GHGRP 2015: 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 four 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, including using it to improve the U.S. Greenhouse Gas Inventory. The data are also being used to inform regulatory actions and voluntary emission reduction efforts.

All emissions presented here reflect the most recent information reported to EPA as of 8/13/2016. The reported emissions exclude biogenic CO_2. GHG data displayed here in units of carbon dioxide equivalent (CO_2e) 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 for 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
– Electricity Generation	– Petroleum Refineries	– Adipic Acid Production – Ammonia Manufacturing – Hydrogen Production – Nitric Acid Production – Phosphoric Acid Production – Petrochemical Production – Silicon Carbide Production – Titanium Dioxide Production – Other Chemicals Production	– Fluorinated Gas Production – HCFC-22 Production/ HFC-23 Destruction	– Municipal Landfills – Industrial Waste Landfills – Industrial Wastewater Treatment – Solid Waste Combustion

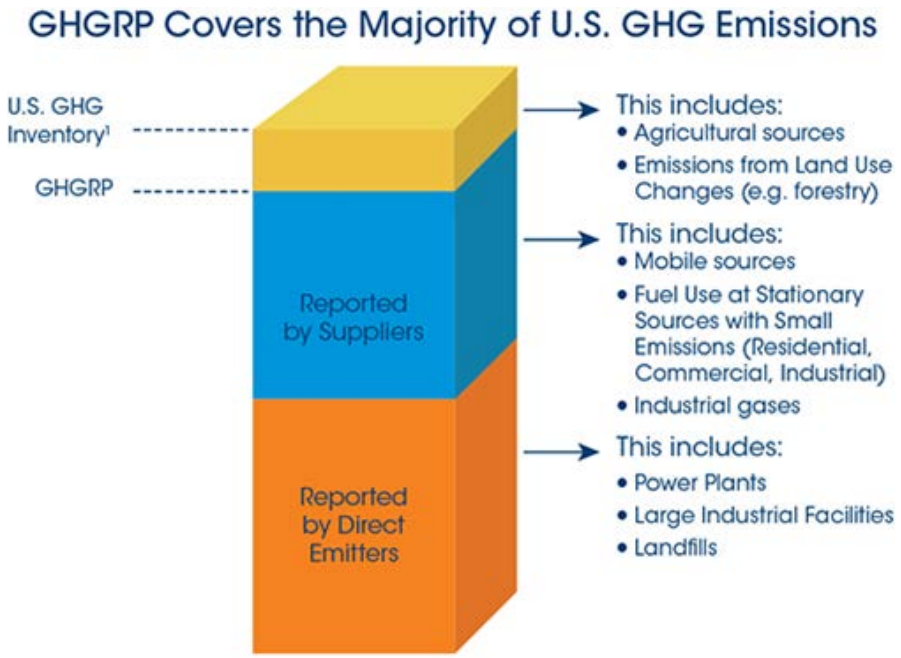
Metals	Minerals	Pulp & Paper	Petroleum & Natural Gas Systems – Direct Emissions
– Aluminum Production – Ferroalloy Production – Iron & Steel Production – Lead Production – Zinc Production – Magnesium Production – Other Metals Production	– Cement Production – Glass Production – Lime Manufacturing – Soda Ash Manufacturing – Other Minerals Production	– Chemical Pulp & Paper Manufacturing – Other Paper Producers	– Onshore Production – Offshore Production – Natural Gas Processing – Natural Gas Trans./Comp. – Natural Gas Distribution – Underground Natural Gas Storage – Liquefied Natural Gas Storage – Liquefied Natural Gas Imp./Exp. – Other Petroleum and Natural Gas Systems

Miscellaneous Combustion Sources	Electrical Equipment	Electronics Manufacturing	Mining
– 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	– Electrical Equipment Manufacture & Refurbishment – Electrical Transmission and Distribution Equipment Use	– Electronics Manufacturing	– Underground Coal Mines
Carbon Dioxide Supply and Injection	**Petroleum Product Suppliers**	**Natural Gas and NGL Suppliers**	**Industrial Gas Suppliers**
– Suppliers of CO_2 – Injection of CO_2 – Geologic Sequestration of CO_2	– Suppliers of Coal-Based Liquid Fuels – Suppliers of Petroleum Products	– Fractionators of Natural Gas Liquids – Local Natural Gas Distribution Companies	– Suppliers of Industrial Greenhouse Gases – Imports and Exports of Equipment Pre–charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed–cell Foams

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: 1990-2014* 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. 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 2015 reported data.

Table 2: Overview of GHG Data Reported (2015)

Direct emitters	
Number of facilities that reported direct GHG emissions	8,003
Direct emissions reported (billion metric tons CO_2e)	3.05
Suppliers of fuel and industrial gases	
Number of suppliers	961
Carbon dioxide injection	
Number of carbon dioxide injection facilities	101

Who Reports?

For 2015, 8,003 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 (2015)

Industry Sector	Number of Reporters[a]
Power Plants	1,480
Petroleum and Natural Gas Systems	2,413
Refineries	144
Chemicals	462
Fluorinated Chemicals	15
Non-fluorinated Chemicals	447
Waste	1,540
Metals	297
Minerals	379
Pulp and Paper	232
Other	1,433
Underground Coal Mines	123
Electrical Equipment Production & Use	112
Electronics Manufacturing	58
Miscellaneous Combustion	1,140

[a] Totals sum to more than 8,003 because facilities with production processes in more than one sector are counted multiple times.

Table 4: Number of Suppliers that Reported (2015)

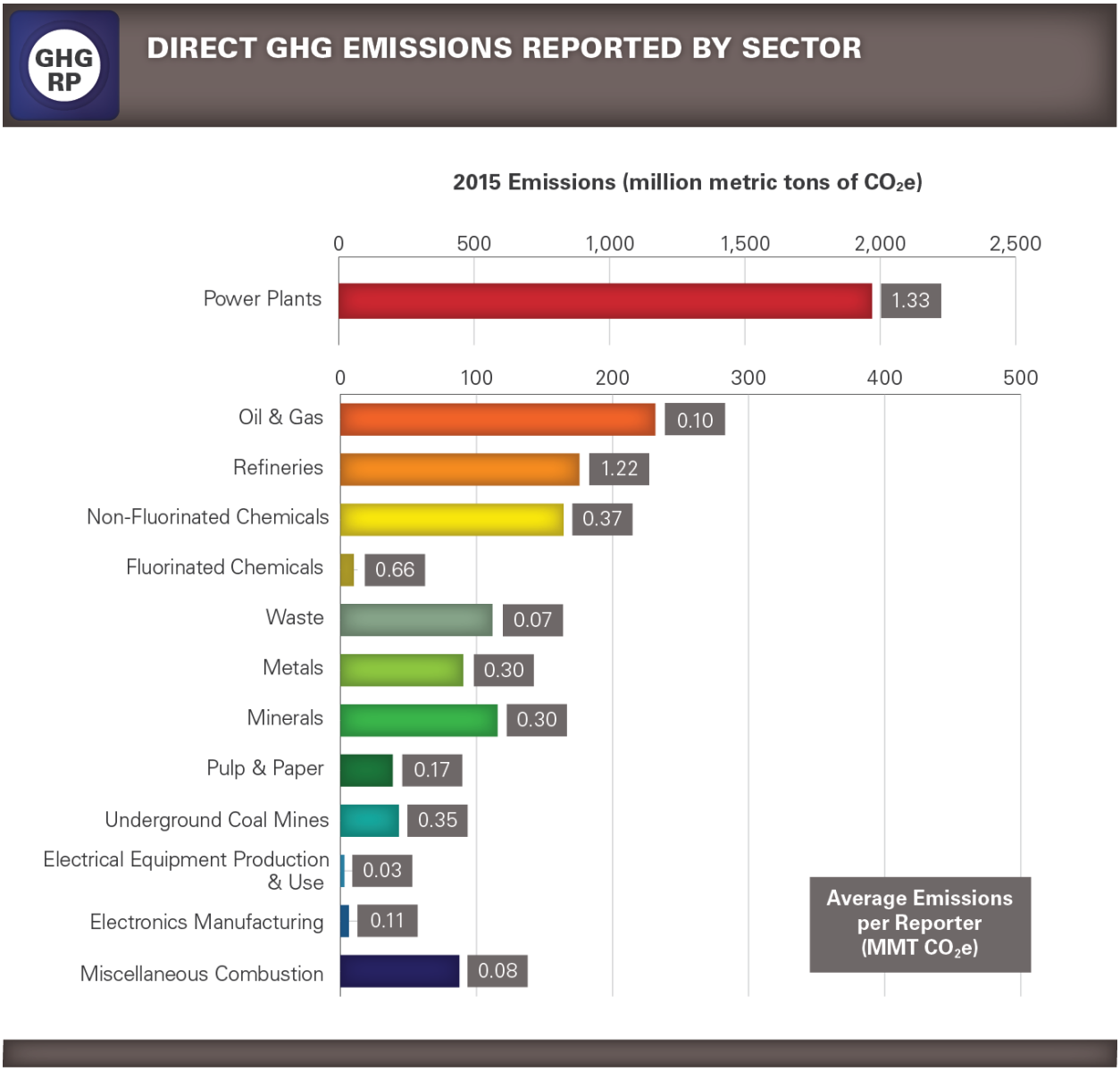
Supply Sector	Number of Reporters[a]
Suppliers of Coal-Based Liquid Fuels	0
Suppliers of Petroleum Products	231
Suppliers of Natural Gas and Natural Gas Liquids	
Natural Gas Distribution	377
Natural Gas Liquids Fractionation	124
Suppliers of Industrial GHGs	
Industrial GHGs	66
Imports and Exports of Equipment Pre–charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed–cell Foams	43
Suppliers of Carbon Dioxide	139

[a] Totals sum to more than 961, because suppliers that fall into more than one sector are counted multiple times.

Reported Emissions

In 2015, 3.05 billion metric tons CO_2e were reported by direct emitters. The largest emitting sector was the Power Plant Sector with 2.0 billion metric tons CO_2e, followed by the Petroleum and Natural Gas Systems Sector with 231 million metric tons (MMT) CO_2e and the Petroleum Refineries Sector with 176 MMT CO_2e. This information, as well as average emissions per reporter, is shown in the following chart.

Figure 2: GHG Emissions Reported by Sector (2015)



Click here to view this information in FLIGHT.

Emission Trends

National level trends in greenhouse gas emissions are available through the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014* (April 2016). The GHGRP 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.

The U.S. GHG Inventory is not yet available for 2015. For sources reporting to the GHGRP, emissions decreased by 4.9% from 2014 to 2015; this decrease was driven by a 6.2% decrease in emissions from power plants. Over the past five reporting years (2011-2015), GHGRP-reported emissions have declined by 8.9%. This decline is caused primarily by the decline in reported emissions from power plants, which have decreased 11.3% since 2011.

Table 5: Emissions Trends for U.S. GHG Inventory and GHGRP (2011–2015)

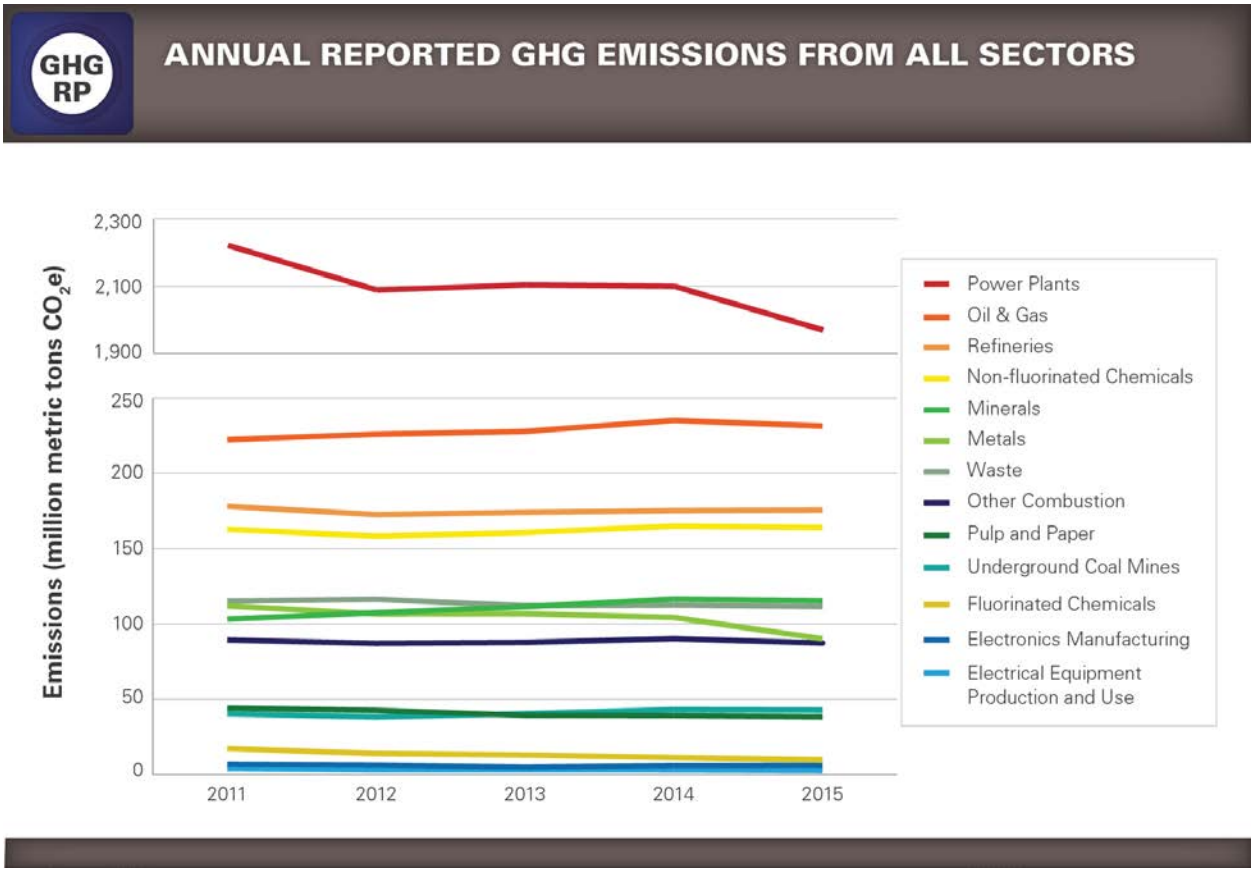
	2011	2012	2013	2014	2015
U.S. GHG Inventory [a]					
Total emissions (million metric tons CO_2e)	6,865.4	6,643.0	6,800.0	6,870.5	Not available
Percent change in emissions from previous year	-1.7%	-3.2%	2.4%	1.0%	Not available
GHGRP					
Number of direct-emitting facilities	7,641	7,885	7,962	8,183	8,003
Direct emissions (million metric tons CO_2e)	3,317.8	3,168.0	3,186.0	3,202.1	3,045.6
Percent change in emissions from previous year	—	-4.5%	0.6%	0.5%	-4.9%

[a] Inventory data from *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014* (April 2016), Table ES-2.

Table 6: Emission Trends by Sector (2011–2015)

Sector	2011 Emissions ($MMT CO_2e$)	2012 Emissions ($MMT CO_2e$)	2013 Emissions ($MMT CO_2e$)	2014 Emissions ($MMT CO_2e$)	2015 Emissions ($MMT CO_2e$)
Power Plants	2,221.3	2,088.4	2,103.6	2,099.6	1,969.3
Oil & Gas	222.3	226.0	227.8	235.1	231.4
Refineries	178.2	172.5	174.0	175.2	175.6
Chemicals	180.3	172.3	173.8	176.3	173.9
Fluorinated Chemicals	17.4	14.1	13.1	11.4	9.9
Non-fluorinated Chemicals	162.9	158.3	160.7	165.0	164.1
Waste	115.3	116.5	112.2	112.6	111.7
Minerals	103.2	107.5	111.5	116.6	115.5
Metals	112.0	106.8	106.8	104.4	90.2
Pulp & Paper	44.2	42.7	39.4	39.3	38.4
Other	141.0	135.4	136.9	143.0	139.5
Underground Coal Mines	40.4	38.4	40.5	43.2	42.9
Electrical Equipment Production & Use	4.3	3.4	3.5	3.4	2.9
Electronics Manufacturing	7.0	6.4	5.1	6.2	6.3
Miscellaneous Combustion	89.4	87.2	87.8	90.2	87.5

Figure 3: Trends in Direct GHG Emissions (2011–2015)[a,b]



Click here to view this information in FLIGHT.

[a] Non-Fluorinated Chemicals and Fluorinated Chemicals are components of "Chemicals" in FLIGHT.

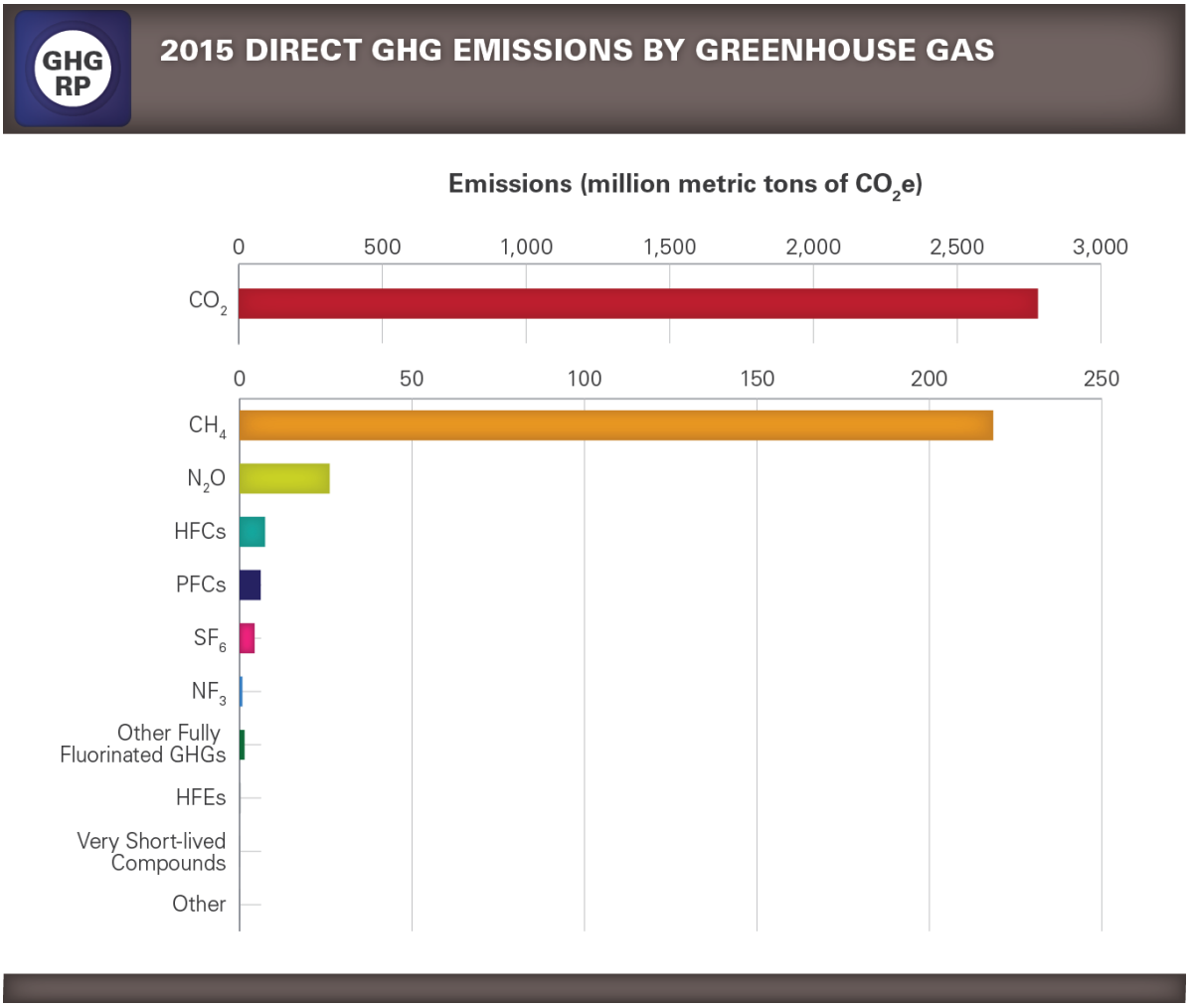
[b] Miscellaneous Combustion, Underground Coal Mines, Electronics Manufacturing and Electrical Equipment Production & Use fall within the "Other" category in FLIGHT.

Emissions by GHG

Carbon dioxide is the GHG emitted in the largest quantities. The 2.8 billion metric tons of CO_2 reported for 2015 represent 91.3% of the GHGs reported in 2015.[1] Methane emissions represent about 7.2% of reported 2015 GHG emissions, N_2O represents about 0.9%, and fluorinated gases (HFCs, PFCs, SF_6) represent about 0.7% (Figure 4).

[1] While the Inventory of U.S. Greenhouse Gas Emissions and Sinks for 2015 is not yet available, in 2014, CO_2 represented 81% of total U.S. GHG emissions.

Figure 4: Direct Emissions by GHG (2015)



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

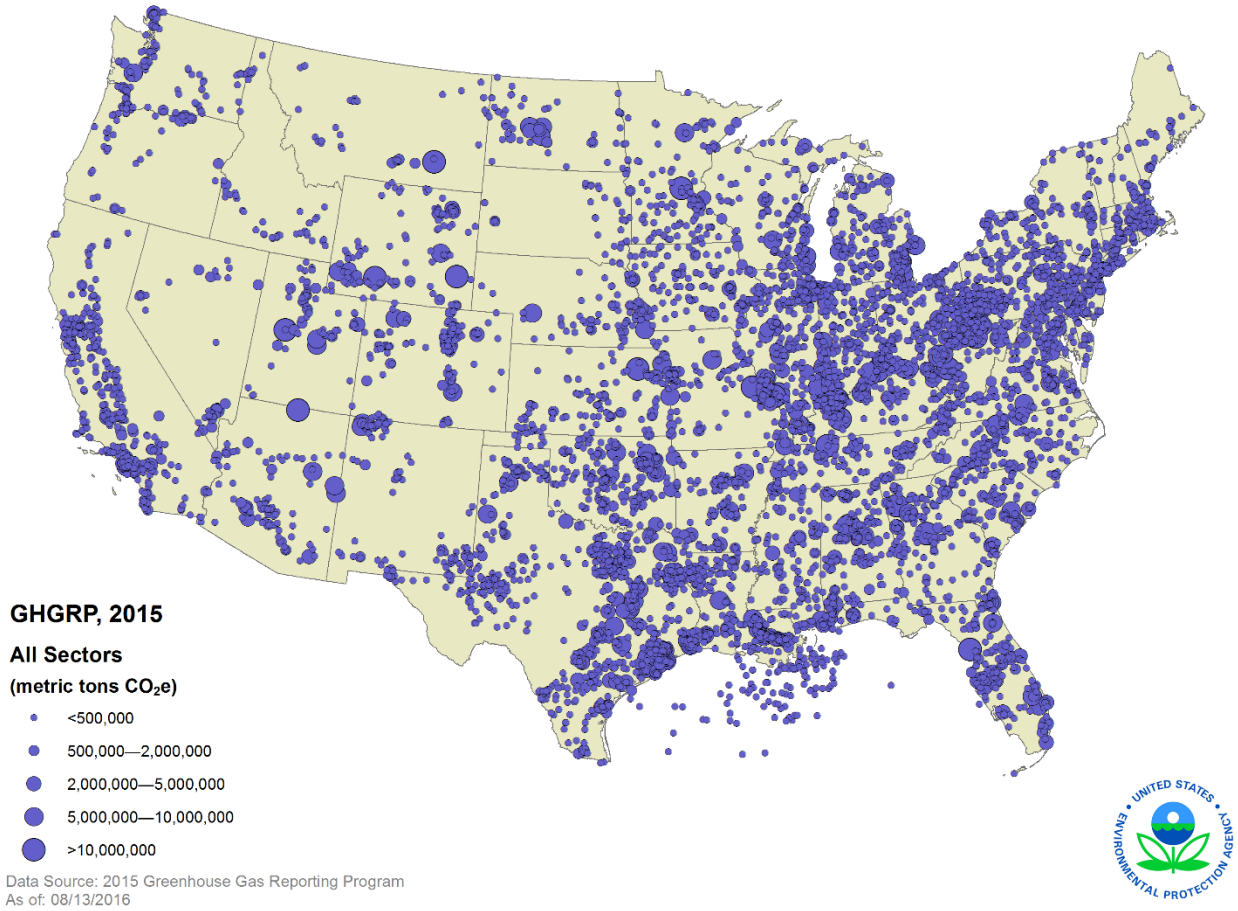
Table 7: Largest Sources of GHG Emissions

Greenhouse Gas	Source Categories Contributing Most to Emissions[a]	Sectors Contributing Most to Emissions
CO_2	Electricity Generation (D), Stationary Combustion (C)	Power Plants
CH_4	Municipal Landfills (HH), Petroleum & Natural Gas Systems (W)	Waste, Petroleum & Natural Gas Systems
N_2O	Nitric Acid Production (V), Electricity Generation (D), Adipic Acid Production (E)	Chemicals, Power Plants
SF_6	SF_6 from Electrical Equipment (DD), Electronics Manufacturing (I), Magnesium Production (T)	Other
NF_3	Electronics Manufacturers (I), Fluorinated Gas Production (L)	Other
HFCs	HCFC–22 Production and HFC–23 Destruction (O), Fluorinated Gas Production (L)	Chemicals
PFCs	Electronics Manufacturers (I), Aluminum Production (F)	Other, Metals

[a] 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 (2015)

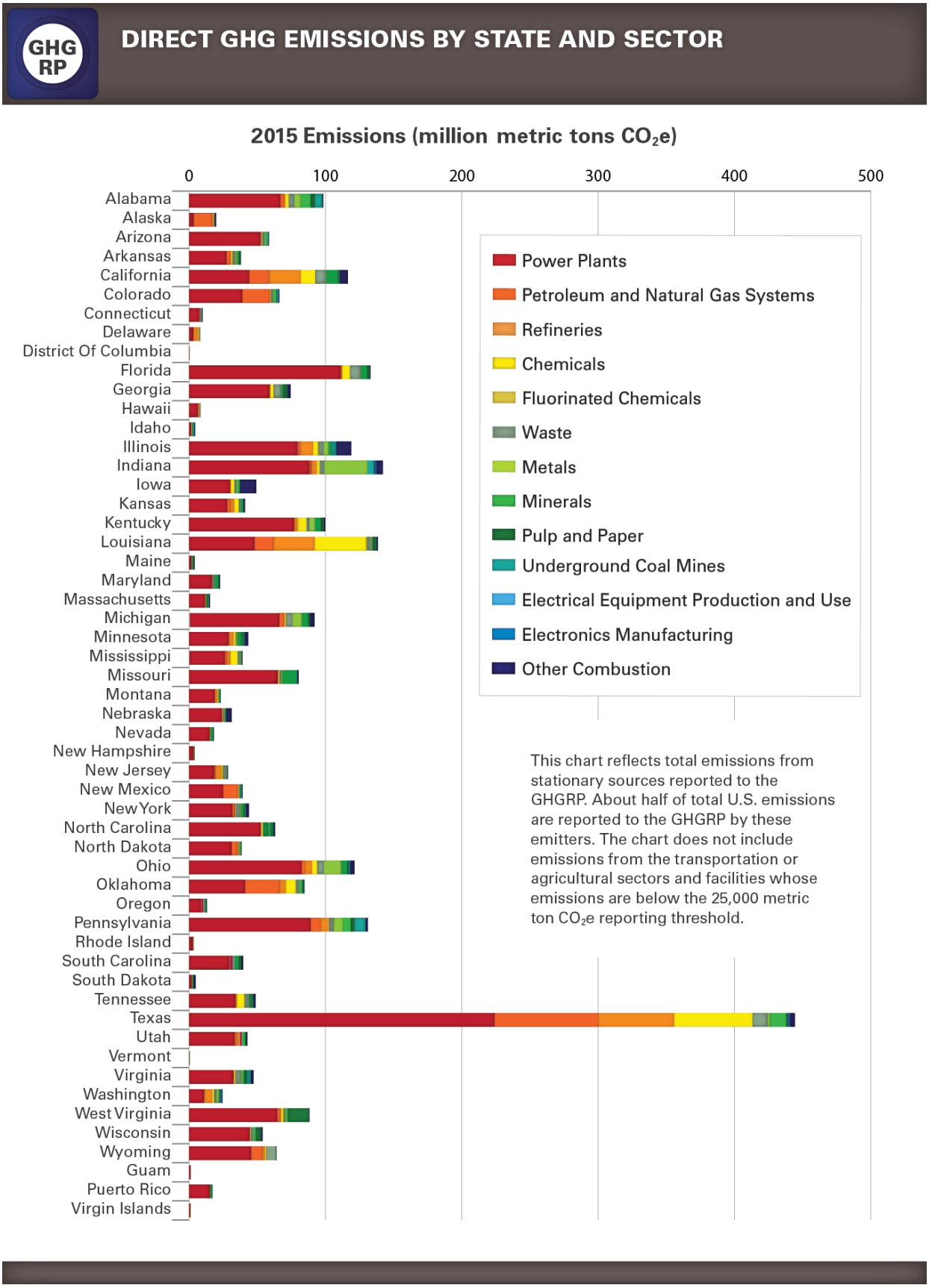


This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility. There are also facilities located in Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and Guam (http://www.epa.gov/ghgreporting/ghgdata/reported/index.html).

Readers can identify facilities in their state, territory, county, or city by visiting FLIGHT (http://ghgdata.epa.gov)

Because it generally applies to facilities that emit greater than 25,000 metric tons CO_2e 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 (2015)

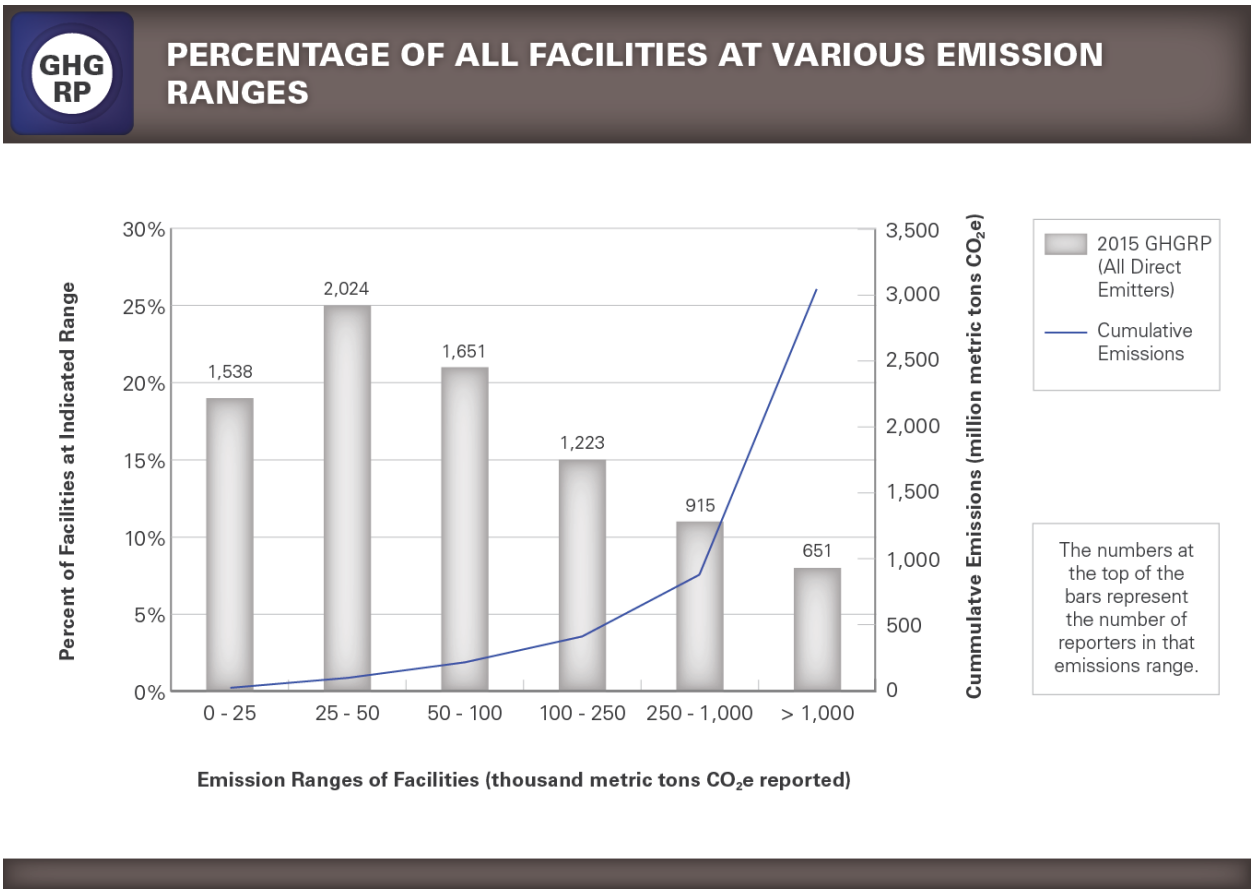


Click here to view this information in FLIGHT.

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. 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.

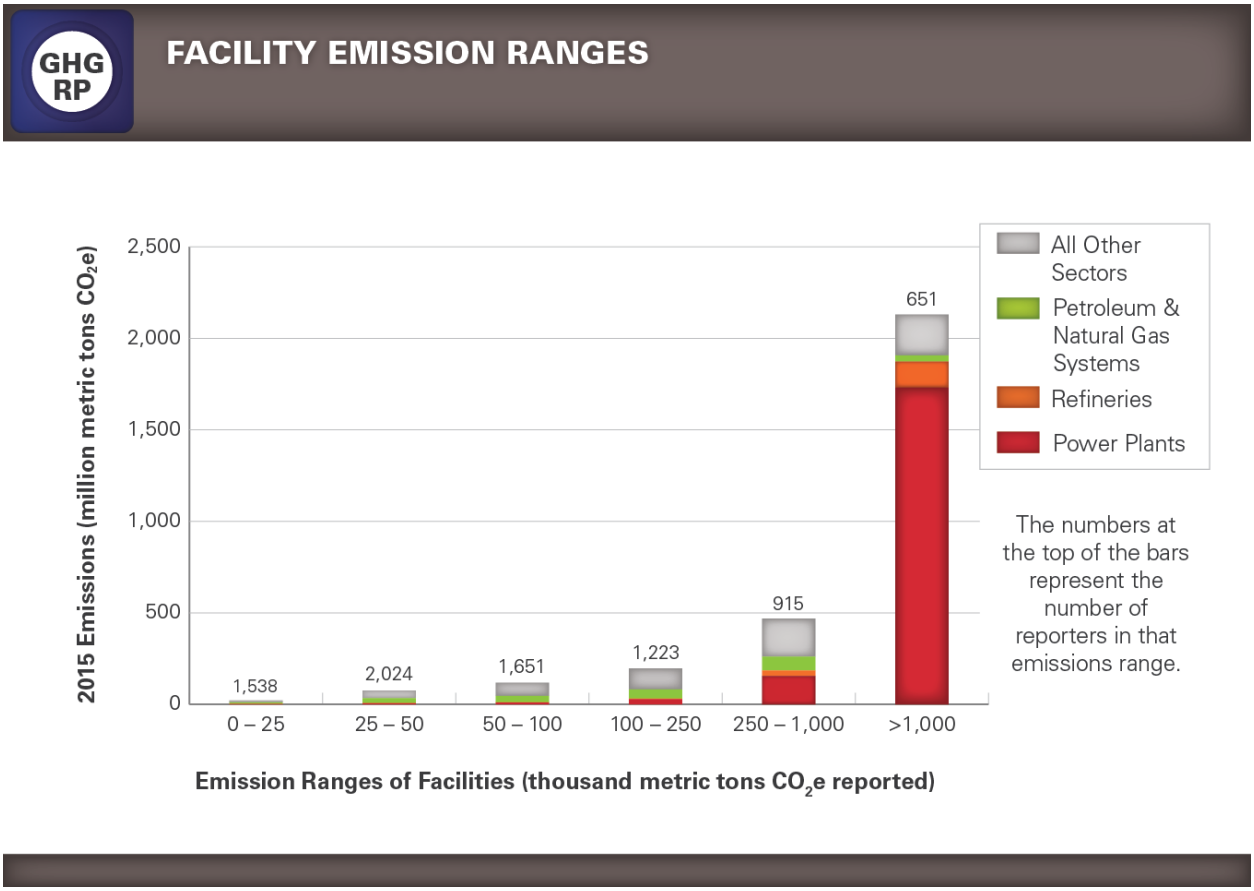
Figure 7: Percentage of All Reporting Facilities at Various Emission Ranges (2015)



Eighty percent of reporting facilities had emissions less than 250,000 metric tons CO_2e. In 2015, the 651 largest-emitting facilities—those emitting more than one million metric tons CO_2e—accounted for almost 2.2 billion metric tons of CO_2e. These emissions represent 71.7% of the total 3.05 billion metric tons of CO_2e reported. These high-emitting facilities are mainly power plants, but they also include petroleum refineries and facilities in the Chemicals and Metals 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 (2015)



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. Additional information on the methodologies that reporters use to determine GHG emissions is available here.

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 about EPA's verification process is available here.

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 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 2014.

GLOSSARY

CO_2e 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 (http://ghgdata.epa.gov).

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. For more information, please see http://www2.epa.gov/ghgreporting/greenhouse-gas-reporting-program-and-us-inventory-greenhouse-gas-emissions-and-sinks.

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.*