broken down into facilities that produce fluorinated chemicals and non-fluorinated chemicals. The non-fluorinated chemicals subsector comprises facilities that produce adipic acid, ammonia, hydrogen (both merchant and non-merchant plants), nitric acid, petrochemicals, phosphoric acid, silicon carbide, titanium dioxide and other non-fluorinated chemicals. The fluorinated chemicals subsector comprises facilities that produce HCFC-22 (or destroy HFC-23) and other fluorinated chemicals. A more detailed description of these subsectors is provided below. A total of 456 chemicals facilities reported in 2017.

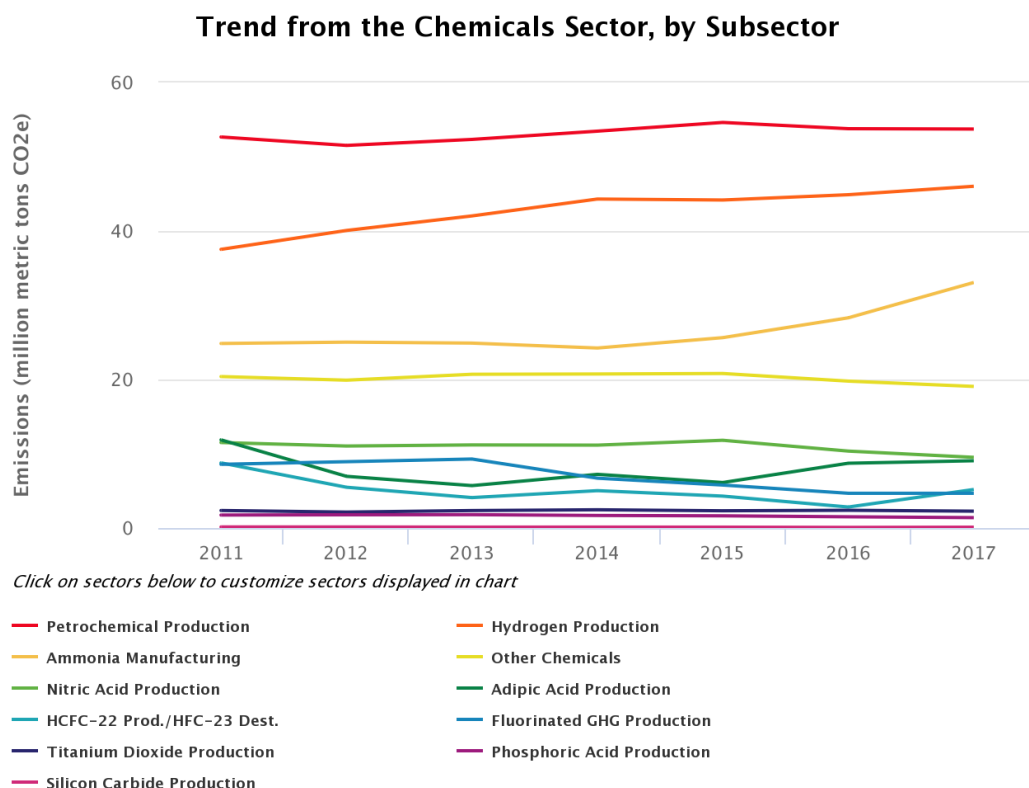
### 2017 Total Reported Direct Emissions from Chemicals, by Subsector (as of 8/19/18).

#### 2017 Total Reported Emissions from the Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions for Chemicals, by Subsector (as of 8/19/18).



What factors influenced the [trend in emissions for non-fluorinated chemicals production](#)?  
 What factors influenced the [trend in emissions for fluorinated chemicals production](#)?

## Number of reporters and emissions for Chemicals (All Subsectors) (as of 8/19/18)

### Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP

(all emissions values presented in million metric tons CO<sub>2</sub>e)

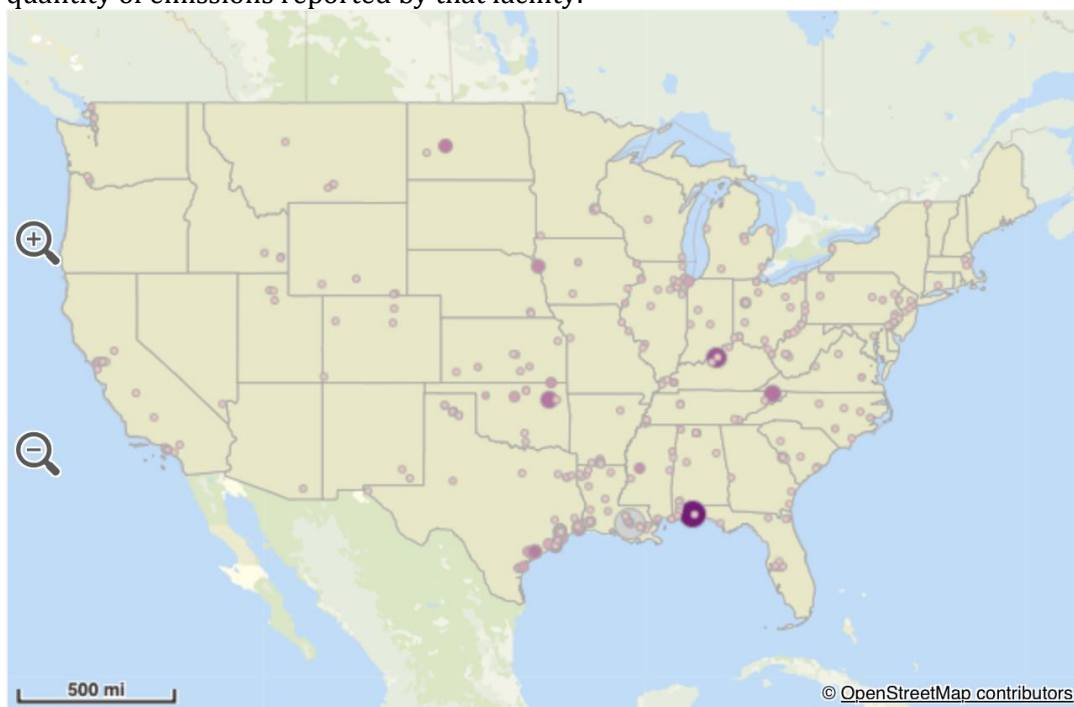
Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	458	468	473	464	465	456	456
<b>Total emissions (CO<sub>2</sub>e):</b>	180.4	173.0	174.5	177.1	177.3	177.3	184.1
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	142.5	143.2	146.9	149.4	151.8	153.0	157.8
• Methane (CH <sub>4</sub> ):	0.2	0.2	0.2	0.3	0.2	0.2	0.3
• Nitrous oxide (N <sub>2</sub> O):	21.3	16.0	14.8	16.6	16.0	17.3	16.9
• Fluorinated GHGs:	16.5	13.6	12.5	10.9	9.3	6.7	9.0
<b>Emissions by subsector</b>							
• Non-fluorinated chemicals	163.1	158.6	161.1	165.4	167.3	169.8	174.2
• Fluorinated chemicals	17.3	14.4	13.4	11.7	10.1	7.5	9.9

Totals may not equal sum of individual GHGs due to independent rounding.

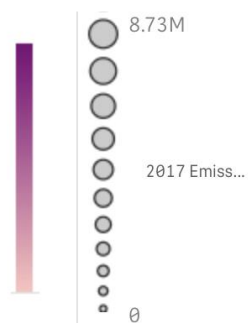


### Location and emissions range for each reporting facility for Chemicals (All Subsectors) (as of 8/19/18)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Continental U.S. ▼

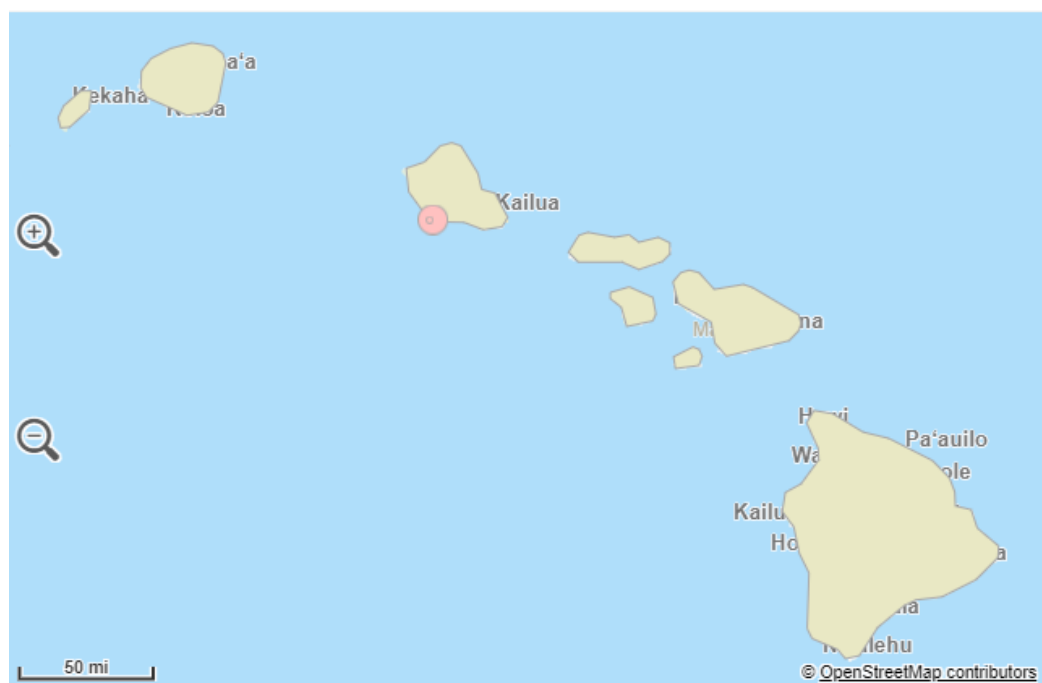


**Alaska**  
**GHGRP, 2017**  
**Chemicals**  
**(metric tons CO<sub>2</sub>e)**

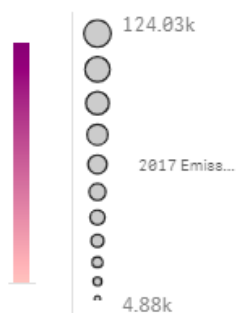


Choose an option from the  
dropdown menu to change  
the focus of the map.

Alaska ▼



**Hawaii**  
**GHGRP, 2017**  
**Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change  
the focus of the map.

Hawaii ▼



**Puerto Rico and the Virgin Islands**  
**GHGRP, 2017**  
**Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

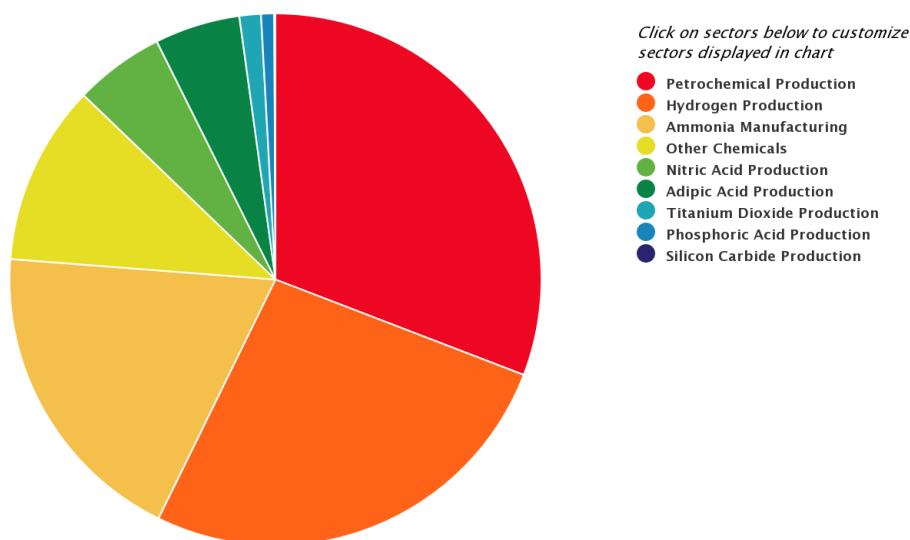
Puerto Rico & USVI ▼

## Non-Fluorinated Chemicals

The non-fluorinated chemical manufacturing subsector consists of facilities that produce adipic acid, ammonia, hydrogen (both merchant and non-merchant plants), nitric acid, petrochemicals (acrylonitrile, carbon black, ethylene, ethylene dichloride, ethylene oxide, and methanol), phosphoric acid, silicon carbide, soda ash, and titanium dioxide and other non-fluorinated chemicals. In addition to emissions from these chemical production processes, the subsector includes combustion emissions from facilities that produce pesticides, fertilizer, pharmaceuticals, and other organic and inorganic chemicals. A total of 441 facilities reported 2017 emissions under the non-fluorinated chemicals subsector. A small number of facilities in this subsector collect CO<sub>2</sub> either for use in their other production processes, to transfer to other users, or to sequester or otherwise inject underground; this subsector includes the CO<sub>2</sub> from those process emissions. For example, some of the process emissions reported for ammonia manufacturing plants includes CO<sub>2</sub> that is later consumed on site for urea production. This CO<sub>2</sub> is not released to the ambient air from the ammonia manufacturing process unit(s).

## 2017 Total Reported Direct Emissions from Chemicals (Non-fluorinated), by Subsector (as of 8/19/18).

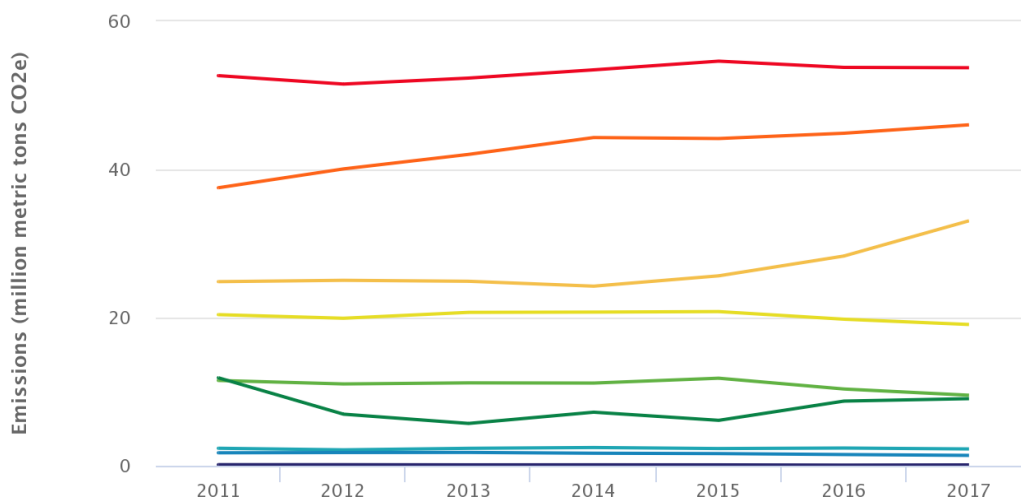
### 2017 Total Reported Emissions from the Non-Fluorinated Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions for Non-Fluorinated Chemicals, by Subsector (as of 8/19/18).

### Trend from the Non-Fluorinated Chemicals Sector, by Subsector



Click on sectors below to customize sectors displayed in chart



### Number of Reporters and Emissions in the Non-Fluorinated Chemicals Sector (as of 8/19/18)

<b>Non-Fluorinated Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	442	452	457	449	450	441	441
<b>Total emissions (CO<sub>2</sub>e):</b>	163.1	158.6	161.1	165.4	167.3	169.8	174.2
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	141.6	142.4	146.1	148.5	151.0	152.3	157.1
• Methane (CH <sub>4</sub> ):	0.2	0.2	0.2	0.3	0.2	0.2	0.3
• Nitrous oxide (N <sub>2</sub> O):	21.3	16.0	14.8	16.6	16.0	17.3	16.9

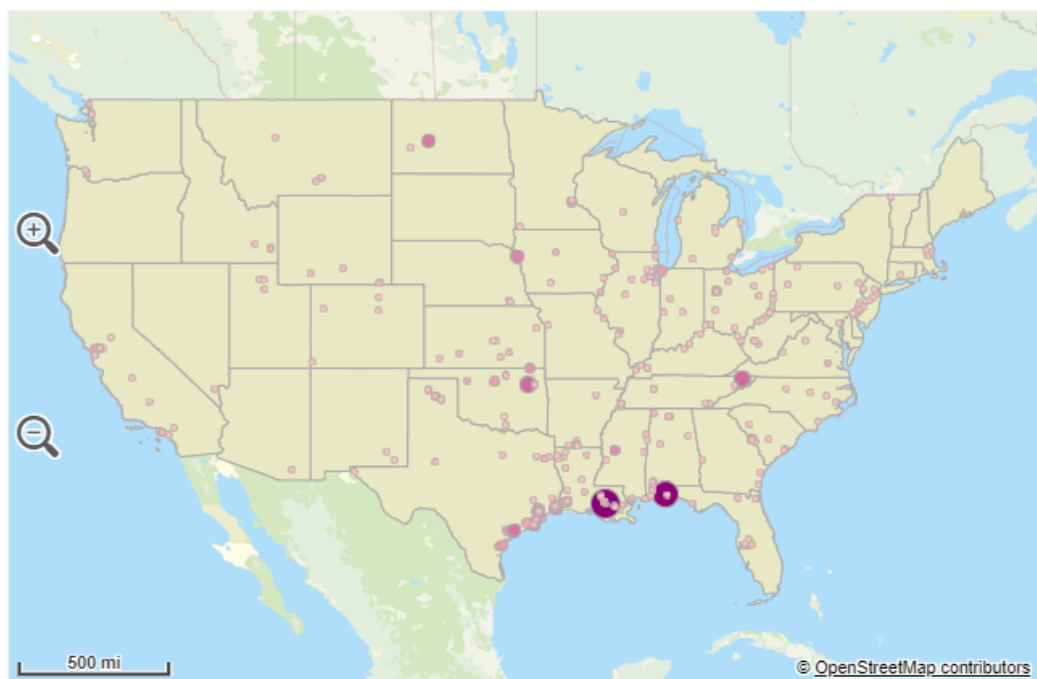
Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

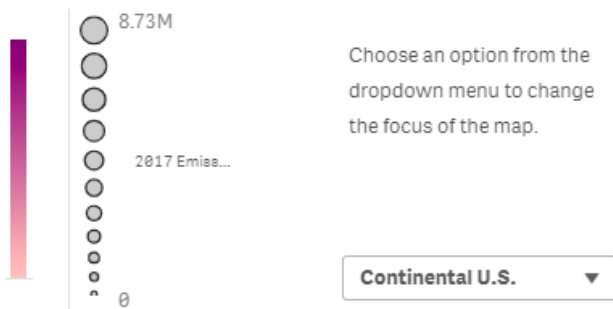
<b>Number of reporters and 2017 emissions (CO<sub>2</sub>e) per non-fluorinated chemicals industry subsector</b>		
<b>Industry Sector</b>	<b>2017 Number of Reporters</b>	<b>2017 Emissions (million metric tons CO<sub>2</sub>e)</b>
<b>Adipic Acid Production</b>	3	9.1
<b>Ammonia Manufacturing</b>	29	33.1
<b>Hydrogen Production</b>	114	46.0
<b>Nitric Acid Production</b>	32	9.5
<b>Petrochemical Production</b>	67	53.7
<b>Phosphoric Acid Production</b>	11	1.4
<b>Silicon Carbide Production</b>	1	0.1
<b>Titanium Dioxide Production</b>	6	2.3
<b>Other Chemicals</b>	206	19.1

### Location and emissions range for each reporting facility for Chemicals (Non-fluorinated) (as of 8/19/18).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Non-Fluorinated Chemicals**  
**(metric tons CO<sub>2</sub>e)**





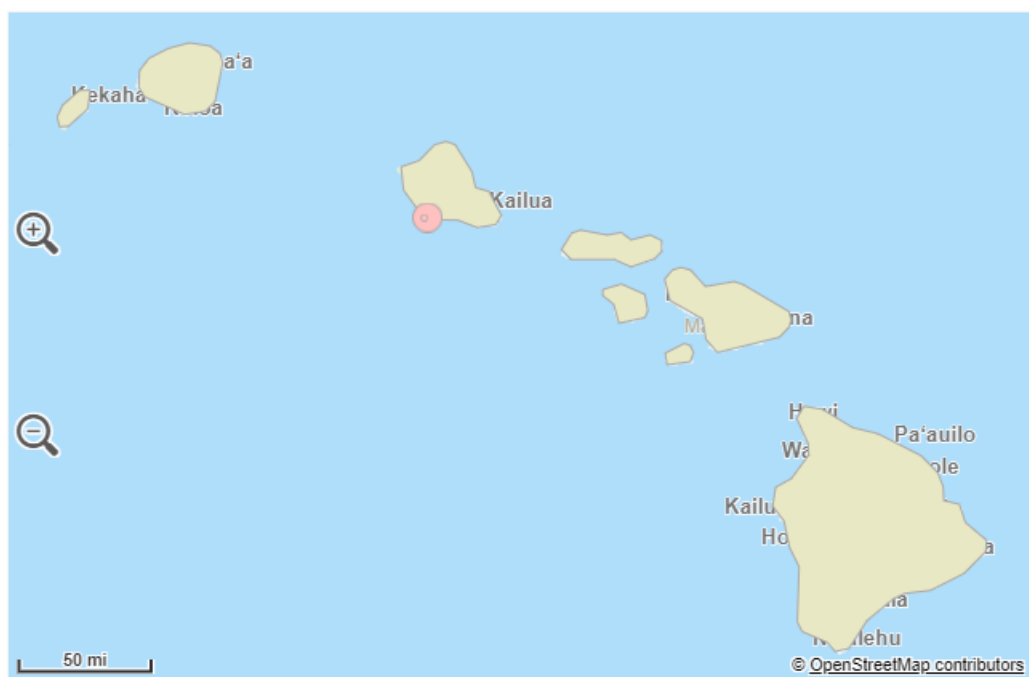
**Alaska**  
**GHGRP, 2017**  
**Non-Fluorinated Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Alaska ▼





**Hawaii**  
**GHGRP, 2017**  
**Non-Fluorinated Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change  
the focus of the map.

Hawaii ▼



**Puerto Rico and the Virgin Islands**  
**GHGRP, 2017**  
**Non-Fluorinated Chemicals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

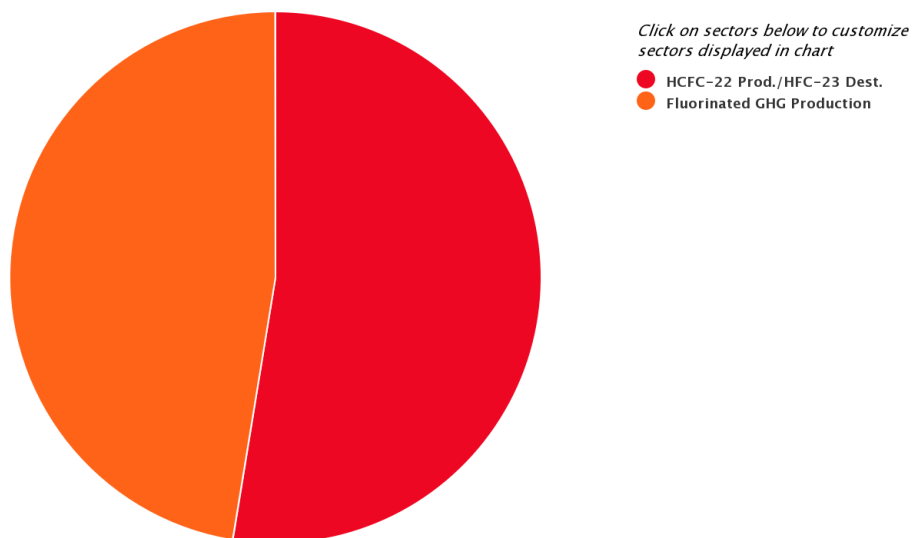
Puerto Rico & USVI ▼

## Fluorinated Chemicals

The fluorinated chemical subsector includes facilities that produce hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>), other fluorinated GHGs such as fluorinated ethers, and chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), including chlorodifluoromethane (HCFC-22). The subsector also includes facilities that destroy HFC-23, which is a by-product of HCFC-22 production and which may be emitted from the destruction process. This subsector does not include industries that use these fluorinated GHGs (i.e. semiconductors).

## 2017 Total Reported Direct Emissions from Fluorinated Chemicals, by Subsector (as of 8/18/18).

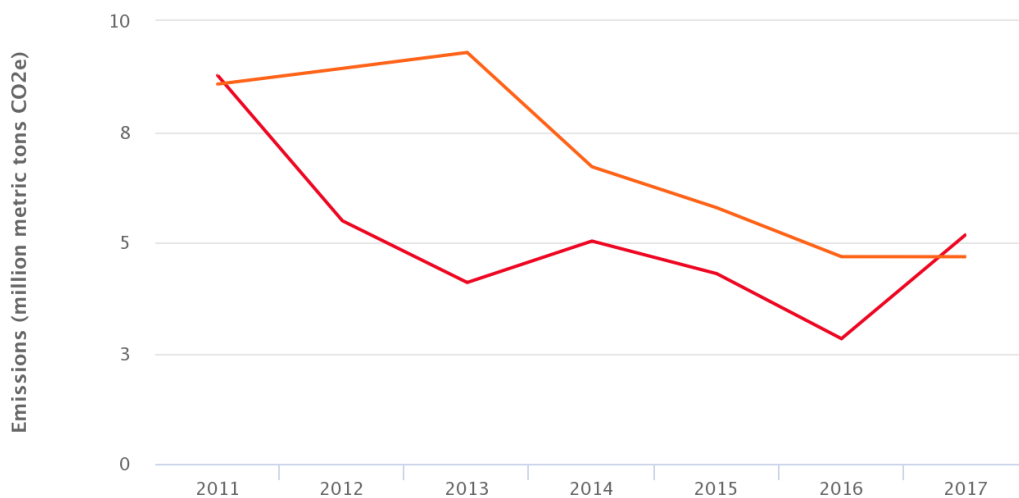
### 2017 Total Reported Emissions from the Fluorinated Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions from Fluorinated Chemicals, by Subsector (as of 8/19/18).

### Trend from the Fluorinated Chemicals Sector, by Subsector



Click on sectors below to customize sectors displayed in chart

HCFC-22 Prod./HFC-23 Dest. Fluorinated GHG Production

**Number of Reporters and Emissions in the Fluorinated Chemicals Sector (as of 8/19/18)**

<b>Fluorinated Chemicals Subsector — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	16	16	16	15	15	15	15
<b>Total emissions (CO<sub>2</sub>e):</b>	17.3	14.4	13.4	11.7	10.1	7.5	9.9
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	0.8	0.8	0.8	0.8	0.8	0.7	0.7
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**
• Fluorinated GHGs:	16.5	13.6	12.6	10.9	9.3	6.8	9.1

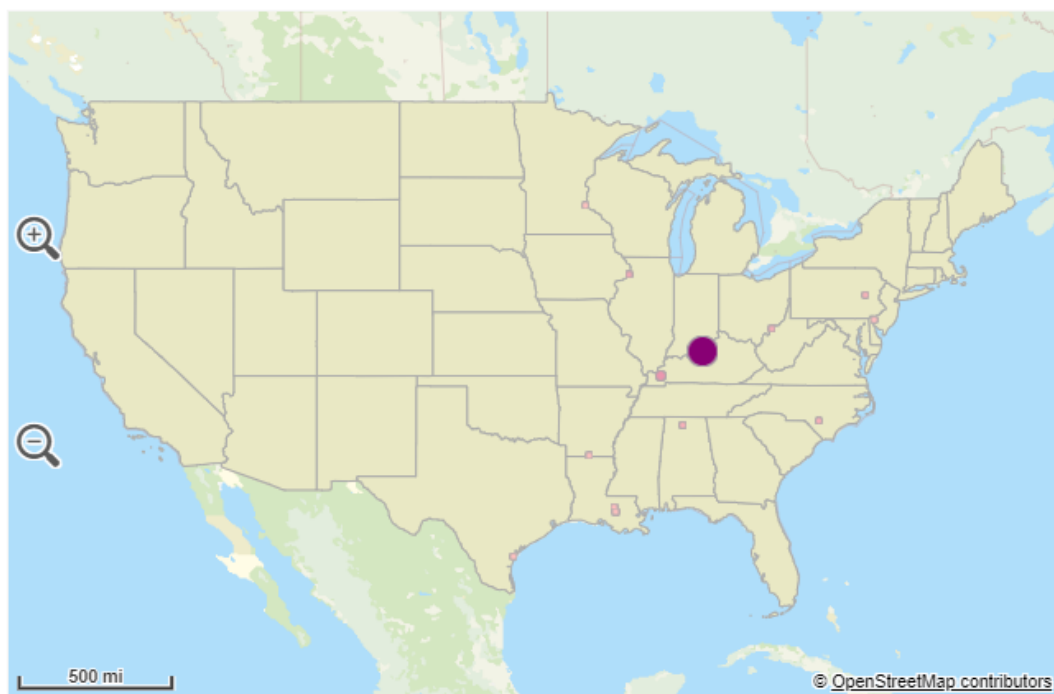
Totals may not equal sum of individual GHGs due to independent rounding.

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

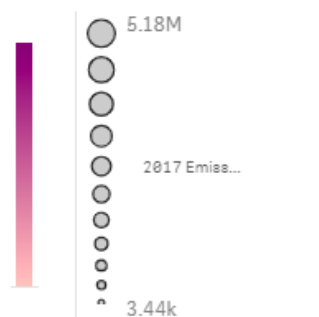
<b>Number of reporters and 2017 emissions (CO<sub>2</sub>e) per fluorinated chemicals industry subsector</b>		
<b>Industry Sector</b>	<b>2017 Number of Reporters</b>	<b>2017 Emissions (million metric tons CO<sub>2</sub>e)</b>
Fluorinated GHG Production	14	4.7
HCFC-22 Production/HFC-23 Destruction	4	5.2

**Location and emissions range for each reporting facility in Fluorinated Chemicals (as of 8/19/18).**

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Fluorinated Chemicals**  
**(metric tons CO<sub>2</sub>e)**



## Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Waste

The waste sector consists of municipal solid waste (MSW) landfills, industrial waste landfills, industrial wastewater treatment systems, and facilities that operate combustors or incinerators for the disposal of nonhazardous solid waste. Emissions from fossil fuel combustion at facilities with industrial waste landfills, and industrial wastewater treatment systems are included in other sectors.

**MSW landfills.** This category consists of landfills that accepted MSW on or after January 1, 1980 and generate methane in amounts equivalent to 25,000 metric tons of CO<sub>2</sub>e or more per year. This category includes emissions from the landfill, landfill gas collection systems, and destruction devices for landfill gases (including boilers, engines, and flares).

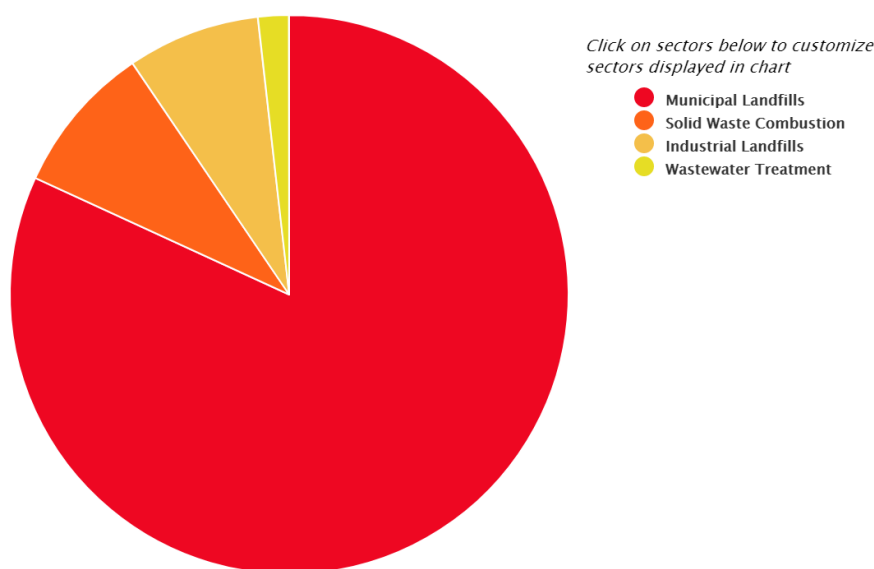
**Industrial Waste Landfills.** This category consists of industrial waste landfills that accepted industrial waste on or after January 1, 1980 and that have a total landfill design capacity of 300,000 metric tons or more. The category excludes landfills for hazardous waste and those that receive only construction and demolition or inert wastes. This category includes emissions from the landfill, landfill gas collection systems, and destruction devices for landfill gases (including flares).

**Industrial Wastewater Treatment.** This category consists of anaerobic processes used to treat nonhazardous industrial wastewater and industrial wastewater treatment sludge at facilities that perform pulp and paper manufacturing, food processing, ethanol production, or petroleum refining.

**Solid Waste Combustion.** This category consists of combustors and incinerators for the disposal of nonhazardous solid waste.

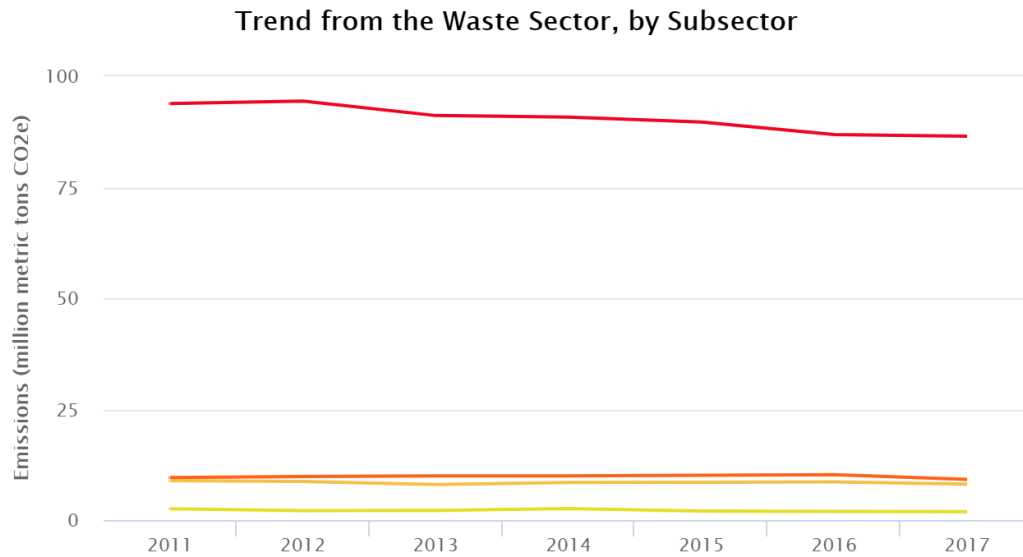
### 2017 Total Reported Direct Emissions from Waste, by Subsector (as of 8/19/18).

2017 Total Reported Emissions from the Waste Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions by Subsector (as of 8/19/18).



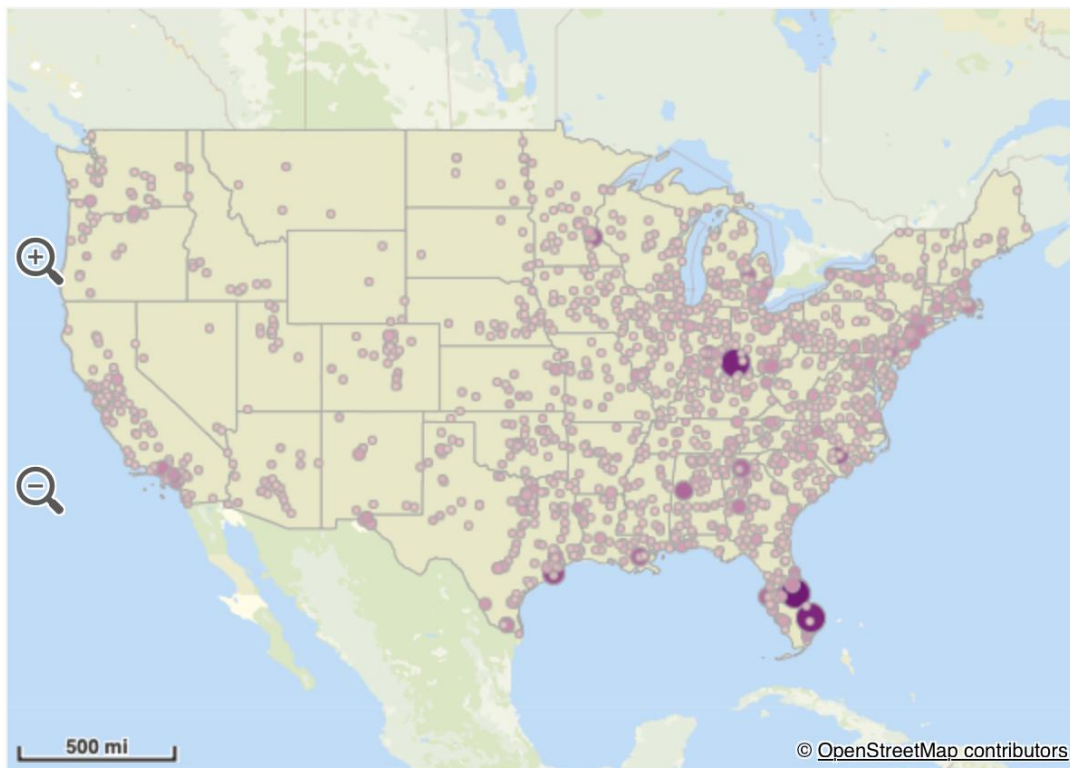
*Click on sectors below to customize sectors displayed in chart*

— Municipal Landfills
 — Solid Waste Combustion
 — Industrial Landfills
 — Wastewater Treatment

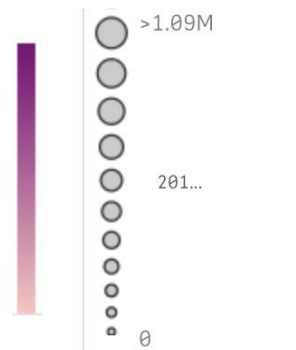
What factors influenced the [trend in emissions for the waste sector](#)?

## Location and emissions range for each reporting facility in the waste sector (as of 8/19/18).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Waste**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Continental U.S. ▼



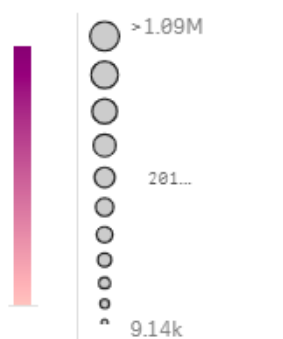


**Alaska**  
**GHGRP, 2017**  
**Waste**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Alaska ▼

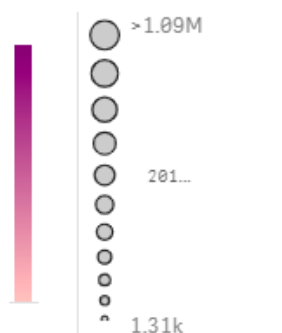


Choose an option from the dropdown menu to change the focus of the map.

Hawaii



**Puerto Rico and the  
Virgin Islands  
GHGRP, 2017  
Waste  
(metric tons CO<sub>2</sub>e)**

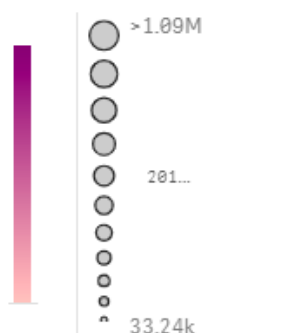


Choose an option from the  
dropdown menu to change  
the focus of the map.

Puerto Rico & USVI ▼



Guam  
GHGRP, 2017  
Waste  
(metric tons CO<sub>2</sub>e)



Choose an option from the  
dropdown menu to change  
the focus of the map.

Guam ▼

### Number of reporters and emissions in the waste sector (as of 8/19/18)

Waste Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	1,645	1,652	1,636	1,629	1,545	1,509	1,496
<b>Total emissions (CO<sub>2</sub>e):</b>	114.9	115.0	111.2	111.8	110.3	107.6	105.6
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	10.1	10.3	10.5	10.6	10.8	11.1	10.0
• Methane (CH <sub>4</sub> ):	104.4	104.4	100.4	100.9	99.1	96.1	95.2
• Nitrous oxide (N <sub>2</sub> O):	0.4	0.4	0.4	0.4	0.4	0.4	0.3

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2016 emissions (CO <sub>2</sub> e) per waste industry subsector		
Industry Sector	2016 Number of Reporters	2016 Emissions (million metric tons CO <sub>2</sub> e per year)
MSW Landfills	1,137	86.6
Industrial Wastewater Treatment	140	2.0
Industrial Waste Landfills	172	8.7
Solid Waste Combustion	63	10.2

## Other EPA Resources

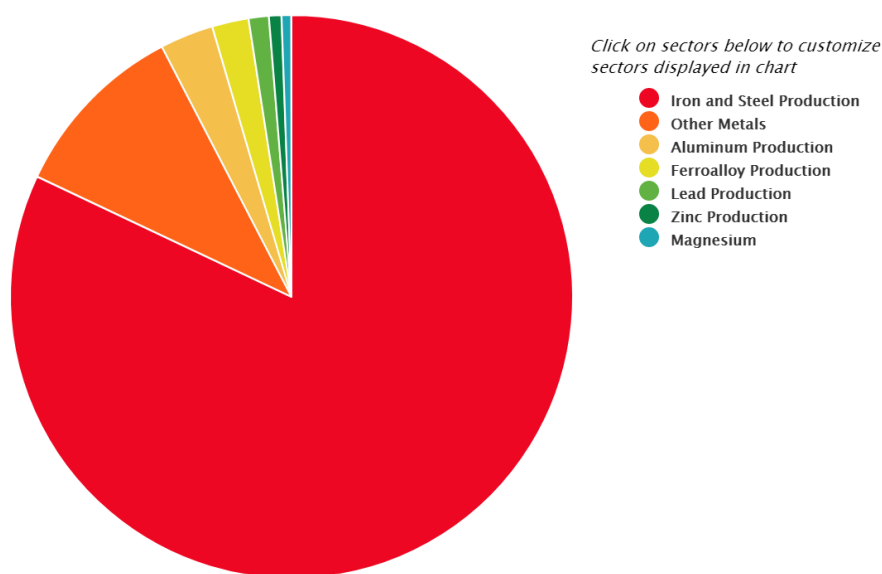
- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Metals

The metals sector consists of metal production facilities that smelt, refine, and/or cast ferrous and nonferrous metals, including primary aluminum, ferroalloy, iron and steel, lead, magnesium, and zinc, from ore, pig, or scrap using electrometallurgical and other methods. The sector also includes foundries and any other metal production facility operating under NAICS codes beginning with 331 (Primary Metal Manufacturing). Primary aluminum, ferroalloy, iron and steel, lead, magnesium, and zinc production facilities report GHG emissions from metal smelting, refining, and/or casting activities, as well as from stationary fuel combustion sources. All other metal production facilities report only the GHG emissions from stationary fuel combustion sources.

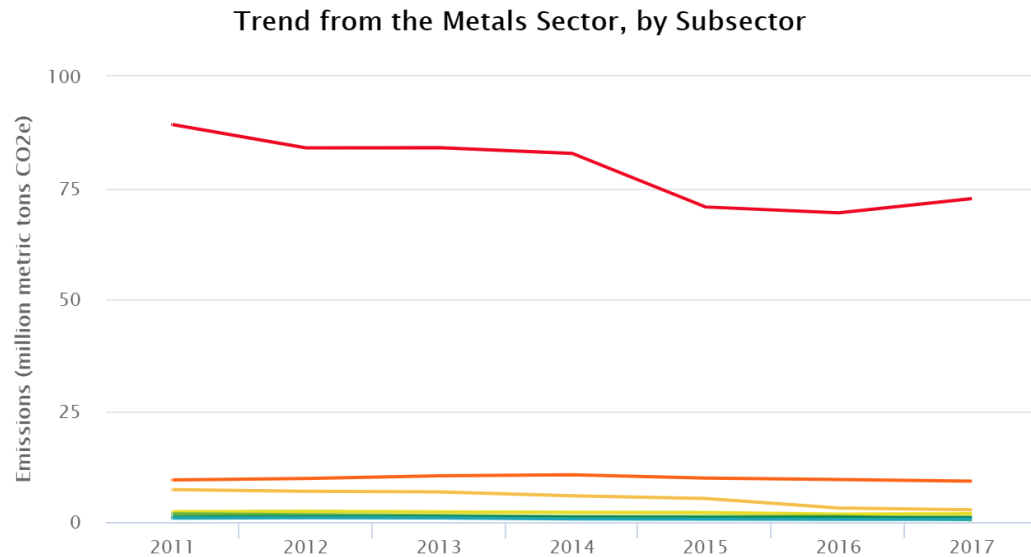
### 2017 Total Reported Direct Emissions from Metals, by Subsector (as of 8/19/18).

2017 Total Reported Emissions from the Metals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions by Subsector (as of 8/19/18).



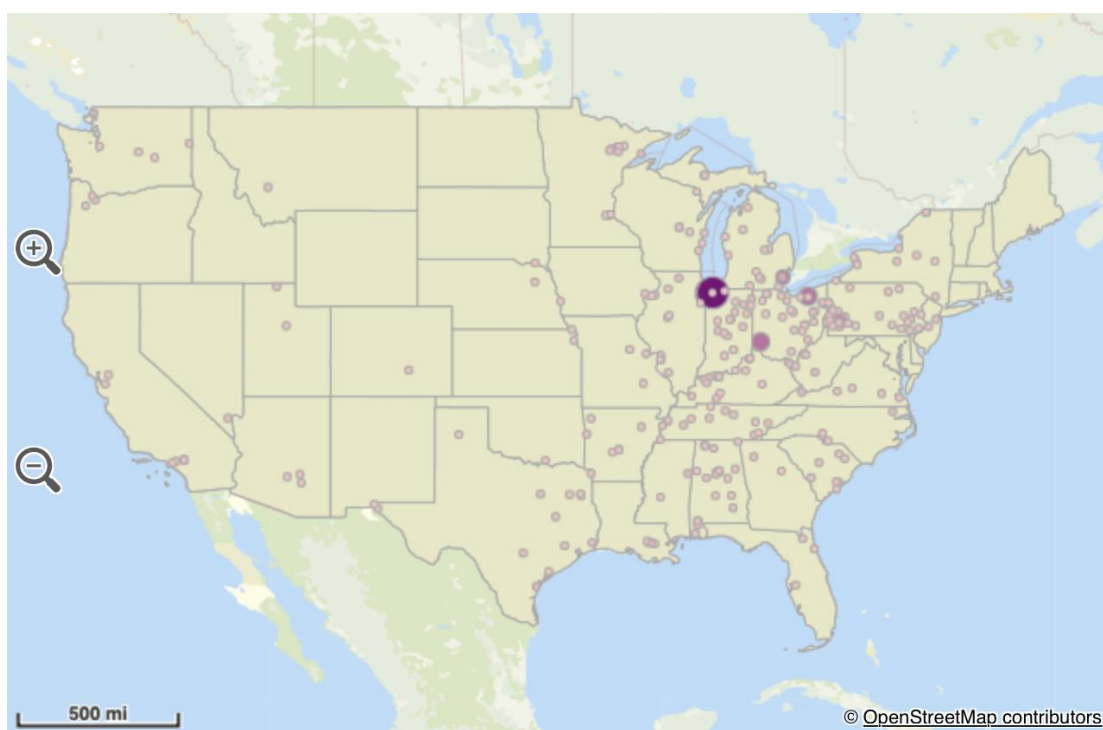
Click on sectors below to customize sectors displayed in chart

- Iron and Steel Production
- Other Metals
- Aluminum Production
- Ferroalloy Production
- Magnesium
- Lead Production
- Zinc Production

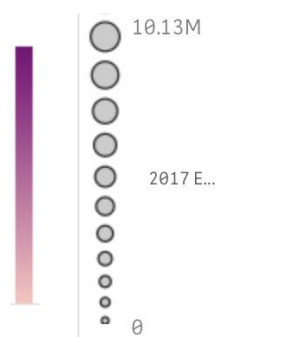
What factors influenced the [trend in emissions for metals production](#)?

## Location and emissions range for each reporting facility in the metals sector (as of 8/19/18).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Metals**  
**(metric tons CO<sub>2</sub>e)**



### Number of reporters and emissions in the metals sector (as of 8/19/18)

<b>Metals Sector — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	299	301	303	305	302	301	291
<b>Total emissions (CO<sub>2</sub>e):</b>	112.0	106.8	106.9	104.4	90.8	86.8	88.5
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	107.0	102.5	102.8	101.0	87.9	84.5	86.9
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**
• Hydrofluorocarbons (HFCs):	**	**	0.1	0.1	0.1	0.1	**
• Perfluorocarbons (PFCs):	3.5	2.9	3.0	2.5	2.0	1.4	1.1
• Sulfur hexafluoride (SF <sub>6</sub> ):	1.5	1.3	1.0	0.7	0.7	0.8	0.5

Totals may not equal sum of individual GHGs due to independent rounding.



\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

<b>Number of reporters and 2016 emissions (CO<sub>2</sub>e) per metal industry subsector</b>		
<b>Industry Sector</b>	<b>2016 Number of Reporters</b>	<b>2016 Emissions (million metric tons CO<sub>2</sub>e per year)</b>
Aluminum Production	7	2.7
Ferroalloy Production	9	1.9
Iron and Steel Production	122	72.6
Lead Production	11	1.0
Magnesium Production	7	0.5
Zinc Production	5	0.6
Other Metals	130	9.2

### Other EPA Resources

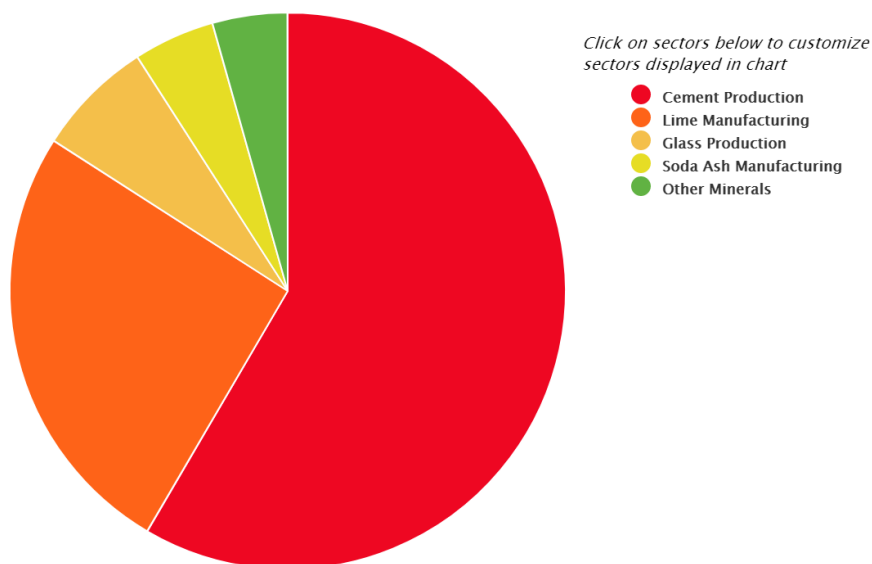
- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Minerals

The minerals sector consists of cement production, glass production, lime manufacturing, soda ash manufacturing, and any other mineral production facility operating under NAICS codes beginning with 327 (Non-metallic Mineral Product Manufacturing). Facilities under this sector transform mined or quarried non-metallic minerals — such as sand, gravel, stone, clay, and refractory materials — into products for intermediate or final consumption. Glass, cement, soda ash and lime facilities report both process emissions from the calcination of carbonate-based raw materials and GHG emissions from stationary fuel combustion sources. All other mineral production facilities report only GHG emissions from stationary fuel combustion sources. A small number of facilities in this sector collect CO<sub>2</sub> either for use in their other production processes (e.g., sugar refining), to transfer to other users, or to sequester or otherwise inject underground. This sector includes the CO<sub>2</sub> emissions reported for those processes.

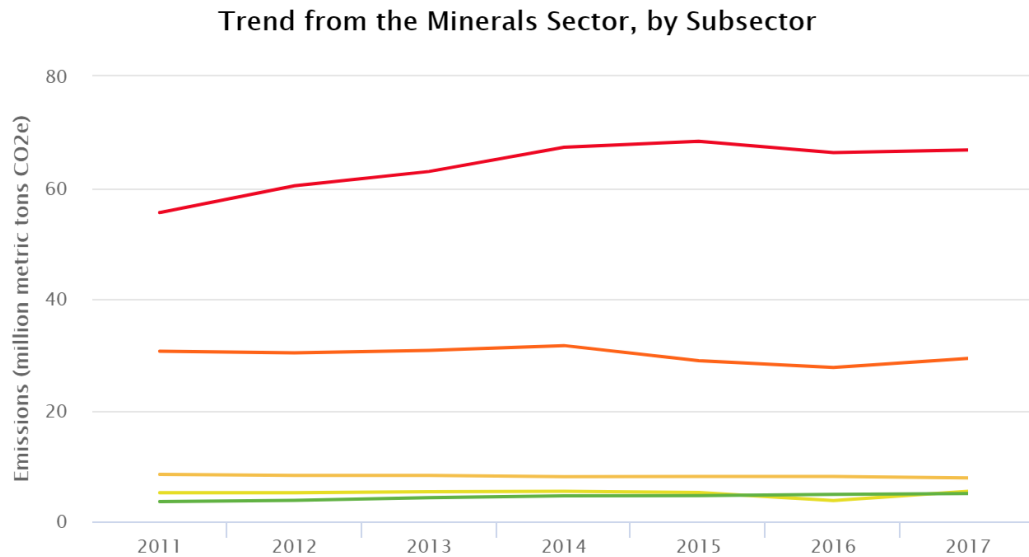
### 2017 Total Reported Direct Emissions from Minerals, by Subsector (as of 8/19/18).

2017 Total Reported Emissions from the Minerals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions by Subsector (as of 8/19/18).



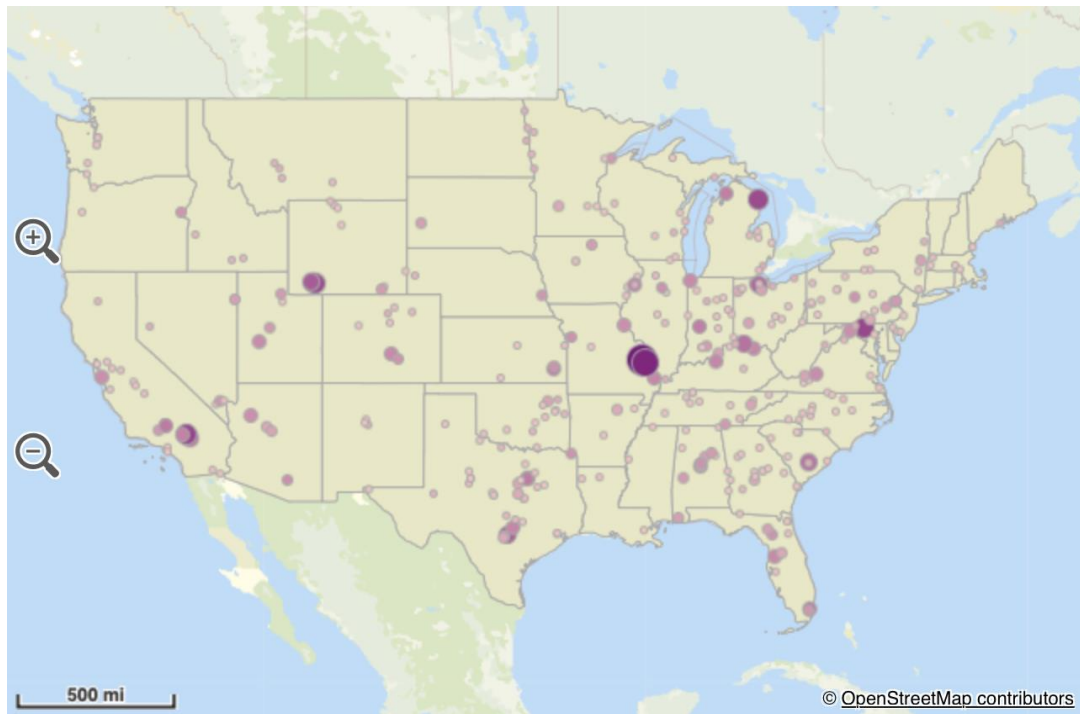
Click on sectors below to customize sectors displayed in chart

- Cement Production
- Lime Manufacturing
- Glass Production
- Soda Ash Manufacturing
- Other Minerals

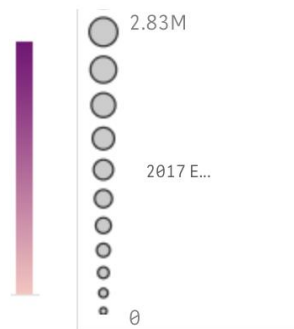
What factors influenced the [trend in emissions for minerals production](#)?

## Location and emissions range for each reporting facility in the minerals sector (as of 8/19/18).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017  
Minerals  
(metric tons CO<sub>2</sub>e)**

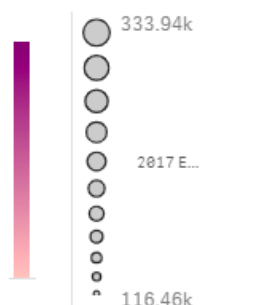


Choose an option from the dropdown menu to change the focus of the map.

Continental U.S. ▼



**Puerto Rico and the Virgin Islands**  
**GHGRP, 2017**  
**Minerals**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Puerto Rico & USVI

### Number of reporters and emissions in the minerals sector (as of 8/19/18)

<b>Minerals Sector — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	367	369	378	381	380	372	374
<b>Total emissions (CO<sub>2</sub>e):</b>	103.2	107.8	111.5	117.0	115.1	110.6	114.3
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	102.9	107.5	111.2	116.5	114.8	110.3	114.0
• Methane (CH <sub>4</sub> ):	0.1	0.1	0.1	0.1	0.1	0.1	0.1
• Nitrous oxide (N <sub>2</sub> O):	0.2	0.2	0.2	0.3	0.2	0.2	0.2

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2017 emissions (CO <sub>2</sub> e) per minerals industry subsector		
Industry Sector	2016 Number of Reporters	2016 Emissions (million metric tons CO <sub>2</sub> e per year)
Cement Production	94	66.8
Lime Production	75	29.3
Glass Production	100	7.8
Soda Ash Manufacturing	4	5.4
Other Minerals	103	5.0

## Other EPA Resources

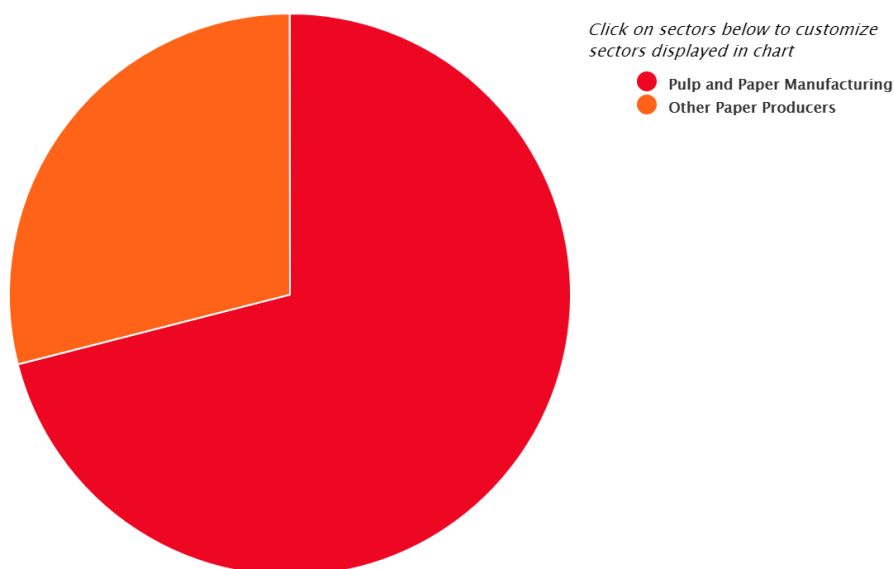
- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Pulp and Paper

The pulp and paper sector consists of facilities that produce market pulp or that manufacture pulp and paper. Facilities that have pulping processes report the GHG emissions from chemical recovery units, lime kilns, and stationary fuel combustion units. In addition to emissions from pulp production processes, the sector includes combustion emissions from facilities that produce paper products from purchased pulp, produce secondary fiber from recycled paper, convert paper into paperboard products, operate coating and laminating processes, print products (such as books, labels, business cards, stationery, and business forms), and perform support activities (such as data imaging, plate-making services, and bookbinding). Emissions from industrial landfills and industrial wastewater treatment at these facilities in the pulp and paper sector are included in the waste sector.

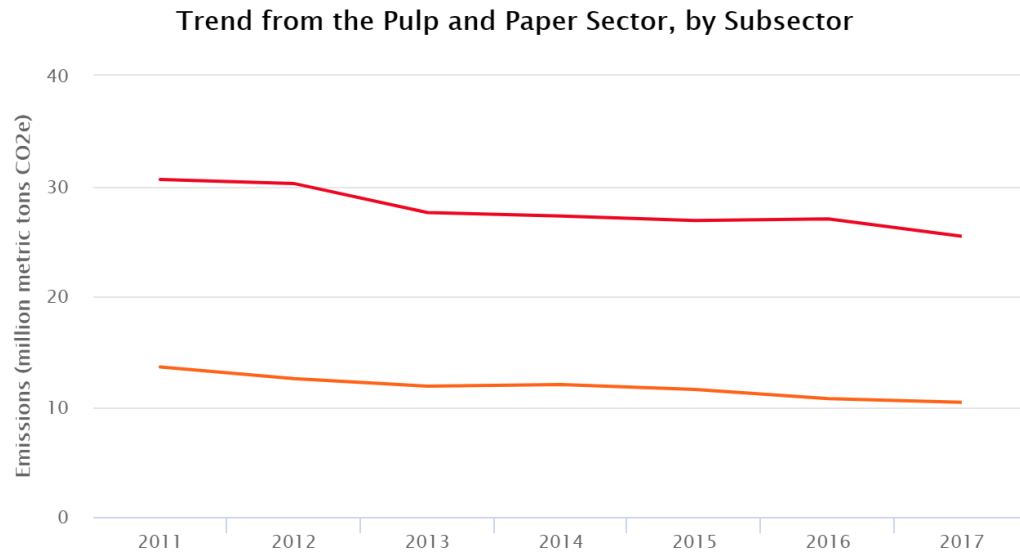
### 2017 Total Reported Direct Emissions from Pulp and Paper, by Subsector (as of 8/19/18).

2017 Total Reported Emissions from the Pulp and Paper Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions by Subsector (as of 8/19/18)



*Click on sectors below to customize sectors displayed in chart*

— Pulp and Paper Manufacturing

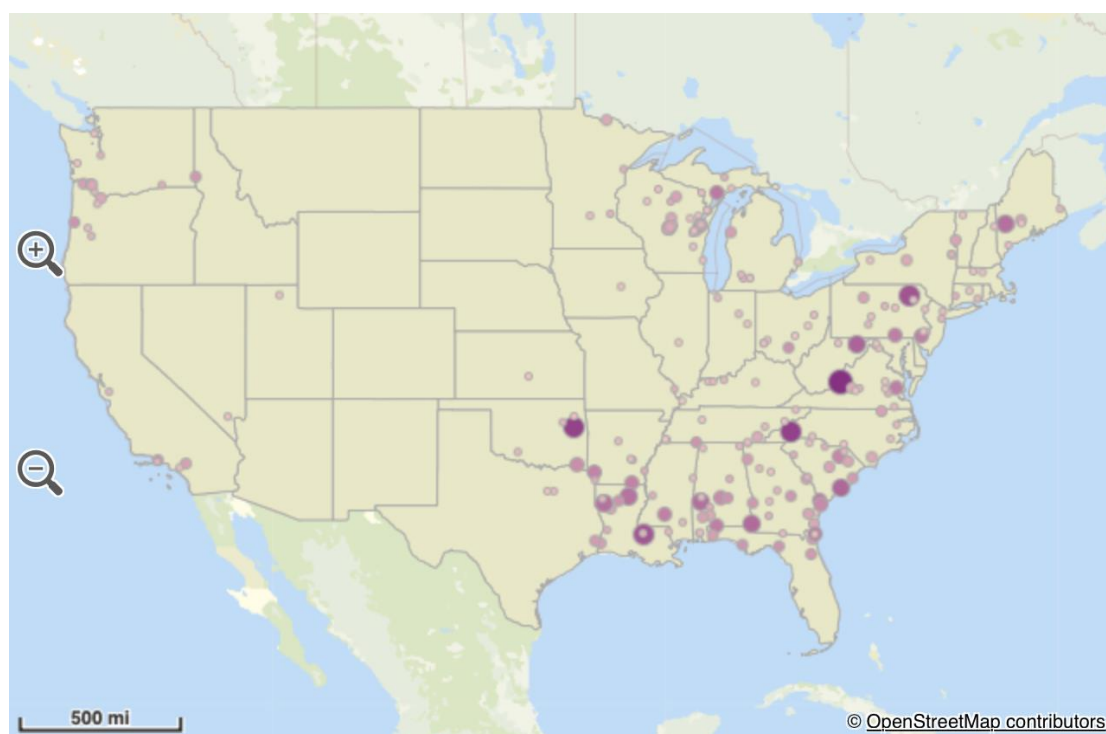
— Other Paper Producers

What factors influenced the [trend in emissions for pulp and paper](#)?

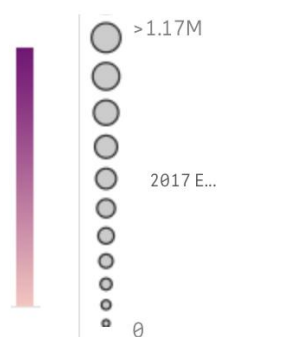
### Location and emissions range for each reporting facility in the pulp and paper sector (as of 8/19/18).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.





**GHGRP, 2017**  
**Pulp & Paper**  
**(metric tons CO<sub>2</sub>e)**



**Number of reporters and emissions in the pulp and paper sector (as of 8/19/18)**

<b>Pulp and Paper Sector — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	233	230	231	232	230	225	222
<b>Total emissions (CO<sub>2</sub>e):</b>	44.2	42.8	39.4	39.3	38.4	37.7	35.8
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	41.2	39.8	38.6	38.5	37.7	37.1	35.2
• Methane (CH <sub>4</sub> ):	1.1	1.1	0.2	0.2	0.2	0.2	0.1
• Nitrous oxide (N <sub>2</sub> O):	1.9	1.9	0.6	0.6	0.6	0.5	0.5

Totals may not equal sum of individual GHGs due to independent rounding.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2017 emissions (CO <sub>2</sub> e) per pulp and paper industry subsector		
Industry Sector	2017 Number of Reporters	2017 Emissions (million metric tons CO <sub>2</sub> e)
Pulp and Paper Production	107	25.5
Other Paper Producers	115	10.4

## Other EPA Resources

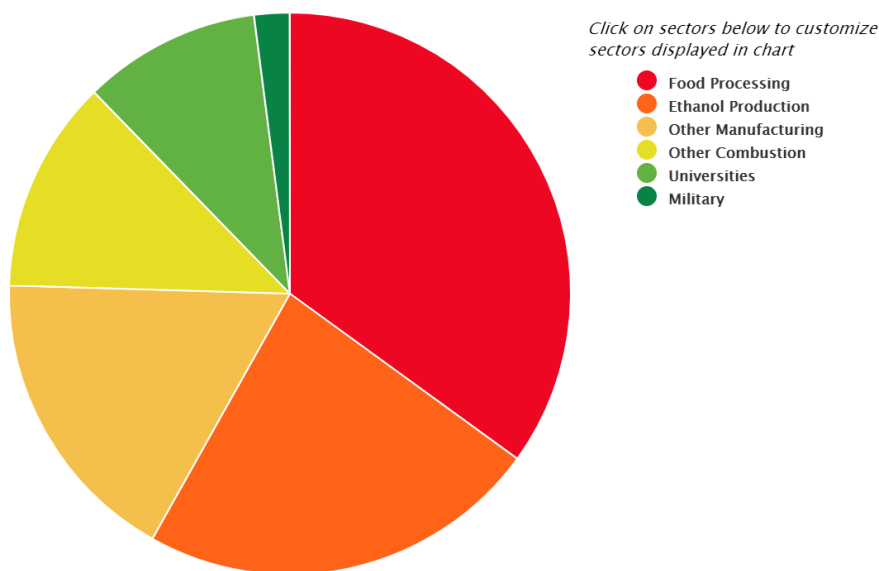
- [U.S. Greenhouse Gas Inventory Report](#)

## GHGRP 2017: Miscellaneous Combustion

Miscellaneous Combustion comprises facilities that reported GHG emissions from stationary fuel combustion sources only and that are not part of any other sector. This category includes food processing, ethanol production, manufacturing operations, universities, military installations, and any combustion sources not included elsewhere, such as mining operations and hospitals.

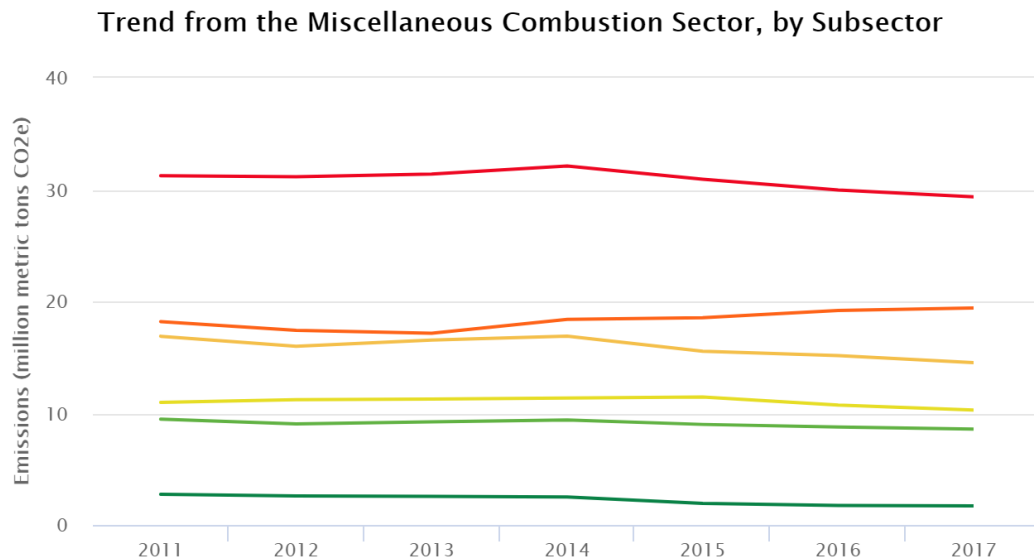
**2017 Total Reported Direct Emissions from Miscellaneous Combustion, by Subsector (as of 8/19/18).**

2017 Total Reported Emissions from the Miscellaneous Combustion Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

### Trend of Annual Reported GHG Emissions from Miscellaneous Combustion, by Subsector (as of 8/19/18).



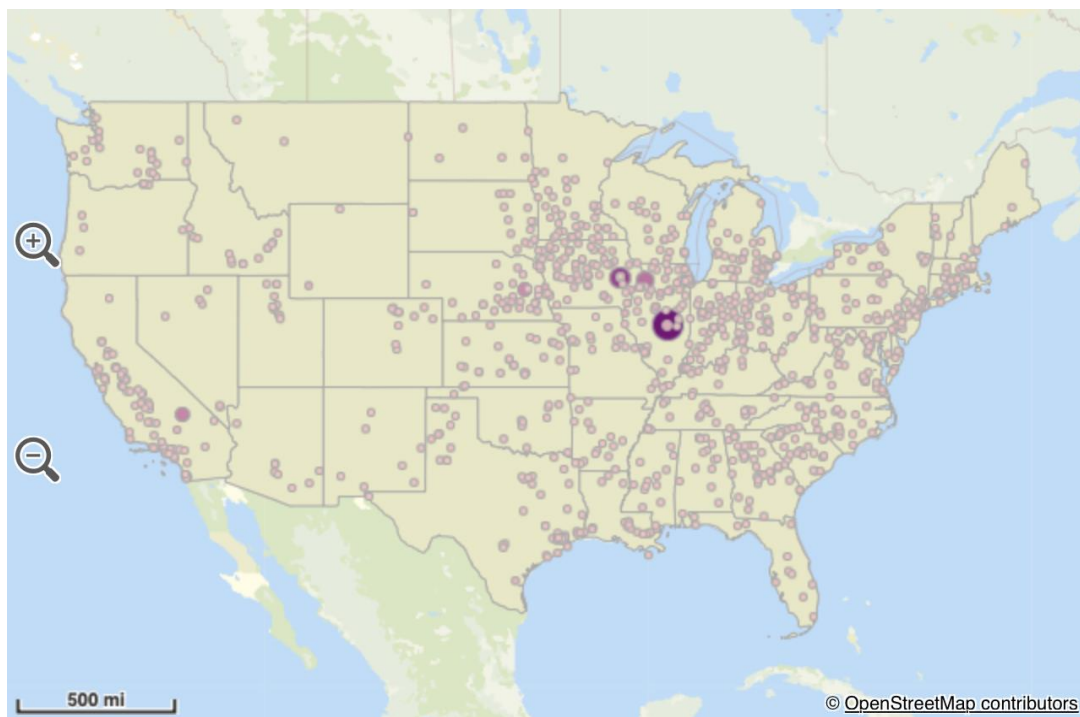
Click on sectors below to customize sectors displayed in chart

- Food Processing
- Ethanol Production
- Other Manufacturing
- Other Combustion
- Universities
- Military

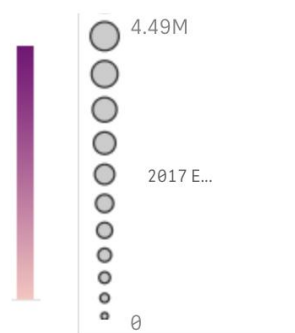
What factors influenced the [trend in emissions for miscellaneous combustion](#)?

### Location and emissions range for each reporting facility in the Miscellaneous Combustion sector (as of 8/19/18).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Miscellaneous Combustion**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the dropdown menu to change the focus of the map.

Continental U.S. ▼

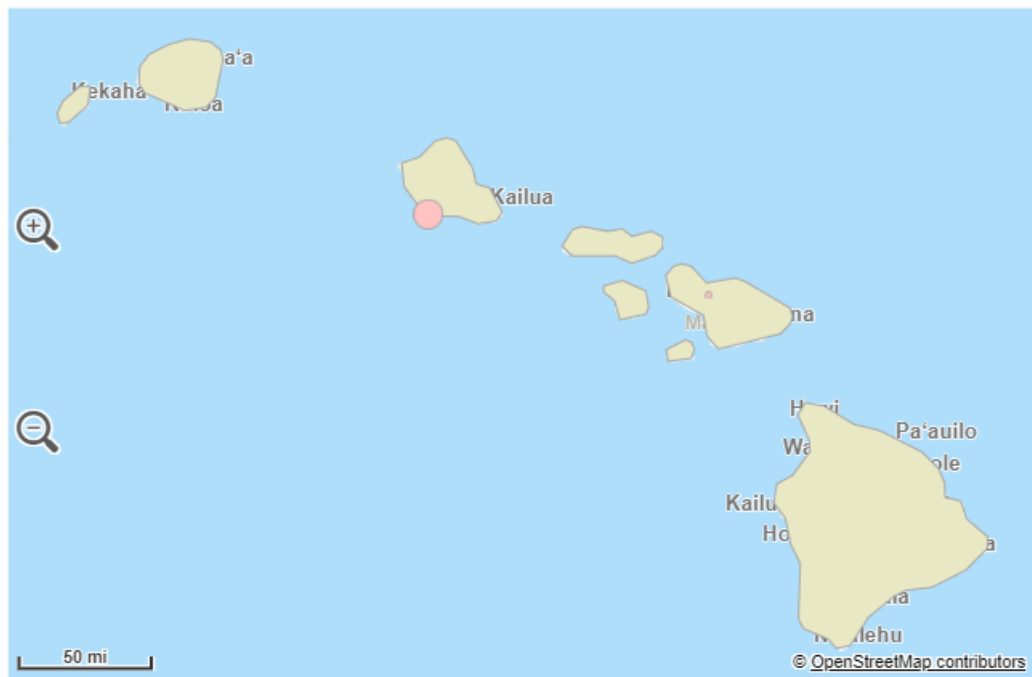


**Alaska**  
**GHGRP, 2017**  
**Miscellaneous Combustion**  
**(metric tons CO<sub>2</sub>e)**



Choose an option from the  
dropdown menu to change the  
focus of the map.

Alaska ▼



**Hawaii**  
**GHGRP, 2017**  
**Miscellaneous Combustion**  
**(metric tons CO<sub>2</sub>e)**

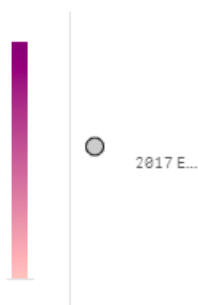


Choose an option from the  
dropdown menu to change the  
focus of the map.

Hawaii ▼



Puerto Rico and the Virgin  
Islands  
GHGRP, 2017  
Miscellaneous Combustion  
(metric tons CO<sub>2</sub>e)



Choose an option from the  
dropdown menu to change the  
focus of the map.

Puerto Rico & USVI ▼

### Number of reporters and emissions in the Miscellaneous Combustion sector (as of 8/19/18)

#### Miscellaneous Combustion — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO<sub>2</sub>e)

	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>							
• Food Processing	319	330	336	341	347	341	331
• Ethanol Production	163	167	165	173	176	173	173
• Other Manufacturing	287	292	294	299	291	284	275
• Universities	112	115	114	117	117	115	114
• Military	43	44	43	43	38	34	33
• Other Combustion	161	171	175	183	184	174	164
<b>Total emissions (CO<sub>2</sub>e):</b>							
• Food Processing	31.2	31.1	31.4	32.1	30.9	30.0	29.4
• Ethanol Production	18.2	17.4	17.1	18.4	18.5	19.2	19.4
• Other Manufacturing	16.9	16.0	16.5	16.9	15.5	15.2	14.5



<b>Miscellaneous Combustion — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016	2017
• Universities	9.5	9.0	9.2	9.4	9.0	8.8	8.6
• Military	2.7	2.6	2.5	2.5	1.9	1.7	1.7
• Other Combustion	11.0	11.2	11.3	11.3	11.4	10.7	10.3
<b>Emissions by greenhouse gas (CO<sub>2</sub>e) Food Processing</b>							
• Carbon dioxide (CO <sub>2</sub> ):	31.1	31.0	31.2	31.9	30.8	29.8	29.2
• Methane (CH <sub>4</sub> ):	0.1	0.1	0.1	0.1	0.1	0.1	0.1
• Nitrous oxide (N <sub>2</sub> O):	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>Ethanol Production</b>							
• Carbon dioxide (CO <sub>2</sub> ):	18.2	17.2	17.1	18.3	18.5	19.2	19.4
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	0.2	**	**	**	**	**
<b>Other Manufacturing</b>							
• Carbon dioxide (CO <sub>2</sub> ):	16.8	15.9	16.4	16.8	15.5	15.1	14.5
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	0.1	0.1	0.1	0.1	**	**	**
<b>Universities</b>							
• Carbon dioxide (CO <sub>2</sub> ):	9.4	9.0	9.2	9.4	9.0	8.7	8.6
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**
<b>Military</b>							
• Carbon dioxide (CO <sub>2</sub> ):	2.7	2.6	2.5	2.5	1.9	1.7	1.7
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**
<b>Other Combustion</b>							
• Carbon dioxide (CO <sub>2</sub> ):	10.9	11.2	11.2	11.3	11.4	10.7	10.2
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**

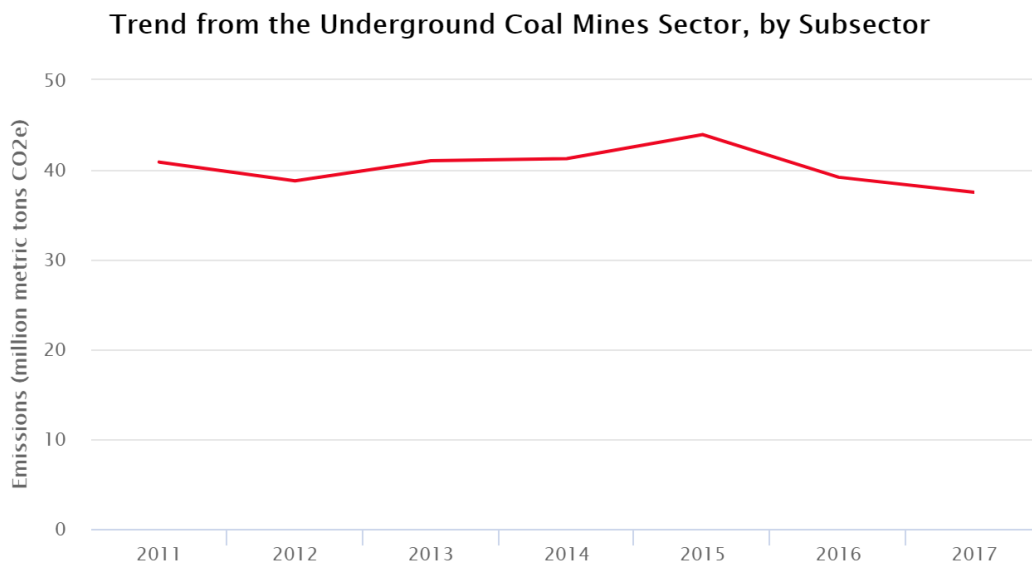
Totals may not equal sum of individual GHGs due to independent rounding.

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

## GHGRP 2017: Underground Coal Mines

The Underground Coal Mines sector consists of all underground coal mines that liberate 36,500,000 actual cubic feet of methane (equivalent to approximately 17,579 metric tons CO<sub>2</sub>e) or more per year. Facilities in this sector include both underground coal mines under development and those categorized by the Mine Safety and Health Administration as active mines. Surface mines and abandoned mines are excluded from this category. Facility owners or operators must report the total annual methane liberated from ventilation and degasification systems as well as GHG emissions from any other source categories at the facility, such as stationary combustion devices.

### Trend of Annual Reported Direct Emissions from the Underground Coal Mines Sector (as of 8/19/18).



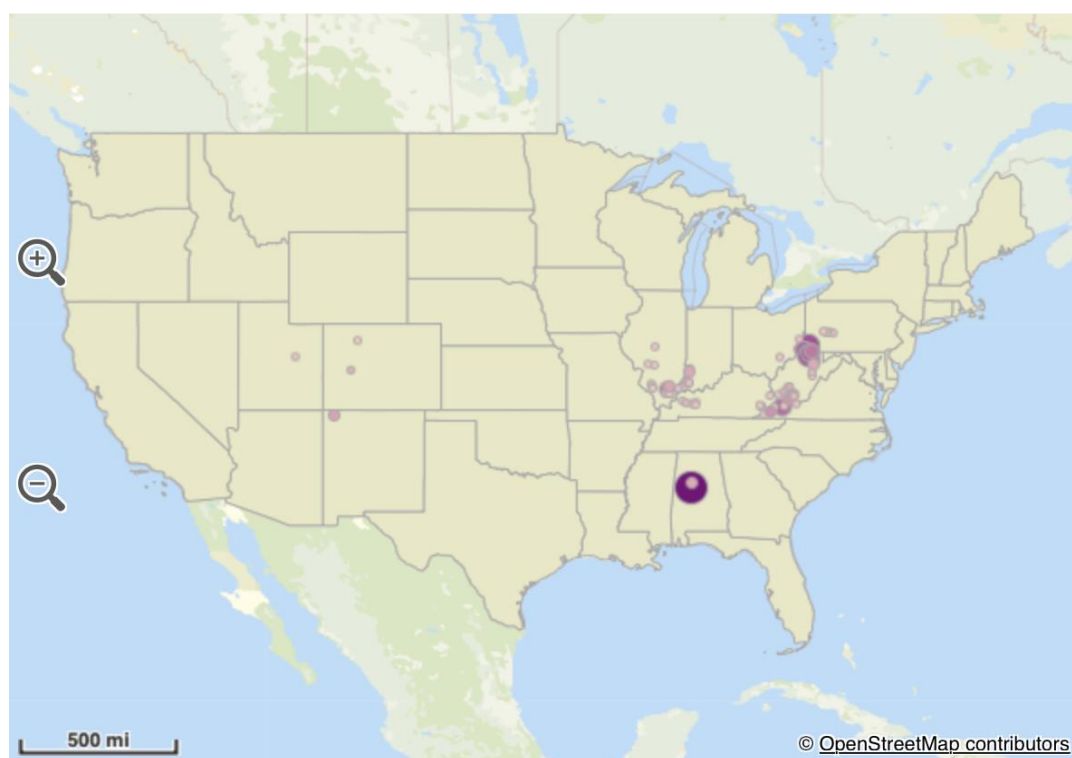
*Click on sectors below to customize sectors displayed in chart*

— Underground Coal Mines

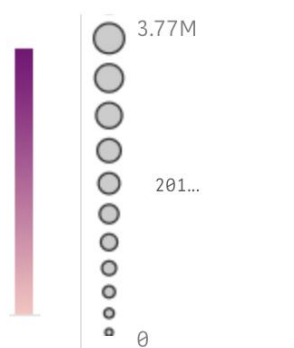
What factors influenced the [trend in emissions for underground coal mines](#)?

### Location and emissions range for each reporting facility in the underground coal mines sector (as of 8/19/18).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Underground Coal Mines**  
**(metric tons CO<sub>2</sub>e)**



### Number of reporters and emissions in the underground coal mines sector (as of 8/19/18)

#### Underground Coal Mines — Greenhouse Gas Emissions Reported to the GHGRP

(all emissions values presented in million metric tons CO<sub>2</sub>e)

	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	117	118	131	130	125	95	78
<b>Total emissions (CO<sub>2</sub>e):</b>	40.9	38.8	41.0	41.2	43.9	39.2	37.5
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	0.2	0.2	0.2	0.5	0.3	0.2	0.2
• Methane (CH <sub>4</sub> ):	40.7	38.6	40.8	40.8	43.7	39.0	37.3
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**

Totals may not equal sum of individual GHGs due to independent rounding.

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

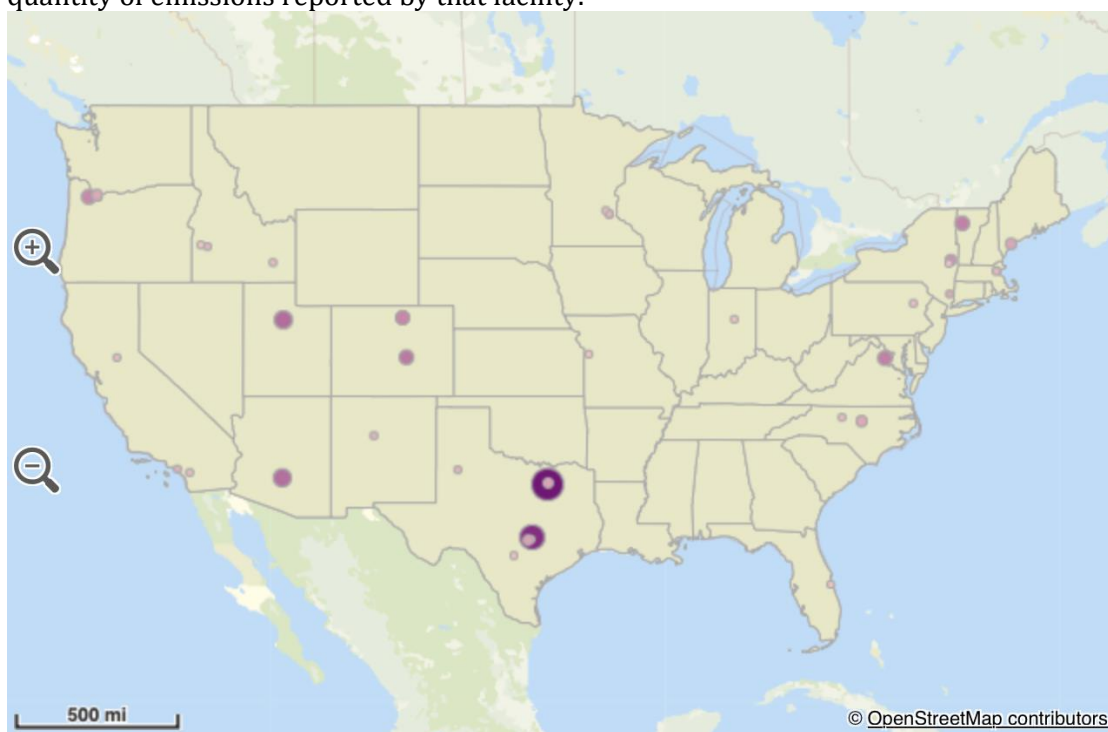
CO<sub>2</sub> emissions from the combustion of biomass are NOT included in the emissions totals provided above.

## GHGRP 2017: Electronics Manufacturing

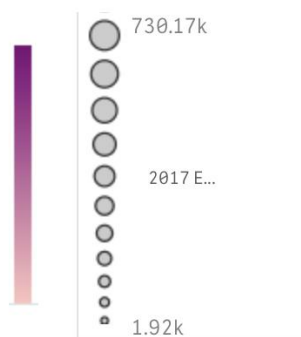
This source category includes, but is not limited to, facilities that manufacture semiconductors (including light-emitting diodes), micro-electromechanical systems (MEMS), liquid crystal displays (LCDs), and photovoltaic cells (PV). Specifically, this subsector consists of electronics manufacturing facilities with production processes that use plasma-generated fluorine atoms and other reactive fluorine-containing fragments to etch thin films, clean chambers for depositing thin films, clean wafers, or remove residual material. The source category also includes electronics manufacturing facilities with chemical vapor deposition processes or other production processes that use N<sub>2</sub>O, and with processes that use fluorinated GHGs as heat transfer fluids (HTF) to control temperature or clean surfaces.

### Location and emissions range for each reporting facility in the Electronics Manufacturing sector (as of 8/19/18).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP, 2017**  
**Electronics Manufacturing**  
**(metric tons CO<sub>2</sub>e)**



**Number of reporters and emissions in the electronics manufacturing sector (as of 8/19/18)**

<b>Electronics Manufacturing — Greenhouse Gas Emissions Reported to the GHGRP</b> (all emissions values presented in million metric tons CO <sub>2</sub> e)							
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Number of facilities:</b>	56	56	58	59	58	53	51
<b>Total emissions (CO<sub>2</sub>e):</b>	7.0	6.4	5.2	6.2	6.3	6.2	6.1
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	1.6	1.5	0.7	0.7	0.8	0.7	0.7
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	0.2	0.2	0.2	0.2	0.2	0.2	0.3
• Hydrofluorocarbons (HFCs):	0.2	0.2	0.2	0.3	0.3	0.3	0.4
• Hydrofluoroethers (HFEs):	**	**	**	**	**	**	**
• Perfluorocarbons (PFCs):	3.2	2.8	2.7	3.0	3.0	2.9	2.9
• Sulfur hexafluoride (SF <sub>6</sub> ):	0.3	0.3	0.3	0.7	0.7	0.8	0.7
• Nitrogen trifluoride (NF <sub>3</sub> ):	0.6	0.6	0.5	0.5	0.6	0.6	0.6
• Other Fully Fluorinated GHGs	0.7	0.8	0.6	0.8	0.7	0.6	0.6
• Very short-lived compounds	**	**	**	**	**	**	**

Emissions of CO<sub>2</sub> and CH<sub>4</sub> are from stationary fuel combustion sources.

What factors influenced the [trend in emissions for electronics manufacturing](#)?

## GHGRP 2017: Electrical Equipment Production and Use

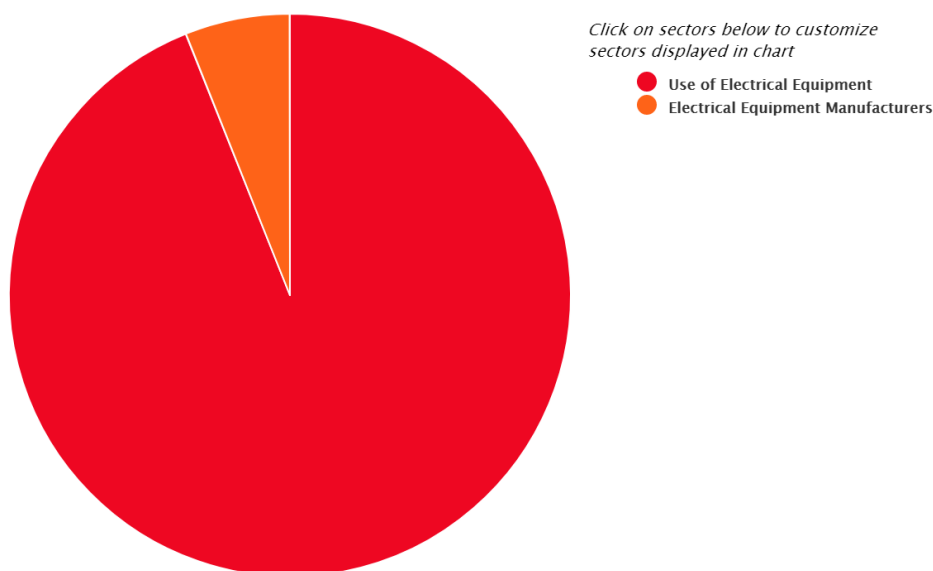
This source category includes electrical transmission and distribution systems and facilities that manufacture or refurbish electrical equipment.

The electrical transmission and distribution subsector consists of all electric transmission and distribution equipment insulated with or containing sulfur hexafluoride (SF<sub>6</sub>) or perfluorocarbons (PFCs) within an electric power system. This equipment includes but is not limited to gas-insulated substations; circuit breakers; switchgear, including closed-pressure and hermetically sealed-pressure switchgear; gas-insulated lines containing SF<sub>6</sub> or PFCs; and gas containers such as pressurized cylinders, gas carts, electric power transformers, and other containers of SF<sub>6</sub> or PFCs. Emissions occur during installation, use, servicing, and decommissioning of the equipment.

The electrical equipment manufacturing subsector includes facilities that manufacture or refurbish electrical equipment. At these facilities, emissions occur during equipment testing and filling.

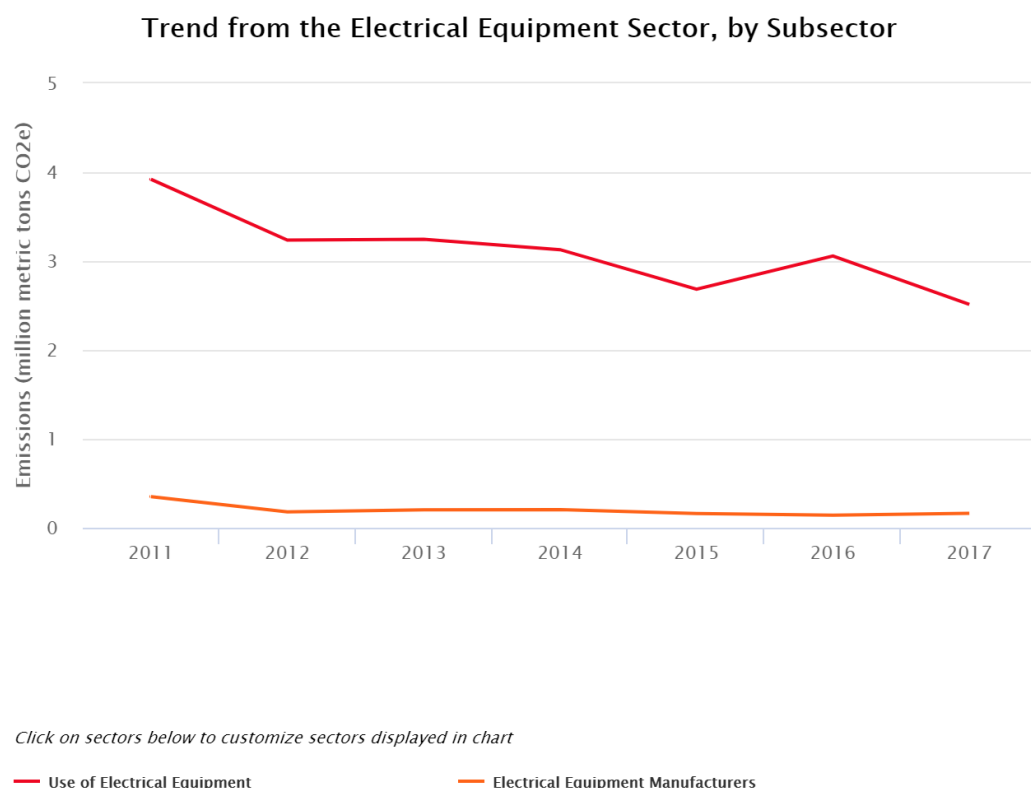
### 2017 Total Reported Direct Emissions from the Electrical Equipment Production and Use Sector, by Subsector (as of 8/19/18).

2017 Total Reported Emissions from the Electrical Equipment Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

## Trend of Annual Reported GHG Emissions from the Electrical Equipment Production & Use Sector, by Subsector (as of 8/19/18)



What factors influenced the [trend in emissions for electrical equipment production and use](#)?

## Number of reporters and emissions in the electrical equipment production and use sector (as of 8/19/18)

Production and Use of Electrical Equipment — Greenhouse Gas Emissions Reported to the GHGRP							
(all emissions values presented in million metric tons CO <sub>2</sub> e)							
	2011	2012	2013	2014	2015	2016	2017
<b>Number of facilities:</b>	127	128	127	125	112	102	89
<b>Total emissions (CO<sub>2</sub>e):</b>	4.3	3.4	3.4	3.3	2.8	3.2	2.7
<b>Emissions by greenhouse gas (CO<sub>2</sub>e)</b>							
• Carbon dioxide (CO <sub>2</sub> ):	**	**	**	**	**	**	**
• Methane (CH <sub>4</sub> ):	**	**	**	**	**	**	**
• Nitrous oxide (N <sub>2</sub> O):	**	**	**	**	**	**	**
• Perfluorocarbons (PFCs):	**	**	**	**	**	**	**
• Sulfur hexafluoride (SF <sub>6</sub> ):	4.3	3.4	3.4	3.3	2.8	3.2	2.7

Totals may not equal sum of individual GHGs due to independent rounding.

\*\* Total reported emissions are less than 0.05 million metric tons CO<sub>2</sub>e.

CO<sub>2</sub> emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2017 emissions (CO <sub>2</sub> e) per electrical equipment industry subsector		
Industry Sector	2017 Number of Reporters	2017 Emissions (million metric tons CO <sub>2</sub> e)
Use of Electrical Equipment	83	2.5
Electrical Equipment Manufacturers	6	0.2



## GHGRP 2017: Supplier Highlights

For reporting year (RY) 2017, over 900 suppliers of fuels and industrial gases reported to EPA's Greenhouse Gas Reporting Program (GHGRP).

Suppliers do not report direct emissions, but instead report the quantity of GHGs that would be emitted if the fuels and industrial GHGs that they produce, import, or export each year were combusted, released, or oxidized. Emissions associated with these fuels and industrial gases do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. An example of this is gasoline, which is supplied into the U.S. economy by a relatively small number of entities and consumed by many individual vehicles throughout the country.

The GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during that particular reporting year. However, the data from suppliers provide important information on the structure and flow of products through the economy and these products may ultimately result in greenhouse gas emissions. In addition, data reported by fossil fuel and industrial gas suppliers can account for greenhouse gases emitted by the numerous sources that use these products but do not report under the GHGRP due to their low individual emissions (passenger vehicles, for example). Emissions reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT.

For 2017, 967 suppliers submitted a GHG report. The majority of GHG emissions associated with the transportation, residential, and commercial sectors are accounted for by these suppliers.

<b>Table 1: Number of Suppliers that Reported (2017)</b>	
<b>Industry Sector</b>	<b>Number of Reporters<sup>9</sup></b>
Suppliers of Coal-Based Liquid Fuels	1
Suppliers of Petroleum Products	236
Suppliers of Natural Gas and Natural Gas Liquids	
• <i>Natural Gas Local Distribution Companies</i>	376
• <i>Natural Gas Liquids Fractionators</i>	123
Suppliers of Industrial GHGs and Products Containing GHGs	
• <i>Industrial GHG Suppliers</i>	78
• <i>Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams</i>	44
Suppliers of Carbon Dioxide	131

<sup>9</sup> Totals sum to more than 967, because suppliers that fall into more than one sector are counted multiple times.

## GHGRP 2017: Suppliers of Natural Gas and Natural Gas Liquids

This sector consists of entities that supply natural gas and natural gas liquids. Natural gas supply is reported by Local Distribution Companies (LDCs) and natural gas liquids (NGL) supply is reported by fractionators.

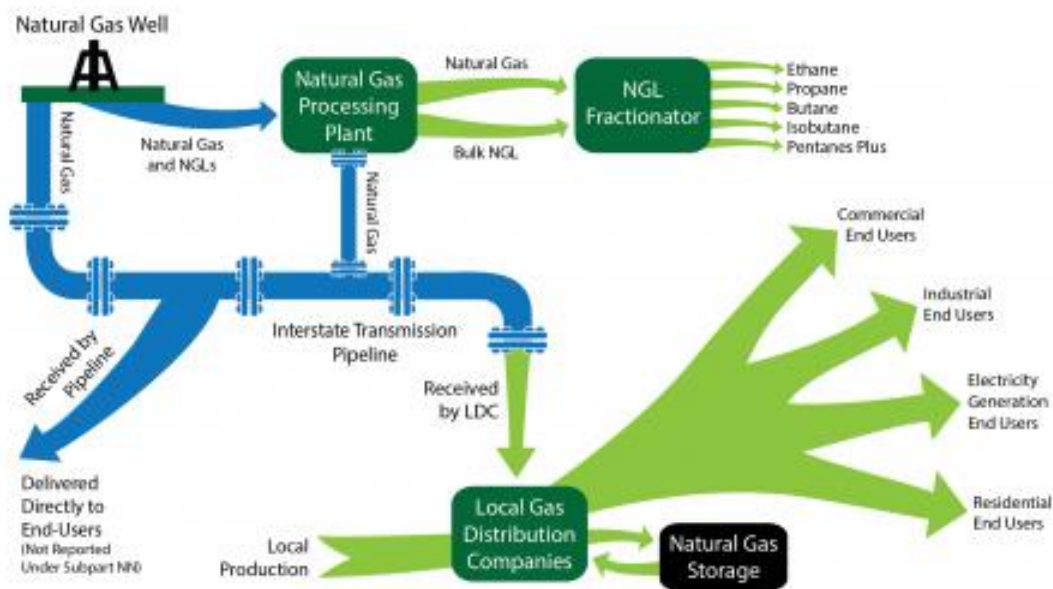
**NGL Fractionators** are installations that receive natural gas or bulk natural gas liquids from producers, fractionate these raw inputs into individual products (ethane, propane, normal butane, isobutane, or pentanes plus), and then supply those products into the economy.

**Local Distribution Companies** receive natural gas from a transmission pipeline company and physically deliver the gas to end users.

These Suppliers report the quantity of CO<sub>2</sub> that would be emitted if the fuels they supply each year were combusted. Emissions associated with these fuels do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. The full GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during the year in which they are reported. An example is ethane supplied by NGL fractionators, which is often used to produce plastics.

The GHG quantities reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT. Some natural gas and natural gas liquids suppliers also report direct emissions from petroleum and natural gas operations.

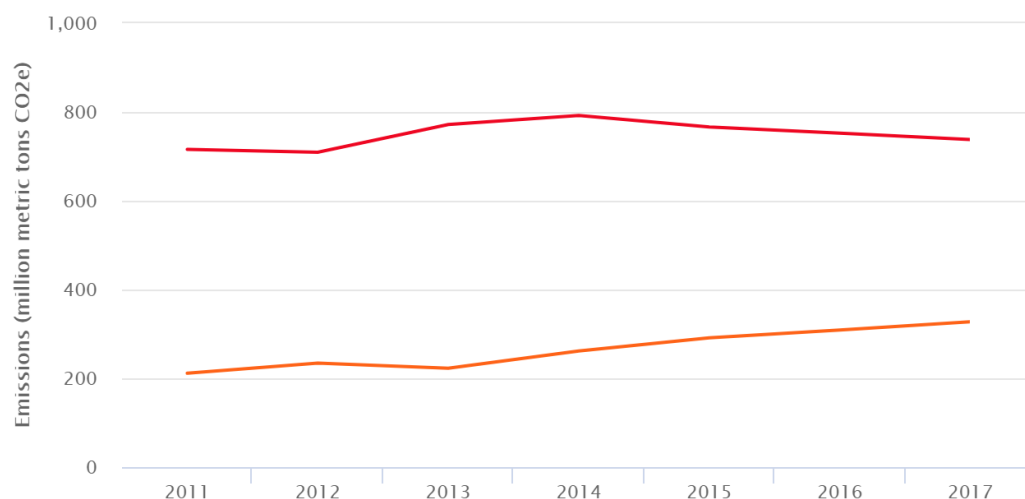
### Graphic of the natural gas and NGL supply chain



Quantities marked with green arrows are reported to EPA by NGL Fractionators or Local Distribution Companies under Subpart NN.

## Trend of annual reported CO<sub>2</sub> quantity associated with natural gas and NGL supply

Trend from the Natural Gas & Natural Gas Liquids Sector, by Subsector



Click on sectors below to customize sectors displayed in chart

— Natural Gas Distribution

— Natural Gas Liquids Fractionation

What factors influenced the [trends in emissions for suppliers of natural gas and natural gas liquids](#)?

### Emissions and Deliveries

#### Natural Gas and Natural Gas Liquids Suppliers Sector – Carbon Dioxide Quantity Reported to the GHGRP

(million metric tons CO<sub>2</sub>)

	2011	2012	2013	2014	2015	2016	2017
<b>Local Distribution Companies</b>							
Number of reporters:	381	386	385	383	383	379	376
CO <sub>2</sub> Quantity	715.9	709.5	771.9	792.1	766.2	752.2	737.7
<b>Natural Gas Liquids Fractionators</b>							
Number of reporters:	116	119	125	128	124	123	123
CO <sub>2</sub> Quantity <sup>10</sup>	211.5	234.3	222.8	261.5	291.3	308.8	327.4

#### Natural Gas Deliveries Reported by LDCs (Mscf)

End-User	2011	2012	2013	2014	2015	2016	2017
<b>Total Reported Deliveries</b>	<b>12,833,353,747</b>	<b>12,814,244,074</b>	<b>13,959,558,590</b>	<b>14,401,595,214</b>	<b>13,890,872,304</b>	<b>13,556,513,736</b>	<b>13,350,019,486</b>
Residential Customers	4,639,182,835	4,085,716,741	4,848,463,986	5,005,539,667	4,543,660,415	4,228,677,672	4,333,241,924

<sup>10</sup> Excludes CO<sub>2</sub> reported by NGL Fractionators whose reported quantities are classified as confidential business information (CBI).

Commercial Customers	3,040,460,385	2,807,075,083	3,195,684,202	3,371,876,222	3,107,981,468	3,019,796,692	3,035,660,356
Industrial Customers	3,294,130,257	3,518,276,435	3,673,846,067	3,787,808,697	3,685,341,109	3,759,236,380	3,777,709,647
Electricity Generating Facilities	1,859,580,270	2,403,175,815	2,241,564,335	2,236,370,627	2,553,889,311	2,498,802,992	2,203,407,559

Msfc means thousand standard cubic feet of gas.

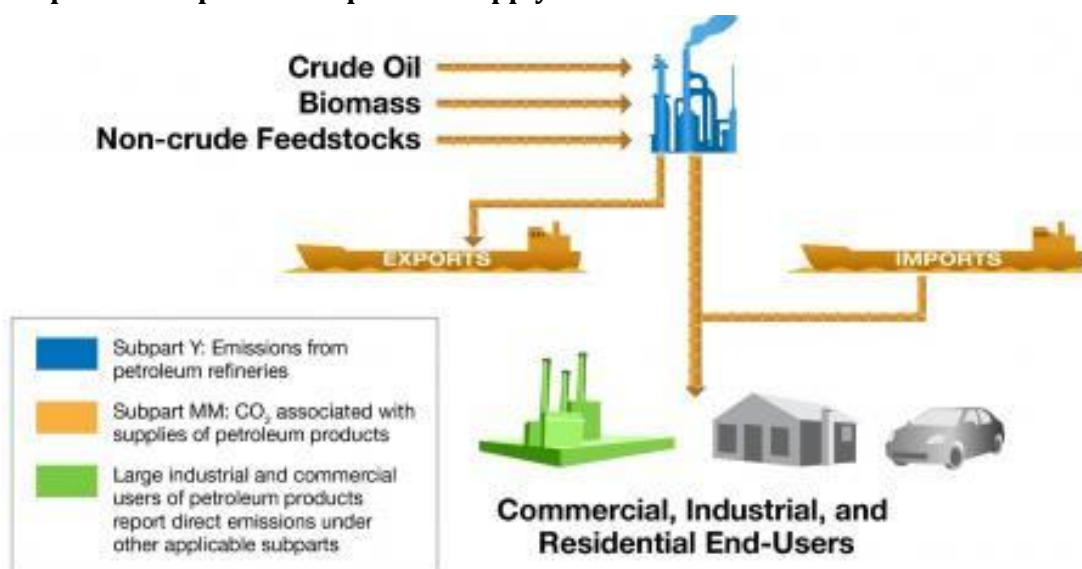
## GHGRP 2017: Suppliers of Petroleum Products

This sector comprises petroleum refineries and importers and exports of petroleum products and natural gas liquids. These suppliers do not report direct emissions, but instead report the quantity of CO<sub>2</sub> that would be emitted if the fuels and other products they supply each year were combusted. Petroleum refineries also report the volume of all feedstocks entering the refinery.

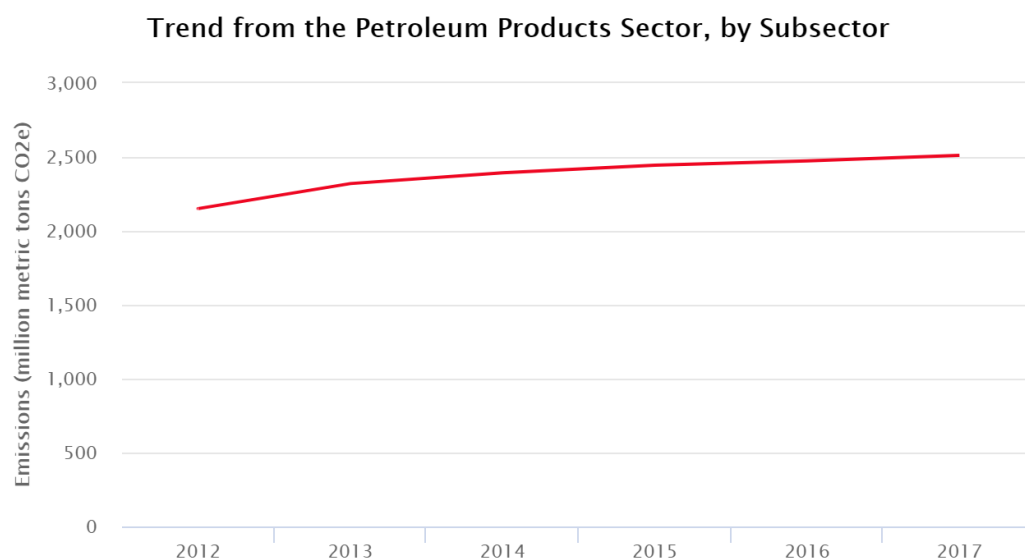
Emissions associated with these products do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. The full GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during that particular reporting year. An example is ethylene, which is a byproduct from petroleum refining that is often used to produce plastics.

The GHG quantities reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT. Petroleum refineries also report direct emissions under other applicable subparts.

### Graphic of the petroleum product supply chain



## Trend of Annual Reported CO<sub>2</sub> Quantity Associated with Refinery Petroleum Products Produced (as of 8/19/18)



Click on sectors below to customize sectors displayed in chart

— Petroleum Refineries

## Number of reporters and emissions associated with refinery petroleum products produced

Petroleum Product Suppliers Sector – Number of Reporters						
	2012	2013	2014	2015	2016	2017
<b>Importers</b>	86	87	90	91	88	87
<b>Exporters</b>	60	61	64	63	67	69
<b>Petroleum Refineries</b>	137	136	136	137	136	137

Petroleum Refineries – CO <sub>2</sub> Quantity Associated with Supplied Products <sup>11</sup> (million metric tons CO <sub>2</sub> )						
	2012	2013	2014	2015	2016	2017
<b>Petroleum Refineries</b>	2,150.7	2,320.2	2,393.3	2,443.9	2,473.4	2,511.8

<sup>11</sup> Carbon dioxide quantities shown in this table exclude petroleum refineries whose carbon dioxide quantities are considered [confidential business information](#).

## GHGRP 2017: Suppliers of Industrial GHGs and Products Containing GHGs

This sector comprises industrial greenhouse gas (GHG) suppliers and entities that import or export certain products that contain [fluorinated greenhouse gases](#). These suppliers do not report direct emissions, but instead report the equivalent quantity of CO<sub>2</sub> that would be emitted if the gases that they produce, import, or export each year were released to the atmosphere.

**Industrial GHG Suppliers.** Entities that [manufacture, import, or export fluorinated greenhouse gases](#) or nitrous oxide in bulk report as suppliers of industrial GHGs under Subpart OO of the GHGRP. The number of reporters displayed in the table below includes all reporters subject to Subpart OO, not just those reporting supply of the specific compounds listed in the table titled Quantity (Net Supply) of GHGs Reported.

**Importers and Exporters** of (1) equipment that is pre-charged with fluorinated greenhouse gases (e.g., electrical equipment and air conditioners) and (2) closed cell foams containing fluorinated greenhouse gases (e.g., insulation contained inside refrigerators; insulation boardstock) report under Subpart QQ.

### Number of Reporters Subject to Subparts OO and QQ

Industry Sector	2010	2011	2012	2013	2014	2015	2016	2017
<b>Industrial GHG Suppliers (OO)</b>	49	64	72	71	74	74	72	78
Producers (Facilities)	21	24	25	24	22	22	22	22
Importers	25	39	43	43	48	45	47	54
Exporters	19	24	26	25	26	26	25	24
<b>Importers and Exporters of Fluorinated Gases in Products (QQ)</b>	N/A <sup>a</sup>	37	43	44	44	44	45	44
Importers	N/A <sup>a</sup>	29	36	36	38	38	38	38
Exporters	N/A <sup>a</sup>	27	32	33	34	33	33	30

<sup>a</sup> Importers and Exporters of Fluorinated Gases in Products were not required to report 2010 data.

The total number of suppliers reporting under OO (and QQ) is less than the sum of the producers, importers, and exporters reporting under OO (and QQ) because some reporters qualify as multiple types of suppliers.

### Quantity (Net Supply) of GHGs Reported (Quantities are presented in million metric tons per year of net CO<sub>2</sub>e<sup>a</sup>)

Industry Sector	2010	2011	2012	2013	2014	2015	2016
<b>Industrial GHG Suppliers</b>							
Saturated HFCs, excluding HFC-23 <sup>b</sup>	235	241	227	278	254	264	240
Sulfur hexafluoride (SF <sub>6</sub> ) <sup>b</sup>	c	c	35	c	c	c	c
Other GHGs	c	c	c	c	c	c	c
<b>Importers and Exporters of Fluorinated Gases in Products</b>	N/A <sup>d</sup>	7.4	18	17	25	26	28

<sup>a</sup> Net supply or net CO<sub>2</sub>e means CO<sub>2</sub>e quantities of bulk gas produced + imported – exported – transformed – destroyed.

<sup>b</sup> All totals reflect the data received as of the original publication date of the total. In some cases, the actual totals (not shown here) have changed slightly as new reporters have provided data for past years and/or existing reporters have revised their data for past years.

<sup>c</sup> To avoid revealing sensitive business information, these quantities have not been published. EPA is investigating which reported quantities may be aggregated and released to the general public.

<sup>d</sup> Importers and Exporters of Fluorinated Gases in Products were not required to report 2010 data.



## GHGRP 2017: Capture, Supply, and Underground Injection of Carbon Dioxide

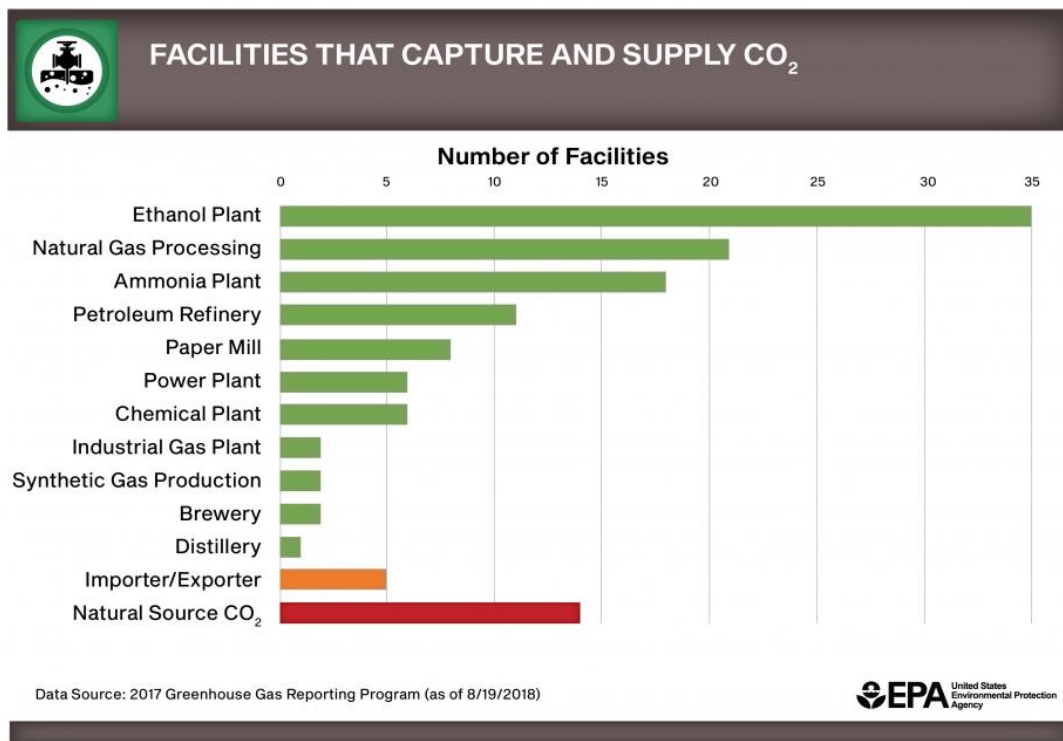
EPA's Greenhouse Gas Reporting Program (GHGRP) collects key information regarding the capture, supply, and underground injection of carbon dioxide (CO<sub>2</sub>) in the United States. Greenhouse gas (GHG) data from these activities are reported under the following GHGRP subparts:

- Suppliers of CO<sub>2</sub> ([subpart PP](#)) covers facilities that capture CO<sub>2</sub> from industrial sources and processes or extract it from natural CO<sub>2</sub>-bearing formations for supply into the economy.
- Underground injection of CO<sub>2</sub> ([subpart UU](#)) covers facilities that inject CO<sub>2</sub> underground for enhanced oil and gas recovery (ER), acid gas injection/disposal, carbon storage research and development (R&D), or for any other purpose other than geologic sequestration.
- Geologic sequestration of CO<sub>2</sub> ([subpart RR](#)) provides a mechanism for facilities to monitor and report to EPA amounts of CO<sub>2</sub> sequestered. Facilities submit a plan for monitoring, reporting and verifying CO<sub>2</sub> sequestered underground. Once the plan is approved, facilities report basic information on CO<sub>2</sub> received for injection, data related to the amounts of CO<sub>2</sub> sequestered, and annual monitoring activities. EPA approved the first "monitoring, reporting, and verification" plan in December 2015 and data will be reported starting in the 2016 reporting year.

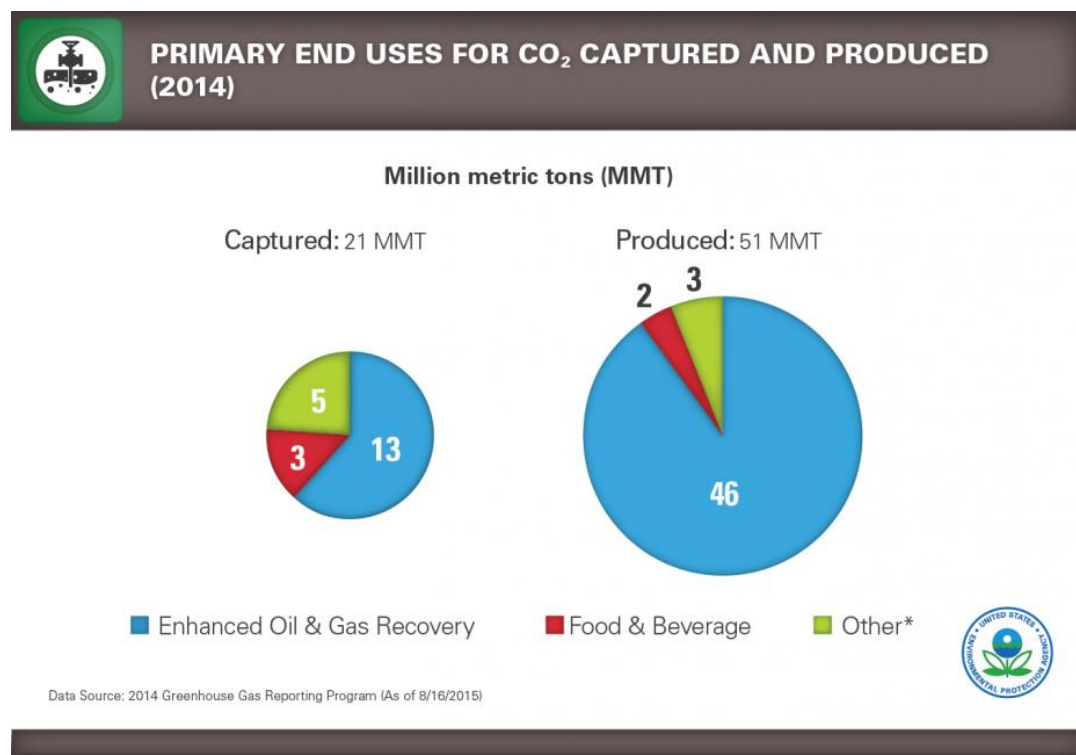
GHGRP, 2014*		
Capture and Supply of CO <sub>2</sub> *	Amount (MMT***)	Reporting Facilities
Total CO <sub>2</sub> captured and produced	72	139
CO <sub>2</sub> captured (industrial sources)	21	123
CO <sub>2</sub> produced (natural sources)	51	16
Underground Injection of CO <sub>2</sub>	Amount (MMT***)	Reporting Facilities
Total CO <sub>2</sub> received for underground injection	64	96
CO <sub>2</sub> received for ER	63	86
CO <sub>2</sub> received for acid gas injection/disposal, carbon storage R&D, and other purposes	1	10
* As of 8/16/15		
** The GHGRP also collects data from <a href="#">importers</a> and <a href="#">exporters</a> of carbon dioxide. These data are not provided in the table but these reporters can be identified through FLIGHT.		
*** Million Metric Tons		

### Capture and Supply of CO<sub>2</sub>

Ethanol, natural gas, and ammonia production are among the top three industrial facility types that capture CO<sub>2</sub> for supply into the economy.



In 2014,<sup>12</sup> most of the CO<sub>2</sub> captured from industrial processes (64 percent) and nearly all of the CO<sub>2</sub> produced from natural sources (91 percent) was used for ER. Food and beverage manufacturing is the second most common end use, followed by other end uses such as pulp and paper manufacturing, fire-fighting equipment, and metal fabrication.



<sup>12</sup> As of 8/16/15.

\* Includes cleaning and solvent use, fumigants and herbicides, transportation and storage of explosives, fire-fighting equipment, industrial and municipal water/wastewater treatment, pulp and paper, metal fabrication, greenhouse plant growth and unknown (which may include ER).

\*\* Note that some CO<sub>2</sub> suppliers reported the primary end use for captured or produced CO<sub>2</sub> as "unknown." It is believed that the quantities reported by CO<sub>2</sub> suppliers as "unknown" account for the difference between CO<sub>2</sub> received for ER and CO<sub>2</sub> supplied for ER.

## Underground Injection of CO<sub>2</sub>

After CO<sub>2</sub> is captured or produced, it can be compressed and transported to a site where it is injected underground. Some facilities both capture or produce CO<sub>2</sub> and inject it underground onsite.

The primary use of carbon dioxide is for ER. ER helps to mobilize oil and gas in underground hydrocarbon reservoirs, thereby increasing production. While most CO<sub>2</sub> captured or produced is supplied to facilities that conduct ER, a smaller portion is injected underground for other purposes.

