METALS SECTOR

All emissions presented here are as of 9/1/2013 and exclude biogenic CO_2.

Highlights

- CO_2e emissions from the metals sector decreased by 4.5% from 2011 to 2012 mainly due to a reduction in emissions from a handful of large iron and steel reporters.
- The majority of the emissions from the metal sector are from facilities located in the central region of the United States, with the largest portion of emissions taking place in the Midwestern states of Indiana, Ohio, and Michigan.
- Facilities in the metals sector have found ways to reduce emissions through involvement in voluntary programs such as Energy Star, switching to less greenhouse gas (GHG) intensive fuels, and improving efficiency through process modifications.

About this Sector

The metals sector[a] 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.[b] The sector covers coke ovens, regardless of whether located at an integrated iron and steel facility or not. The sector also includes stationary fuel combustion sources at foundries and other metal production facilities operating under NAICS codes beginning with 331 (Primary Metal Manufacturing). More than half of the greenhouse gas emissions in the metals sector are generated by stationary fuel combustion.

Process CO_2 emissions are generated from the processing of metal ore with carbonaceous materials and fluxes, production of coke, consumption of carbon containing electrodes, and the use of fluorinated cover gases. Facilities in this sector also emit several other GHGs including CH_4, N_2O, SF_6, hydrochlorofluorocarbons (HCFCs), and perfluorocarbons (PFCs). However, emissions of CO_2 are significantly higher than emissions of other GHGs in this sector.

Who Reports?

In total, 297 facilities in the metals sector reported in 2012. Total reported emissions were 106.8 million metric tons of carbon dioxide equivalent (MMT CO_2e). The metals sector reflects 3.8% of the facilities reporting direct emissions to the GHGRP and 1.6% of total U.S. GHG emissions.[c]

[a] The GHGRP covers both primary and secondary production of metals. A description of each metal production source category can be found in the Glossary at the end of this report.

[b] The sector covers coke ovens, regardless of whether located at an integrated iron and steel facility or not.

[c] The total U.S. GHG emissions are 6,525.6 million metric tons (MMT) carbon dioxide equivalent (CO_2e) as reported in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012.* U.S. Environmental Protection Agency. April 15, 2014. EPA 430-R-14-003. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2012.

Table 1: Metals Sector Reporting Schedule by Subpart

Subpart	Source Category	Applicability	First Reporting Year
F	Aluminum Production	All operating facilities	2010
K	Ferroalloy Production	Facilities emitting ≥ 25,000 metric tons CO_2e/year	2010
Q	Iron and Steel Production	Facilities emitting ≥ 25,000 metric tons CO_2e/year	2010
R	Lead Production	Facilities emitting ≥ 25,000 metric tons CO_2e/year	2010
T	Magnesium Production and Processing	Facilities emitting ≥ 25,000 metric tons CO_2e/year	2011
GG	Zinc Production	Facilities emitting ≥ 25,000 metric tons CO_2e/year	2010
C	Other Metals	Facilities under NAICS codes beginning with 331 that emit ≥ 25,000 metric tons CO_2e/year from stationary fuel combustion.	2010

Table 2: Metals Sector – Number of Reporters (2010–2012)

Metals Sector	Number of Reporters		
	2010	2011	2012
Total Metals Sector	**269**	**297**	**297**
Aluminum Production	9	10	10
Ferroalloy Production	10	10	10
Iron and Steel Production	123	128	125
Lead Production	12	13	14
Magnesium Production and Processing[a]	--	9	10
Zinc Production	6	6	6
Other Metals	109	121	122

[a] This subsector was not required to report in 2010.

Table 3: Metals Sector – GHGRP Coverage

Source Category	GHGRP Coverage of Industry	Estimated Percent of Industry Facilities Covered by GHGRP	Estimated Percent of Industry Emissions Covered by GHGRP
Aluminum Production[a]	All operating facilities	100%	100%
Ferroalloy Production[b]	Facilities emitting ≥ 25,000 metric tons CO_2e/year	59%	94-99%
Iron and Steel Production[c]	Facilities emitting ≥ 25,000 metric tons CO_2e/year	~100%	~100%
Lead Production[d]	Facilities emitting ≥ 25,000 metric tons CO_2e/year	100%	100%
Magnesium Production and Processing[e]	Facilities emitting ≥ 25,000 metric tons CO_2e/year	77%	76%
Zinc Production[f]	Facilities emitting ≥ 25,000 metric tons CO_2e/year	100%	100%[g]
Other Metals (Subpart C)[g]	All facilities	NA	NA

[a] The GHGRP covers all operating primary aluminum production facilities who manufacture aluminum using the processes outlined in the rule regardless of the amount of GHGs emitted from the facility.

[b] Estimates of the size of the industry are based on information from the US Geological Survey Minerals Yearbook – Ferroalloys, September 2013 and from GHGRP and substituting a range of 5,000 to 20,000 metric tons CO_2e for facilities not reporting.

[c] Estimates of integrated iron and steel facilities, coke plants, and electric arc furnace steel plants were compiled in "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Iron and Steel Industry, U. S. EPA, Office of Air and Radiation, September, 2012. Some facilities listed in this reference did not operate in 2012. A list of eight facilities operating taconite indurating furnaces was obtained from Heller, K. et al. Taconite Iron Ore NESHAP Economic Impact Analysis. EPA-452/R-03-015. August, 2003. It should be noted that there may be a few facilities that are not covered by the GHGRP and thus the coverage under the Iron and Steel sector is generally estimated to be slightly less than 100%.

[d] Estimate of size of industry based on December 2011 memo "Development of the RTR Emissions Dataset for the Secondary Lead Smelting Source Category (EPA-HQ-OAR-2011-044-0163), and web searches of facility closures.

[e] Estimate of size of industry based on estimates from U.S. Greenhouse Gas Emissions and Sinks: 1990-2012 and EPA's SF_6 Emission Reduction Partnership for the Magnesium Industry (http://www.epa.gov/highgwp/magnesium-sf6/index.html)

[f] Estimate of size of industry based on 2011 USGS Minerals Yearbook and Technical Support Document for the Zinc Production Sector January 22, 2009. Only 6 facilities manufacture zinc using waelz kilns or through electrothermic furnaces.

[g] Due to the diversity of facilities and products within the Other Metals subsector, the U.S. population of all facilities similar to this subsector of GHGRP reporters is not available. However, fuel and feedstock data for 2010 (available from EIA's MECS data publication at http://www.eia.gov/consumption/manufacturing/about.cfm) indicate that virtually all facilities reporting to EIA under NAICS code 331XXX (Primary Metals Manufacturing) also reported emissions to the GHGRP in 2010.

Reported Emissions

All GHG emissions data, displayed in units of carbon dioxide equivalent (CO_2e) 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).

Table 4: Metals Sector Emissions by Subsector (2010–2012)

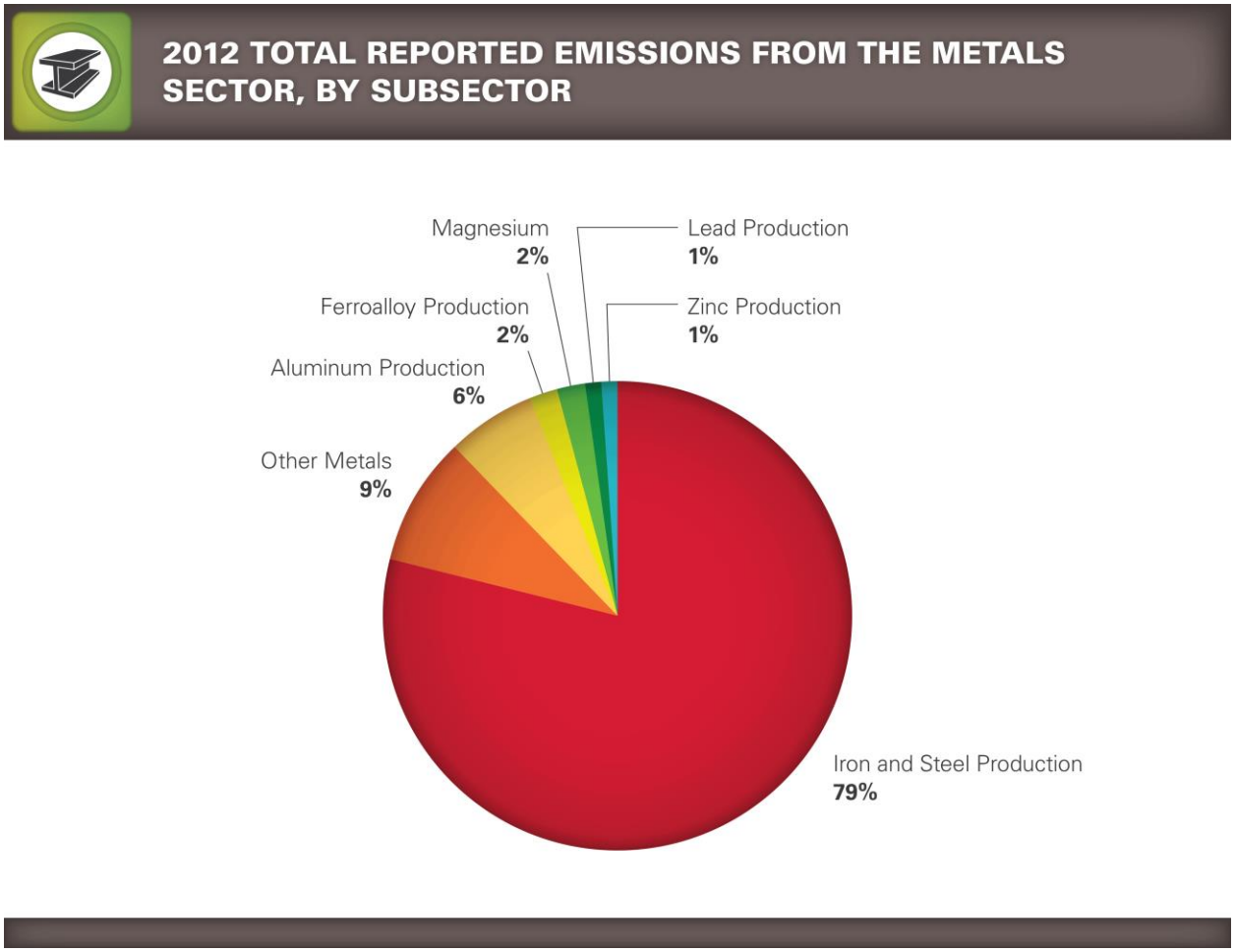
Metals Sector	Emissions (MMT CO_2e)[a]		
	2010	2011	2012
Total Metals Sector[b]	**--[c]**	**112**	**107**
Aluminum Production	4.8	6.8	6.5
Ferroalloy Production	2.3	2.3	2.4
Iron and Steel Production	82.0	89.3	84.4
Lead Production	0.9	1.1	1.1
Magnesium Production and Processing[c]	NA	1.9	1.7
Zinc Production	0.8	0.9	1.0
Other Metals (Subpart C)	8.0	10	9.7

[a] Emissions of CH_4 and N_2O from process units within the iron and steel sector are excluded, except for a relatively small number of process units that monitor emissions using continuous emissions monitoring systems (CEMS).

[b] Represents total emissions reported to the GHGRP from these industries. Additional emissions may occur at facilities that have not reported, for example, those below the reporting threshold.

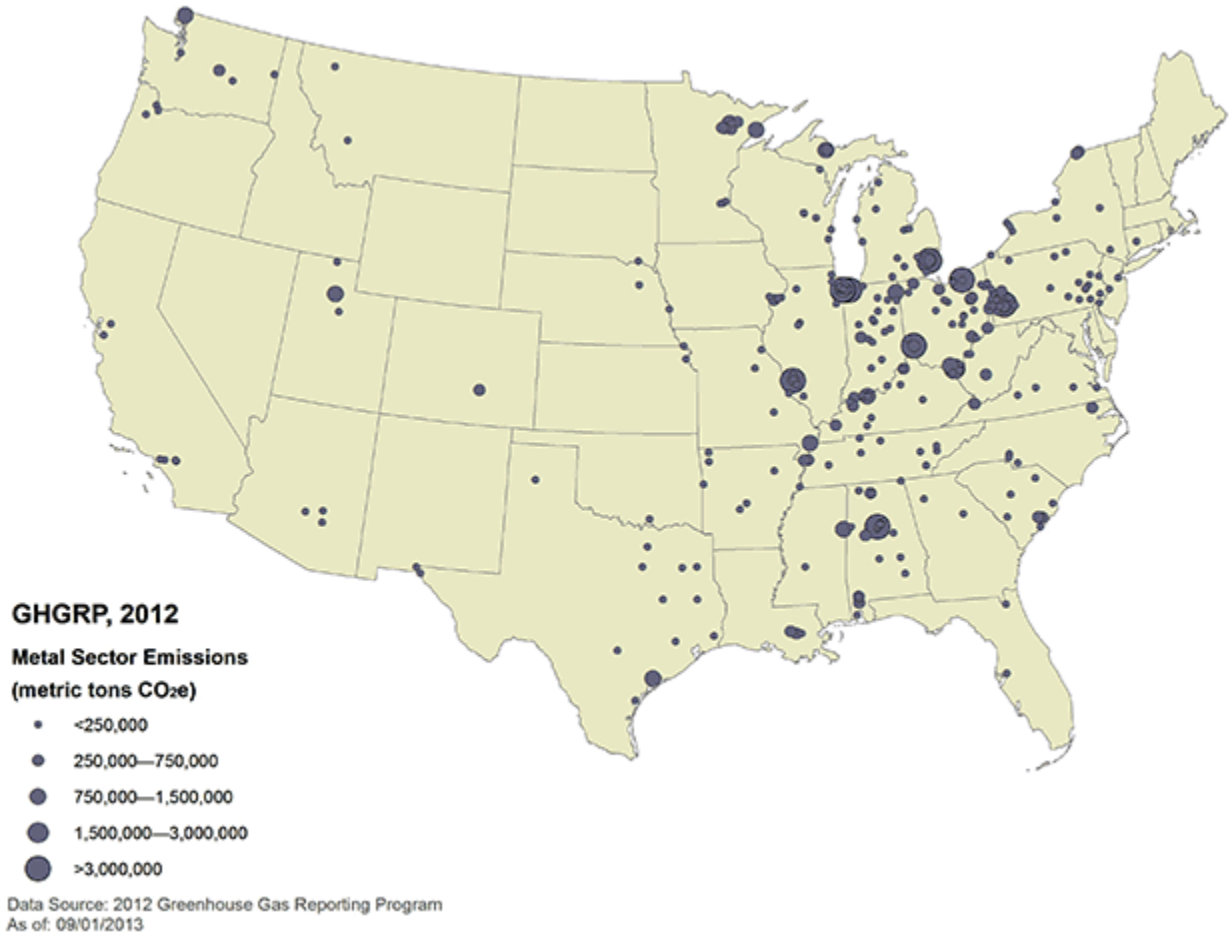
[c] Facilities reporting under the Magnesium subsector were not required to report emissions in 2010.

Figure 1: Metals Sector – Emissions by Subsector (2012)



Click here to view the most recent data using FLIGHT.

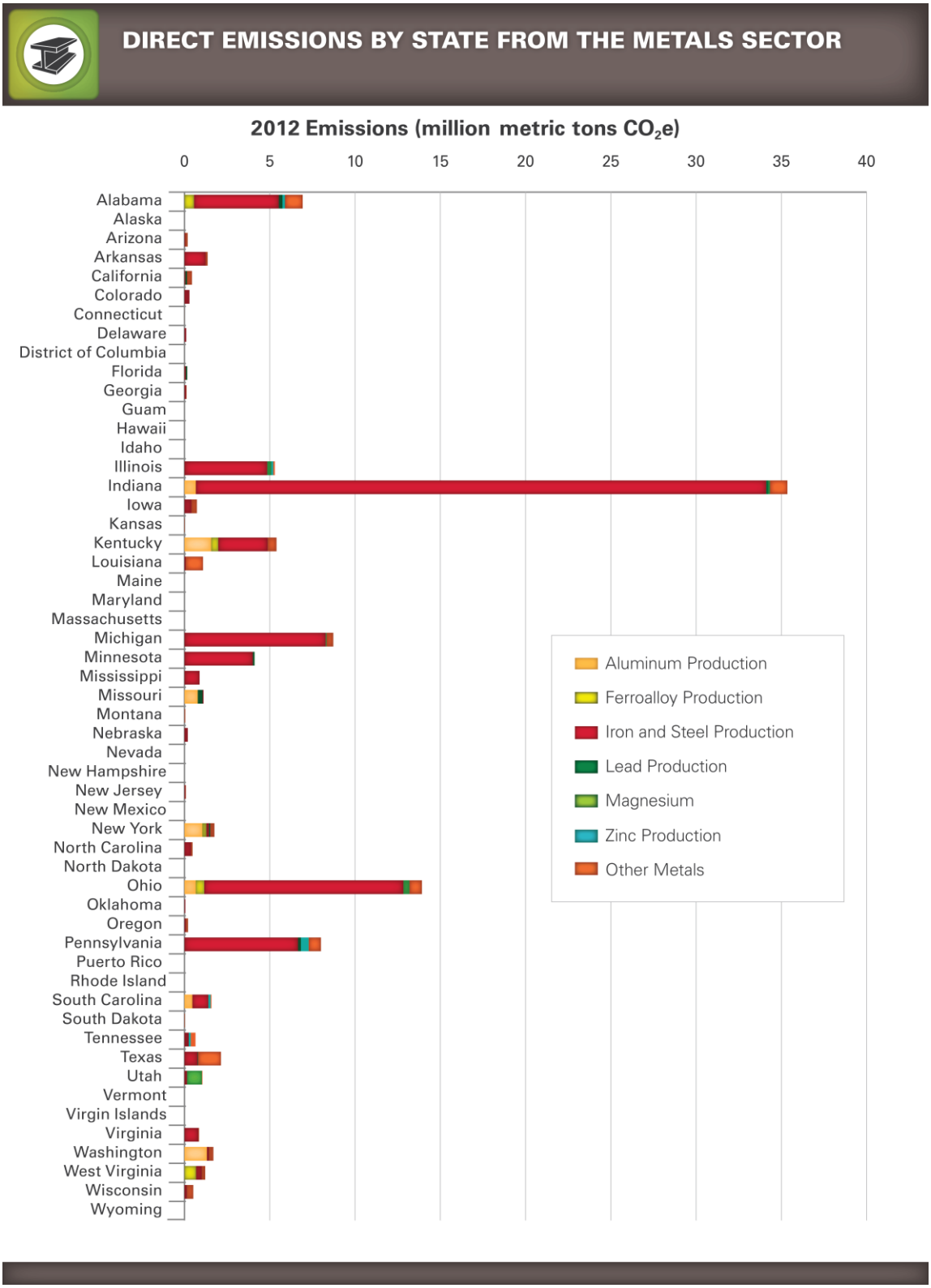
Figure 2: Location and Emissions Range for Each Reporting Facility in the Metals Sector (as of 9/1/13)



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

Readers can identify the largest emitting facilities by visiting the Facility Level Information on GreenHouse gases Tool (FLIGHT) website (http://ghgdata.epa.gov).

Figure 3: Metals Sector – Emissions by State (2012) [a]



[a] Represents total emissions reported to the GHGRP from this sector. Additional emissions occur at facilities that have not reported; for example those below the reporting threshold.

Click here to view the most recent data using FLIGHT.

Figure 3 shows the number of facilities reporting under the Metals Sector by state. Indiana, Ohio, Michigan, Pennsylvania, Alabama and Illinois have the highest number of facilities reporting in this sector for several reasons, including availability of raw materials and close proximity to major waterways that allow easy transport of goods.

Metals Sector Emissions Trends 2010 to 2011

Considering only the subsectors that reported in both 2010 and 2011, GHG emissions from the metals sector increased by 11.3 MMT CO_2e in 2011. This represents an 11.4% difference. The majority of the increase was from iron and steel production (7.3 MMT CO_2e) due to an additional five iron and steel facilities reporting for 2011 that did not report in 2010, and to an increase in average emissions per iron and steel reporter of 28,646 metric tons of CO_2e. All sectors, except ferroalloy production, also reported an increase in emissions per reporter for 2011.

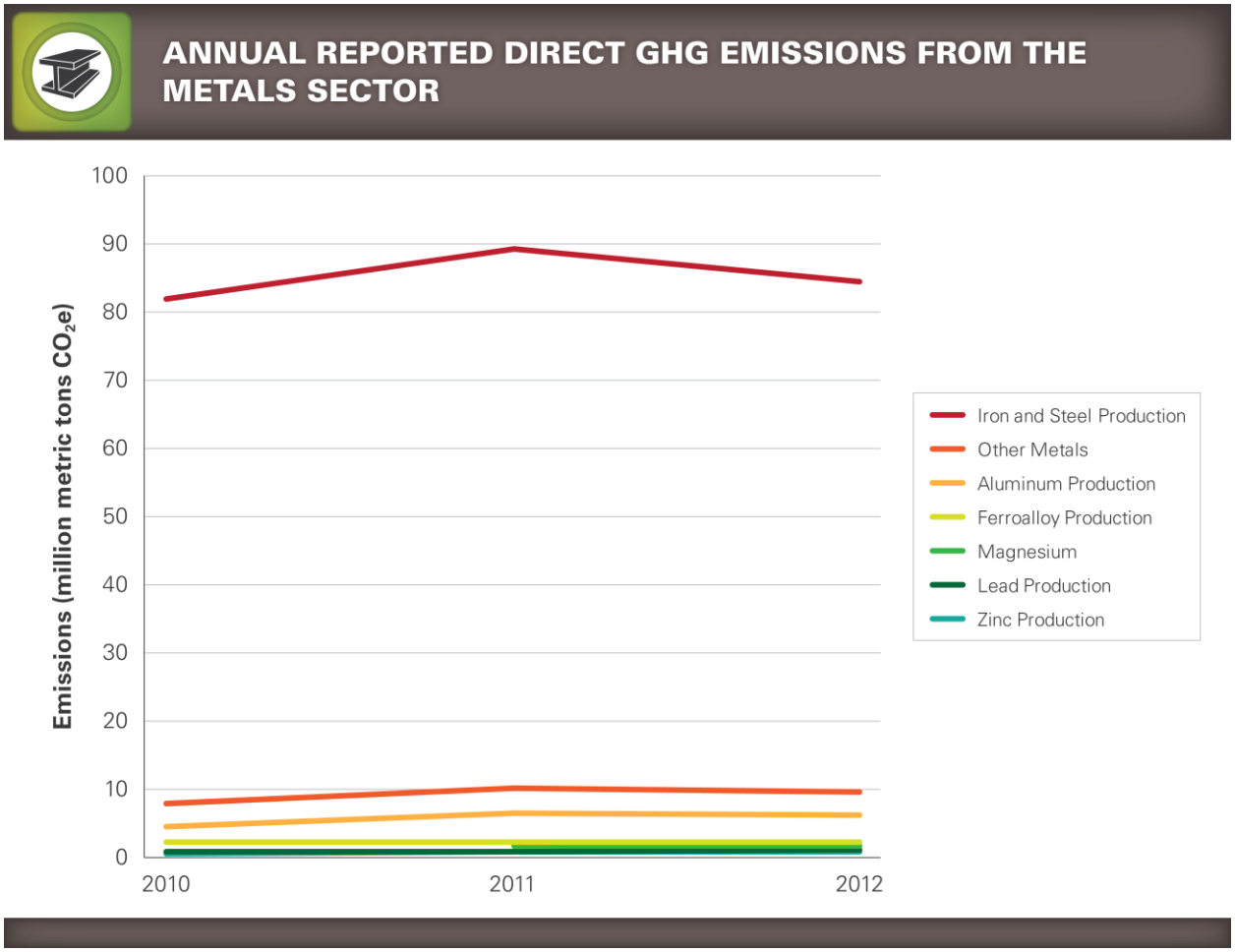
GHG emissions from primary aluminum production increased by 42% from 4.8 MMT CO_2e in 2010 to 6.8 MMT CO_2e in 2011. Although there was one additional aluminum production facility reporting in 2011, the increase in emissions was largely due to atypical process operations experienced at one facility. Excluding consideration of magnesium facilities[c], an additional 19 facilities reported under the metals sector for 2011 (288) compared to 2010 (269). Most of those facilities are in the Other Metals subsector (12 additional reporters).

Metals Sector Emissions Trends 2011 to 2012

Metal Sector emissions were 5.4 MMT CO_2e lower in 2012 (4.5% decrease) than in 2011. Although overall emissions for the Metals Sector decreased from 2011 to 2012, the emissions from zinc production and ferroalloy production showed a slight increase. Emissions for lead production remained unchanged, while emissions from aluminum production, iron and steel production, and magnesium production and processing decreased. For iron and steel production, the decrease could be the result of a reduction in the number of reporters, while for magnesium production and processing along with aluminum production this decrease in emissions could be due to a change in production processes or demand for the product. For the "other metals" subsector, which emits GHGs only from stationary combustion sources, the number of facilities increased marginally by one reporter from 2011 to 2012, and emissions remained nearly constant at approximately 10 million metric tons annually.

[c] Magnesium facilities are not considered in this trends analysis because these facilities were not required to report in 2010.

Figure 4: Metals Sector - Emissions Trend (2010–2012)



Click here to view the most recent data using FLIGHT.

Figure 4 shows the direct GHG emissions as reported by facilities in the metals sector. Comparing reporting year 2010, 2011, and 2012, emissions increased slightly in 2011 and decreased slightly in 2012.

Table 5: Metals Sector —Emissions by GHG (MMT CO_2e) [a,b]

Metals Sector	Reporting Year		
	2010	2011	2012
Number of facilities	269	297	297
Total emissions	NA[c]	112.3	106.8
Emissions by GHG (CO_2e)			
Carbon dioxide (CO_2)			
• Aluminum Production	3.2	3.8	4.0
• Ferroalloy Production	2.3	2.3	2.4
• Iron and Steel Production[d]	82.0	89.2	84.4
• Lead Production	0.9	1.1	1.1
• Magnesium Production and Processing	NA	0.3	0.4
• Zinc Production	0.8	0.9	1.0
• Other Metals	8.0	10.1	9.7
Methane (CH_4)			
• Aluminum Production	**	**	**
• Ferroalloy Production	**	**	**
• Iron and Steel Production*	**	**	**
• Lead Production	**	**	**
• Magnesium Production and Processing	NA	**	**
• Zinc Production	**	**	**
• Other Metals	**	**	**
Nitrous oxide (N_2O)			
• Aluminum Production	**	**	**
• Ferroalloy Production	**	**	**
• Iron and Steel Production*	**	**	**
• Lead Production	**	**	**
• Magnesium Production and Processing	NA[c]	**	**
• Zinc Production	**	**	**
• Other Metals	**	**	**
Sulfur Hexafluoride (SF_6)			
• Magnesium Production and Processing	NA	1.5	1.3
Hydrofluorocarbons (HFCs)			
• Magnesium Production and Processing	NA	**	**
Perfluorocarbons (PFCs)			
• Magnesium Production and Processing	1.6	2.9	2.5

[a] Represents total emissions reported to the GHGRP in this industry sector. Additional emissions occur at facilities that have not reported, for example those below the 25,000 metric ton CO_2e reporting threshold

[b] Totals may not sum due to independent rounding.

[c] Facilities in the magnesium sector were not required to begin reporting until 2011.

[d] Includes reports of CH_4 and N_2O emissions from only a relatively small number of emission points monitored by CEMS.

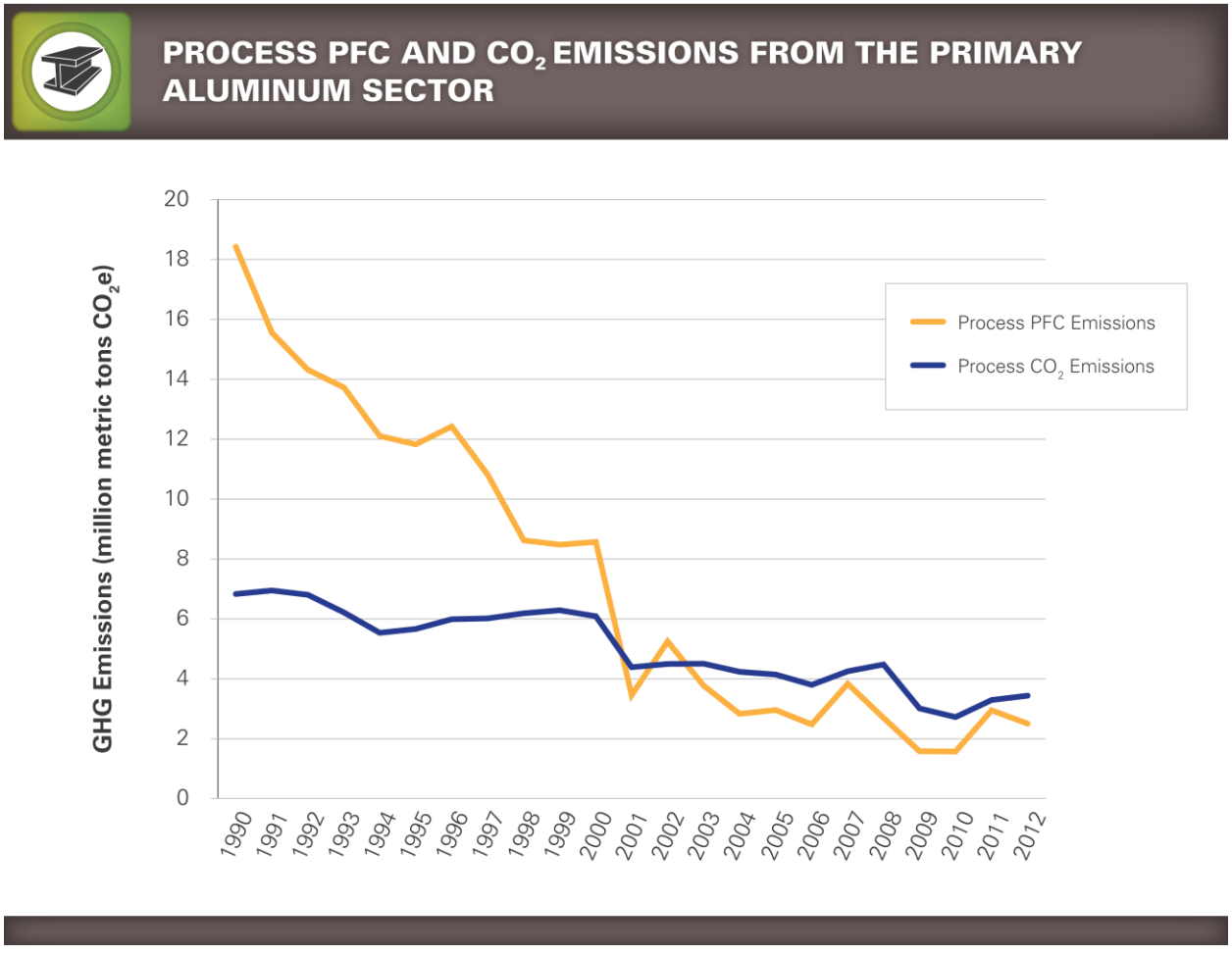
** Total reported emissions are less than 0.05 million metric tons CO_2e.

Aluminum Production Emissions[d]

From 1990 to 2012, process emissions of CO_2 have declined by 49 percent, from to 6.83 MMT CO_2 to 3.44 MMT CO_2.[e] This decline is due primarily to reductions in domestic aluminum production, which has declined by 49 percent since 1990.

Since 1990, emissions of CF_4 and C_2F_6 (i.e., PFC) have declined by 87 percent and 81 percent, respectively, to 2.0 MMT CO_2e of CF_4 and 0.5 MMT CO_2e of C_2F_6 in 2012. This decline is due both to reductions in domestic aluminum production and to actions taken by aluminum smelting companies to reduce the frequency and duration of anode effects. These actions include technology and operational changes such as employee training, use of computer monitoring, and changes in alumina feeding techniques. For example, between 1995 through 2010, the majority of U.S. primary aluminum producers reported their process CF_4 and C_2F_6 emissions and aluminum production to EPA under a voluntary program, and committed to voluntary reduction goals.

Figure 5: Process CO_2 and PFC Emissions for the Primary Aluminum Sector



[d] As reported under EPA's voluntary program for the aluminum production sector.

[e] This value is less than the total reported emissions from aluminum production because it excludes fuel combustion.

Magnesium Production and Processing Emissions[f]

EPA launched the "SF_6 Emission Reduction Partnership for the Magnesium Industry" in 1999. The partnership, between the EPA and the U.S. magnesium industry, with support from the International Magnesium Association, launched with the goal of reducing emissions of SF_6 and gaining a better understanding of this potent GHG in light of global climate change. Partners in EPA's SF_6 Emission Reduction Partnership for the Magnesium Industry provided data to the EPA stating their SF_6 emissions (partners did not submit estimates of CO_2 emissions) from the beginning of the program in 1999 until 2011. See Figure 6: SF_6 Emissions for the Magnesium Production and Processing Sector.

Figure 6: SF_6 Emissions for the Magnesium Production and Processing Sector

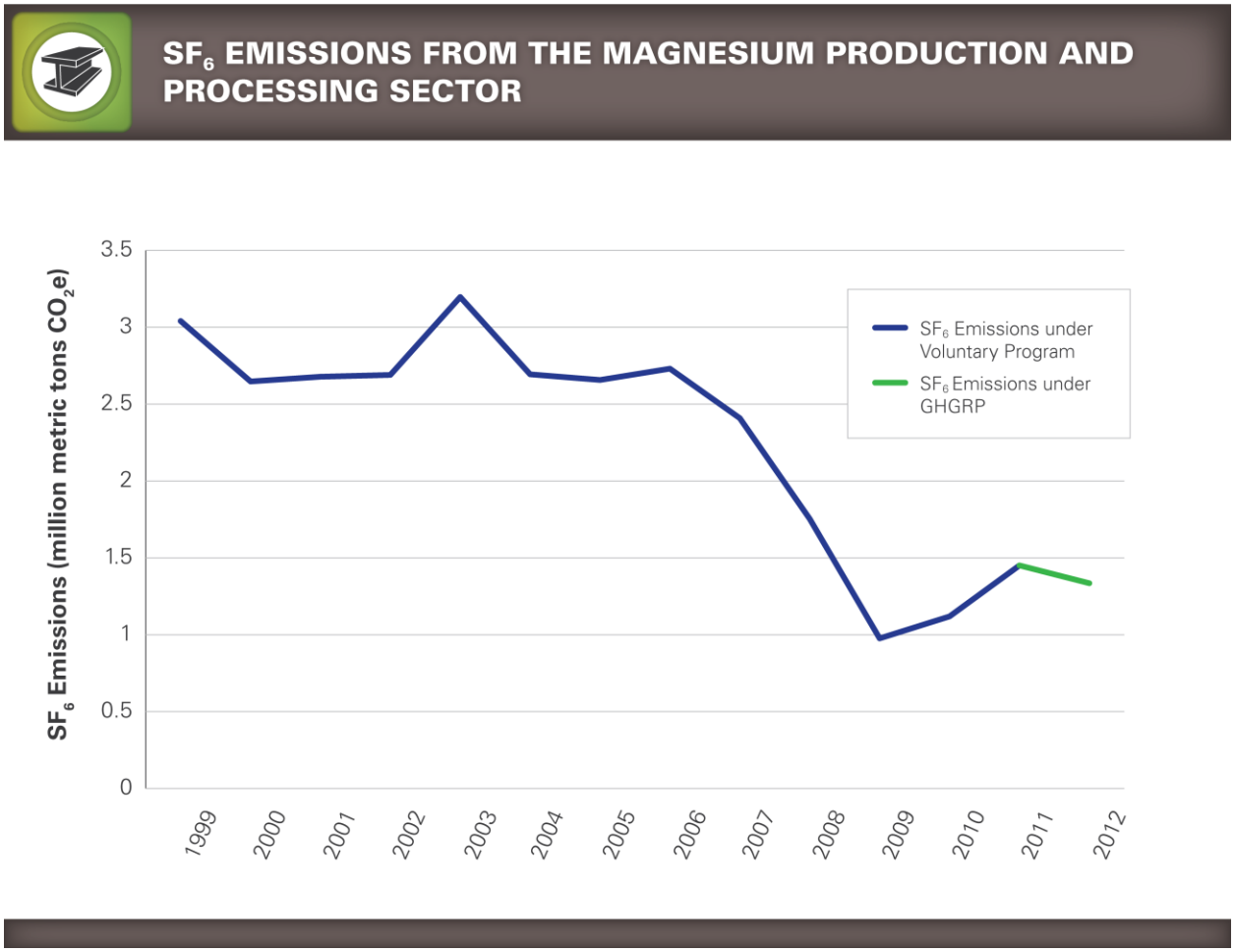


Figure 6 shows the estimated emissions of SF_6 by the U.S. magnesium industry from 1999 to 2012. The emissions have declined dramatically since 1999 for several reasons. First, the magnesium industry was deeply affected by the economic recession and as a result suffered from decreased demand for product, and a reduced number of operating facilities. In particular, from 2006 to 2009 the magnesium industry suffered losses due to the economic recession resulting in less production and closure of some facilities. Even with the economy rebounding after 2010, the magnesium industry has still declined in comparison to 1999 levels. Second, there has been an increased

[f] As reported under EPA's voluntary program for the magnesium production and processing sector.

demand for the use of aluminum metal over magnesium metal in the automobile industry which is one of the leading consumers of magnesium metal products. Third, sulfur hexafluoride had been extensively used by industry as a cover gas by diluting it in dry air and/or CO_2 and used as a protectant for molten magnesium metal from oxidation or burning. Protecting the molten magnesium ensures that oxidation of magnesium in the presence of air is minimized thus reducing the formation of magnesium oxide deposits that would reduce the quality and strength of the product. Over the past 25 years, the industry has relied less on SF_6 and has instituted best practices including optimizing how SF_6 is used so that less is needed while still achieving product goals, and by switching to an alternative cover gas.

Figure 7: Metals Sector – Average Emissions per Reporter (2012)

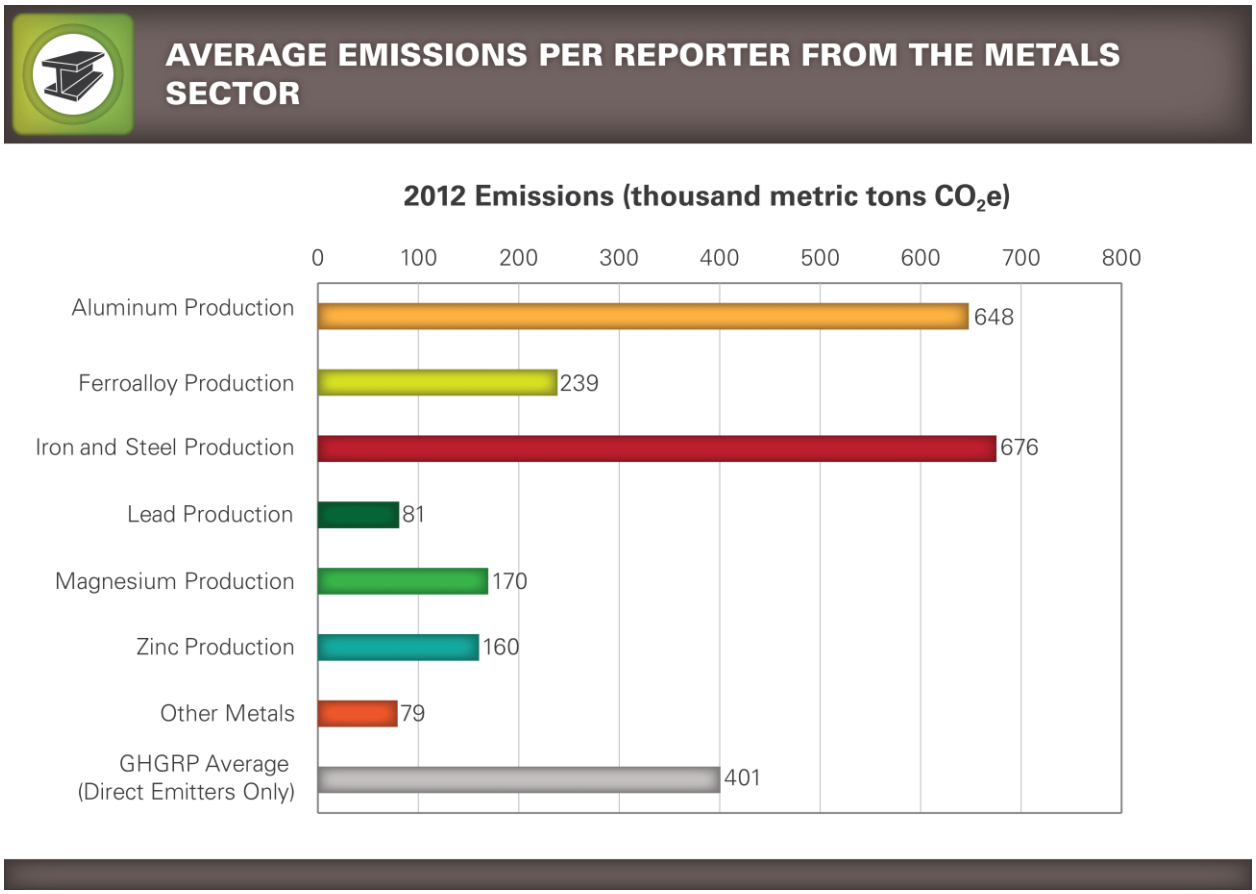
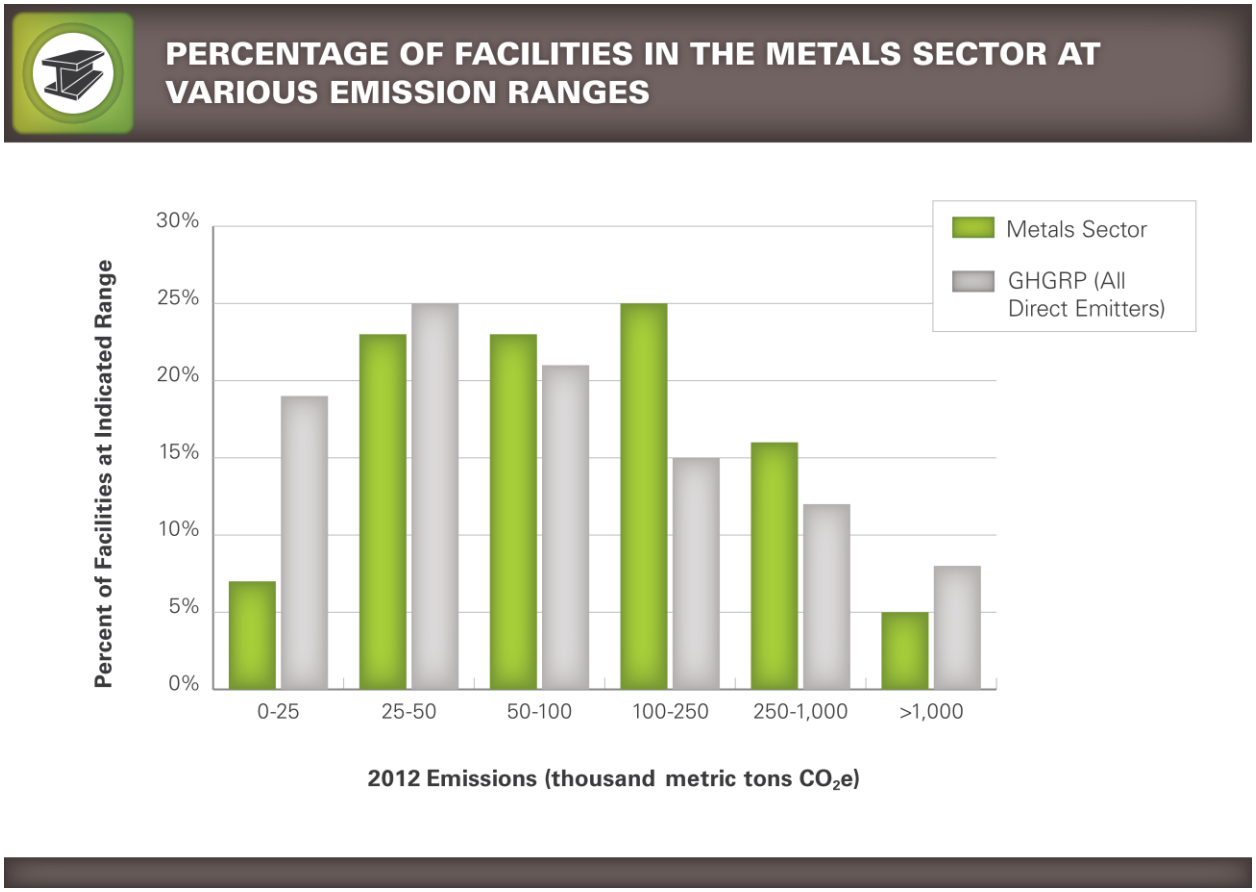


Figure 7 shows the average emissions per reporter under the Metals Sector. Aluminum Production and Iron and Steel Production have average emissions per reporter greater than the average for other reporters in the program.

Table 6: Metals Sector – Number of Reporters by Range of Emissions (2012)

Metals Sector	Emissions Range (MMT CO_2e)					
	0 – 0.025	0.025 – 0.05	0.05 – 0.1	0.1 – 0.25	0.25 – 1	> 1
Total Metals Sector	**22**	**69**	**67**	**74**	**49**	**16**
Aluminum Production					9	1
Ferroalloy Production	1			6	3	
Iron and Steel Production	2	13	34	31	30	15
Lead Production	1	2	7	4		
Magnesium Production and Processing	4	2		2	2	
Zinc Production				6		
Other Metals	14	52	26	26	4	

Figure 8: Percentage of Reporters by Range of Emissions (2012)



Calculation Methods Used

Facilities must calculate GHG emissions using one of the following methods:

- **Process Emissions**
  - **Continuous Emissions Monitoring System (CEMS) –** Operate a CEMS to measure CO_2 emissions according to requirements specified in 40 CFR part 98, subpart C .
  - **Carbon mass balance –** Calculate process CO_2 emissions based on measurements of the annual mass of process inputs or outputs or both (depending on the subsector), and periodic analyses of the weight fraction of carbon in inputs and outputs.
  - **Site-specific emission factors –** Calculate process CO_2 emissions using an emission factor derived through emission testing at the facility.
  - **Default emission factors –** Calculate process CO_2 emissions using an emission factor provided in the rule.
- **Fuel Combustion Emissions –** Follow the applicable tier method prescribed in subpart C (general stationary fuel combustion sources) to estimate CO_2 emissions (Tier methods are shown in Tables 7 through 13). All facilities use default emission factor to estimate CH_4 and N_2O emissions from fuel combustion.

Table 7: Aluminum Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Process Emissions – CO_2	Mass balance[a]	100%	100%	100%
Process Emissions – CF_4 and C_2F_6	Site-specific emission factors[b]	100%	100%	100%
Combustion Emissions	Measured high heating values (HHVs) and default emission factors (Tier 2)	45.4%	54.7%	58.7%
	Default HHVs and emission factors (Tier 1)	54.6%	45.3%	41.3%

[a] Facilities had the option of using CEMS.
[b] Some facilities had the option to use default emission factors.

Table 8: Ferroalloy Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Process Emissions – CO_2	Mass balance	100%	100%	100%
Process Emissions – CH_4	Default emission factors	100%	100%	100%
Combustion Emissions	Measured carbon content and, if applicable, molecular weight (Tier 3)	40.6%	16.8%	15.4%
	Default high heating values and emission factors (Tier 1)	59.4%	83.2%	84.6%

Table 9: Iron and Steel Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Process Emissions	CEMS[a]	4.6%	4.8%	5.4%
	Mass balance (including flares)	78.8%	80.3%	80.2%
	Site-specific emission factor	16.0%	14.4%	13.9%
	Default emission factor for coke pushing	0.6%	0.5%	0.5%
Combustion Emissions	CEMS (Tier 4)	0%	8.4%	8.1%
	Measured carbon content and, if applicable, molecular weight (Tier 3)	66.6%	59.9%	59%
	Measured high heating values (HHVs) and default emission factors (Tier 2)	27.2%	26.2%	27.5%
	Default HHVs and emission factors (Tier 1)	6.3%	5.6%	5.4%

[a] Some continuous emissions monitoring systems (CEMS) monitor a mixture of process and combustion emissions in a common stack. In these cases, facilities are not required to report the discrete fractions of process and combustion emissions; only the combined total is reported. This table excludes emissions from CEMS that co-monitor process and combustion emissions.

Table 10: Lead Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Process Emissions	Mass balance[a]	100%	100%	100%
Combustion Emissions	Measured carbon content and, if applicable, molecular weight (Tier 3)	1%	0.5%	0.7%
	Measured high heating values (HHVs) and default emission factors (Tier 2)	5.1%	6.2%	8.6%
	Default HHVs and emission factors (Tier 1)	78.2%	85%	71.8%
	Sorbent emissions	7.9%	8.4%	9.5%

[a] Facilities had the option to use CEMS.

Table 11: Magnesium Production and Processing – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010[a]	2011	2012
Process Emissions	Mass balance by cover/carrier gas inventory	--	42.3%	54.1%
	Mass balance by gas cylinder weighing	--	57.7%	45.9%
Combustion Emissions	Default high heating values and emission factors (Tier 1)	--	100%	100%

[a] Did not report in 2010.

Table 12: Zinc Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Process Emissions	Mass balance[a]	100%	100%	100%
Combustion Emissions	Default high heating values and emission factors (Tier 1)	100%	100%	100%

[a] Facilities had the option to use CEMS.

Table 13: Other Metals Production – Methodologies

Type of Emissions	Methodology	Portion of Emissions Monitored by Method (by Type)		
		2010	2011	2012
Combustion Emissions	Alternative Part 75 Methodology: CEMS per §98.33(a)(5)(iii)[a,b]	0%	0.3%	0.3%
	Measured carbon content and, if applicable, molecular weight (Tier 3)	0%	3.7%	3.4%
	Measured high heating values (HHVs) and default emission factors (Tier 2)	25.4%	33.4%	29.8%
	Default HHVs and emission factors (Tier 1)	58.5%	62.6%	66.5%
	Abbreviated reporting[c]	16%	0%	0%
	Sorbent emissions	**	**	**

[a] Units that are required to monitor emissions according to 40 CFR part 75 can report CO_2 emissions under subpart C using Part 75 calculation methods and monitoring data that they already collect under Part 75 (e.g. heat input, fuel use).

[b] Some continuous emissions monitoring systems (CEMS) monitor a mixture of process and combustion emissions in a common stack. In these cases discrete fractions of process and combustion emissions are not reported; only the combined total is reported.

[c] Abbreviated reporting was only allowed for RY2010. Facilities using abbreviated reporting were not required to report the Tier method used for CO_2.

** Value is between 0% and 0.05%.

Data Verification and Analysis

As a part of the reporting and verification process, EPA evaluates annual GHG reports with electronic verification checks. EPA contacts facilities regarding potential reporting issues. Statistics related to EPA's verification of reports from this sector are provided below. Additional information on EPA's verification process is available here.

GLOSSARY

Aluminum production means the manufacturing of primary aluminum using the Hall-Héroult manufacturing process. The primary aluminum process comprises electrolysis in prebake and Söderberg cells and anode baking for prebake cells. The process excludes experimental cells and research and development process units.

BAMM means Best Available Monitoring Methods. Facilities approved for BAMM may use best available monitoring methods for any parameter (e.g., fuel use, feedstock rates) that cannot reasonably be measured according to the monitoring and QA/QC requirements of a relevant subpart.

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.

The **ferroalloy production** subsector comprises facilities that use pyrometallurgical techniques to produce any of the following metals: ferrochromium, ferromanganese, ferromolybdenum, ferronickel, ferrosilicon, ferrotitanium, ferrotungsten, ferrovanadium, silicomanganese, or silicon metal.

FLIGHT refers to EPA's GHG data publication tool, named Facility Level Information on Greenhouse Gases Tool (http://ghgdata.epa.gov/ghgp).

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 https://www.epa.gov/ghgreporting/greenhouse-gas-reporting-program-and-us-inventory-greenhouse-gas-emissions-and-sinks.

The **iron and steel production** subsector comprises facilities that make iron from iron ore and coke in a blast furnace and refine the molten iron (and some ferrous scrap) in a basic oxygen furnace to make steel. Electric arc furnace operations which re-melt ferrous scrap and direct reduced iron are also included, as are processes that decarburize raw steel. This subsector also includes taconite (iron ore) processing facilities, coke-making facilities, and direct reduced iron production facilities.

The **lead production** subsector comprises primary and secondary lead smelters. A primary lead smelter produces lead metal from lead sulfide ore concentrates through the use of pyrometallurgical processes. A secondary lead smelter produces lead and lead alloys from lead-bearing scrap metal. Lead is used in products such as batteries, ammunition, construction materials, electrical components and accessories, and vehicle parts.

Magnesium production and processing: Magnesium metal is used in alloying, casting, drawing, extruding, forming, or rolling operations.

MMT means million metric tons.

NAICS means the North American Industry Classification System, the standard used by federal statistical agencies to classify business establishments into industrial categories for collecting and publishing statistical data related to the U.S. economy.

The **other metals** subsector comprises metals production facilities under NAICS codes beginning with 331 that are not otherwise subject to a metals subpart under Part 98.

Primary metal manufacturing refers to the production of metal products from ore using electrometallurgical and other process metallurgical techniques. **Secondary metal manufacturing** refers to the production of alloys from ingots and the recovery of metal from scrap and salvage.

The **zinc production** subsector comprises primary zinc smelters and zinc recycling processes.