

## GHGRP 2019: REPORTED DATA

### 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 major industrial sources across the United States. With ten years of reporting for most sectors, GHGRP data provide important information on industrial emissions—showing variation in emissions within an industry, across geographic areas, and over time at the sector and facility level. EPA uses these data to improve estimates of national greenhouse gas emissions in the [U.S. Greenhouse Gas Inventory](#) and to inform regulatory actions and voluntary emission reduction efforts.

All emissions presented here reflect the most recent information reported to EPA as of 9/26/20. The reported emissions exclude biogenic CO<sub>2</sub>. GHG data displayed here in units of carbon dioxide equivalent (CO<sub>2</sub>e) reflect the global warming potential (GWP) values from [Table A-1](#) of 40 CFR 98, which is generally based on the [IPCC AR4](#), with the addition of GWPs from the [IPCC AR5](#) fluorinated GHGs that did not have GWPs in the AR4.

This document summarizes national industrial sector emissions and trends.

**Table 1: GHGRP Sector Classifications**

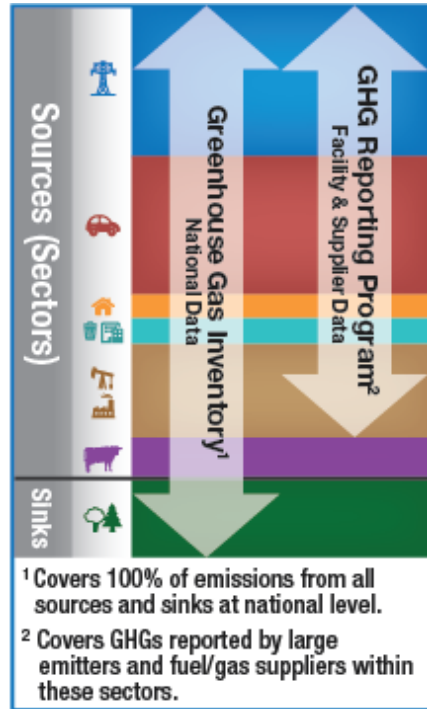
Power Plants	Refineries	Chemicals	Fluorinated Chemicals	Waste
<ul style="list-style-type: none"> <li>– Electricity Generation</li> </ul>	<ul style="list-style-type: none"> <li>– Petroleum Refineries</li> </ul>	<ul style="list-style-type: none"> <li>– Adipic Acid Production</li> <li>– Ammonia Manufacturing</li> <li>– Hydrogen Production</li> <li>– Nitric Acid Production</li> <li>– Phosphoric Acid Production</li> <li>– Petrochemical Production</li> <li>– Silicon Carbide Production</li> <li>– Titanium Dioxide Production</li> <li>– Other Chemicals Production</li> </ul>	<ul style="list-style-type: none"> <li>– Fluorinated Gas Production</li> <li>– HCFC-22 Production/ HFC-23 Destruction</li> </ul>	<ul style="list-style-type: none"> <li>– Municipal Landfills</li> <li>– Industrial Waste Landfills</li> <li>– Industrial Wastewater Treatment</li> <li>– Solid Waste Combustion</li> </ul>
Metals	Minerals	Pulp & Paper	Petroleum & Natural Gas Systems – Direct Emissions	
<ul style="list-style-type: none"> <li>– Aluminum Production</li> <li>– Ferroalloy Production</li> <li>– Iron &amp; Steel Production</li> <li>– Lead Production</li> <li>– Zinc Production</li> <li>– Magnesium Production</li> <li>– Other Metals Production</li> </ul>	<ul style="list-style-type: none"> <li>– Cement Production</li> <li>– Glass Production</li> <li>– Lime Manufacturing</li> <li>– Soda Ash Manufacturing</li> <li>– Other Minerals Production</li> </ul>	<ul style="list-style-type: none"> <li>– Chemical Pulp &amp; Paper Manufacturing</li> <li>– Other Paper Producers</li> </ul>	<ul style="list-style-type: none"> <li>– Onshore Production</li> <li>– Offshore Production</li> <li>– Gathering and Boosting</li> <li>– Natural Gas Processing</li> <li>– Natural Gas Trans. Comp.</li> <li>– Natural Gas Trans. Pipelines</li> <li>– Natural Gas Distribution</li> <li>– Underground Natural Gas Storage</li> <li>– Liquefied Natural Gas Storage</li> <li>– Liquefied Natural Gas Imp./Exp.</li> <li>– Other Petroleum and Natural Gas Systems</li> </ul>	

Miscellaneous Combustion Sources	Electrical Equipment	Electronics Manufacturing	Mining
<ul style="list-style-type: none"> <li>– Stationary Fuel Combustion Sources at facilities that are not part of any other sector, including Food Processing, Ethanol Production, General Manufacturing, Universities, Military Installations, Others</li> </ul>	<ul style="list-style-type: none"> <li>– Electrical Equipment Manufacture &amp; Refurbishment</li> <li>– Electrical Transmission and Distribution Equipment Use</li> </ul>	<ul style="list-style-type: none"> <li>– Electronics Manufacturing</li> </ul>	<ul style="list-style-type: none"> <li>– Underground Coal Mines</li> </ul>
Carbon Dioxide Supply and Injection	Petroleum Product Suppliers	Natural Gas and NGL Suppliers	Industrial Gas Suppliers
<ul style="list-style-type: none"> <li>– Suppliers of CO<sub>2</sub></li> <li>– Injection of CO<sub>2</sub></li> <li>– Geologic Sequestration of CO<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>– Suppliers of Coal-Based Liquid Fuels</li> <li>– Suppliers of Petroleum Products</li> </ul>	<ul style="list-style-type: none"> <li>– Fractionators of Natural Gas Liquids</li> <li>– Local Natural Gas Distribution Companies</li> </ul>	<ul style="list-style-type: none"> <li>– Suppliers of Industrial Greenhouse Gases</li> <li>– Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams</li> </ul>

The GHGRP does not represent total U.S. GHG emissions, but provides facility level data for large sources of direct emissions, thus including 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 by suppliers to the GHGRP, emissions coverage reaches approximately 85-90% (See Figure 1). The [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018](#) 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



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. 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 majority of GHG emissions associated with the transportation, residential, and commercial sectors are accounted for by these suppliers. This document focuses on data reported by direct emitters. Data reported by suppliers can be viewed through the [suppliers section](#) of the Facility Level Information on GreenHouse gases Tool ([FLIGHT](#)). Learn more about suppliers and their 2019 reported data.

Table 2: Overview of GHG Data Reported (2019)

Direct emitters	
Number of facilities that reported direct GHG emissions	7,624
Direct emissions reported (billion metric tons CO <sub>2</sub> e)	2.85
Suppliers of fuel and industrial gases	
Number of suppliers	949
Carbon dioxide injection	
Number of carbon dioxide injection facilities	99

## Who Reports?

For 2019, 7,624 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 (2019)**

Industry Sector	Number of Reporters <sup>a</sup>
Power Plants	1,369
Petroleum and Natural Gas Systems	2,350
Refineries	138
Chemicals	449
Fluorinated Chemicals	16
Non-fluorinated Chemicals	433
Waste	1,471
Metals	295
Minerals	380
Pulp and Paper	220
Other	1,307
Underground Coal Mines	67
Electrical Equipment Production & Use	91
Electronics Manufacturing	48
Miscellaneous Combustion	1,101

<sup>a</sup> Totals sum to more than 7,624 because facilities with production processes in more than one sector are counted multiple times.

**Table 4: Number of Suppliers that Reported (2019)**

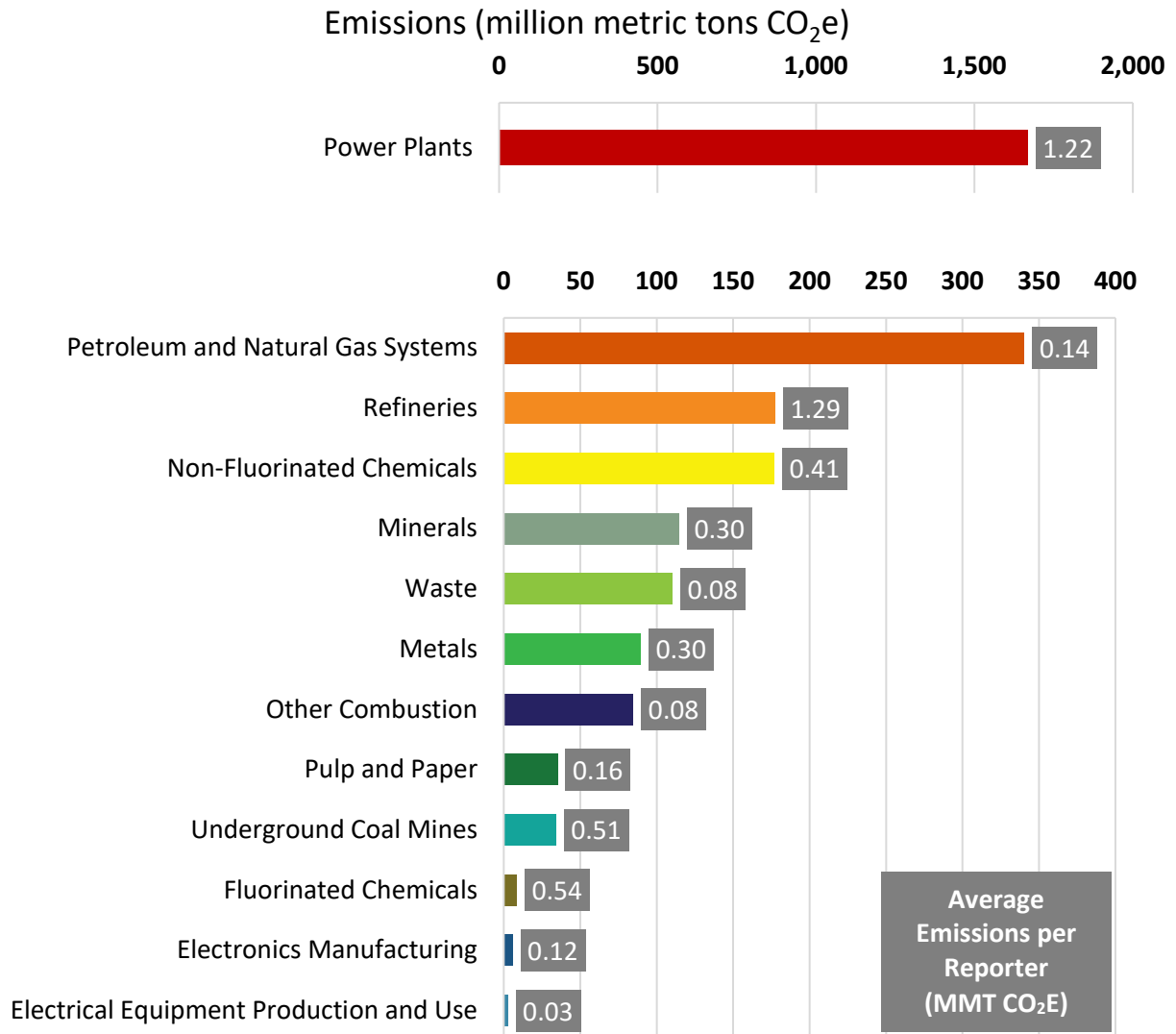
Supply Sector	Number of Reporters <sup>a</sup>
Suppliers of Coal-Based Liquid Fuels	1
Suppliers of Petroleum Products	229
Suppliers of Natural Gas and Natural Gas Liquids	
<i>Natural Gas Distribution</i>	365
<i>Natural Gas Liquids Fractionation</i>	123
Suppliers of Industrial GHGs and Products Containing GHGs	
<i>Industrial GHGs</i>	76
<i>Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams</i>	43
Suppliers of Carbon Dioxide	132

<sup>a</sup> Totals sum to more than 949 because suppliers that fall into more than one sector are counted multiple times.

### Reported Emissions

In 2019, 2.85 billion metric tons CO<sub>2</sub>e were reported by direct emitters. The largest emitting sector was the Power Plant Sector with 1.7 billion metric tons CO<sub>2</sub>e, followed by the Petroleum and Natural Gas Systems Sector with 340 million metric tons (MMT) CO<sub>2</sub>e and the Chemicals Sector with 191 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.

**Figure 2: GHG Emissions Reported by Sector (2019)**



[View this information in FLIGHT.](#)





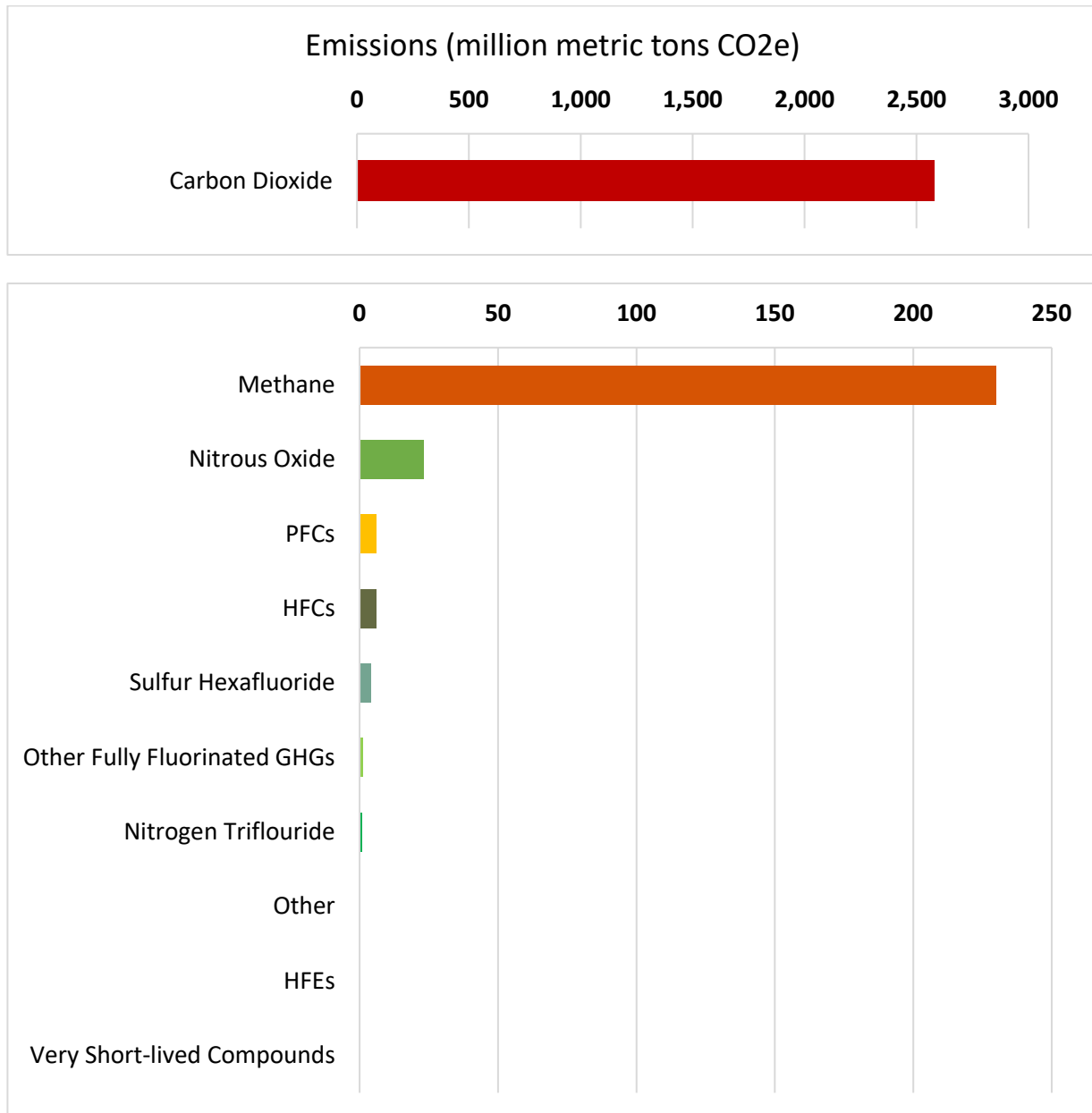




### Emissions by GHG

Carbon dioxide is the GHG emitted in the largest quantities. The 2.6 billion metric tons of CO<sub>2</sub> reported for 2019 represent 90.5% of the GHGs reported in 2019.<sup>1</sup> Methane emissions represent about 8.1% of reported 2019 GHG emissions, N<sub>2</sub>O represents 0.8%, and fluorinated gases (HFCs, PFCs, SF<sub>6</sub>) represent about 0.6% (see Figure 4).

**Figure 4: Direct Emissions by GHG (2019)**



<sup>1</sup> While the Inventory of U.S. Greenhouse Gas Emissions and Sinks for 2019 is not yet available, in 2018, CO<sub>2</sub> represented 81% of total U.S. GHG emissions.

The table below lists the primary sectors that emit each GHG.

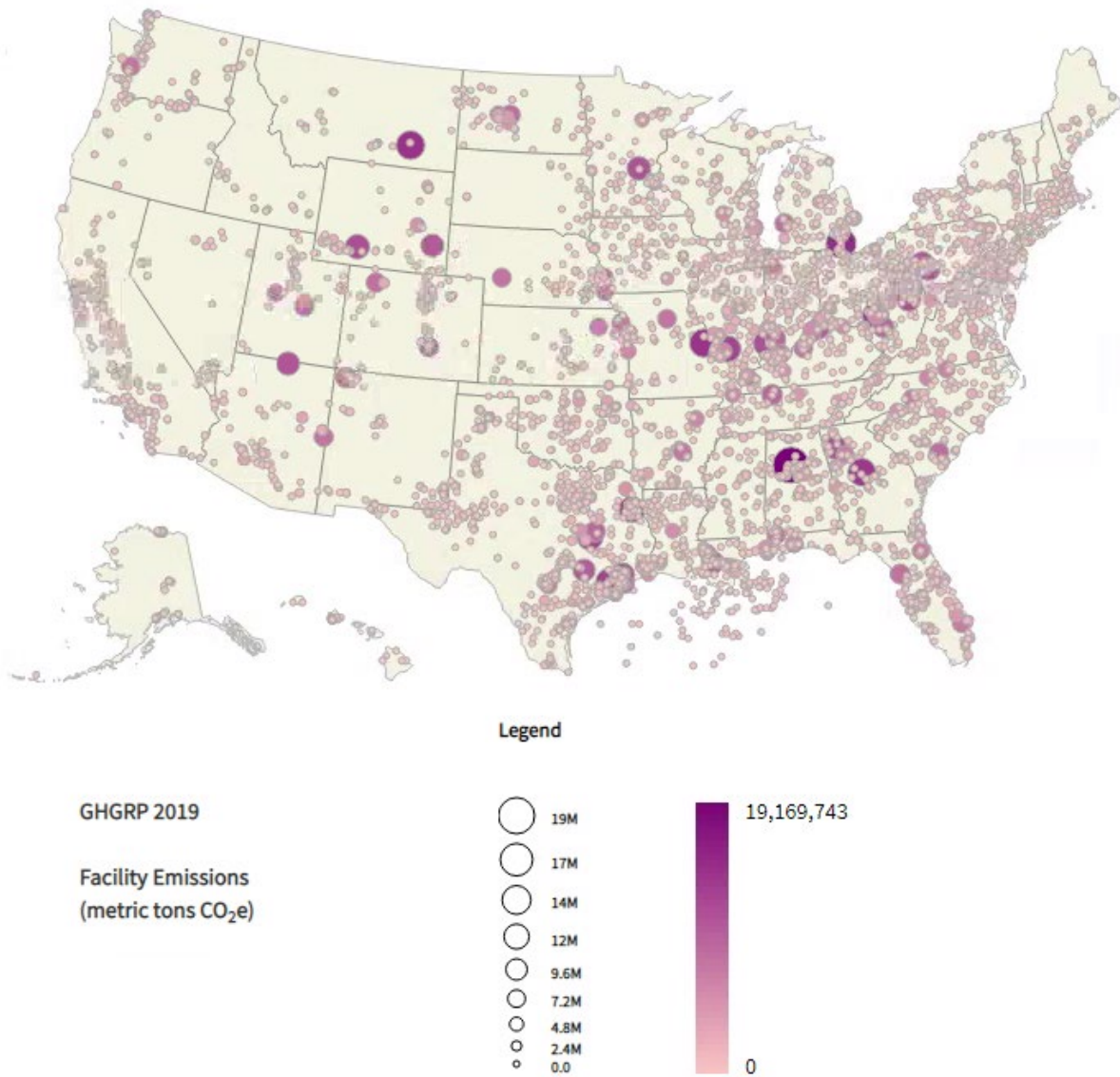
**Table 7: Largest Sources of GHG Emissions**

Greenhouse Gas	Source Categories Contributing Most to Emissions <sup>a</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)	Waste, Petroleum and Natural Gas Systems
N <sub>2</sub> O	Nitric Acid Production (V), Electricity Generation (D), Adipic Acid Production (E)	Chemicals, Power Plants
SF <sub>6</sub>	SF <sub>6</sub> from Electrical Equipment (DD), Electronics Manufacturers (I)	Other, Metals
NF <sub>3</sub>	Electronics Manufacturers (I)	Other
HFCs	HCFC-22 Production and HFC-23 Destruction (O), Fluorinated Gas Production (L)	Chemicals, Other
PFCs	Electronics Manufacturers (I), Fluorinated Gas Production (L), Aluminum Production (F)	Other, Chemicals, Metals

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

## Geographic Distribution of Emissions

Figure 5: Location and Total Reported Emissions from GHGRP Facilities (2019)



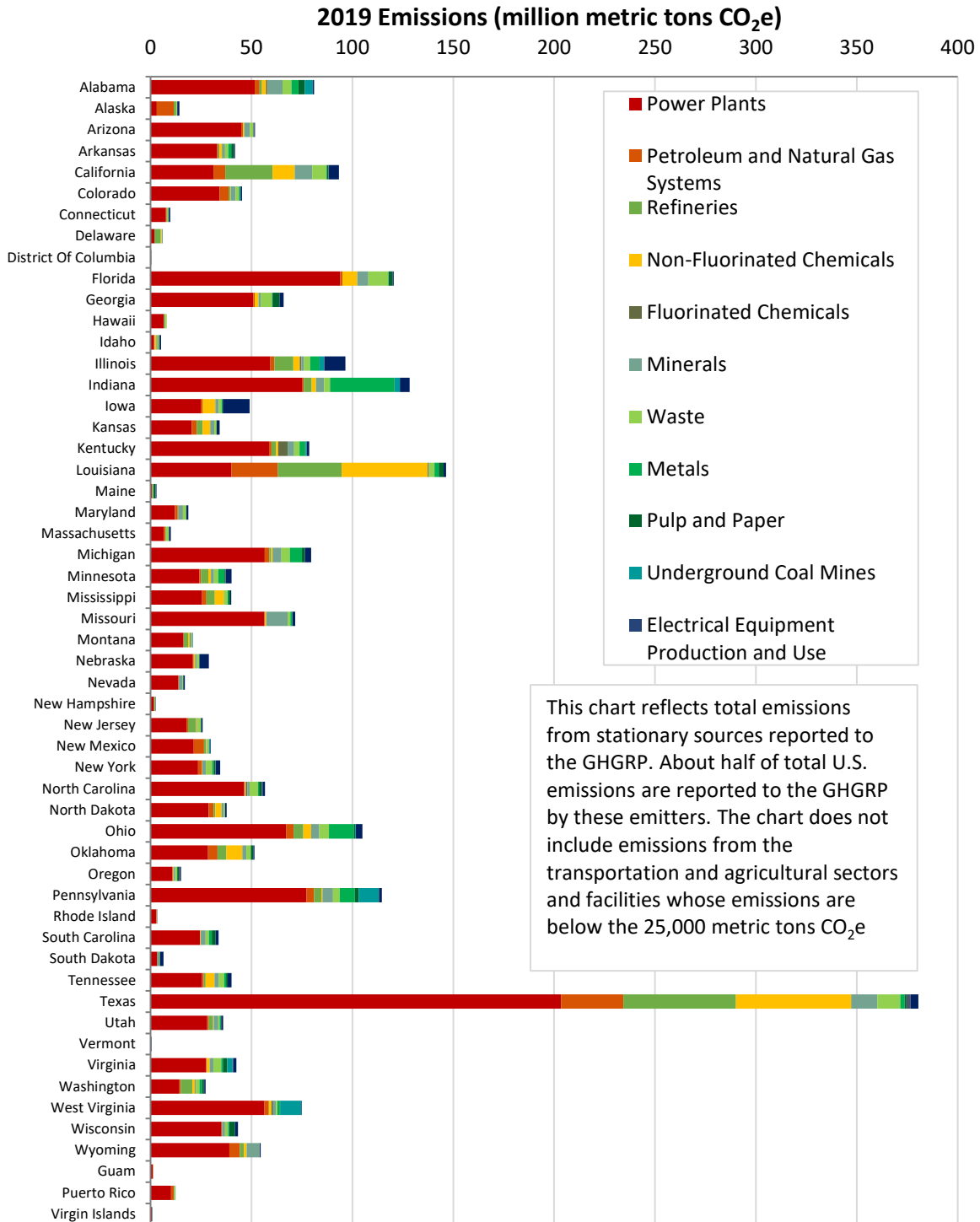
This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility. [There are also facilities located in Puerto Rico, the U.S. Virgin Islands, and Guam.](#)

Readers can identify facilities in their state, territory, county, or city by visiting [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 (2019)**

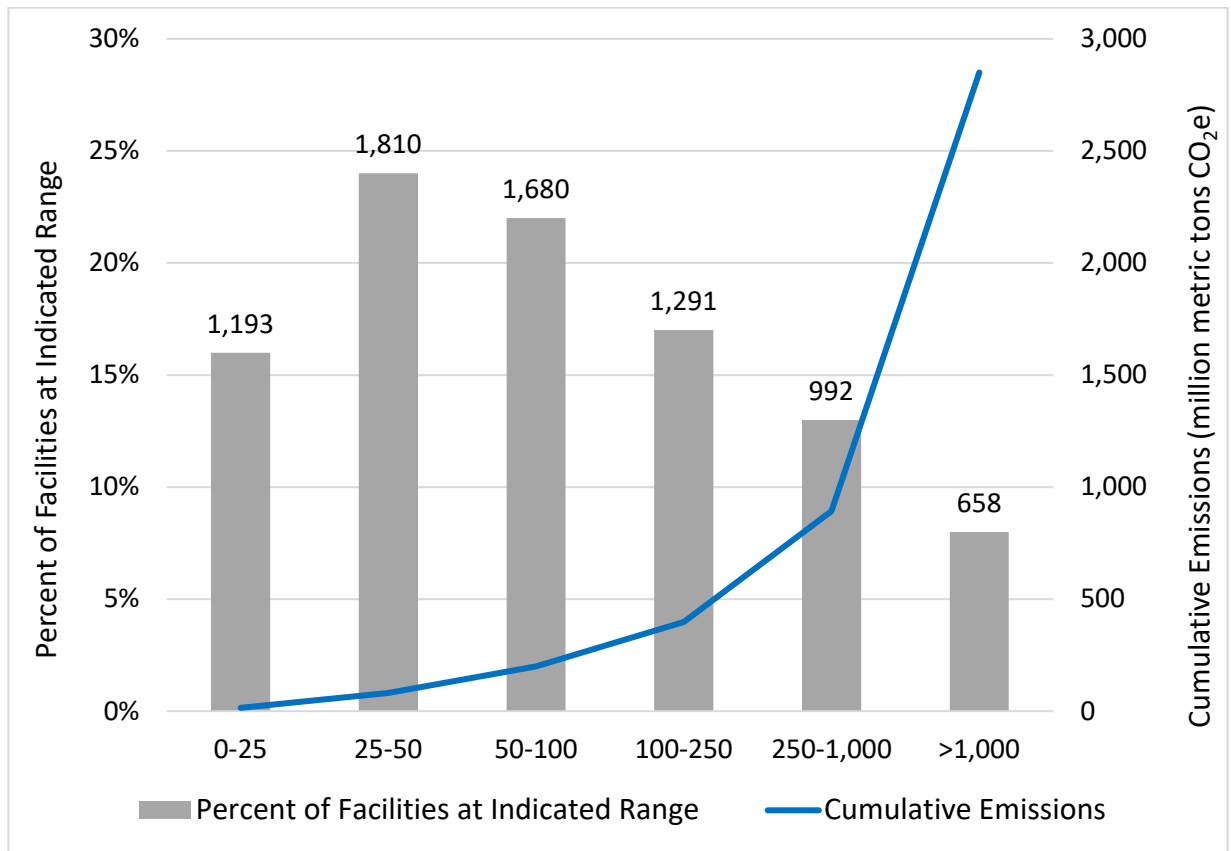
State emissions totals do not include emissions from the Petroleum and Natural Gas Systems Onshore Production and Gathering and boosting segments, as these emissions are reported at the geologic basin level, which may cross state boundaries. State emission totals also do not include emissions from electric distribution systems, which are reported at the corporate level, and cannot be allocated to individual states.



### 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. This information is valuable for planning future policies. GHGRP data provide policy makers with a better understanding of the number of facilities and total emissions that would be covered by potential GHG reduction policies for various industries.

**Figure 7: Percentage of All Reporting Facilities at Various Emission Ranges<sup>a</sup> (2019)**

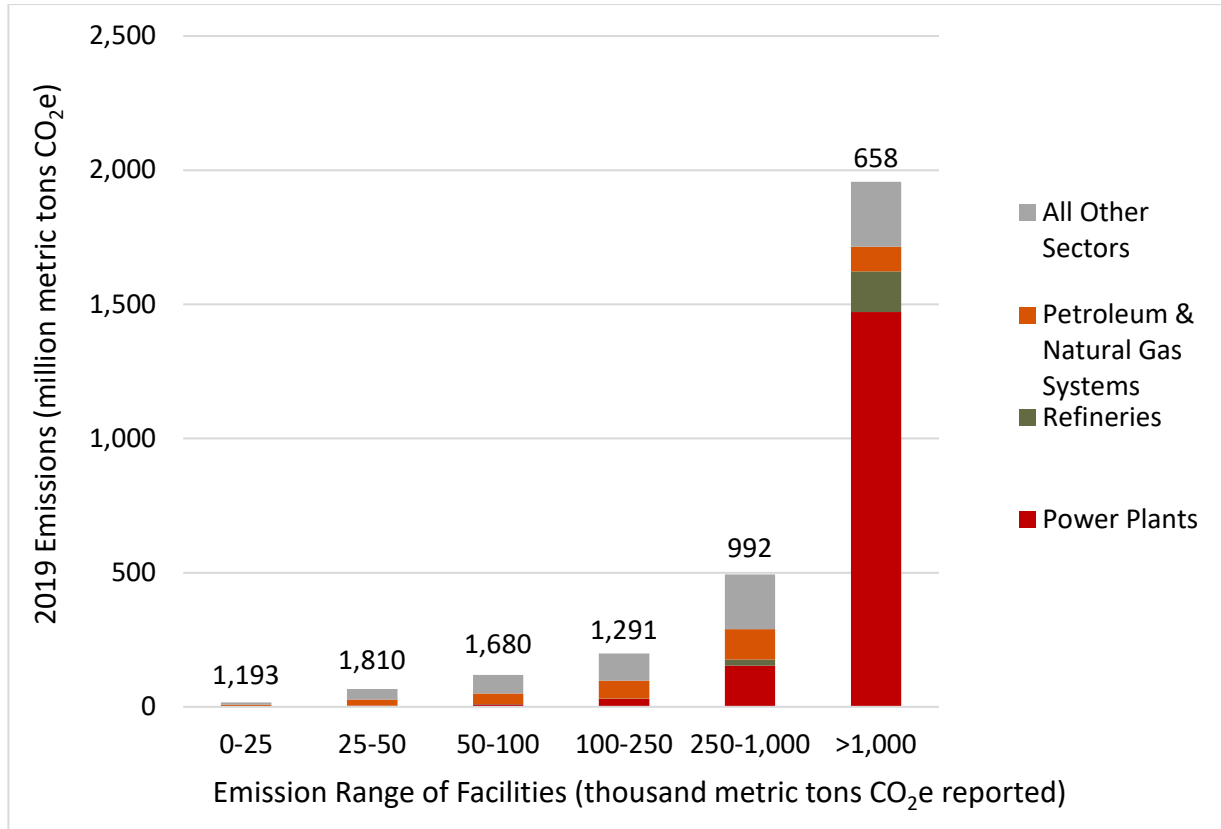


<sup>a</sup> Numbers at the top of the bars represent the number of reporters in that emissions range.

Seventy-eight percent of reporting facilities had emissions less than 250,000 metric tons CO<sub>2</sub>e. In 2019, the 658 largest-emitting facilities—those emitting more than one million metric tons CO<sub>2</sub>e—accounted for approximately 1.96 billion metric tons of CO<sub>2</sub>e. These emissions represent 68.7% of the total 2.85 billion metric tons of 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 and find the largest emitting facilities in the country or a specific state or county. This tool also allows you to sort facilities by specific industry types.

Figure 8: Facility Emission Ranges (2019)<sup>a</sup>



<sup>a</sup> Numbers at the top of the bars represent the number of reporters in that emissions range.

### GHG 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. [Access 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. [Access additional information about EPA’s verification process.](#)

### For More Information

For more detailed information from each industrial sector, view the [GHGRP Data Highlights website](#) and select an industry from the text box on the right hand side.

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.](#)

The [U.S. Greenhouse Gas Inventory](#) contains information on all sources of GHG emissions and sinks in the United States from 1990 to 2018.

## GLOSSARY

**CO<sub>2</sub>e** means carbon dioxide equivalent, which is a metric used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). The carbon dioxide equivalent for a gas is calculated by multiplying the tons of the gas by the associated GWP.

**Direct emitters** are facilities that combust fuels or otherwise put greenhouse gases into the atmosphere directly from their facility. Alternatively, **Suppliers** are entities that supply certain fossil fuels or fluorinated gases into the economy that—when combusted, released or oxidized—emit greenhouse gases into the atmosphere.

**FLIGHT** refers to EPA's GHG data publication tool, named [Facility Level Information on GreenHouse Gases Tool](#).

**GHGRP** means EPA's Greenhouse Gas Reporting Program (40 CFR part 98).

**GHGRP vs. GHG Inventory:** EPA's Greenhouse Gas Reporting Program (GHGRP) collects and disseminates annual greenhouse gas data from individual facilities and suppliers across the U.S. economy. EPA also develops the annual Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHG Inventory) to track total national emissions of greenhouse gases to meet U.S. government commitments to the United Nations Framework Convention on Climate Change. The GHGRP and Inventory datasets are complementary and may inform each other over time. However, there are also important differences in the data and approach. [Access more information.](#)

**GWP** means global warming potential, which is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide. The GWP for carbon dioxide is one.

**IPCC AR4** refers to the Fourth Assessment Report by 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.

**IPCC AR5** refers to the Fifth Assessment Report by the Intergovernmental Panel on Climate Change. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.*