



Alberta Greenhouse Gas Reporting Program 2013 Facility Emissions

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Summary

Alberta's Specified Gas Reporting Program has collected facility greenhouse gas emissions data since 2003. In 2005 (for 2004 emissions data collection), Alberta harmonized its Specified Gas Reporting Program with the Government of Canada's Greenhouse Gas Emissions Reporting Program. Since then, Alberta has jointly collected greenhouse gas data from Alberta's largest industrial emitters with the Government of Canada. Alberta facilities report their emissions data to Environment and Climate Change Canada through the federal reporting program and the results are forwarded to the Alberta Climate Change Office, allowing both provincial and federal reporting requirements to be satisfied.

For the 2013 calendar year, 167 facilities located in Alberta reported greenhouse gas emissions, which included 20 facilities that reported voluntarily or were over the threshold due to biomass carbon dioxide (CO₂). The total reported emissions for these facilities equaled 132.7 megatonnes (Mt) in carbon dioxide equivalent (CO₂e), from sources of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride.

From 2004 to 2013, reported Alberta greenhouse gas emissions have increased by 23.2 per cent and the number of facilities reporting has increased by 69, largely due to the change in emissions threshold for reporting (changed from 100 kilotonnes (kt) to 50 kt in 2010). Only considering facilities above 100 kt, reported Alberta greenhouse gas emissions have increased by 20.7 per cent since 2004 and the number of facilities reporting has increased by 14.

Between 2012 and 2013, the number of Alberta facilities emitting over 50 kt CO₂e increased from 145 to 147, while total reported emissions increased by 3.9 per cent from 127.2 Mt to 132.2 Mt. Carbon dioxide accounted for 94.8 per cent of the total emissions, with the remainder coming from methane (4.3 per cent), nitrous oxide (0.9 per cent), hydrofluorocarbons (<0.01 per cent), perfluorocarbons (<0.001 per cent), and sulphur hexafluoride (<0.01 per cent).

Reported industrial emissions accounted for 49.7 per cent of Alberta's total emissions. Among Alberta's industrial sectors, oil sands operations (consisting of oil sands mining and upgrading, in situ extraction, and all emissions associated with cogeneration of heat and electricity) represented the largest share of 2013 reported emissions. The breakdown of 2013 reported emissions was as follows:

- Oil Sands Operations – 44.1 per cent (24.4 per cent from oil sands mining and upgrading and 19.7 per cent from oil sands in situ extraction) of total reported emissions;
- Electric Power Generation – 31.6 per cent of total reported emissions;
- Conventional Oil and Gas Extraction – 6.0 per cent of total reported emissions; and
- Chemical Manufacturing – 5.8 per cent of total reported emissions.

The remaining 12.5 per cent of emissions came from fertilizer manufacturing, petroleum and coal products, pipeline transportation, mineral product manufacturing, wood product manufacturing, coal mining, primary metal manufacturing, waste treatment and disposal, natural gas distribution, food manufacturing, and miscellaneous manufacturing.

Stationary fuel combustion accounted for 83.2 per cent of Alberta's reported emissions. The remainder of the emissions were attributed to industrial process (6.7 per cent), venting and flaring (3.5 per cent), fugitive/other (3.8 per cent), on-site transportation (2.4 per cent) and waste and wastewater (0.4 per cent) sources.

Across Canada, a total of 261.3 Mt of greenhouse gas emissions were reported in 2013 from facilities whose emissions met or exceeded 50 kt (which includes facilities that were below the 50 kt threshold, but voluntarily reported). This number is slightly different than the total reported by Environment and

Climate Change Canada (260.7 Mt)¹ because it includes two Alberta facilities that reported only to Alberta due to the inclusion of CO₂ sent off site as an emission (which is consistent with emissions calculations under Alberta's Specified Gas Emitters Regulation). Emissions from Alberta facilities represent 50.8 per cent of the national total due to Alberta's large energy industry and electricity base. Other provinces with notable shares were Ontario (17.5 per cent of total reported emissions), Saskatchewan (9.1 per cent of total reported emissions), Quebec (7.5 per cent of total reported emissions) and British Columbia (5.8 per cent of total reported emissions).

¹ Facility Greenhouse Gas Emissions Reporting: Overview of Reported Emissions 2013. Government of Canada. May 2015. <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=040E378D-1>.

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1 Climate Change Management

1.1 Specified Gas Reporting Program Requirements

The Alberta Specified Gas Reporting Program requires that all large Alberta facilities emitting 50 kilotonnes (kt) or more of greenhouse gases in carbon dioxide equivalent (CO₂e) units per year - based on the sum of direct emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) - report their greenhouse gas emissions to the Alberta Climate Change Office. Facilities that do not exceed the 50 kt regulatory threshold may voluntarily report their emissions under the Specified Gas Reporting Program.

Facilities are required to submit greenhouse gas emissions reports through an electronic data reporting system, which is administered by Environment and Climate Change Canada. In 2005 (for 2004 emissions collection), Alberta harmonized its Specified Gas Reporting Program with the Government of Canada's Greenhouse Gas Emissions Reporting Program. Alberta has jointly collected greenhouse gas data from Alberta's largest industrial emitters with the Government of Canada since then. Alberta facilities report their emissions data to Environment and Climate Change Canada through the federal reporting program and the results are forwarded to the Alberta Climate Change Office, allowing both provincial and federal reporting requirements to be satisfied.

Alberta's provincial Specified Gas Reporting Program is an important aspect of managing climate change, providing real data to inform and enable effective policies for reducing emissions of greenhouse gases from facilities. The three main policies framing the Specified Gas Reporting Program are the *Climate Change and Emissions Management Act*, the Specified Gas Reporting Regulation and the Specified Gas Reporting Standard.

The reporting program is intended to work in concert with the Specified Gas Emitters Regulation. Information gathered under the program is used to assist both industry and the province in characterizing emission sources and identifying opportunities for emissions reduction. The program provides an annual inventory of greenhouse gas emissions from large facilities in the province and provides a platform for smaller facilities to voluntarily report their greenhouse gas emissions. It also assists the government in monitoring the results of greenhouse gas reduction strategies.

1.2 Specified Gas Emitters Regulation

The Specified Gas Emitters Regulation came into effect on July 1, 2007. The Specified Gas Emitters Regulation requires all facilities in Alberta emitting 100 kt CO₂e or more per year to reduce their emissions intensity from a historical baseline. Regulated facilities may comply with the reduction requirements by: improving their emissions intensity performance, purchasing technology fund credits, purchasing emission offsets, or submitting emission performance credits. Table 1.1 provides the emissions intensity reduction requirements and fund credit purchase price.

Table 1.1: Alberta's Emission Reduction Requirements

Period	Emission Intensity Reduction	Fund Credit Purchase Price
Up to and including 2015	12%	\$15 per tonne CO ₂ e
2016	15%	\$20 per tonne CO ₂ e
2017	20%	\$30 per tonne CO ₂ e

More information about the Specified Gas Emitters Regulation can be found on the Alberta Climate Change Office website and in the Technical Guidance Document for Completing Specified Gas Compliance Reports.

- [Specified Gas Emitters Regulation](#)
- [Information for Industry](#)

While the requirements of the Specified Gas Emitters Regulation and the Specified Gas Reporting Regulation must be satisfied independently, emissions data collected under the reduction program must be third party verified and may be used to update the reporting program database.

2 Specified Gas Reporting Regulation Annual Report

2.1 Objective

The objective of this report is to provide results from and analysis of the 2013 reporting year of the Specified Gas Reporting Program. This report builds on previous annual reports available at:

- [Specified Gas Reporting Regulation](#)

2.2 Report Content

Greenhouse gas data collected under the Specified Gas Reporting Regulation for the 2013 calendar year is examined by greenhouse gas type, source category, facility and industrial sector, and is also compared to previous reporting years.

2.3 Report Data

This report uses data from the Government of Canada's Greenhouse Gas Emissions Reporting Program that is current as of October 2014. Any changes to the database after this date are not reflected in this report. Emissions data has been numerically rounded to present workable numbers in this report. As a result, the numbers presented may differ slightly across sections of the report and may also differ slightly from the same data presented from other sources, including past reports.

There may have been updates to portions of the 2004 to 2012 data sets used to develop this report. Consequently, data presented in this report may differ from what was published in previous Alberta Climate Change Office greenhouse gas reports.

2.4 Changes to Reporting

The 2013 greenhouse gas data presented in this report was collected using the March 2014 Specified Gas Reporting Standard. A number of changes have been introduced since the reporting program began:

2010:

- The mandatory reporting threshold was lowered to 50,000 tonnes CO₂e for the 2010 calendar year and subsequent reporting years.
- Emissions of CO₂ from combustion and decomposition of biomass became mandatory for the 2010 calendar year and subsequent reporting years and have been included in the emissions threshold determination.²

2012:

- Supplemental data collected through the reporting program has changed to better align with the requirements of the Specified Gas Emitters Regulation. Starting in 2012, formation CO₂ was to continue to be reported under the venting source category and was also required to be reported as a separate value.
- CO₂ sent off site is now being included as a direct emission to align with the Specified Gas Emitters Regulation (reductions through carbon capture and storage are credited at the point of injection).

² Consistent with previous reports, emissions of CO₂ from combustion and decomposition of biomass are not included in the greenhouse gas emissions totals presented in this report, unless otherwise stated.

2013:

- Adoption and application of the 2007 Intergovernmental Panel on Climate Change global warming potentials, consistent with Environment and Climate Change Canada's greenhouse gas reporting program and the National Inventory Report.
- Collection of additional data on greenhouse gas intensive inputs and outputs: net electricity imported or exported, net heat imported or exported, net H₂ imported or exported, and cogeneration data.
- Application of quantification of area fugitive emissions from mine faces and tailings ponds, oil sands according to the Guidance for the Quantification of Area Fugitive Emissions at Oil Sands Mines.

The sectoral breakdown of industrial facilities has been classified based on the reported North American Industrial Classification System (NAICS) code and grouped into the following industrial sectors:

- Chemical Manufacturing;
- Coal Mining;
- Conventional Oil and Gas Extraction;
- Electric Power Generation (previously Utilities);
- Fertilizer Manufacturing;
- Food Manufacturing;
- Mineral Product Manufacturing;
- Miscellaneous Manufacturing;
- Natural Gas Distribution (previously included as a Utility);
- Oil Sands In Situ Extraction;
- Oil Sands Mining and Upgrading;
- Petroleum and Coal Products;
- Pipeline Transportation;
- Primary Metal Manufacturing;
- Waste Treatment and Disposal; and
- Wood Product Manufacturing (previously Paper Manufacturing).

2.5 Data Quality and Program Enforcement

The 2013 greenhouse gas emissions data that was collected under the Specified Gas Reporting Program has undergone checks by Environment and Climate Change Canada and the Alberta Climate Change Office to ensure facilities exceeding the threshold complied with the reporting requirements and to attempt to identify major errors in submitted data. As these are reported values, it is incumbent upon reporting facilities to submit the most accurate greenhouse gas emissions data possible.

Reporting to the Specified Gas Reporting Program is a mandatory regulatory requirement for Alberta facilities that emit 50 kt CO₂e or more of greenhouse gas emissions. Facilities are required to retain all records, data and information used in the preparation of a specified gas report for at least three years after the report is submitted. These regulatory requirements ensure that facilities are submitting reasonably accurate emissions information and that there is a record should the Alberta Climate Change Office need to verify the submitted emissions data. Facilities that fail to meet the regulatory requirements of the Specified Gas Reporting Program could face enforcement action.

Additional information on enforcement can be found in the Specified Gas Reporting Regulation, Administrative Penalty Regulation and the *Climate Change and Emissions Management Act*. Some

facilities that do not exceed the threshold are voluntary participants in the program and are included in the inventory.

The Alberta Climate Change Office encourages facilities reporting to the Specified Gas Reporting Program to use consistent methods across different reporting years, and for similar facilities to use the same calculation methods similar to the Specified Gas Emitters Regulation. However, there is currently no requirement for facilities to do so.

The program provides an inventory of greenhouse gas emissions in the province for large emitters only, and does not include smaller sources of emissions.

2.6 Voluntary Reporting

The Alberta Climate Change Office encourages industrial facilities that do not exceed the reporting threshold to voluntarily report their greenhouse gas emissions to the Specified Gas Reporting Program. Under the Specified Gas Reporting Program, facilities that do not exceed the 50 kt CO₂e reporting threshold may choose to voluntarily report their greenhouse gas emissions. There were 12 Alberta facilities that voluntarily reported 2013 emissions to the Alberta Climate Change Office. The reported greenhouse gas emissions from these 12 facilities equals a combined total of 0.35 Mt, or 0.26 per cent of the total 2013 reported greenhouse gas emissions. The individual reported greenhouse gas emissions totals from these 12 voluntary facility reports ranges from 0.6 to 48.1 kt.

The Alberta Climate Change Office would like to acknowledge the following companies for voluntarily submitting a specified gas report for one or more of their facilities under the Specified Gas Reporting Program threshold:

- AECO Gas Storage Partnership;
- City of Calgary;
- Direct Energy Marketing Ltd.;
- Dow Chemical Canada ULC;
- EPCOR Water Services Inc.;
- General Scrap Partnership;
- Keyera Corp;
- MacKay Operating Corp;
- Pengrowth Energy Corporation;
- SemCams ULC; and
- Talisman Energy.

3 Reported 2013 Alberta Greenhouse Gas Emissions

3.1 Reported Emissions by Sector

In total, 167 facilities from sixteen industrial sectors reported a total of 132.7 Mt CO₂e of greenhouse gas emissions in Alberta for the 2013 calendar year through the Specified Gas Reporting Program. Reported greenhouse gas emissions for each facility can be found in the accompanying spreadsheet document. The total reported greenhouse gas emissions and the number of reporting facilities is shown in Table 3.1 for each industrial sector.

Table 3.1: Reported Emissions and Reports Received by Industrial Sector

Sector	Reports Received	Emissions (t CO₂e)	Percent of Total Emissions
Electric Power Generation	23	41,932,713	31.6%
Oil Sands Mining and Upgrading	8	32,390,593	24.4%
Oil Sands In Situ Extraction	22	26,160,060	19.7%
Conventional Oil and Gas Extraction	58	8,005,223	6.0%
Chemical Manufacturing	12	7,647,360	5.8%
Fertilizer Manufacturing	5	4,486,527	3.4%
Petroleum and Coal Products Manufacturing	5	3,876,739	2.9%
Pipeline Transportation	4	3,735,902	2.8%
Non-Metallic Mineral Product Manufacturing	4	1,892,374	1.4%
Wood Product Manufacturing	9	820,731	0.6%
Coal Mining	4	613,974	0.5%
Primary Metal Manufacturing	2	449,188	0.3%
Waste Treatment and Disposal	7	418,145	0.3%
Natural Gas Distribution	1	140,260	0.1%
Food Manufacturing	1	82,665	0.1%
Miscellaneous Manufacturing	2	2,559	0.0%
Total	167	132,655,013	100.0%

The total oil sands operations sector, which includes oil sands in situ extraction, mining and upgrading, and associated cogeneration facilities, reported the largest share of 2013 greenhouse gases in Alberta, emitting 44.1 per cent of total reported emissions. Electric power generation emitted 31.6 per cent of total reported emissions. The conventional oil and gas extraction sector was also a notable source of emissions, emitting 6.0 per cent of the total reported emissions. The chemical manufacturing sector emitted 5.8 per cent of total reported emissions, the fertilizer manufacturing sector emitted 3.4 per cent of total reported emissions, and the petroleum and coal products sector emitted 2.9 per cent of total reported emissions. Facilities in the pipeline transportation, mineral product manufacturing, wood product manufacturing, coal mining, primary metal manufacturing, waste treatment and disposal, natural gas distribution, food manufacturing, and miscellaneous manufacturing sectors together accounted for the remaining 6.1 per cent of total reported emissions. The contribution of total reported greenhouse gas emissions by industrial sector is shown in Figure 3.1.

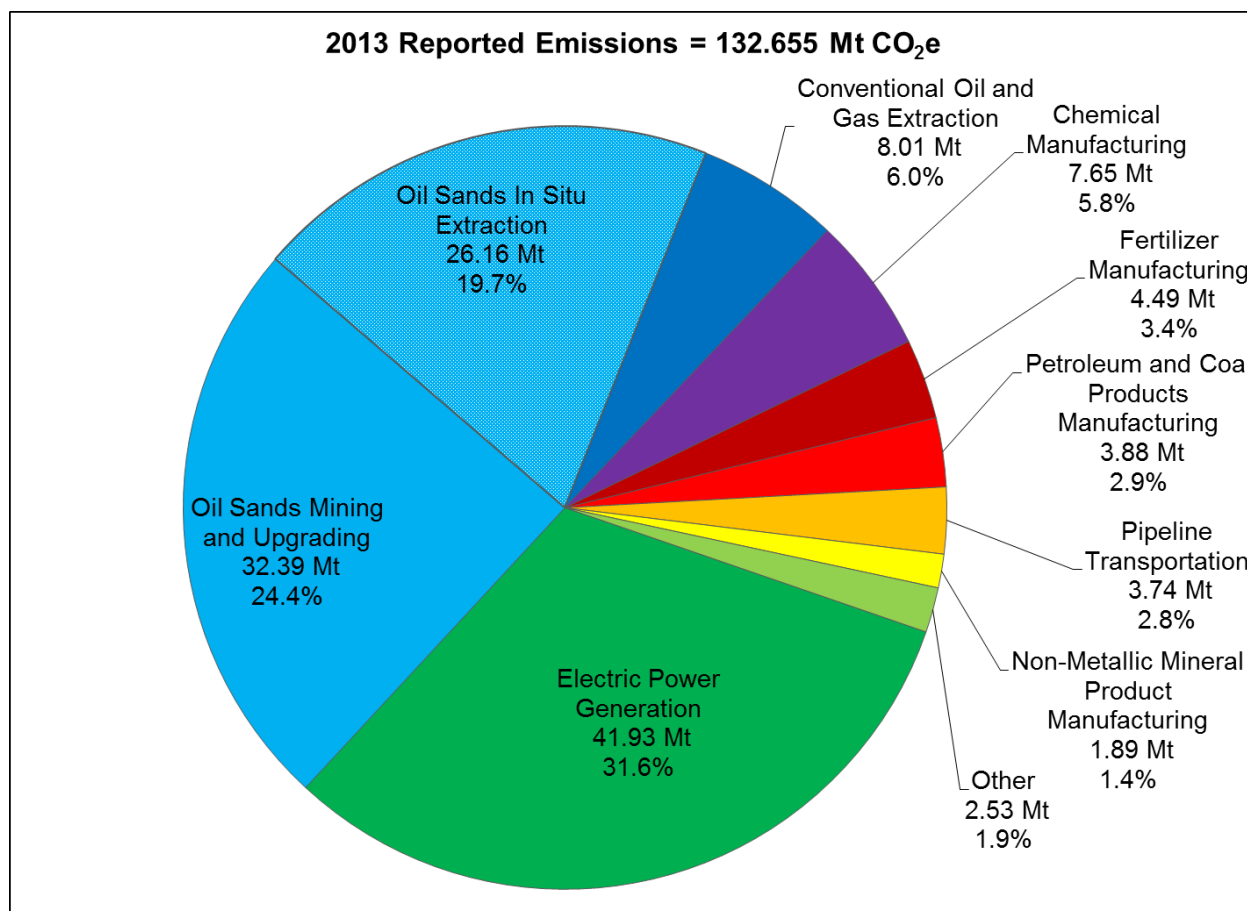


Figure 3.1: 2013 Reported Emissions by Industrial Sector (in CO₂e)

3.2 Reported Emissions by Gas Type

The Alberta Specified Gas Reporting Program requires six greenhouse gases to be reported: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbon (HFC) species; perfluorocarbon (PFC) species; and sulphur hexafluoride (SF₆). The emitted mass of each gas is converted to carbon dioxide equivalent units using the global warming potential values detailed in the Specified Gas Reporting Standard and summed to compute total emissions.

Of the 167 reporting facilities, all reported carbon dioxide emissions, all reported methane emissions, 162 reported nitrous oxide emissions, six reported emissions of hydrofluorocarbons, one reported emissions of perfluorocarbons, and six reported emissions of sulphur hexafluoride.

The largest portion of reported greenhouse gas emissions by CO₂e was CO₂, contributing 94.8 per cent of the total with 125.8 Mt. The remainder consisted of CH₄ (4.3 per cent or 5.7 Mt CO₂e), N₂O (0.9 per cent or 1.1 Mt CO₂e), HFCs (<0.01 per cent or 8.6 kt CO₂e), PFCs (<0.001 per cent or 0.09 kt CO₂e) and SF₆ (<0.01 per cent or 1.7 kt CO₂e). The contribution of total reported greenhouse gas emissions by gas type is depicted in Figure 3.2.

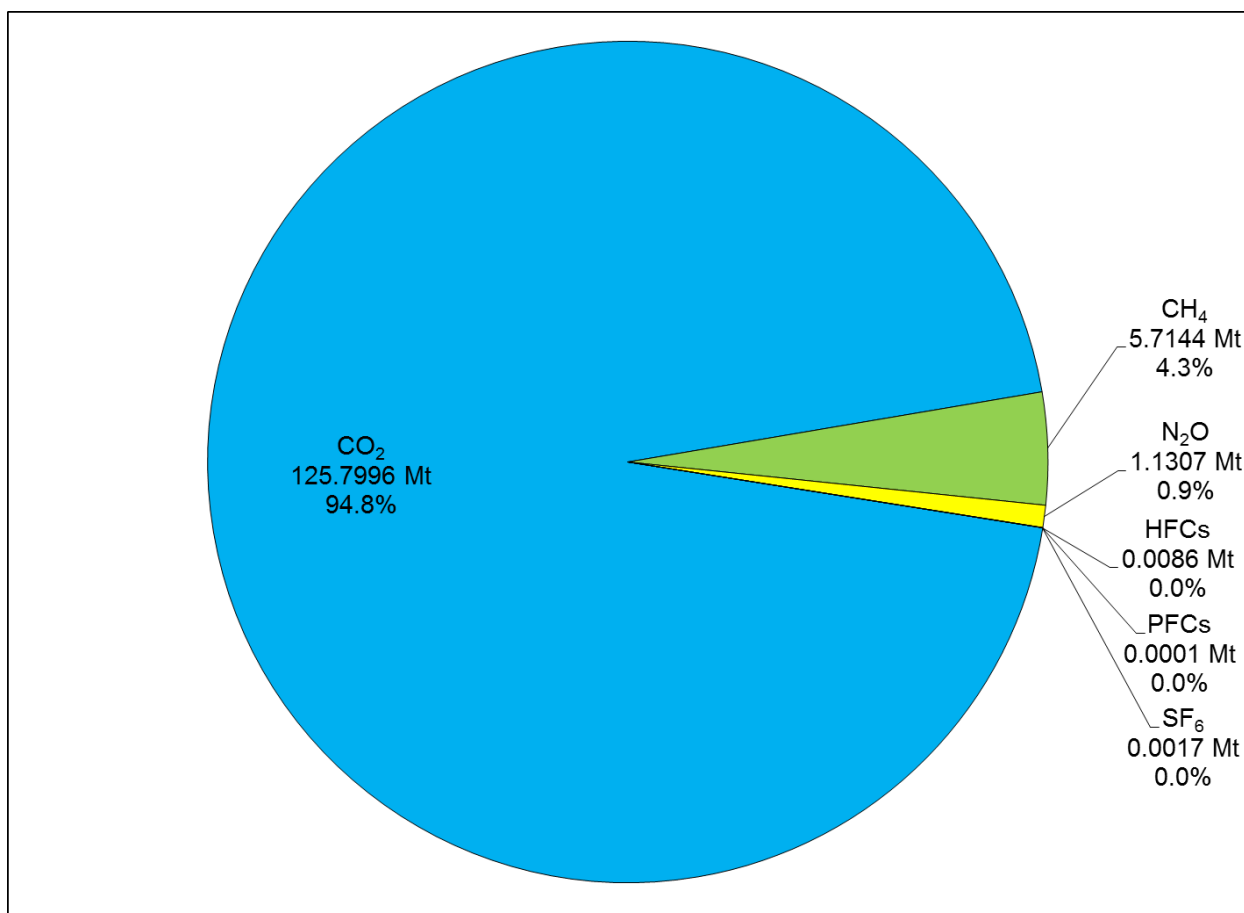


Figure 3.2: 2013 Reported Emissions by Gas Type (in CO₂e)

3.3 Distribution of Total Reported Emissions by Facility

Among the 167 facilities in Alberta that reported greenhouse gas emissions for 2013, a varied distribution of emissions totals can be observed at the facility level. Of the 132.7 Mt CO₂e total reported emissions, 106 Mt (80 per cent) was reported by only 28 facilities (17 per cent), while the other 139 facilities accounted for the remaining 26.7 Mt. The nine largest emitters each reported greater than 4 Mt and together accounted for 68.4 Mt (51.6 per cent of total reported emissions). Of the nine largest emitters, four facilities are in the electric power generation sector, three are in the oil sands mining and upgrading sector and two are in the oil sands in situ extraction sector. The distribution of 2013 facility emissions in order of decreasing magnitude is shown in Figure 3.3.

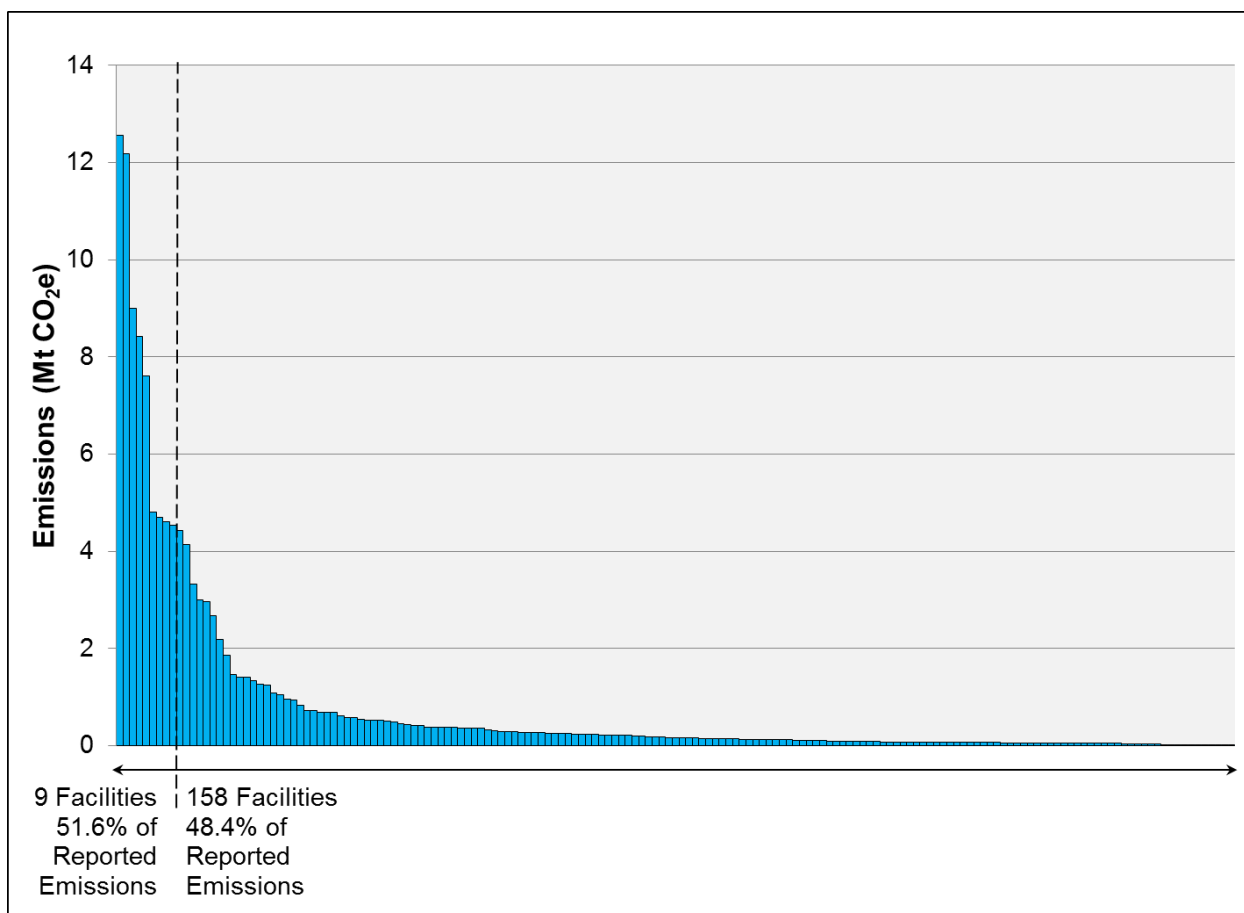


Figure 3.3: 2013 Reported Emissions Distribution by Facility (in CO₂e)

3.4 Reported Emissions by Industrial Sector and Gas Type

While CO₂ contributed the largest portion of total reported emissions, the contribution from each greenhouse gas varied across industrial sectors, as shown in Figure 3.4.

- Carbon dioxide contributed more than 90 per cent of greenhouse gas emissions for ten industrial sectors, including electric power generation, oil sands mining and upgrading, oil sands in situ extraction, chemical manufacturing, conventional oil and gas extraction, fertilizer manufacturing, petroleum and coal products, primary metal manufacturing, mineral product manufacturing, and miscellaneous manufacturing and contributed the majority of greenhouse gas emissions in the pipeline transportation, coal mining, food manufacturing, and wood product manufacturing sectors.
- Methane was the majority greenhouse gas contributor in the natural gas distribution and waste treatment and disposal sectors, and contributed greater than 10 per cent in the coal mining, food manufacturing, pipeline transportation, and wood product manufacturing.
- Nitrous oxide contributed 10 per cent of greenhouse gas emissions in the wood product manufacturing sector, 4.2 per cent in the fertilizer manufacturing sector, 3.6 per cent in waste treatment and disposal, 4.7 per cent in the coal mining, and less than 2 per cent in all other sectors.
- Emissions of HFCs, PFCs and SF₆ were reported in small quantities and are excluded from Figure 3.4.

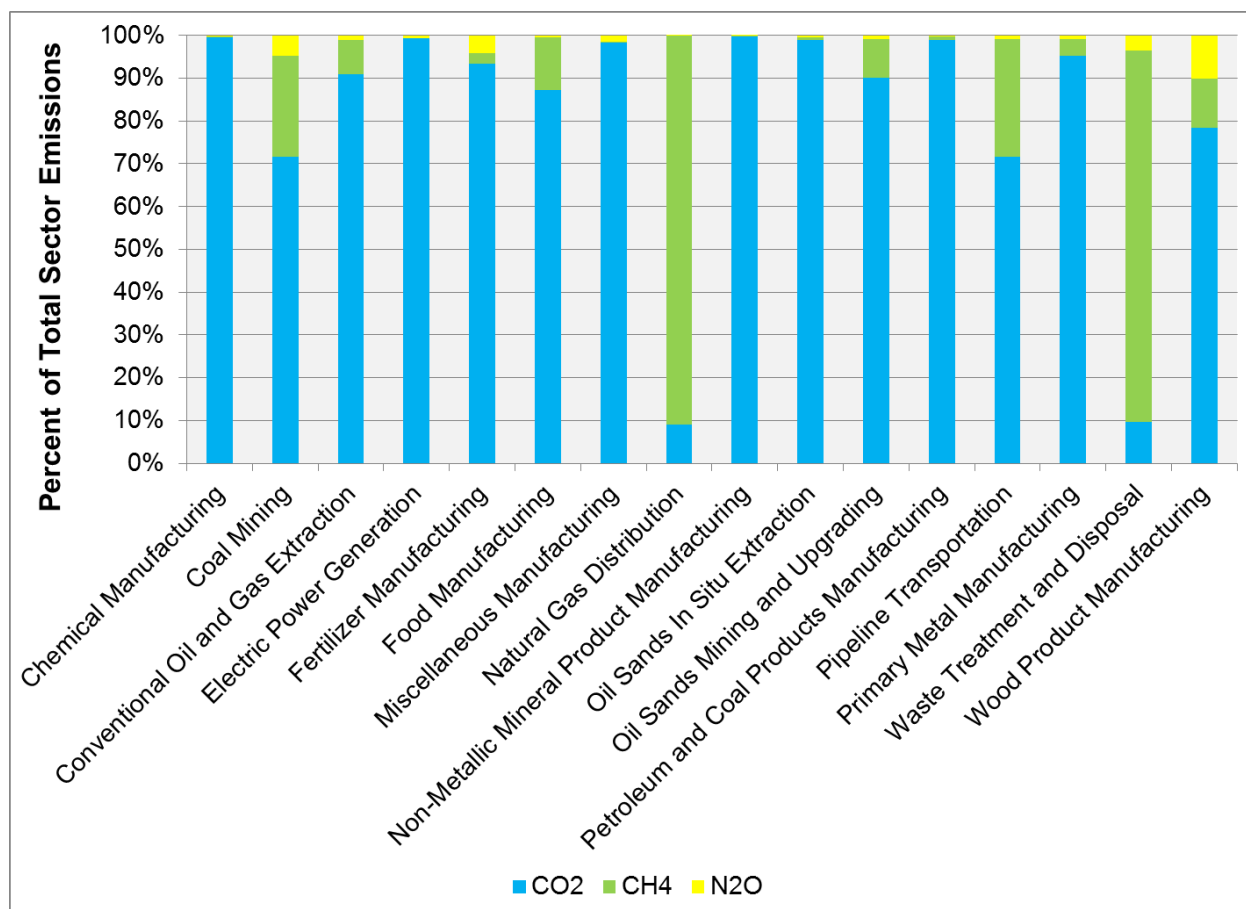


Figure 3.4: Composition of 2013 Reported Sector Emissions by Gas Type (in CO₂e)

3.5 Reported Emissions of CO₂ from Biomass Combustion and Decomposition

Emissions of CO₂ from the combustion and decomposition of biomass are considered carbon neutral by the Intergovernmental Panel on Climate Change (IPCC). Therefore, Alberta has excluded biomass CO₂ emissions from the reduction requirements of the Specified Gas Emitters Regulation and the total emissions quantification in this report. However, in order to gain a better understanding of direct emission sources throughout the province, the Specified Gas Reporting Standard was amended for the 2010 reporting year, and subsequent years, so that reporting of biomass CO₂ emissions is no longer optional, but mandatory.

For the 2013 year, a total of 6.8 Mt CO₂ from combustion and decomposition of biomass was reported. The largest contributor to this total was the wood product manufacturing sector, accounting for 5.6 Mt. The remainder was reported by the electric power generation, oil sands mining and upgrading, waste treatment and disposal, mineral product manufacturing, food product manufacturing, chemical manufacturing, and oil sands in situ extraction sectors, listed in order of decreasing magnitude. The sectoral contribution to total reported biomass CO₂ emissions is shown in Figure 3.5.

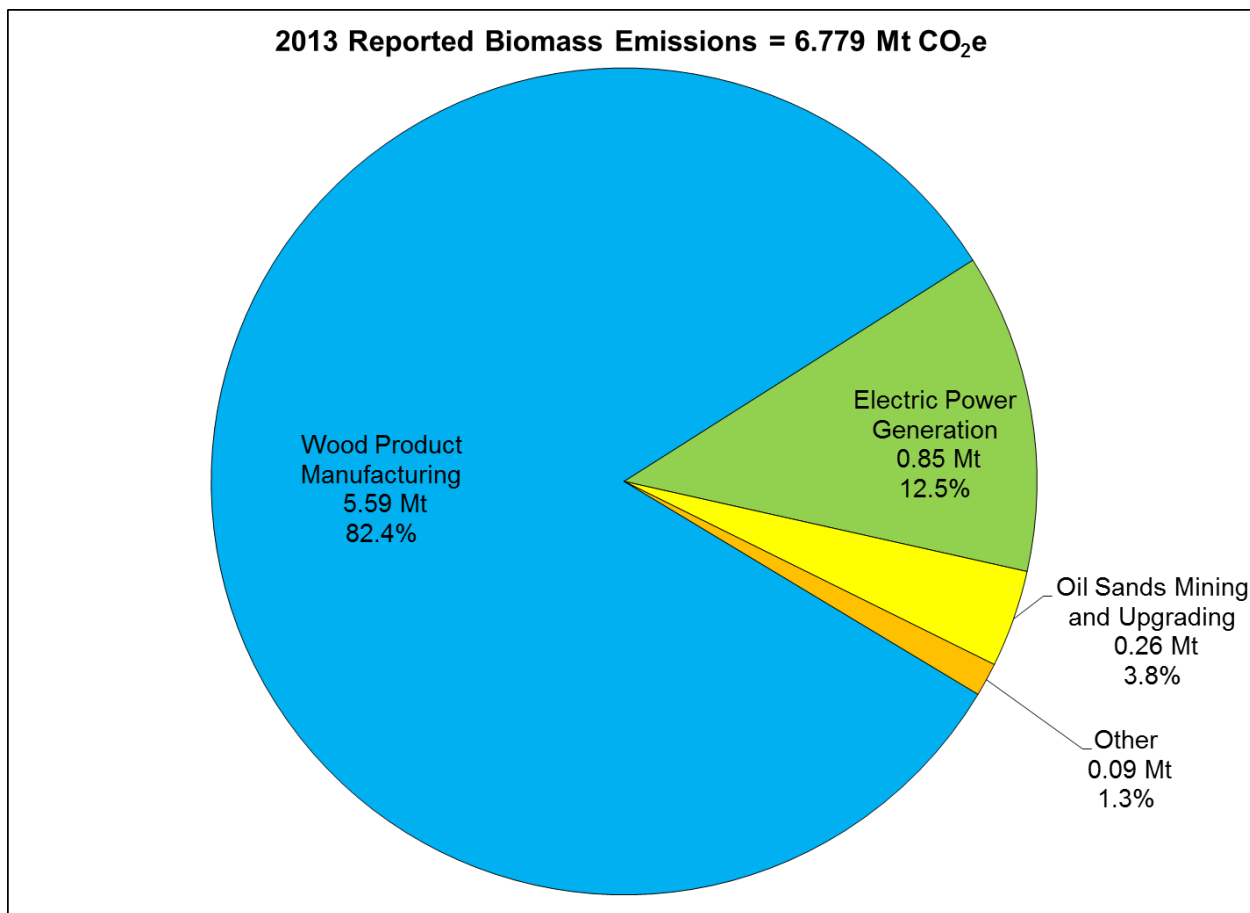


Figure 3.5: 2013 Biomass Emissions by Industrial Sector (in CO₂e)

4 Reported 2013 Alberta Greenhouse Gas Emissions by Source Category

The Alberta Specified Gas Reporting Program requires greenhouse gas emissions to be reported according to six source categories: stationary fuel combustion; industrial process; fugitive/other; venting and flaring; on-site transportation; and waste and wastewater. A description of the source categories can be found in the Glossary of Terms.

4.1 Total Reported Emissions by Source Category

The largest source of greenhouse gas emissions was stationary fuel combustion, accounting for 109.9 Mt. The remaining 22.2 Mt was from industrial processes, venting/flaring, fugitive/other, on-site transportation, and waste and wastewater sources. The contribution of each source category to the total 2013 reported emissions is shown in Figure 4.1.

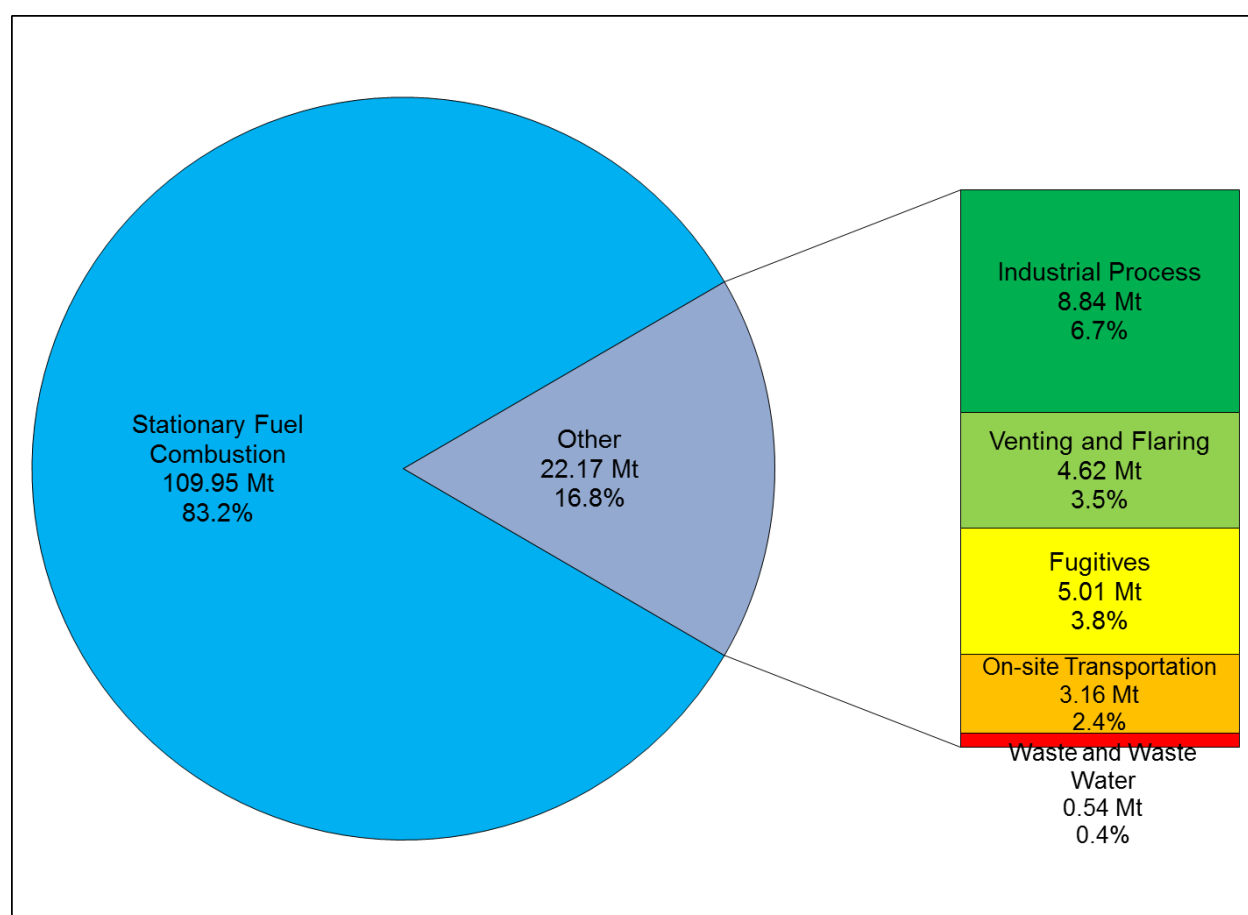


Figure 4.1: 2013 Reported Emissions by Source Category (in CO₂e)

4.2 Reported Sector Emissions by Source Category

In 11 of 16 industrial sectors, stationary fuel combustion contributed the majority of greenhouse gas emissions. In the mineral manufacturing sector, industrial process emissions contributed the majority of greenhouse gas emissions, largely due to calcination processes occurring at these facilities. The fertilizer manufacturing sector reported an almost even split between stationary fuel combustion emissions and

industrial process emissions, with the former representing the majority. On-site transportation emissions contributed the majority of greenhouse gas emissions in the coal mining sector, primarily due to hauling of mined coal. On-site transportation emissions also contributed the majority of greenhouse gas emissions in the miscellaneous manufacturing sector. Fugitive/other emissions contributed the majority of greenhouse gases in the natural gas distribution sector. The relative contribution of each source category to total reported emissions in each industrial sector is shown in Figure 4.2.

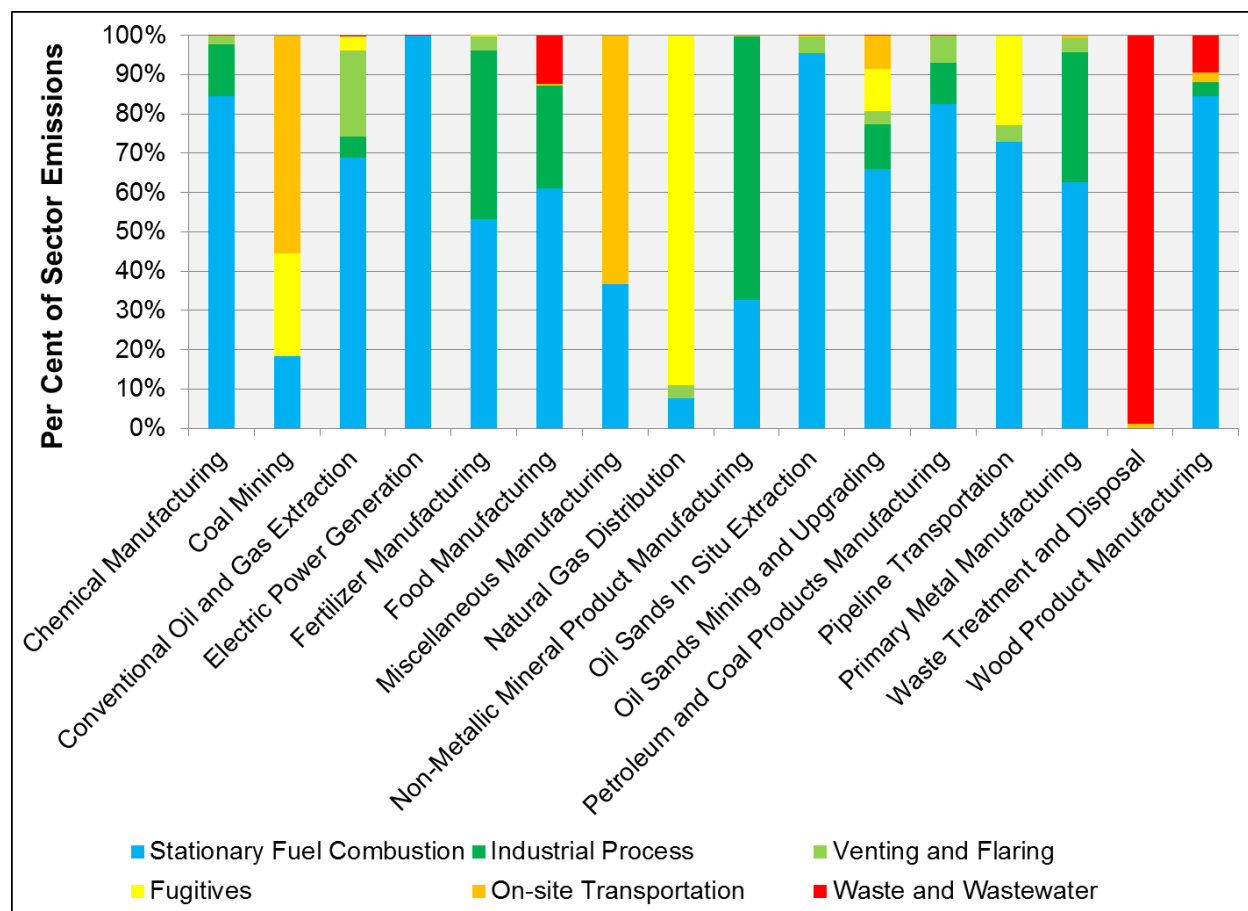


Figure 4.2: Composition of 2013 Reported Sector Emissions by Source Category (in CO₂e)

4.3 Source Category Emissions by Industrial Sector

The relative contribution of each industrial sector to total reported emissions in each source category is shown in Figure 4.3. The stationary fuel combustion emissions sectoral composition is similar to the sectoral composition of total 2013 emissions shown in Figure 3.1. This similarity is expected since stationary fuel combustion was the dominant source of total emissions, as noted in Section 4.1. The electric power generation sector was the largest source of stationary fuel combustion emissions, followed by oil sands in situ extraction, oil sands mining and upgrading, chemical manufacturing, and conventional oil and gas extraction. The largest contributors in the industrial process category were oil sands mining and upgrading, fertilizer manufacturing, mineral product manufacturing, chemical manufacturing, petroleum and coal products and conventional oil and gas extraction. The largest portion of fugitive/other emissions came from the oil sands mining and upgrading sector, and the largest portion of venting and flaring emissions came from the conventional oil and gas extraction sector. The oil sands mining and upgrading

sector was also the largest contributor in the on-site transportation emissions category, and the waste treatment and disposal sector was the largest contributor in the waste and wastewater emissions category.

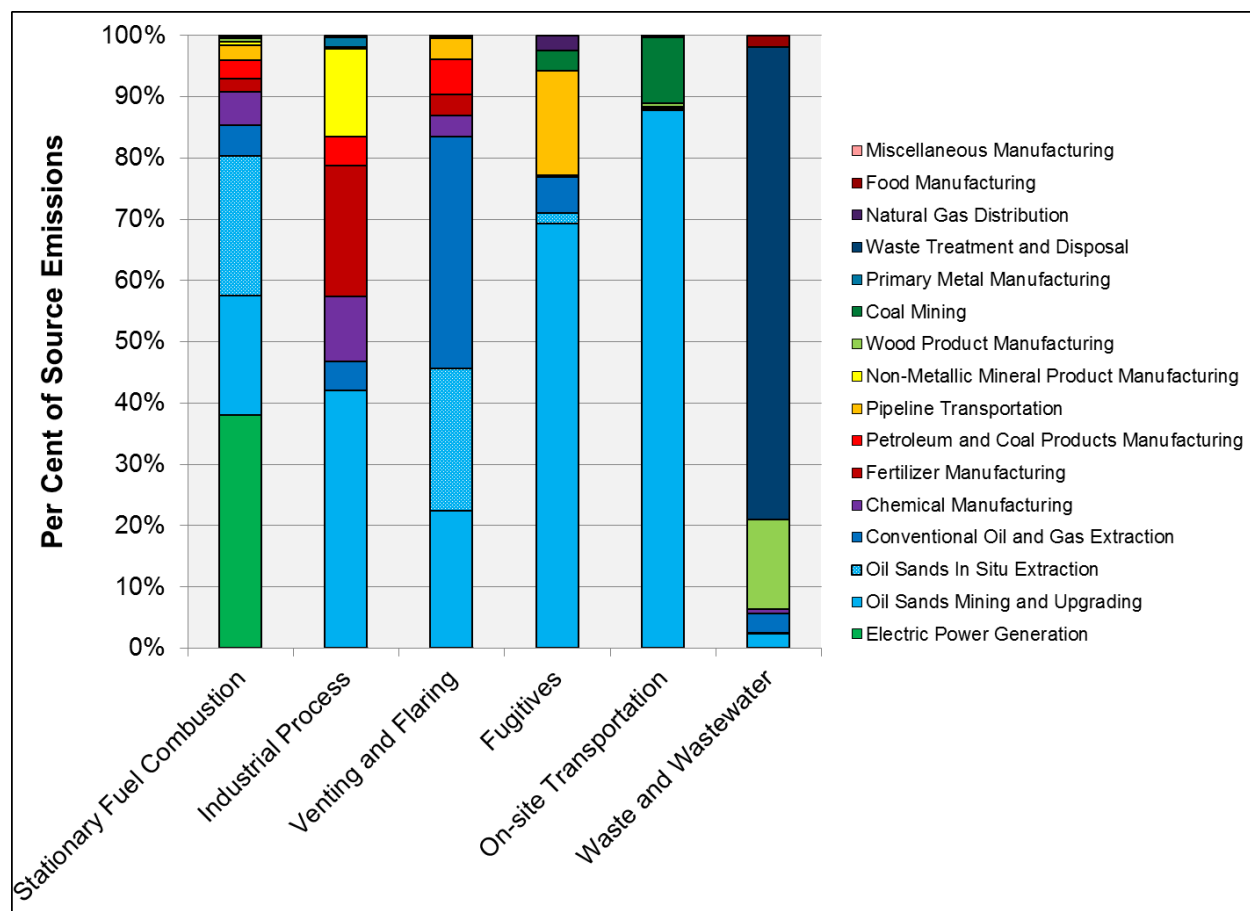


Figure 4.3: Composition of 2013 Reported Source Category Emissions by Sector (in CO₂e)

5 Comparison with Previous Reporting Periods

Short and long-term trends in reported greenhouse gas emissions in Alberta are explored in this section. To improve comparability of current data with previous years, only facilities whose emissions are 50 kt CO₂e or more are considered for the short-term comparison and only facilities whose emissions are 100 kt CO₂e or more are considered for the long-term comparison.

***Note:** Comparability of reported emissions between reporting years is additionally limited due to lack of information and consistency regarding calculation methods used to estimate emissions inventories as well as variation in the annual facility list from facilities exceeding or falling below the reporting threshold in subsequent years, decommissioning, and reporting voluntarily. Only emissions reported through the national single window reporting program are included in this analysis, which excludes data received for 2003.*

5.1 Short-term Trend: Comparison of 2012 and 2013 Reported Greenhouse Gas Emissions

The total reported greenhouse gas emissions from Alberta facilities with 50 kt or more of emissions increased by 5.0 Mt from 127.2 Mt to 132.2 Mt between 2012 and 2013. The number of facilities with 50 kt or more of emissions increased from 145 to 147. A sectoral comparison of total reported emissions and number of reports received is shown in Table 5.1 for the 2012 and 2013 reporting years.

Table 5.1: Number of Reports Received and Total Reported Emissions by Sector for 2012 and 2013

Sector	2012		2013		2012-2013 Change (t CO ₂ e)
	Facilities Reporting	Emissions (t CO ₂ e)	Facilities Reporting	Emissions (t CO ₂ e)	
Chemical Manufacturing	11	7,323,475	11	7,624,840	301,365
Coal Mining	4	743,168	4	613,974	-129,194
Conventional Oil and Gas Extraction	53	7,795,177	52	7,760,734	-34,442
Electric Power Generation	19	41,193,921	19	41,907,659	713,739
Fertilizer Manufacturing	5	4,546,803	5	4,486,527	-60,276
Food Manufacturing	1	78,034	1	82,665	4,630
Natural Gas Distribution	1	149,677	1	140,260	-9,417
Non-Metallic Mineral Product Manufacturing	4	1,897,999	4	1,892,374	-5,625
Oil Sands In Situ Extraction	21	23,684,997	21	26,155,186	2,470,189
Oil Sands Mining and Upgrading	7	31,427,387	8	32,390,593	963,206
Petroleum and Coal Products Manufacturing	5	3,937,946	5	3,876,739	-61,207
Pipeline Transportation	4	3,038,082	4	3,735,902	697,821
Primary Metal Manufacturing	2	453,896	2	449,188	-4,708
Waste Treatment and Disposal	3	217,852	4	302,111	84,259
Wood Product Manufacturing	5	670,966	6	746,499	75,533
Total	145	127,159,380	147	132,165,252	5,005,873

The change in total reported emissions from 2012 to 2013 for each industrial sector is illustrated in Figure 5.1. Oil sands in-situ extraction emissions increased by 2.5 Mt and oil sands mining increased 1.0 Mt. Electric power generation emissions increased by 0.7 Mt. Pipeline transportation emissions also increased 0.7 Mt. All other sectors saw changes that were less than +/- 0.5 Mt.

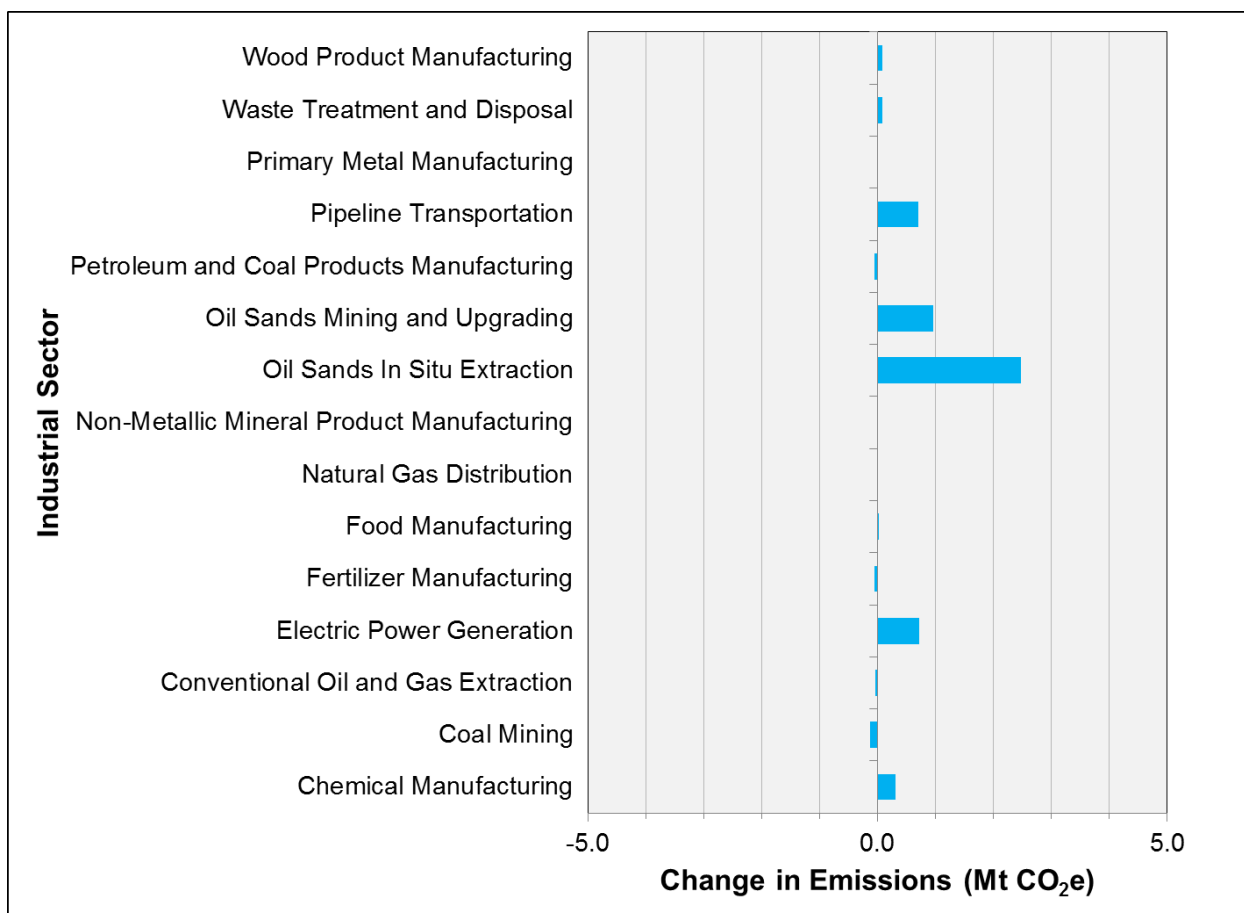


Figure 5.1: Change in Reported Greenhouse Gas Emissions by Sector from 2012 to 2013

5.2 Long-term Trend: Comparison of 2004 and 2013 Reported Greenhouse Gas Emissions

The total reported greenhouse gas emissions from Alberta facilities with 100 kt or more of emissions increased by 20.1 per cent from 107.1 Mt to 129.3 Mt. The number of facilities with 100 kt or more of emissions increased from 92 to 106. A sectoral comparison of total reported emissions and number of reports received is shown in Table 5.2 for the 2004 and 2013 reporting years.

Table 5.2: Number of Reports Received and Total Reported Emissions by Sector for 2004 and 2013

Sector	2004		2013		2004-2013 Change (t CO ₂ e)
	Facilities Reporting	Emissions (t CO ₂ e)	Facilities Reporting	Emissions (t CO ₂ e)	
Chemical Manufacturing	10	7,028,048	10	7,530,410	502,361
Coal Mining	1	209,674	4	613,974	404,300
Conventional Oil and Gas Extraction	31	8,640,452	22	5,697,755	-2,942,697
Electric Power Generation	16	46,764,143	18	41,848,713	-4,915,429
Fertilizer Manufacturing	5	4,668,154	5	4,486,527	-181,627
Natural Gas Distribution	1	313,530	1	140,260	-173,270
Non-Metallic Mineral Product Manufacturing	3	2,133,560	4	1,892,374	-241,186
Oil Sands In Situ Extraction	9	7,678,798	21	26,155,186	18,476,388
Oil Sands Mining and Upgrading	5	21,736,324	8	32,390,593	10,654,269
Petroleum and Coal Products Manufacturing	3	3,938,593	4	3,787,415	-151,179
Pipeline Transportation	4	3,347,973	4	3,735,902	387,930
Primary Metal Manufacturing	1	275,553	1	371,922	96,369
Wood Product Manufacturing	3	394,123	4	625,386	231,263
Total	92	107,128,926	106	129,276,417	22,147,492

There are similarities in the short-term and longer-term trends as illustrated in Figure 5.2. Oil sands in situ extraction emissions increased by 18.5 Mt, oil sands mining and upgrading emissions increased by 10.7 Mt, and chemical manufacturing increased by 0.5 Mt. Electric power generation emissions decreased by 4.9 Mt and conventional oil and gas extraction decreased by 2.9 Mt. All other sectors saw changes that were +/- 0.5 Mt or less.

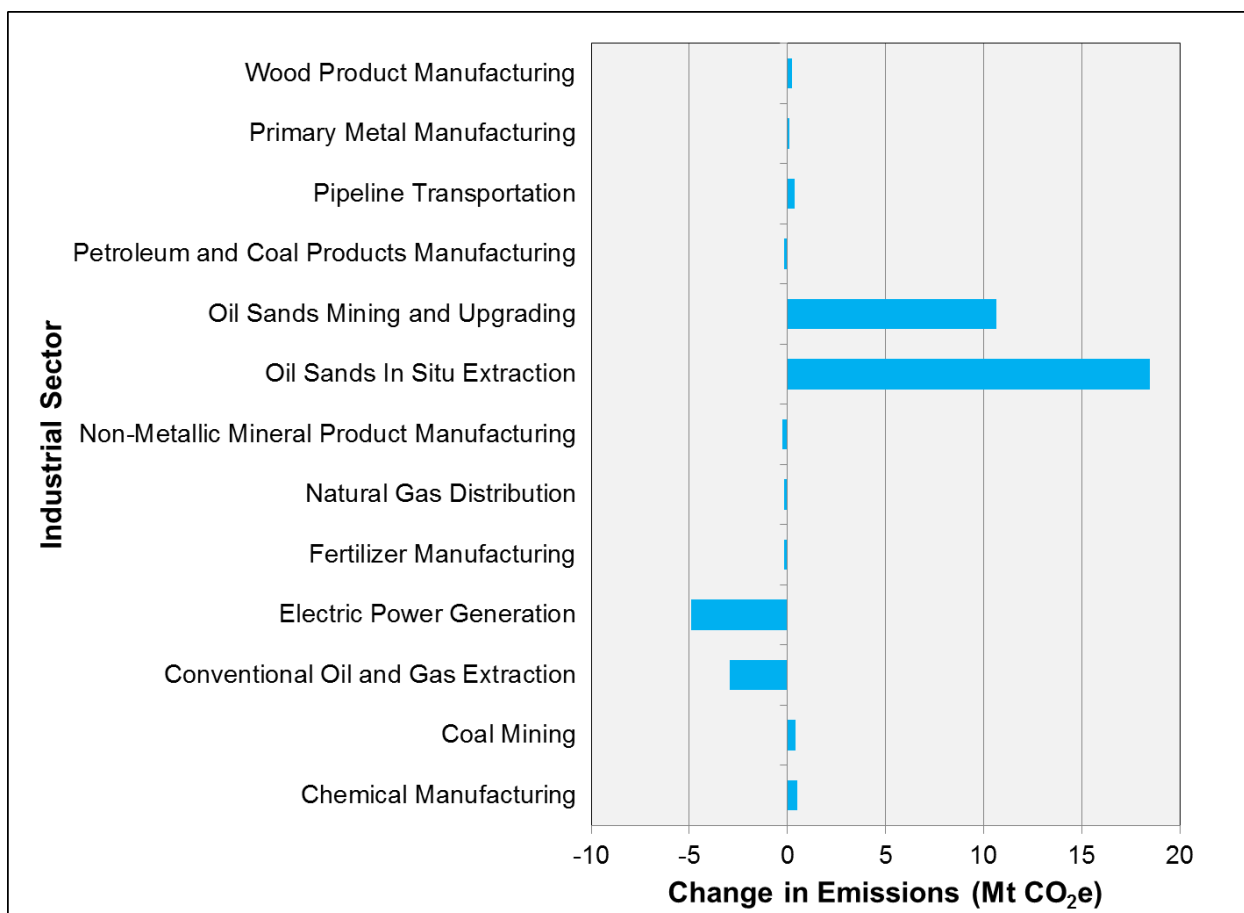


Figure 5.2: Change in Reported Greenhouse Gas Emissions by Sector from 2004 to 2013

5.3 Comparable Facilities

Analysis of the long-term trend also needs to consider the effects of facilities rising and falling below the threshold. For this purpose, the concept of comparable facilities is used. Comparable facilities are all facilities that have reported greenhouse gas emissions in every year from 2004 to 2013, of which there are 73.

The total reported emissions from 2004 to 2013 for comparable facilities are shown in Figure 5.3. In the short-term, the reported greenhouse gas emissions have increased from 93.5 Mt in 2012 to 95.4 Mt in 2013.

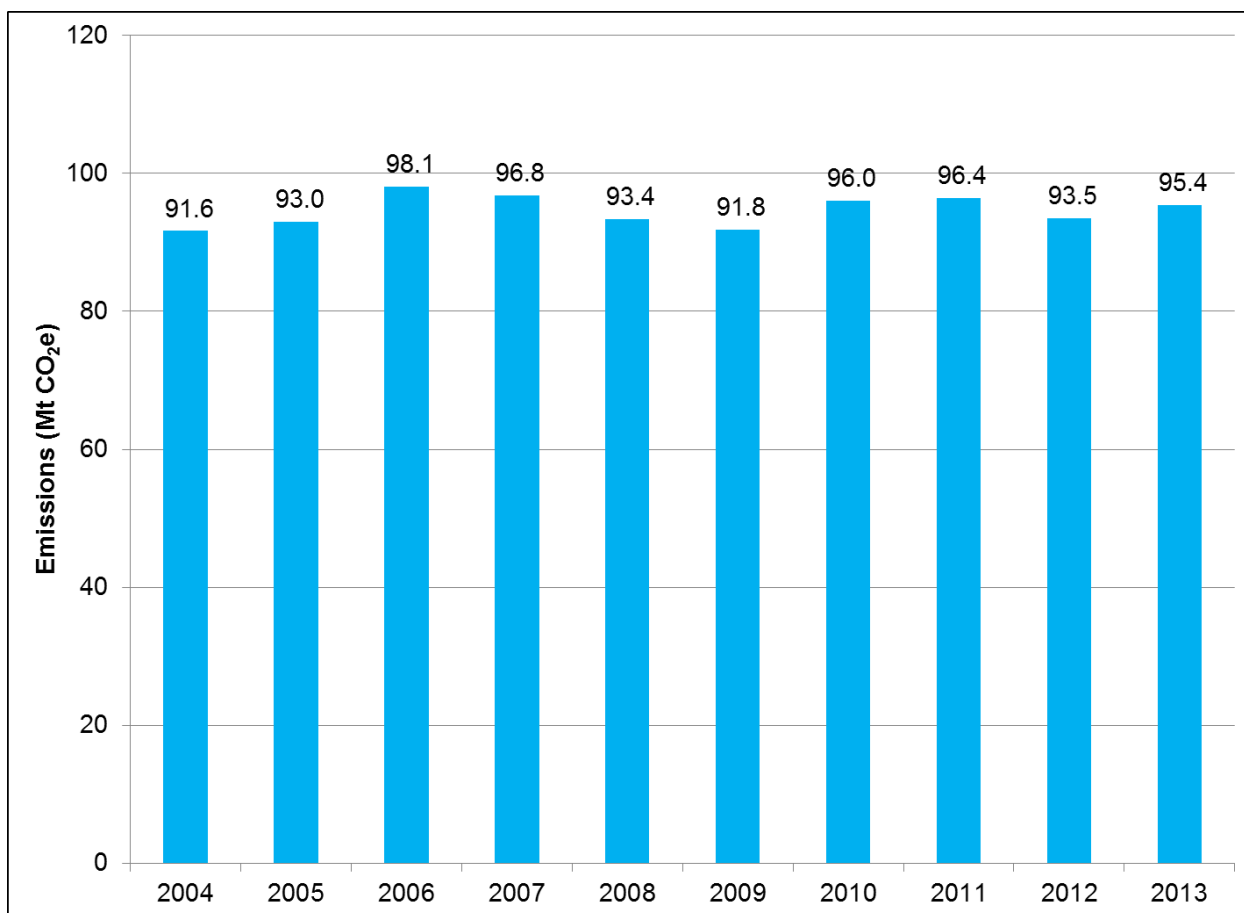


Figure 5.3: Total Annual Reported Emissions for Comparable Facilities

6 National Reported Greenhouse Gas Emissions

This section of the report examines the 2013 greenhouse gas emissions data for facilities that emitted 50 kt or more (and those facilities that did not exceed the 50 kt threshold, but voluntarily reported), collected through the harmonized reporting system for all of Canada. Note that for the reported Alberta facility emissions, facilities that did not report to Environment and Climate Change Canada and only reported to Alberta are included.

6.1 2013 Reported Greenhouse Gas Emissions by Province

A total of 261.3 Mt of greenhouse gas emissions were reported in Canada for the 2013 reporting period. The proportional contribution from provinces and territories to the national reported emissions is shown in Figure 6.1.

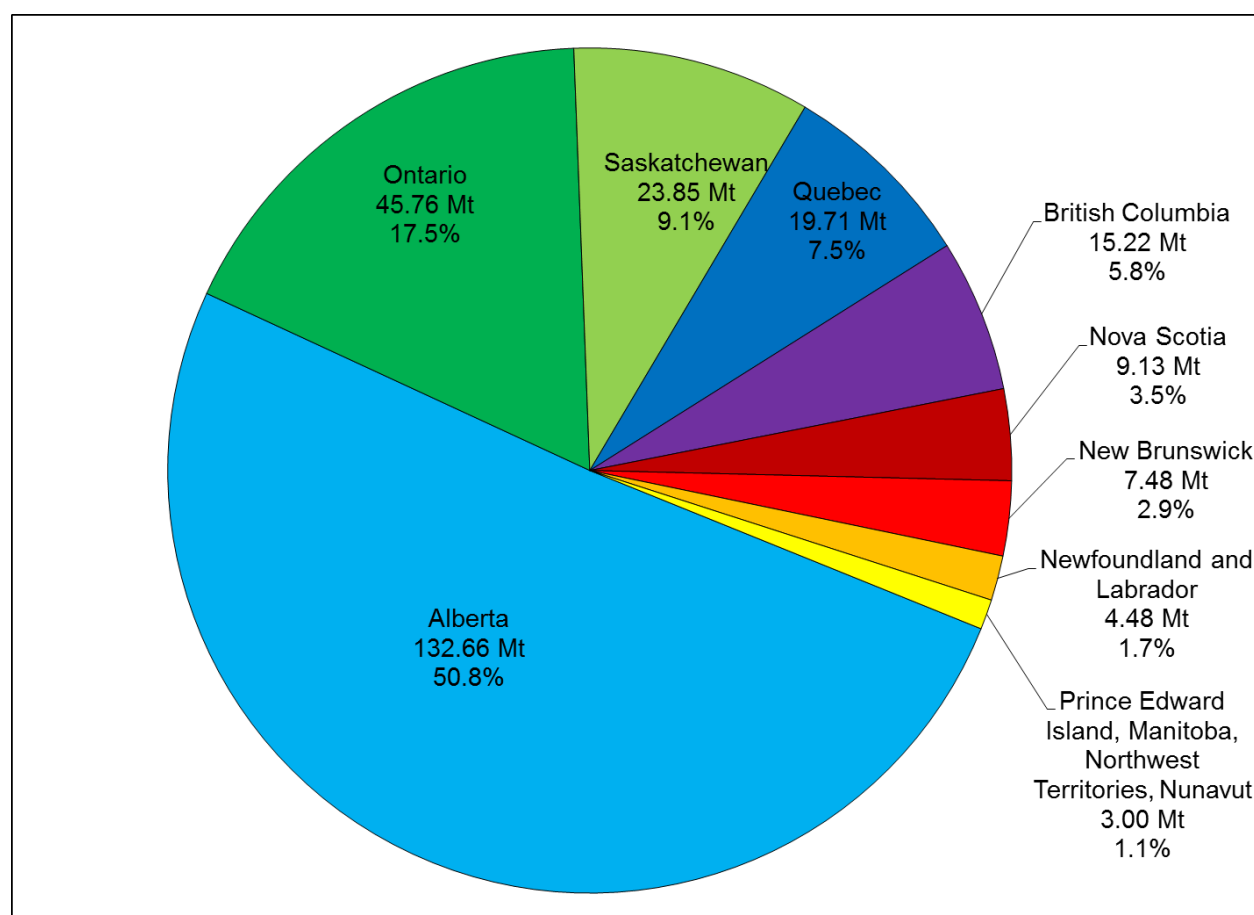


Figure 6.1: 2013 National Facility Emissions Reported by Province and Territory (in CO₂e)

The 167 facilities located in Alberta reported the largest portion greenhouse gas emissions (132.66 Mt or 50.8 per cent). Facilities in Ontario reported the next largest share (45.76 Mt or 17.5 per cent), followed by facilities in Saskatchewan (23.9 Mt or 9.1 per cent), Quebec (19.7 Mt or 7.5 per cent), British Columbia (15.2 Mt or 5.8 per cent), Nova Scotia (9.13 Mt or 3.5 per cent), New Brunswick (7.48 Mt or 2.9 per cent), and Newfoundland and Labrador (4.5 Mt or 1.7 per cent). The provinces and territories of Manitoba, the Northwest Territories, Nunavut and Prince Edward Island contributed a combined total of 3.0 Mt (1.1 per cent). Yukon did not have any reported greenhouse gas emissions from large industrial facilities.

6.2 2013 Reported Facility Greenhouse Gas Emissions as a Portion of Total Provincial Emissions

Emissions reported through the National Mandatory Greenhouse Gas Reporting Program represent only a portion of total greenhouse gas emissions from each province. Total greenhouse gas emissions for Canada and each province/territory are described in the National Inventory Report: 1990-2013, published by Environment and Climate Change Canada. The 2013, the emissions reported through the mandatory industrial reporting program as a portion of total provincial emissions described in the inventory are shown in Figure 6.2. Reported greenhouse gas emissions from large industrial facilities represent varying fractions of the provincial inventory, as high as 88.4 per cent for Nunavut and as low as 0 per cent for Yukon. Alberta's reported greenhouse gas emissions from large industrial facilities represent 49.7 per cent of Alberta's provincial inventory.

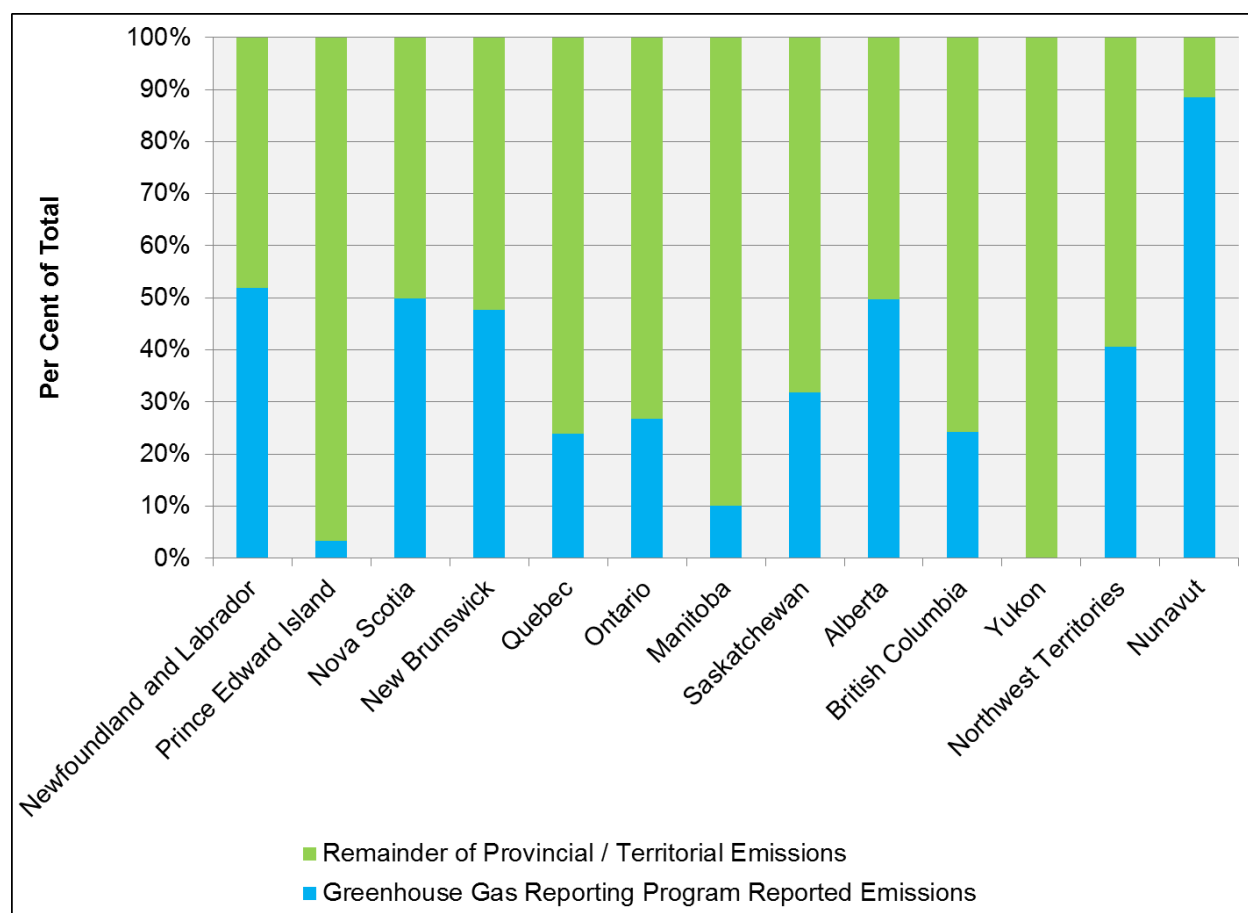


Figure 6.2: Proportion of Reported Facility Emissions to Total Emissions by Province and Territory

7 Data Confidentiality and Access

7.1 Confidentiality Request Process

The Specified Gas Reporting Regulation permits organizations submitting greenhouse gas emissions reports to request confidentiality for information contained in the report. Confidentiality may be granted for up to five years if the information is determined to be commercial, financial, scientific or technical information that would reveal proprietary business, competitive or trade-secret information about a specific facility, technology or corporate initiative. The confidentiality request and review process is outlined in Figure 7.1. The following factors are considered during the confidentiality review process:

- whether disclosure could reasonably be expected to significantly harm the competitive position of the specified gas reporter;
- whether disclosure could reasonably be expected to interfere significantly with the negotiating position of the specified gas reporter;
- whether disclosure could reasonably be expected to result in undue financial loss or gain to any person or organization;
- the availability of the information from other public sources; and
- whether there are any other competing interests that would suggest disclosure of the information is warranted.

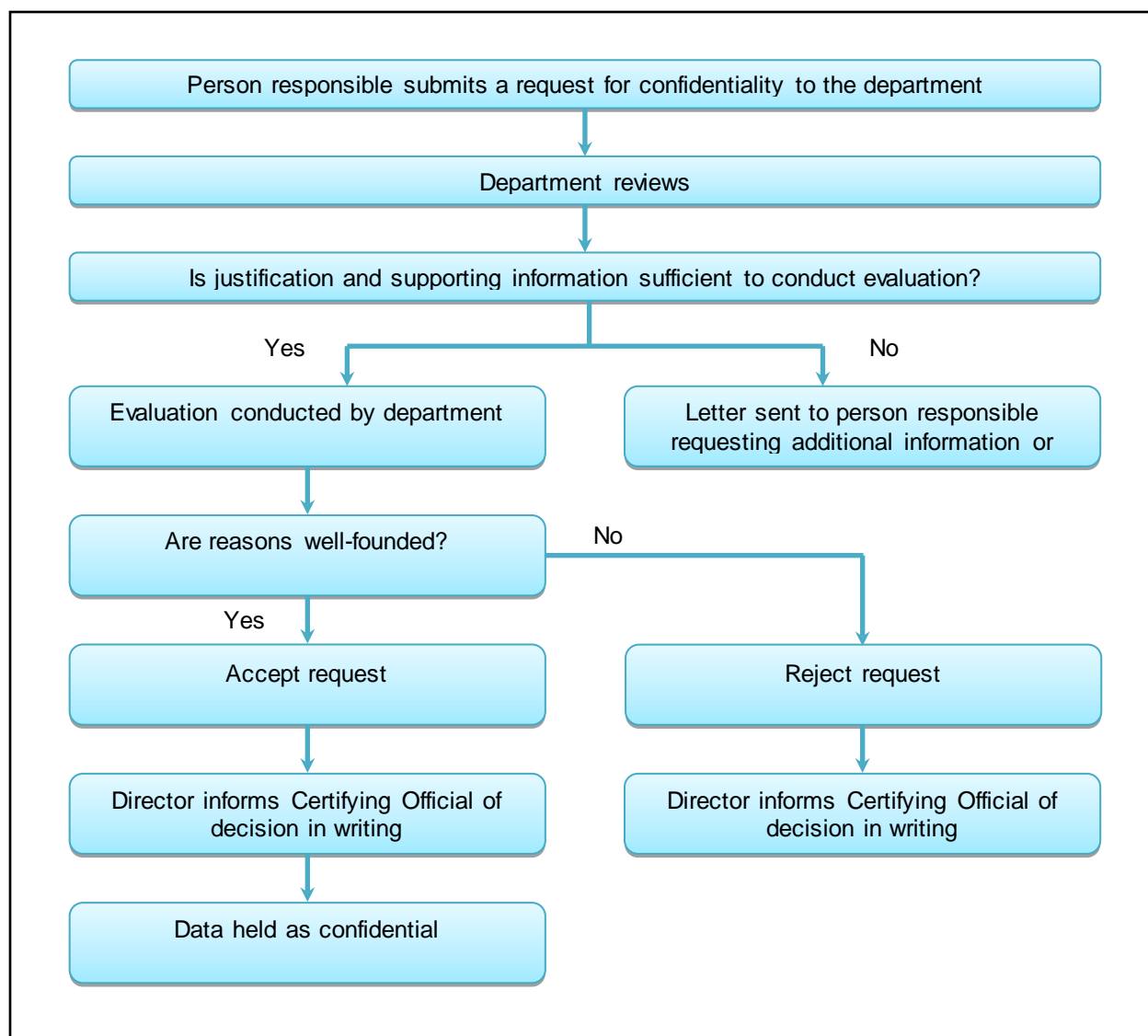


Figure 7.1: Confidentiality Assessment Process for the Specified Gas Reporting Program

7.2 2013 Confidentiality Requests and Decisions

There were 14 Alberta facilities that submitted confidentiality requests to the Alberta Climate Change Office for the 2013 reporting period. Table 7.1 shows the facilities that requested confidentiality for 2013 and the corresponding decision by the Director.

Table 7.1: Confidentiality Requests Decisions for 2013 Greenhouse Gas Data

Company Name	Facility Name	Decision:
Air Products Canada Ltd.	Edmonton Hydrogen	Section A for five years - granted
AltaSteel Ltd.	Edmonton Manufacturing	Section B for five years - granted
Canadian Natural Resource Limited	Horizon Oil Sands	Section B for five years - denied
Canadian Natural Resource Limited	Wolf Lake and Primrose Oil Sands	Section B for five years - denied
Dow Chemical	Fort Saskatchewan	Section B for five years - denied
Dow Chemical	Prentiss Chemical	Section B for five years - denied
Graymont	Exshaw	Section A for five years - granted
Imperial Oil	Cold Lake	Section A for five years - granted
Imperial Oil	Strathcona Refinery	Section A for five years - granted
MEGlobal Canada Inc.	Fort Saskatchewan	Section B for five years – partially granted
MEGlobal Canada Inc.	Prentiss Chemical	Section B for five years – partially granted
Shell Canada	Scotford Chemicals	Section A for five years - granted
Shell Canada	Scotford Refinery	Section A for five years - granted
Suncor Energy Products Partnership	Edmonton Refinery	Sections A and E for five years - granted

7.3 Publishing Greenhouse Gas Data

Section 7 of the Specified Gas Reporting Regulation permits the Director to publish data and information in any specified gas report in any form or manner the Director considers appropriate. The department of Environment and Sustainable Resource Development has published an annual report on the results of the Specified Gas Reporting Program since 2003 when the mandatory greenhouse gas reporting program began.

7.4 Requesting Greenhouse Gas Data

Written requests for information contained in a submitted specified gas report that has not been deemed confidential can be submitted to the designated Director at:

- ESRD.GHG@gov.ab.ca

The Director shall respond to these requests within a reasonable amount of time. The process for requesting non-confidential greenhouse gas data from the Alberta Climate Change Office is outlined in Figure 7.2.

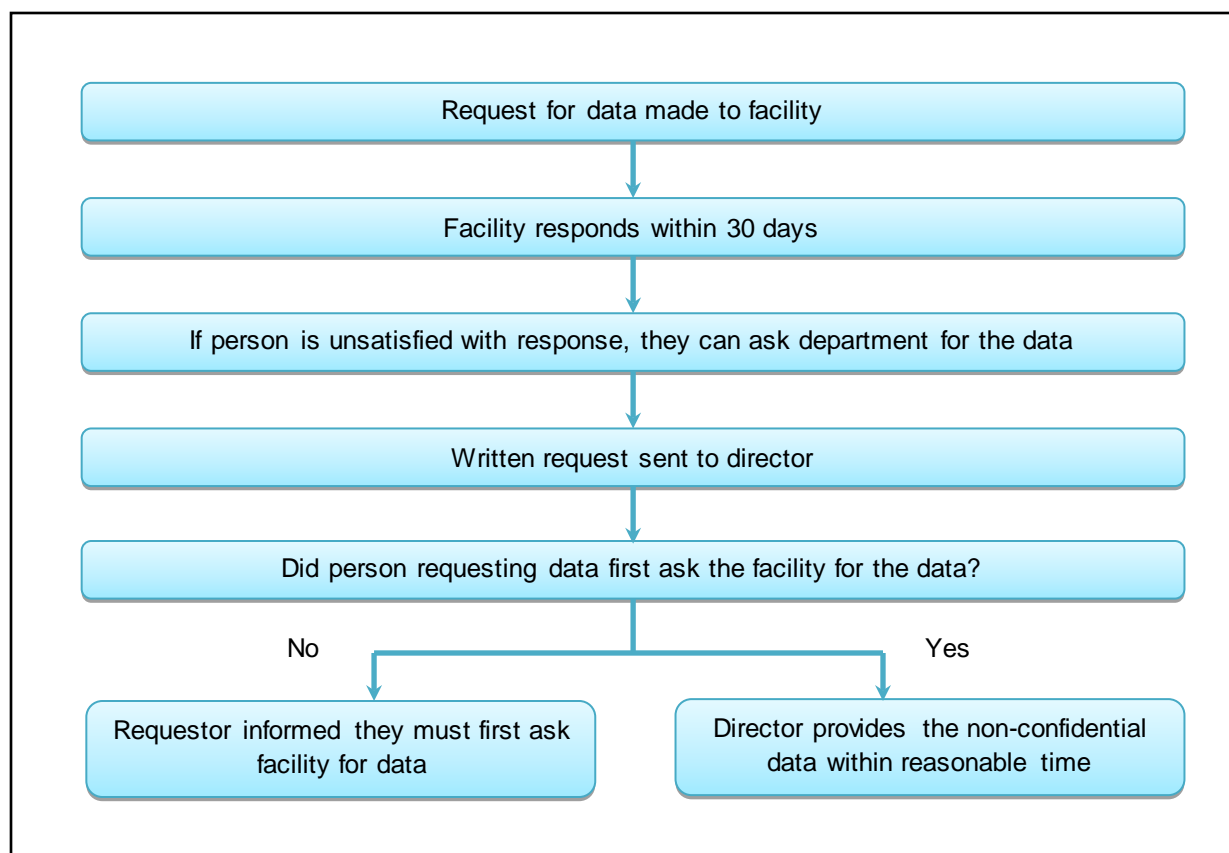


Figure 7.2: Process for Requesting Non-Confidential Greenhouse Gas Data

Glossary of Terms

For the purposes of this report, the following definitions are provided.

Biomass: Plant materials, animal waste or any product made of either of these and includes without limitation wood and wood products, charcoal, agricultural residues and wastes including organic material above and below ground, both living and dead, such as trees, crops, grasses, tree litter, roots, municipal and industrial wastes where the organic material is biological in origin, landfill gas, bio-alcohols, black liquor, sludge gas, animal or plant-derived oils.

Carbon dioxide equivalent (CO₂e): Concentration of CO₂ that would cause the same amount of absorption of infrared radiation in the atmosphere as another greenhouse gas. CO₂e is calculated by multiplying the emissions of a greenhouse gas by an established global warming potential to get an equivalent quantity of carbon dioxide. Using CO₂e permits the calculation of total greenhouse gas emissions for a particular source.

Direct emissions: Release of specified gases to the air from sources located at a facility, expressed in tonnes on a CO₂e basis.

Facility: Any plant, structure or thing where an activity listed in Section 2 of the Schedule of Activities to the *Environmental Protection and Enhancement Act* occurs, and a site or one or more contiguous or adjacent sites that are operated and function in an integrated fashion where an activity listed in any of Sections 3 to 11 of the Schedule of Activities to the *Environmental Protection and Enhancement Act* occurs, including all the buildings, equipment, structures, machinery and vehicles that are an integral part of the activity.

Flaring emissions: Direct emissions from the controlled combustion of a gas or liquid stream produced on site not for the purpose of producing energy and includes without limitation emissions arising from waste petroleum incineration, hazardous emissions prevention systems (whether in pilot or active mode), well testing, natural gas gathering systems, processing plant operations, crude oil production, pipeline operations, petroleum refining and chemical fertilizer and steel production.

Fugitive/other emissions: Direct emissions that do not fall under stationary fuel combustion emissions, industrial process emissions, venting emissions, flaring emissions, on-site transportation emissions, or waste and wastewater emissions and includes without limitation intentional or unintentional releases of gases arising from the production, processing, transmission, storage and use of solid, liquid or gaseous fuels. In general, emissions from fugitive/other sources are a result of the handling or processing of various types of fuel in the fossil fuel industry. Fugitive/other sources include leaks from natural gas transmission lines and processing plants, accidental releases from oil and gas wells and releases from the mining and handling of coal.

Global warming potential: Relative measure of the warming effect that the emission of a specified gas might have on the Earth's atmosphere calculated as the ratio of the time-integrated radiative forcing that would result from the emission of one kilogram of a given specified gas to that from the emission of one kilogram of carbon dioxide.

Industrial process emissions: Direct emissions from an industrial process involving chemical or physical reactions, other than combustion, and where the primary purpose of the industrial process is not energy production. This includes mineral, metal and chemical production. This source category is more sector-specific than stationary fuel combustion and is not found in all industrial sectors.

On-site transportation emissions: Greenhouse gas source category with direct emissions resulting from fuel combustion in machinery used for the on-site transportation of products and material integral to the production process. Examples are the transportation of raw or intermediate products and materials within the production process; such as equipment used at an oil sands operation to mine and/or move materials to subsequent on-site processing, or equipment used at above or below ground mining operations to mine and/or move mined materials or other intermediate products or materials to different on-site production processes.

Perfluorocarbons (PFCs): Synthetic industrial gases emitted in small quantities but are powerful greenhouse gases with global warming potential of hundreds to thousands of times that of carbon dioxide. Perfluorocarbons include the following PFC species: CF₄, C₂F₆, C₃F₈, C₄F₁₀, c-C₄F₈, C₅F₁₂, and C₆F₁₄. Only PFC emissions from industrial process and industrial product use are reported under the Specified Gas Reporting Program. Sources of PFC emissions from industrial process and industrial product use include aluminum production and foam blowing.

Specified gas: Those primary greenhouse gases identified in the Specified Gas Reporting Regulation, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride.

Stationary fuel combustion emissions: Direct emissions resulting from non-vehicular combustion of fossil or biomass fuel for the purpose of producing energy but do not include biomass combustion CO₂ emissions. Stationary fuel combustion is a common source of greenhouse gas emissions and is produced in most industrial sectors. The stationary fuel combustion source category includes on-site waste incineration if the waste is combusted for the purpose of energy production.

Venting emissions: Direct emissions from intentional releases to the atmosphere of a waste gas or liquid stream and includes without limitation emissions of casing gas, associated (or solution) gas, treater, stabilizer, dehydrator off-gas, blanket gas and emissions from pneumatic devices which use natural gas as a driver, compressor start-up, pipeline and other blowdowns and metering and regulation station control loops.

Waste and wastewater emissions: Direct emissions from disposal of waste and waste or wastewater treatment and includes without limitation sources of emissions from on-site waste disposal and waste or wastewater treatment at a facility such as landfilling of solid waste, flaring of landfill gas, treatment of liquid waste and waste incineration.

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