

GHGRP 2012 OVERVIEW OF 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 three 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 greenhouse gas data presented here reflect the most recent information reported to EPA as of 09/01/2013. The reported emissions **exclude biogenic CO₂ unless otherwise noted.**

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 Transmission/Compression – Natural Gas Distribution – Underground Natural Gas Storage – Liquefied Natural Gas Storage – Liquefied Natural Gas Import/Export – Other Petroleum and Natural Gas Systems	

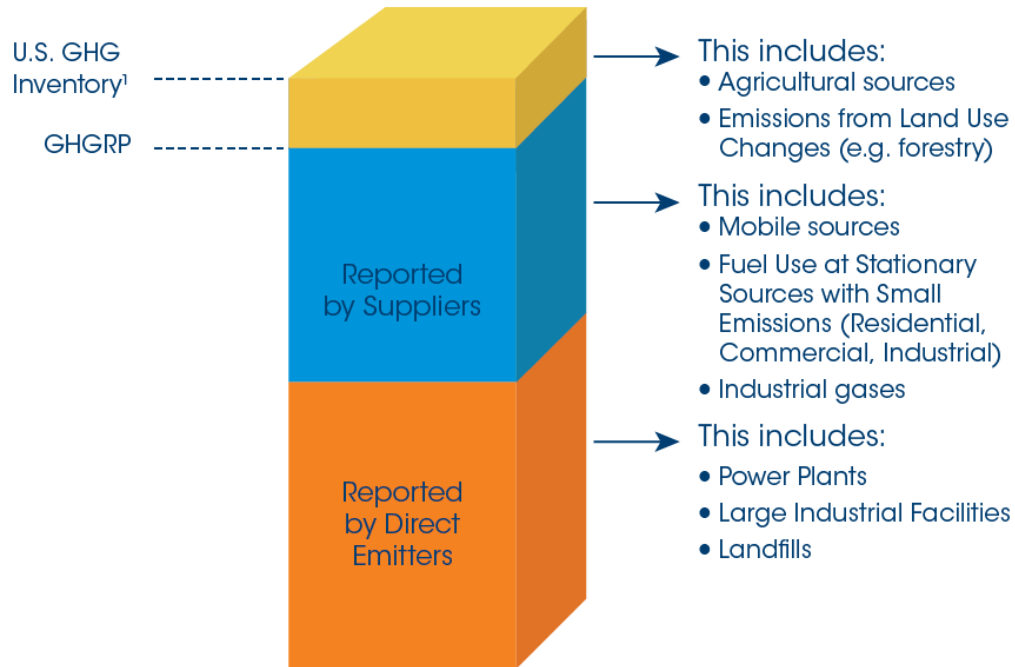
Other	Electrical Equipment	Electronics Manufacturing	Mining
<ul style="list-style-type: none"> – Stationary Fuel Combustion at facilities that are not part of any other sector, including Food Processing, Ethanol Production, General Manufacturing, Universities, Military Installations, Others 	<ul style="list-style-type: none"> – Electrical Equipment Manufacture & Refurbishment – Electrical Transmission and Distribution Equipment Use 	<ul style="list-style-type: none"> – Electronics Manufacturing 	<ul style="list-style-type: none"> – Underground Coal Mines
Carbon Dioxide Supply and Injection	Petroleum Product Suppliers	Natural Gas and Natural Gas Liquids Suppliers	Industrial Gas Suppliers
<ul style="list-style-type: none"> – Suppliers of CO₂ – Injection of CO₂ – Geologic Sequestration of CO₂ 	<ul style="list-style-type: none"> – Suppliers of Coal-Based Liquid Fuels – Suppliers of Petroleum Products 	<ul style="list-style-type: none"> – Fractionators of Natural Gas Liquids – Local Natural Gas Distribution Companies 	<ul style="list-style-type: none"> – 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: 1990-2012](#) 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

GHGRP Covers the Majority of U.S. GHG Emissions



¹ Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012, April 2014.

Suppliers are those entities that supply products into the economy that, if combusted, released, or oxidized, would emit GHGs into the atmosphere. 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](#)).

Table 2: Overview of GHG Data Reported (2012)

Direct emitters	
Number of facilities that reported direct GHG emissions	7,809
Direct emissions reported (billion metric tons CO ₂ e)	3.13
Suppliers of fuel and industrial gases	
Number of suppliers	937
Carbon dioxide injection	
Number of carbon dioxide injection facilities	87
Number of carbon dioxide sequestration facilities	0

Who Reports?

For 2012, 7,809 direct emitters submitted a GHG report. The Petroleum and Natural Gas Systems sector had the largest number of reporting facilities, followed by the Power Plants Sector and the Waste 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 (2012)

Industry Sector	Number of Reporters ¹
Power Plants	1,611
Petroleum and Natural Gas Systems	2,058
Refineries	144
Chemicals	463
<i>Fluorinated Chemicals</i>	16
<i>Non-fluorinated Chemicals</i>	447
Waste	1,611
Metals	297
Minerals	369
Pulp and Paper	232
Other	1,419
<i>Underground Coal Mines</i>	151
<i>Electrical Equipment Production & Use</i>	129
<i>Electronics Manufacturing</i>	53
<i>Other Combustion</i>	1,090

¹ Totals sum to more than 7,809 because facilities with production processes in more than one sector are counted multiple times.

Table 4: Number of Suppliers that Reported (2012)

Supply Sector	Number of Reporters ²
Suppliers of Coal-Based Liquid Fuels	1
Suppliers of Petroleum Products	234
Suppliers of Natural Gas and Natural Gas Liquids	
<i>Natural Gas Distribution</i>	365
<i>Natural Gas Liquids Fractionation</i>	119
Suppliers of Industrial GHGs	
<i>Industrial GHGs</i>	58
<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	137

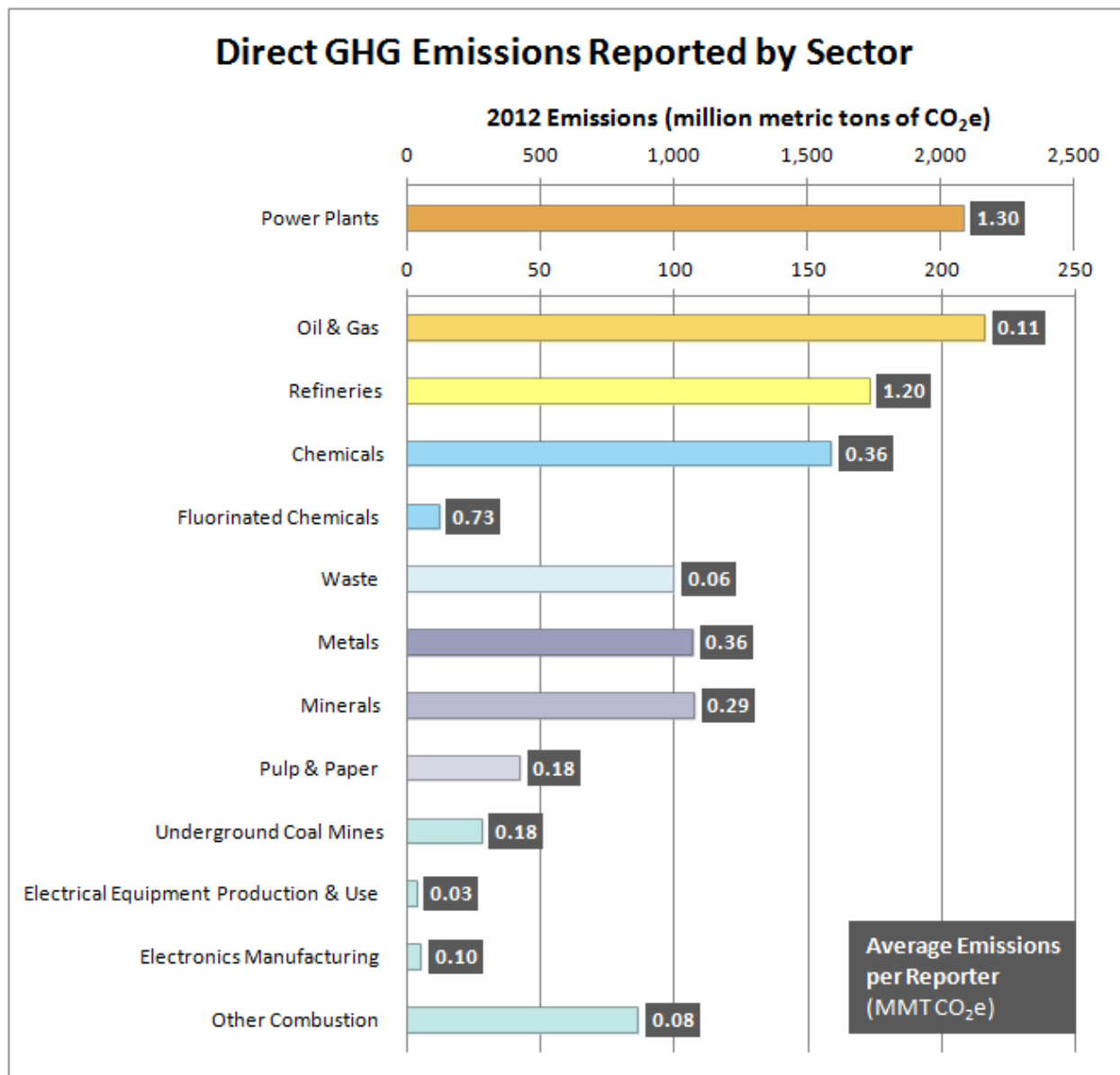
² Totals sum to more than 883, because suppliers that fall into more than one sector are counted multiple times.

Reported Emissions

All GHG emissions data, displayed in units of carbon dioxide equivalent (CO₂e) reflect the global warming potential (GWP) values from the Intergovernmental Panel on Climate Change (IPCC), Climate Change 1995: The Science of Climate Change (Second Assessment Report (SAR), Cambridge, United Kingdom: Cambridge University Press). The SAR values also can be found in the version of Table A-1 to 40 CFR part 98, published in the Federal Register on October 30, 2009 (74 FR 56395).

In 2012, 3.13 billion metric tons CO₂e were reported by direct emitters. The largest emitting sector was the Power Plant Sector with 2.09 billion metric tons CO₂e, followed by the Petroleum and Natural Gas Systems Sector with 217 million metric tons (MMT) CO₂e and the Petroleum Refinery Sector with 173 MMT CO₂e. This information, as well as average emissions per reporter, is shown in Figure 2.

Figure 2: Direct GHG Emissions Reported by Sector (2012)



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: 1990-2012](#). The Greenhouse Gas Reporting Program collects information from the largest stationary sources in the U.S. and provides nearly complete emissions coverage for many of the largest emitting industries. Discussion of the trend in reported emissions from 2010 (or in some cases 2011) to 2012 from individual industries that report to the GHGRP is included in the industry specific reports.

While total U.S. emissions decreased by 1.8% from 2010 to 2011, emissions *reported to the GHGRP* increased over this period (Table 5). The increase occurred because 12 source categories were required to begin reporting for the first time in 2011. For these industries, 2011 is the appropriate base year for determining trends in reported emissions. Trends for other sectors can be determined using GHGRP data beginning in 2010 (Figure 3).

Total U.S. emissions decreased by 3.4% from 2011 to 2012 based on the [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012](#) (April 2014). For facilities that *reported to the GHGRP* in 2011 and 2012, emissions declined by 4.5% (Table 5). This decline was driven by a 4.7% decline in emissions from power plants. In the two years since reporting began, emissions from power plants have decreased 10 percent.

Table 5: Emissions Trends for U.S. GHG Inventory and GHGRP (2010-2012)

	2010	2011	2012
U.S. GHG Inventory			
Total emissions (million metric tons CO ₂ e)	6,848.6	6,726.6	6,501.5
Percent change in emissions from previous year	--	-1.8%	-3.4%
GHGRP			
Number of direct-emitting facilities	6,267	7,612 ¹	7,809
Direct emissions (million metric tons CO ₂ e)	3,180	3,275 ¹	3,129
Percent change in emissions from previous year	--	--	-4.5%

¹ [Twelve additional source categories](#) began reporting in 2011.

Table 6: Emission Trends by Sector (2010-2012)

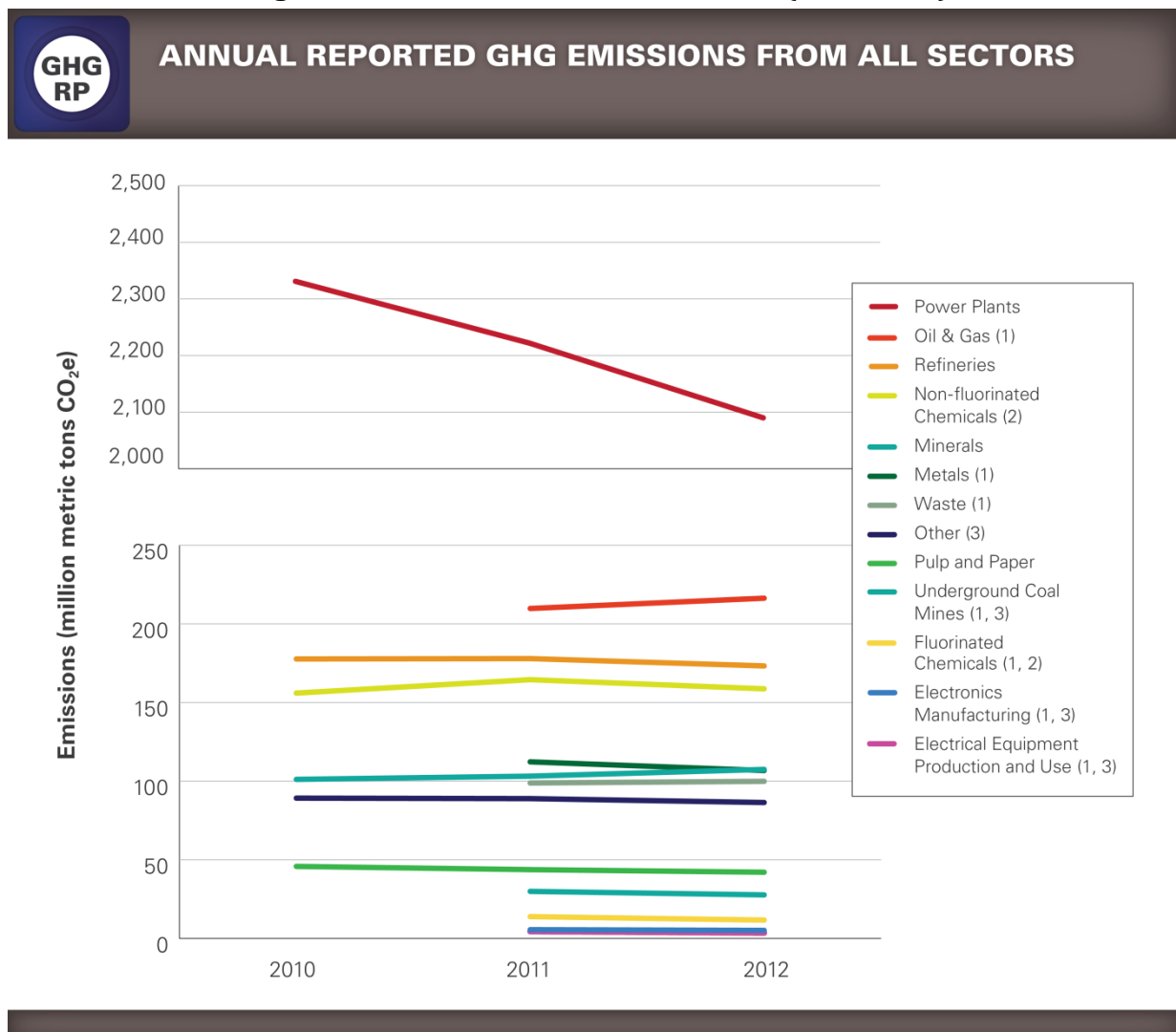
Sector	2010 Emissions (MMT CO ₂ e)	2011 Emissions (MMT CO ₂ e) ¹	2012 Emissions (MMT CO ₂ e)
Power Plants	2,330.8	2,221.9	2,090.0
Oil & Gas	NR	209.8	217.1
Refineries	177.7	177.9	173.3
Chemicals	NR	178.4	170.4
<i>Fluorinated Chemicals</i>	NR	13.9	11.7
<i>Non-fluorinated Chemicals</i>	156.0	164.5	158.7
Waste	NR	98.8	99.9
Metals	NR	112.3	106.8

Minerals	101.1	103.2	107.5
Pulp & Paper	45.8	43.8	42.1
Other	NR	128.9	122.8
<i>Underground Coal Mines</i>	NR	29.9	27.7
<i>Electrical Equipment Production & Use</i>	NR	4.5	3.6
<i>Electronics Manufacturing</i>	NR	5.6	5.1
<i>Other Combustion</i>	89.2	88.9	86.4

¹ [Twelve additional source categories](#) began reporting in 2011.

NR means that emissions are not shown for the 2010 reporting year for sectors in which some source categories in the sector were not required to be reported in 2010.

Figure 3: Trends in Direct GHG Emissions (2010-2012)



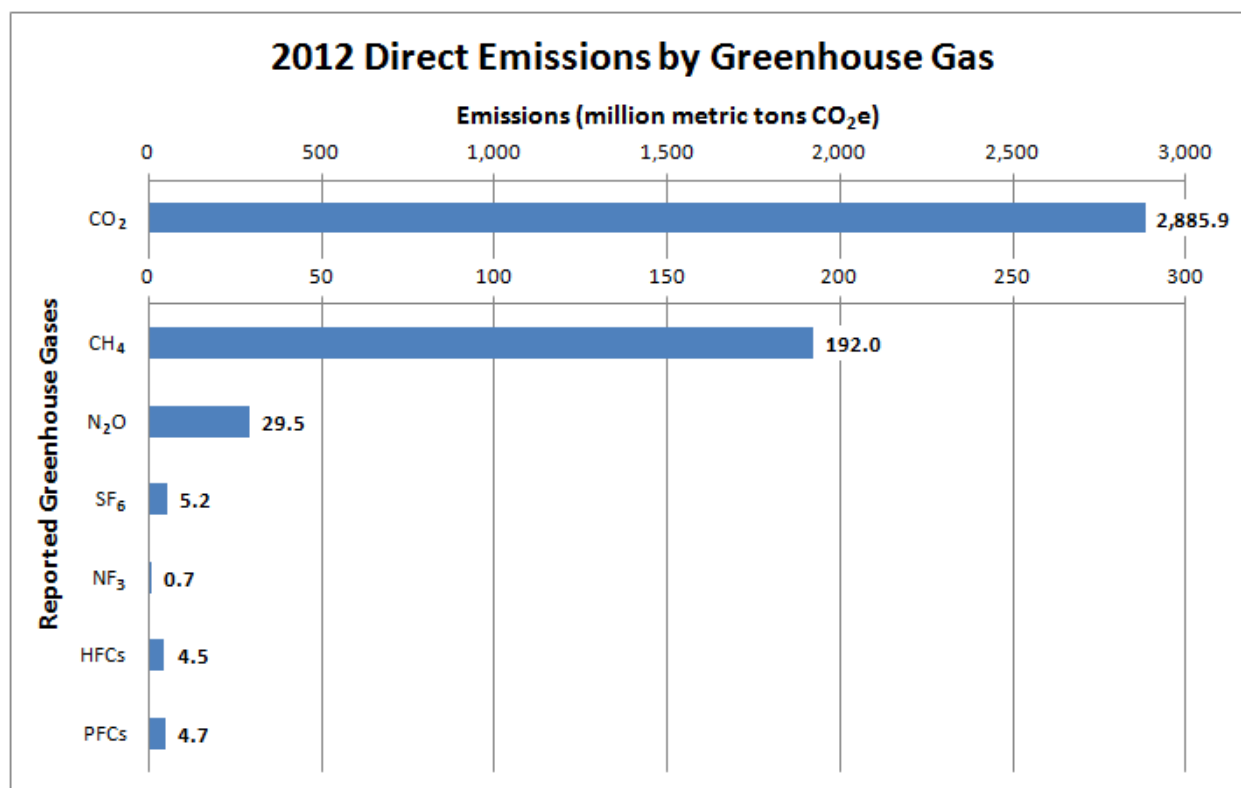
Click [here](#) to view this information in FLIGHT.

- (1) In reporting year 2011, emissions for some processes in this sector were reported for the first time.
- (2) Non-fluorinated Chemicals and Fluorinated Chemicals are components of “Chemicals” in FLIGHT.
- (3) Other Combustion, Underground Coal Mines, Electronics Manufacturing and Electrical Equipment Production & Use comprise “Other” in FLIGHT.

Emissions by GHG

Carbon dioxide represented 92.2% of the GHGs reported in 2012. The reported 2.89 billion metric tons represents about 54%¹ of total U.S. CO₂ emissions. Reported methane emissions were 192.0 MMT CO₂e of methane, representing about 34%¹ of total U.S. methane emissions. Facilities reported 29.5 MMT CO₂e of N₂O, representing about 7%¹ of total U.S. N₂O emissions. Finally, reported emissions of fluorinated gases (HFCs, PFCs, SF₆) represent about 13%¹ of U.S. emissions of these compounds.

Figure 4: Direct Emissions by GHG (2012)



The table below lists the primary sectors emitting each GHG.

Table 7: Largest Sources of GHG Emissions

Greenhouse Gas	Source Categories Contributing Most to Emissions ¹	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 ₂ O	Nitric Acid Production (V), Electricity Generation (D), Adipic Acid Production (E)	Chemicals, Power Plants
SF ₆	SF ₆ from Electrical Equipment (DD), Magnesium Production (T)	Other, Metals
NF ₃	Electronics Manufacturers (I)	Other

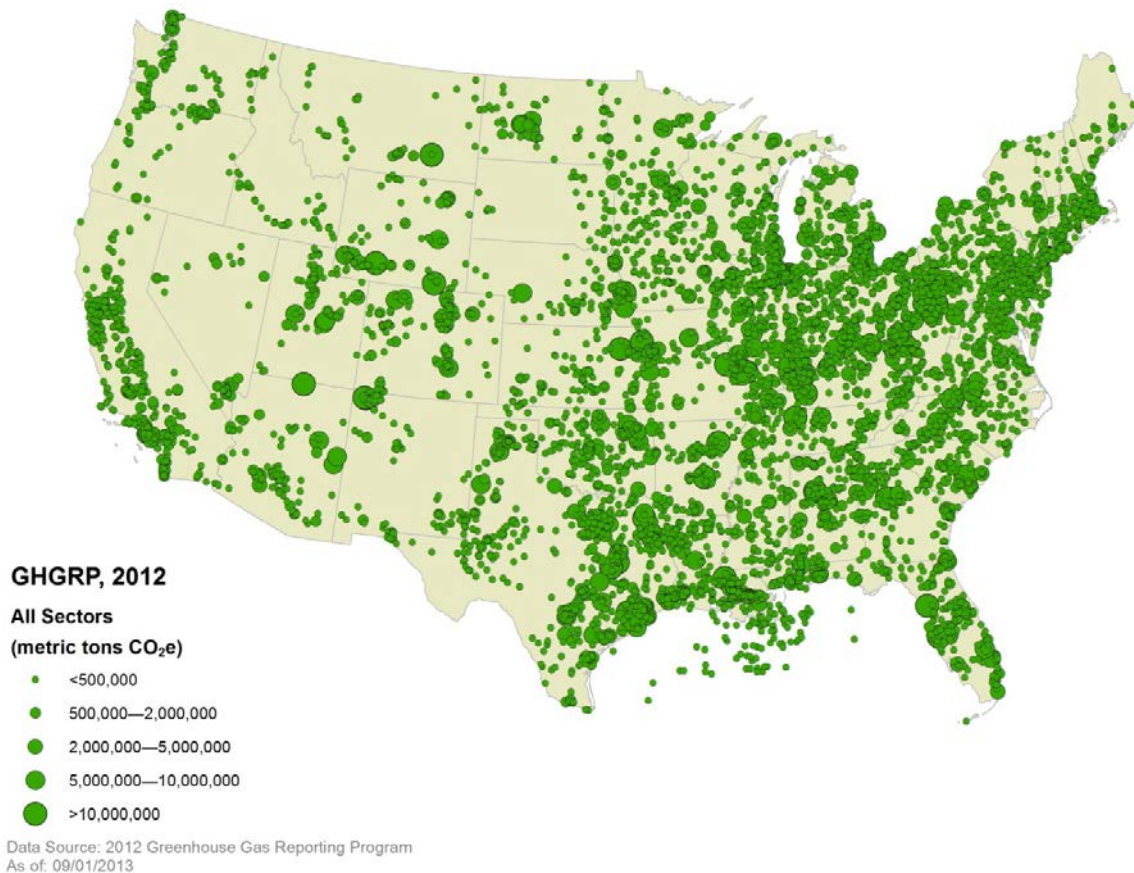
¹ Inventory of U.S. Greenhouse Gas Emissions And Sinks: 1990-2012 (April 2014)

Greenhouse Gas	Source Categories Contributing Most to Emissions ¹	Sectors Contributing Most to Emissions
HFCs	HCFC-22 Production and HFC-23 Destruction (O)	Chemicals
PFCs	Aluminum Production (F), Electronics Manufacturers (I)	Metals, Other

¹ 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.

Geographic Distribution of Emissions

Figure 5: Location and Total Reported Emissions from GHGRP Facilities (2012)

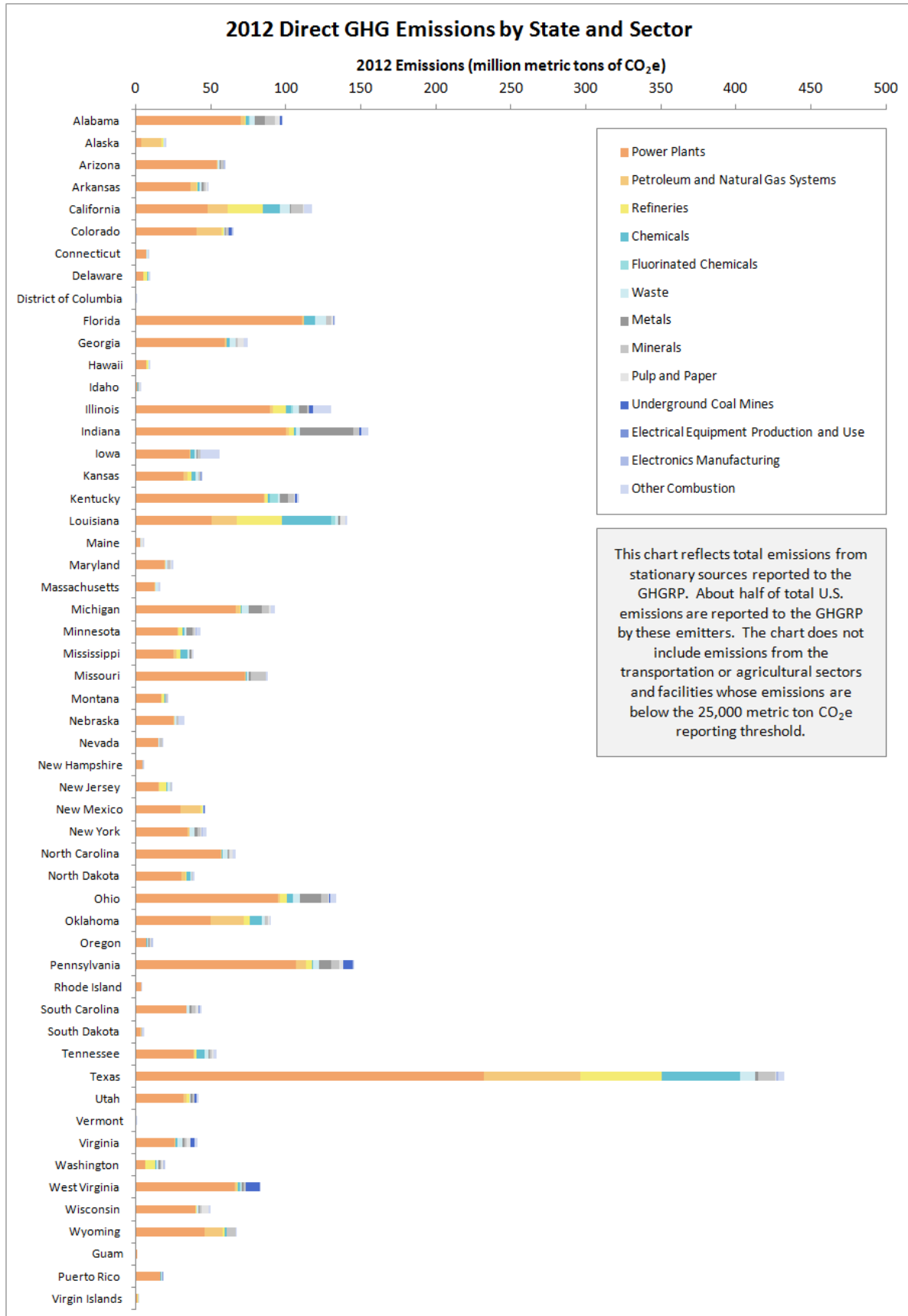


This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility. There are also facilities located in Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and Guam.

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

Because it generally applies to facilities that emit greater than 25,000 metric tons CO₂e 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 (2012)

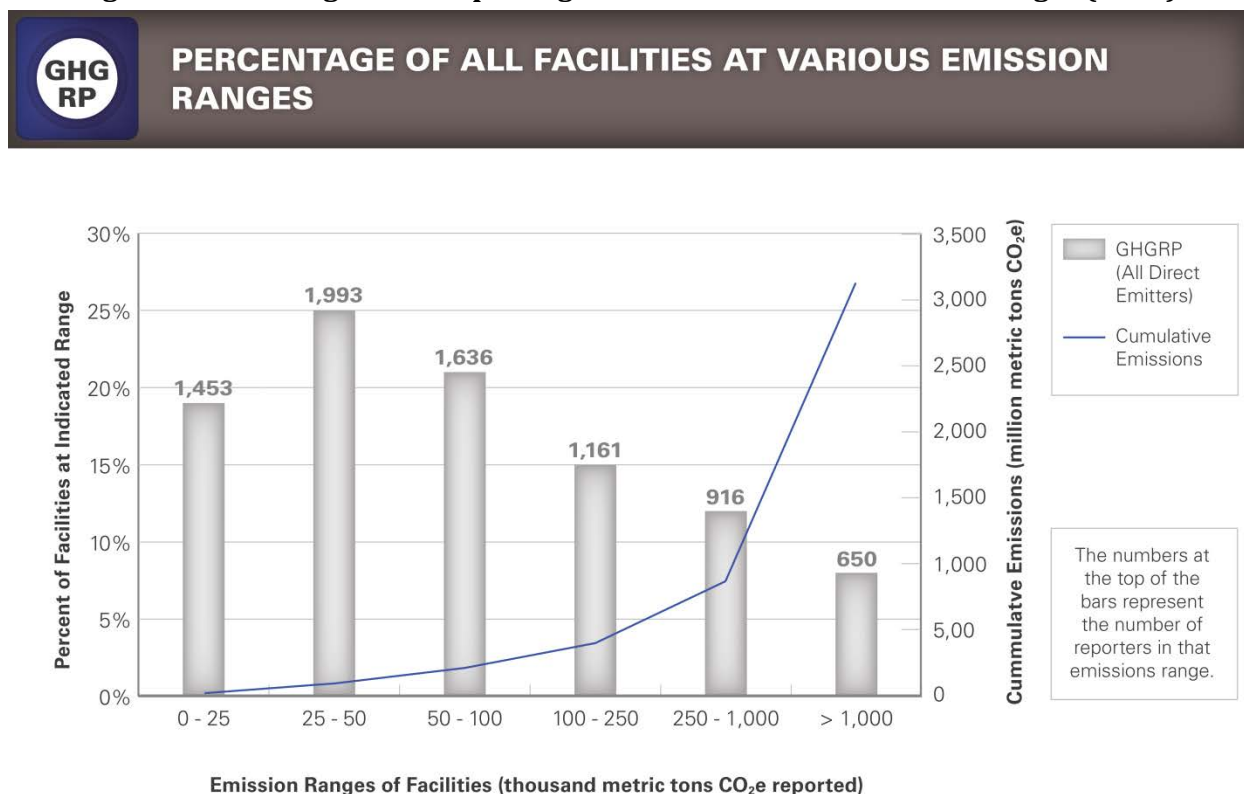


Click [here](#) to view this information in FLIGHT.

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.

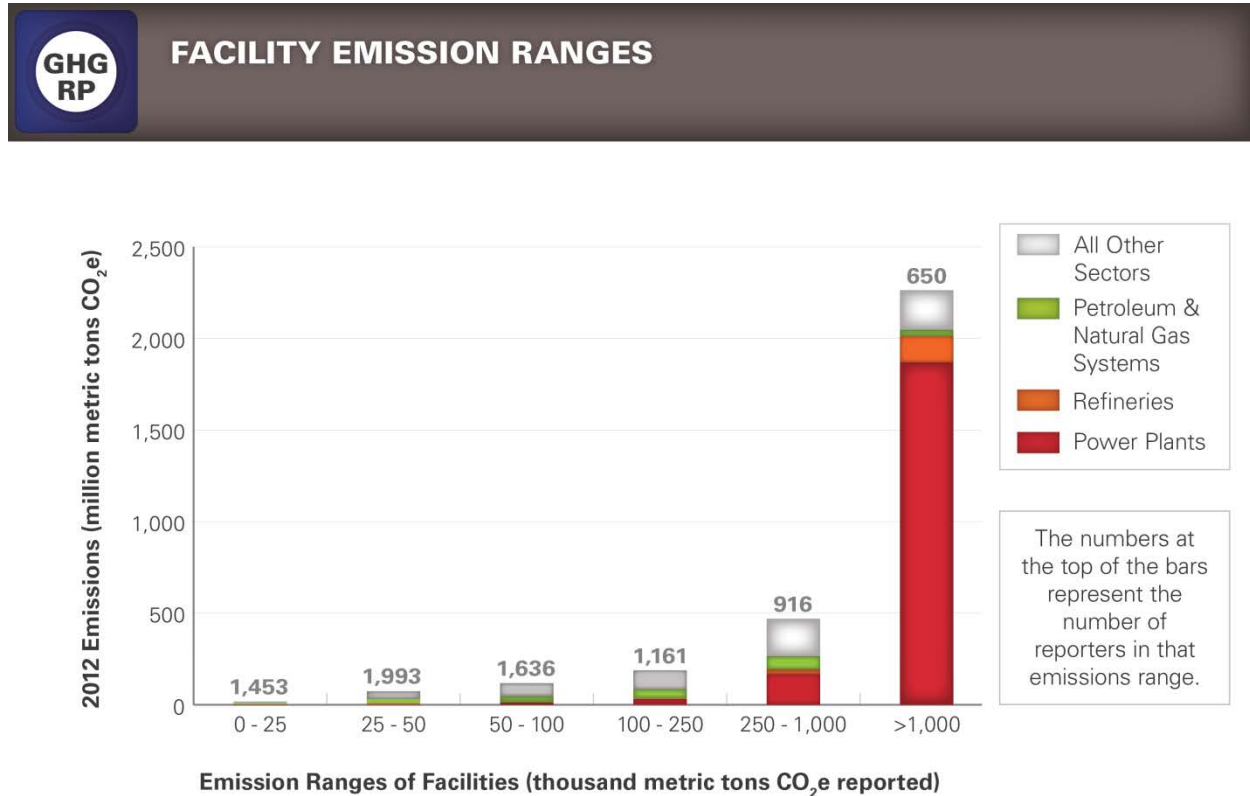
Figure 7: Percentage of All Reporting Facilities at Various Emission Ranges (2012)



Eighty percent of reporting facilities had emissions less than 250,000 metric tons CO₂e. In 2012, the 650 largest-emitting facilities—those emitting more than 1,000,000 metric tons CO₂e—accounted for almost 2.3 billion metric tons CO₂e. These emissions represent 73% of the total 3.13 billion metric tons CO₂e reported. These high-emitting facilities are mainly Power Plants, but 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 (2012)



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 describing EPA's verification process in more details is available [here](#).

For More Information

For more detailed information from each industrial sector, view the [GHGRP Data Highlights](#) 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 2012.