OVERVIEW OF 2019 REPORTED EMISSIONS

FACILITY GREENHOUSE GAS REPORTING PROGRAM

Environment and Climate Change Canada
Environnement et Changement climatique Canada

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Environment and Climate Change Canada
Public Inquiries Centre
12th Floor, Fontaine Building
200 Sacré-Coeur Boulevard
Gatineau QC K1A 0H3
Telephone: 819-938-3860
Toll Free: 1-800-668-6767 (in Canada only)
Email: ec.enviroinfo.ec@canada.ca

Aussi disponible en français

Environment and Climate Change Canada's **50th anniversary**
50e anniversaire d'Environnement et Changement climatique Canada

Meteorological Service of Canada's **150th anniversary**
150e anniversaire du Service météorologique du Canada

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HIGHLIGHTS

- 1700 facilities reported their greenhouse gas (GHG) emissions in 2019 to Environment and Climate Change Canada, totalling 293 megatonnes (Mt)[1] of carbon dioxide equivalent (CO_2 eq.).
- The 2019 reporting cycle is the third year under the expanded federal GHG reporting program (GHGRP). Under the expansion to date, the reporting threshold was lowered to 10 kilotonnes (kt) CO_2 eq. (in 2017) and facilities in 14 industry sectors were required to provide additional data and use prescribed methods to determine emissions.[2]
- The reported emissions are largely distributed across three sectors: (i) Mining, Quarrying, and Oil and Gas Extraction (39%), (ii) Manufacturing (30%), and (iii) Utilities (24%)—amongst all facilities, those engaged in oil/gas extraction and electricity generation account for 59% of the total.
- 554 facilities reported emitting 50 kt of CO_2 eq. or more in 2019 for a total of 270 Mt, essentially unchanged from the 2018 total.
- 1030 facilities reported emission levels in the 10 to 50 kt range, accounting for 8% (22 Mt) of the total facility-reported emissions for 2019—largely from the oil and gas and manufacturing sectors.
- Since 2005, total emissions from facilities in the Utilities and Manufacturing sectors declined by 52 Mt and 5 Mt respectively, while emissions reported by facilities in the Mining, Quarrying, and Oil and Gas Extraction sector increased by 67 Mt. These sectoral trends mirror those reported in Canada's Official GHG Inventory.
- The reported emissions reduction in Utilities (52 Mt) since 2005 were primarily from the Electricity sector in Ontario and Alberta, driven by switching to less GHG intensive fuels to generate electricity and increased use of renewable energy sources. The reported decrease from the Manufacturing sector (5 Mt) since 2005 were mostly attributed to manufacturers of aluminium, chemicals and cement, as well as petroleum refining.
- The GHG emissions data reported by facilities represents 40% of Canada's total GHG emissions (730 Mt in 2019) and 64% of Canada's industrial GHG emissions, as reported in Canada's Official GHG Inventory.[3]
- Environment and Climate Change Canada will continue to expand reporting requirements under the GHGRP, which aims to facilitate the direct use of the facility data in the National GHG Inventory, thus better reflecting emission changes occurring at individual facilities and improving the granularity, consistency and comparability of GHG data across Canada.

1. 1 Mt = 1 million tonnes or 1 000 kilotonnes.
2. The reporting requirements were expanded progressively over the last three years. The 2019 GHGRP Gazette notice describes the complete reporting requirements for 2019 data. It can be accessed on the *Canada Gazette*: http://gazette.gc.ca/rp-pr/p1/2020/2020-02-01/html/sup1-eng.html#S91.
3. In this overview report, Canada's industrial GHG emissions include those from the following GHG categories from the *National Inventory Report: Greenhouse Gas Sources and Sinks in Canada 1990–2019*: Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste. The National Inventory Report is available on the United Nations Framework Convention on Climate Change-National Inventory Submissions: https://unfccc.int/ghg-inventories-annex-i-parties/2021.

1 GREENHOUSE GAS REPORTING PROGRAM

Environment and Climate Change Canada (ECCC)'s Greenhouse Gas Reporting Program (GHGRP) has completed the collection of GHG emissions information from Canadian facilities for the 2019 calendar year. Any facility with annual GHG emissions of 10 kt of carbon dioxide equivalent (CO_2 eq.) or higher is required to report to the program.

The Government of Canada established the GHGRP in March 2004 under the authority of section 46 of the Canadian Environmental Protection Act, 1999 (CEPA) to collect GHG emissions information annually from the largest emitting Canadian facilities. To date, facility-reported GHG information has been collected and published through ECCC's GHGRP for the period of 2004 to 2019. This program is part of ongoing efforts to develop, in collaboration with Canadian provinces and territories, a harmonized and efficient GHG reporting system that minimizes duplication and reporting burden for industry and governments. Key objectives of the program are to provide Canadians with consistent information on GHG emissions, inform the development of the National Greenhouse Gas Inventory and support regulatory initiatives. The data collected are also shared with provinces and territories.

In December 2016, the Government of Canada published a Notice of Intent to inform stakeholders of its intent to expand the GHGRP. It is pursuing this expansion in order to: enable the direct use of the reported data in Canada's Official GHG Inventory, increase the consistency and comparability of GHG data across jurisdictions, and obtain a more comprehensive picture of Canadian facility emissions. In phase 1 (2017 data), the reporting threshold was lowered to 10 kt or more of GHGs (in CO_2 eq. units). Facilities in targeted industry sectors were also required to use prescribed methods to quantify their emissions and to report additional information on their calculations. These sectors were cement, lime, aluminium, iron and steel producers as well as facilities engaged in CO_2 capture, transport, and geological storage activities.

Under Phase 2 of the expansion (2018 data), the reporting threshold was maintained at 10 kt CO_2 eq. and facilities in 9 industry sectors were required to provide additional data and use prescribed methods to determine emissions. These sectors were mining, ethanol production, electricity and heat generation, ammonia production, nitric acid production, hydrogen production, petroleum refineries, pulp and paper production, and base metal production.

The *Notice with respect to reporting of greenhouse gases (GHGs) for 2019*, published in the *Canada Gazette* on February 1, 2020,[4] reflects the federal reporting requirements for 2019 data, submitted by facilities to Environment and Climate Change Canada in 2020. An amendment to this notice was published on May 2, 2020, extending the deadline to July 31, 2020 to provide facilities with more time for reporting due to impacts related to the Covid-19 pandemic. The data used in this overview report are current as of November 19, 2020. Subsequent company updates or new reports received will be included in future data releases.

The *Notice with respect to reporting of greenhouse gases (GHGs) for 2020*[5] was published in the *Canada Gazette* on February 13, 2021. The 2020 Notice sets out the federal reporting requirements for 2020 data, scheduled to be submitted by facilities to Environment and Climate Change Canada by June 1, 2021.

The 2019 and 2020 Notices did not incorporate significant changes in reporting requirements. Environment and Climate Change Canada will continue to assess further expansion in future years.

REPORTED 2019 GREENHOUSE GAS EMISSIONS 2

For the purposes of the GHGRP, a facility[6] is defined as an integrated facility, pipeline transportation system, or offshore installation. An integrated facility is defined as all buildings, equipment, structures, on-site transportation machinery, and stationary items that are located on a single site, on multiple sites or between multiple sites that are owned or operated by the same person or persons and that function as a single integrated site, excluding public roads.

A total of 1700 facilities reported their GHG emissions to Environment and Climate Change Canada for the 2019 calendar year, collectively emitting a total of 293 Mt of GHGs[7] (Figure 1). Of these facilities, 554 reported GHG emission levels greater than 50 kt, accounting for 92% (270 Mt) of the total reported emissions, and 61 emitted more than 1 Mt, accounting for over half (57%, or 167 Mt) of the total emissions (Figure 2). Those with emissions over 1 Mt fall within several industrial sectors such as electric power generation, oil sands extraction, petroleum refineries and primary metal manufacturing (e.g. iron, steel and aluminium).

Among all reported facilities, 1030 reported GHG emission levels in the 10 to 50 kt range, accounting for 8% (22 Mt) of the total reported emissions. These facilities belong to a number of sectors, such as oil and gas extraction (713 facilities), food manufacturing (69 facilities), and waste treatment and disposal (108 facilities).

Facilities with emissions falling below the reporting threshold of 10 kt per year can voluntarily report their GHG emissions; 116 facilities did so for the 2019 calendar year, representing 0.2% (0.46 Mt). All voluntarily reported emissions are included in this report and in the data set published by Environment and Climate Change Canada.

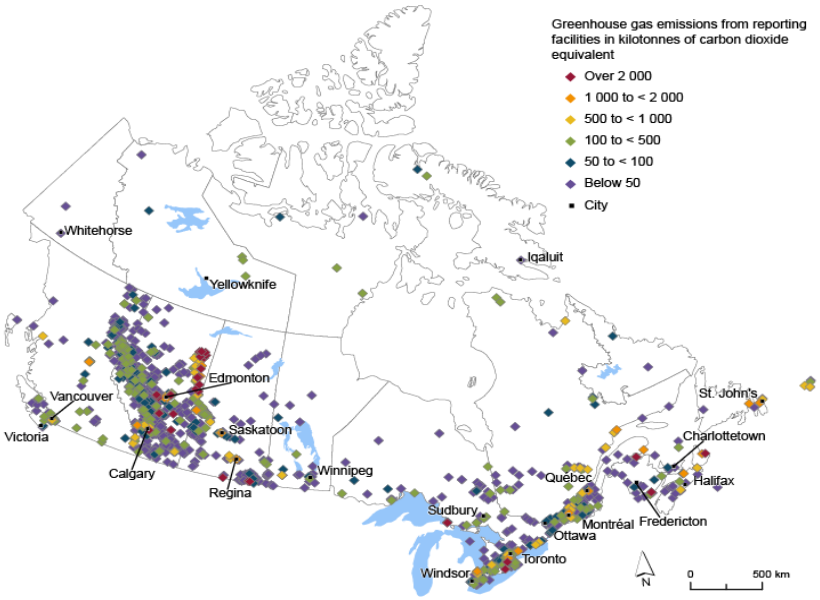
4 The *Notice with respect to reporting of greenhouse gases (GHGs) for 2019* can be accessed at the *Canada Gazette*: http://gazette.gc.ca/rp-pr/p1/2020/2020-02-01/html/sup1-eng.html#S91

5 The *Notice with respect to reporting of greenhouse gases (GHGs) for 2020* can be accessed at the *Canada Gazette*: https://canadagazette.gc.ca/rp-pr/p1/2021/2021-02-13/html/sup1-eng.html.

6 The term "facility" was updated in the 2017 notice as part of the GHGRP expansion to provide clarification that equipment used for on-site transportation is included and to reflect new requirements for reporting on carbon capture, transport and storage.

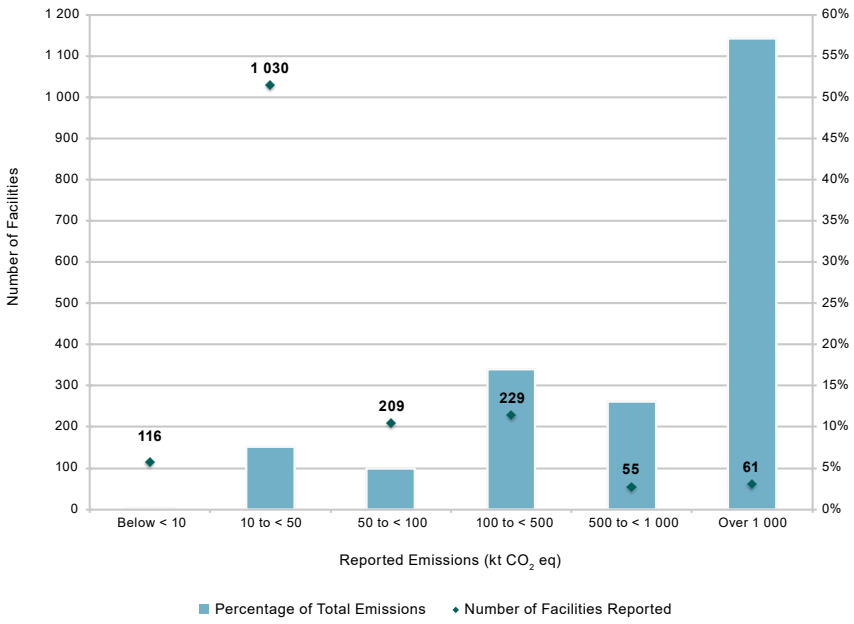
7 Unless explicitly stated otherwise, all emissions data presented in this report are expressed in CO_2 eq. units.

Figure 1: **2019 Facility Greenhouse Gas (GHG) Emissions Reported to Environment and Climate Change Canada**



Notes:
Map excludes pipeline transportation systems.
Map is provided by the Canadian Environmental Sustainability Indicators program.

Figure 2: **Contribution of Facilities in Various Emission Ranges to Total Reported Emissions (2019)**



Notes:
Facilities in the 0–10 kt range voluntarily reported their emissions.
Totals may not add up due to rounding.

2.1 Emission Calculation Methods

Facilities reporting to the GHGRP (except those subject to expanded requirements) may choose among a number of available methods to calculate their GHG emissions. The methods selected by these facilities must be consistent with the methodological guidelines developed by the Intergovernmental Panel on Climate Change (IPCC) and adopted by the United Nations Framework Convention on Climate Change (UNFCCC) for the preparation of national GHG inventories. Reporting facilities must indicate the types of methods used to determine the quantities of emissions reported. Such methods may include monitoring or direct measurement, mass balance, emission factors, and/or engineering estimates.

As specified in section 1, facilities in 14 industry sectors or engaged in activities covered under phases 1 and 2 of the GHGRP expansion are required to use specific quantification methods, described in *Canada's Greenhouse Gas Quantification Requirements*.[8]

Overall, methods incorporating the use of emission factors were the approach preferred by most facilities (Figure 3). An emission factor is a statistical measure of the rate at which a GHG is released into the atmosphere due to a given activity, such as burning a specific fuel type or producing a specific industrial product. The emission factors used may be general or technology-specific. Many facilities used more than one calculation method to determine their emissions.

8 Canada's Greenhouse Gas Quantification Requirements: https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/reporting/quantification-requirements.html

2.2 Greenhouse Gases and Global Warming Potentials

GHGs are not equal in their effect on the atmosphere. Each GHG has its own average atmospheric lifetime and heat-trapping potential. GHG emissions are often calculated and reported in terms of how much CO_2 would be required to produce a similar warming effect over a given time horizon. This is called the carbon dioxide equivalent (CO_2 eq.) value and is calculated by multiplying the amount of the gas by its associated metric such as global warming potential (GWP) (Table 1). Environment and Climate Change Canada uses GWP values consistent with those used in Canada's Official GHG Inventory, a complete list of which can be found in the *Notice with respect to reporting of greenhouse gases (GHGs) for 2019.*

2.3 Reported GHG Emissions by Gas and by Source

CO_2 represented the majority (93%) of the total reported emissions in 2019, while methane (CH_4) and nitrous oxide (N_2O) emissions contributed 5% and 1%, respectively (Figure 4). Facilities are also required to report emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) stemming from industrial processes or industrial product use. The combined emissions of these gases accounted for the remaining 0.5% (2 Mt).

Figure 3: **Types of Methods Used by Facilities**

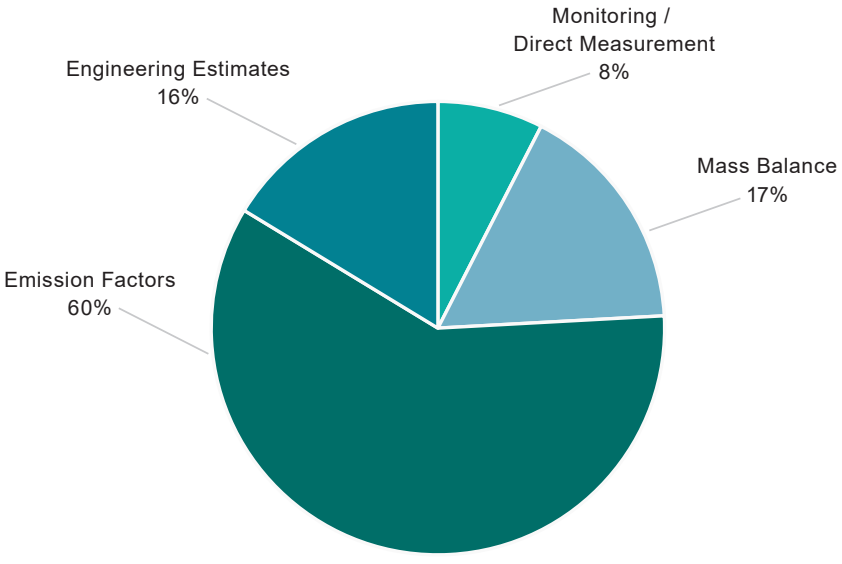


Table 1: **Global Warming Potential Values for the Main Greenhouse Gases**

Greenhouse Gas	100-year GWPs[a]
Carbon dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous oxide (N_2O)	298
Sulphur hexafluoride (SF_6)	22 800
Hydrofluorocarbons (HFCs), 13 species	Ranges from 92 to 14 800
Perfluorocarbons (PFCs), 7 species	Ranges from 7 390 to 12 200

Note:

a. GWPs were updated in 2013 and applied to all years in the data published by the GHGRP.

When reporting to the GHGRP, facilities are required to report GHG emissions under the following source categories:[9] stationary fuel combustion, industrial processes, fugitive sources including venting, flaring and leakage, on-site transportation, waste and wastewater.[10]

9 Additional information on these emission source categories can be found in the Technical Guidance on Reporting Greenhouse Gas Emissions

10 Some source categories were modified and updated as part of the GHGRP expansion and are applicable to the data reported since 2017.

Stationary fuel combustion is the largest source of reported emissions, representing 76% of the total (Figure 5). This source includes emissions resulting from the burning of fuels for the purpose of producing energy (e.g., to generate electricity, heat or steam), but does not include emissions from combustion engines in vehicles or mobile equipment, which are grouped under on-site transportation. Any waste material burned or incinerated at a facility to produce energy is also included in stationary combustion. Industrial process emissions, the second-largest source of reported emissions at 13%, refer to emissions stemming from specific industrial processes involving chemical or physical reactions other than combustion. Such reactions occur, for example, in the processes of mineral production (e.g., lime, cement), metal production (e.g., iron, steel, aluminium) and chemical production (e.g., nitric acid and ammonia production).

2.4 Reported GHG Emissions by Province/Territory

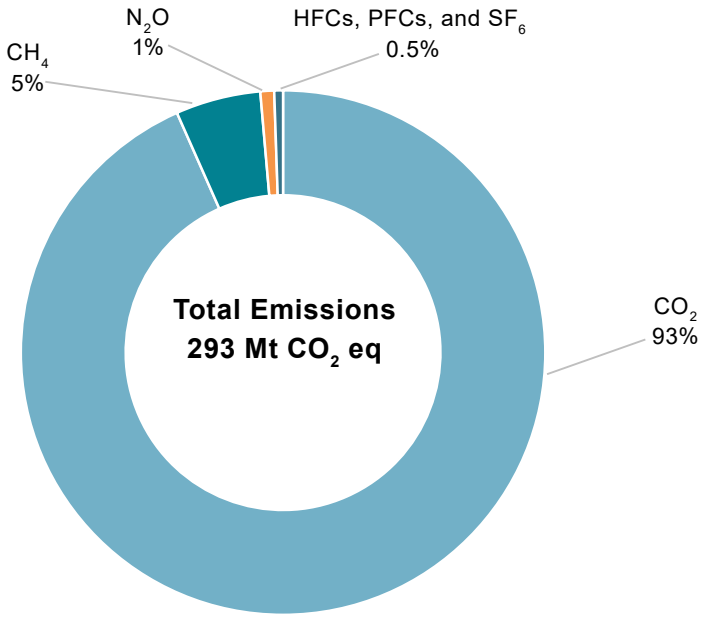
Facilities in the province of Alberta accounted for the largest share of reported emissions, with approximately 54% of the total, followed by facilities in Ontario (15%), Saskatchewan (10%) and Quebec (8%) (Table 2). The number of facilities, the quantity and type of fuel consumed, and the predominant industry largely explain this ranking.

Table 2: **Reported 2019 Greenhouse Gas Emissions by Province/Territory**

Province / Territory	Number of Facilities	Total Emissions (kt CO_2 eq)	Percentage of Total Emissions
Newfoundland and Labrador	15	5 639	2%
Prince Edward Island	3	83	0.03%
Nova Scotia	21	7 133	2%
New Brunswick	22	6 805	2%
Quebec	194	22 872	8%
Ontario	349	44 305	15%
Manitoba	41	2 642	0.9%
Saskatchewan	162	29 033	10%
Alberta	696	156 809	54%
British Columbia	183	16 060	5%
Nunavut	7	601	0.2%
Northwest Territories	5	610	0.2%
Yukon	2	36	0.01%
Total	**1 700**	**292 628**	**100%**

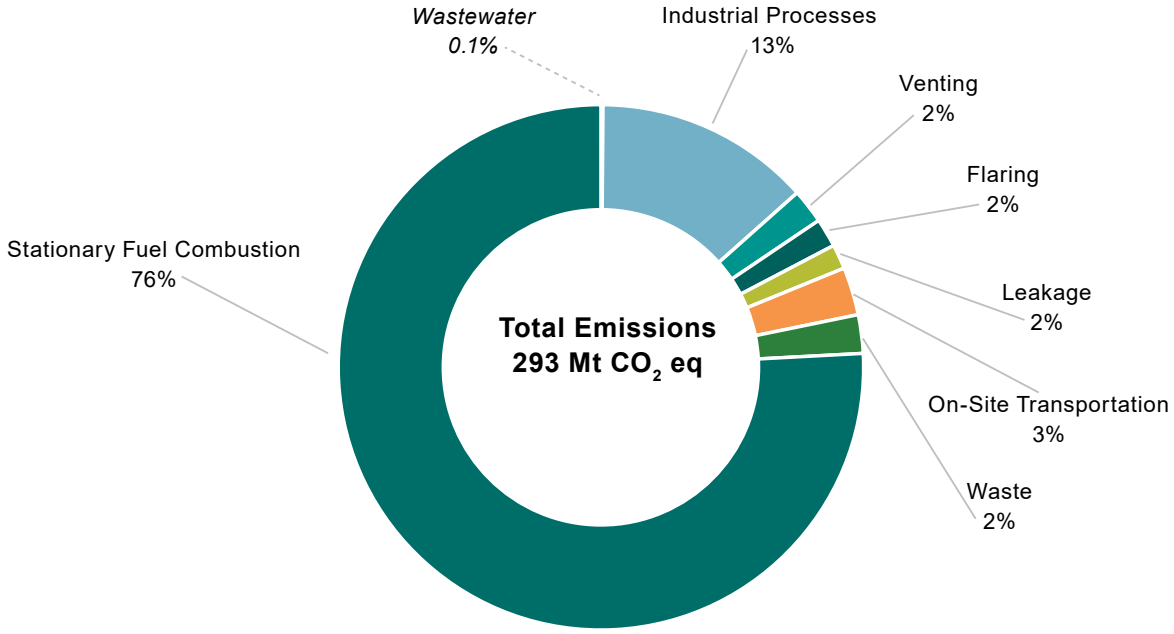
Note: Totals may not add up due to rounding.

Figure 4: **Reported 2019 Greenhouse Gas Emissions by Gas (293 Mt of CO_2 eq.)**



Note: Totals may not add up due to rounding.

Figure 5: **Reported 2019 Greenhouse Gas Emissions by Source**



Note: Totals may not add up due to rounding.

2.5 Reported GHG Emissions by Sector

When completing a report for the GHGRP, a reporter is required to identify the main activities occurring at its facility using the North American Industry Classification System (NAICS).[11] In 2019, three NAICS-defined industry sectors accounted for the majority of GHG emissions: the Mining, Quarrying, and Oil and Gas Extraction sector (NAICS 21), representing 39% (115 Mt) of total reported emissions; the Manufacturing sector (NAICS 31-33), accounting for 30% (87 Mt); and the Utilities sector (NAICS 22), primarily facilities generating electricity from fossil fuels, accounting for 24% (71 Mt) (Figure 6). The remaining 7% (20 Mt) of emissions captured under "Other" were reported by various types of facilities, mainly natural gas transportation pipelines (10 Mt) and waste management (7 Mt).

Activities of reporting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector can be further broken down into three main categories (Figure 7):

1. Oil sands extraction, the dominant sub-category which includes oil sands mining, in-situ bitumen production and upgrading (64% of sector emissions).
2. Oil and gas extraction (except oil sands) (26%).
3. Mining of metal ore (e.g., iron) (4%), coal (3%), and non-metallic minerals (e.g., potash and diamonds) (2%).

11 The NAICS is an industry classification system that was developed by the statistics agencies of Canada, the United States and Mexico to enable them to collect comparable statistical data. It is a comprehensive system that encompasses all economic activities using six-digit codes. In Canada, the NAICS 2017 version 3 consists of 20 sectors, 102 subsectors, 322 industry groups, 708 industries and 923 national industries. NAICS 2017 can be accessed on Statistics Canada.

The Manufacturing sector includes a wide range of industrial activities, with important contributors to the reported 2019 emissions being (Figure 8):

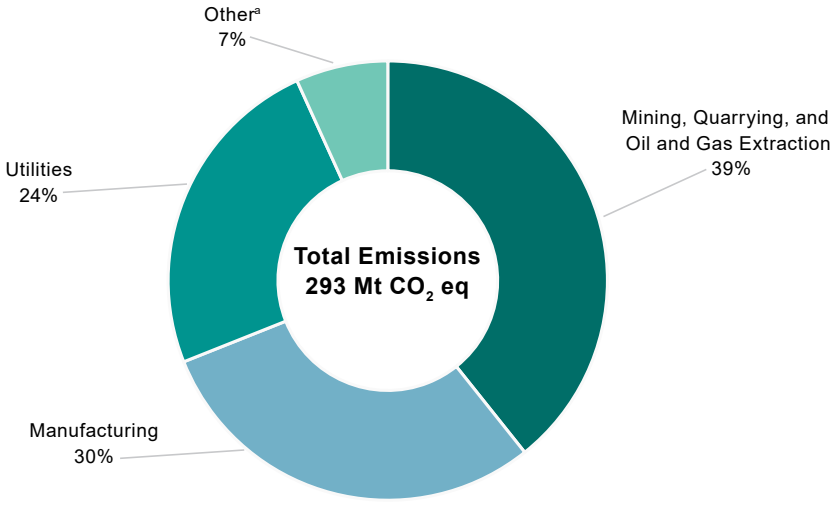
1. Petroleum and coal product manufacturing (21% of sector emissions).
2. Iron and steel manufacturing (18%).
3. Basic chemical manufacturing (e.g., ethylene, polyethylene, hydrogen gas) (15%).
4. Cement and concrete product manufacturing (13%).

2.6 Impact of GHGRP Expansion: Reported Emissions in the 10 kt to 50 kt Range

Starting with the 2017 data collection, the mandatory reporting threshold was lowered from 50 kt CO_2 eq. to 10 kt CO_2 eq. This means any facility emitting 10 kt or more of GHGs in the calendar year must report to the program. The threshold change resulted in a significant increase in the number of facilities reporting.

Of all 1700 facilities that reported in 2019, 1030 facilities (61%) reported emissions in the range of 10 kt to 50 kt. Total emissions from these 1030 facilities are 22 Mt, representing 8% of the 2019 total reported emissions. Over half (54%) of the 22 Mt of GHGs emitted by these facilities come from the 578 facilities in the Mining, Quarrying, and Oil and Gas Extraction sector (Figure 9). The Manufacturing sector is the second largest contributor (233 facilities reporting), accounting for 24% of the emissions reported by the

Figure 6: **Reported 2019 Greenhouse Gas Emissions by Industry Sector (293 Mt CO_2 eq.)**



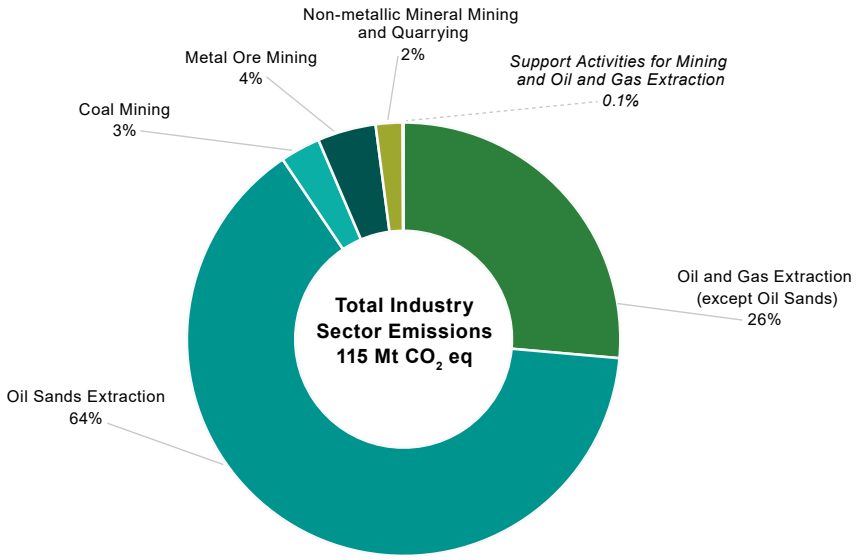
Note:

a. "Other" includes various types of facilities such as natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.

facilities in this range. Many landfills, universities and hospitals were also required to report because of the 10 kt threshold.

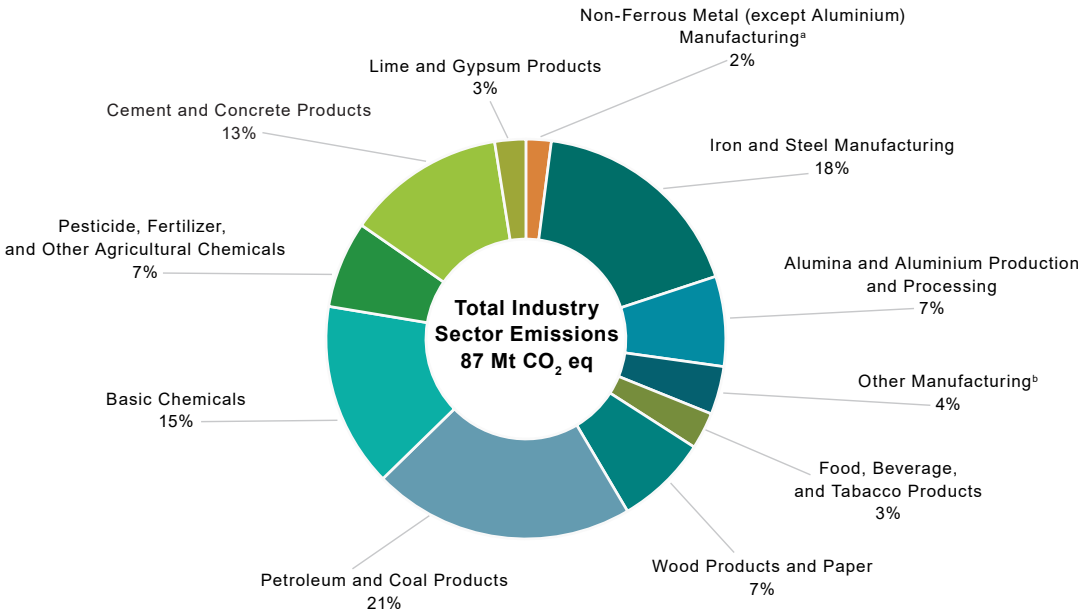
Alberta experienced the highest number of reporters in this range with a total 441 reported facilities (43% of the total number of new reporting facilities – Figure 10), followed by 215 in Ontario (21%), 110 in British Columbia (11%), and 95 in Saskatchewan (9%). The Alberta-based facilities contributed the most to the total emissions reported (9 Mt), followed by Ontario (5 Mt), British Columbia (2.3 Mt), and Saskatchewan (2 Mt).

Figure 7: **Reported 2019 Greenhouse Gas Emissions by Subsectors of Mining, Quarrying, and Oil and Gas Extraction (115 Mt CO_2 eq.)**



Note: Totals may not add up due to rounding.

Figure 8: **Reported 2019 Greenhouse Gas Emissions by Subsectors of Manufacturing (87 Mt CO_2 eq.)**

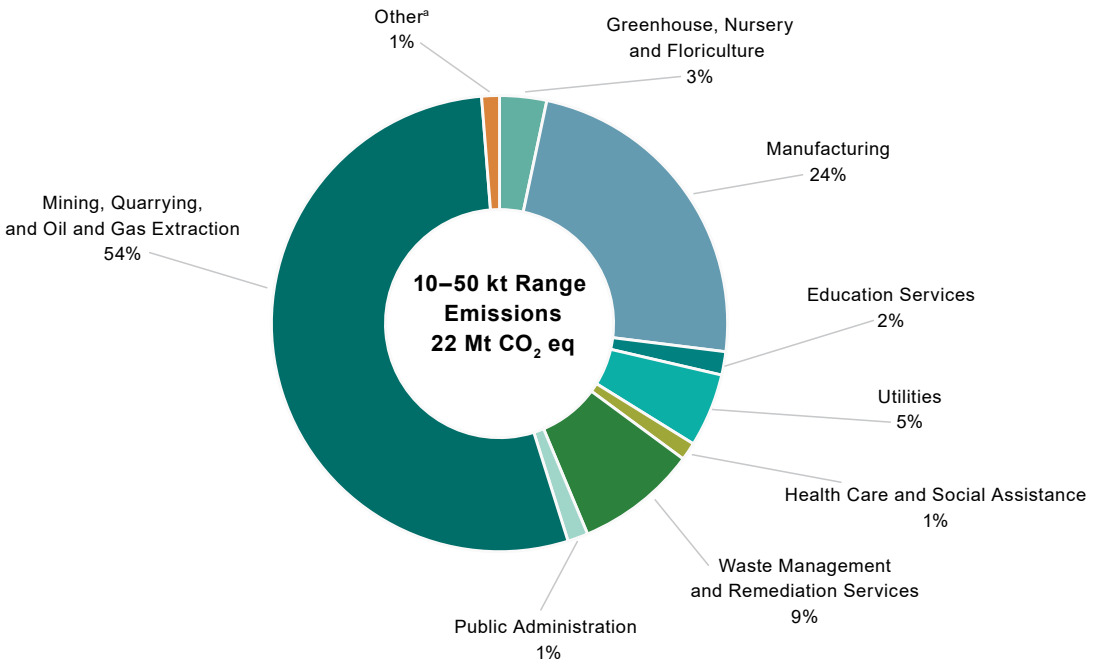


Notes:

a. Non-Ferrous Metal (except Aluminium) Manufacturing includes the production of base metals (e.g., copper, nickel, zinc).

b. "Other Manufacturing" represents other types of manufacturing, including electrical equipment, transportation equipment and furniture manufacturing.

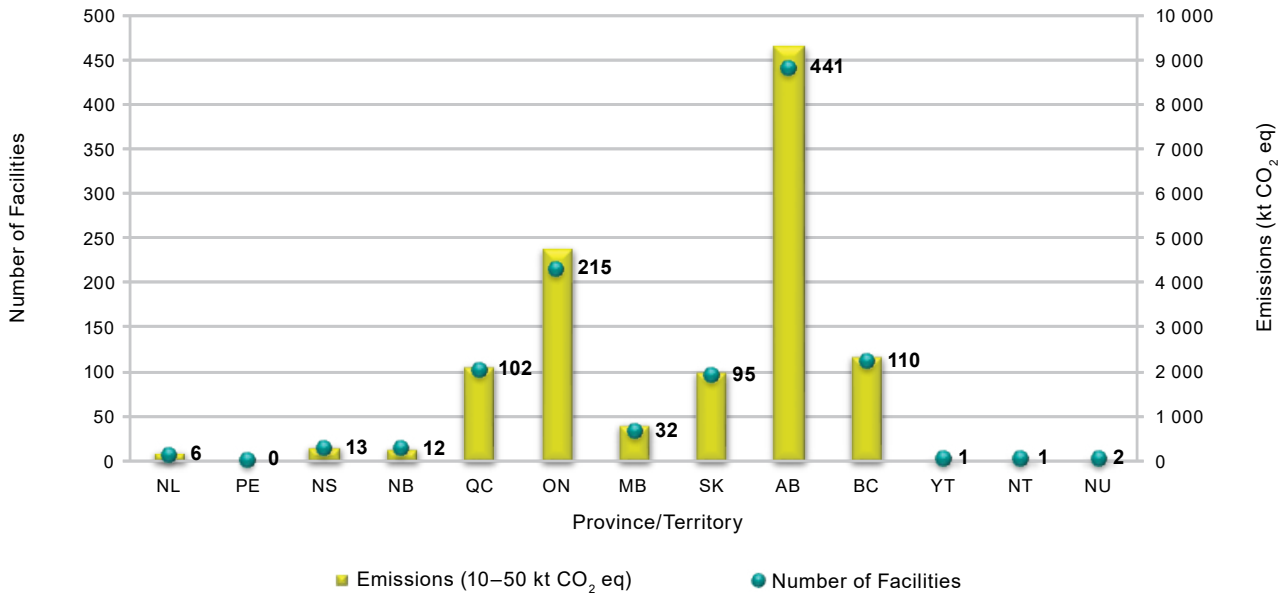
Figure 9: **Reported 2019 Greenhouse Gas Emissions from Facilities in the 10 to 50 kt Range by Sector (22 Mt CO_2 eq.)**



Note:

a. "Other" includes various types of facilities such as wholesale trade and transportation and warehousing.

Figure 10: **Reported 2019 Greenhouse Gas Emissions for Facilities between 10 kt to 50 kt CO_2 eq. by Province/Territory**



The total number of facilities as well as the coverage of emissions for specific industry subsectors have increased to varying degrees due to the lower reporting threshold, providing more complete tracking of emissions in these subsectors (Table 3).

Comparing the level of reporting in 2016 and in 2019, 678 facilities in the Oil and Gas Extraction (Except Oil Sands) subsector are now reporting their emissions to the GHGRP (up from 113), exhibiting the largest change in emissions due to newly reporting facilities (increase of 11 Mt). These newly reporting facilities include various facility types such as natural gas processing plants, oil/gas battery operations and compressor stations. Facilities in the Waste Treatment and Disposal subsector (such as landfills) have also shown a notable increase, with 108 facilities reporting emissions in 2019 from 48 facilities in 2016. Gold and silver ore mining facilities increased from 8 facilities reporting in 2016 to 24 in 2019, increasing the amount of emissions reported by 25%.

From the manufacturing sector, Pulp, Paper and Paperboard mills have increased from 51 facilities reporting in 2016 to 74 facilities reporting in 2019. Grain and oilseed milling also saw an increase in reporting due to the lower threshold (from 4 facilities to 17 in 2019), with 27% of the emissions reported in 2019 attributed to the newly reporting facilities.

The lowering of the threshold also resulted in a number of subsectors reporting for the first time. For example, 40 facilities within the Other food crops grown under cover subsector (mainly consisting of greenhouses) now report their emissions.

3 TRENDS IN REPORTED GHG EMISSIONS

The number of facilities reporting GHG emissions to Environment and Climate Change Canada can change from year to year. The lowering of the mandatory reporting threshold from 50 kt to 10 kt resulted in an increase in the number of facilities reporting. Changes in production levels, processes and technologies, the types of fuels used at a facility, facility start-ups/closures and unplanned events can all result in a change in the annual emissions, so that a facility may fall below or attain the reporting threshold from one year to the next. The number of voluntary reporters may also change, affecting the number of reporting facilities. Over the 2005–2019 period, the number of reporting facilities increased from 337 to 1700 (Table 4).

3.1 National-Level Trends

The overall total reported GHG emissions for all facilities were 293 Mt in 2019, reflecting a similar total reported for 2018 (Table 4).[12] Over the 2005–2019 period, the number of reporting facilities increased from 337 to 1700, and emissions from facilities increased by 5.3% (15 Mt). The significant increase in the number of reporting facilities and total reported emissions since 2005 is partly attributed to the lower thresholds introduced in 2009 (50 kt) and in 2017 (10 kt).

12 A number of facilities submitted new reports or updates to GHG reports for previous years. Environment and Climate Change Canada includes these updates in its annual data release, resulting in some revisions to previously published data.

Table 3: **Impact of Lowering the Emissions Threshold, Selected Industry Subsectors**

Industry Subsectors	2016 Number of Facilities	2019 Number of Facilities	2016 total emissions (kt CO_2 eq.)	2019 total emissions (kt CO_2 eq.)	2019 emissions from new facilities (< 50 kt CO_2 eq.)
Oil and Gas Extraction (Except Oil Sands)	113	678	14 827	30 368	10 697
Waste Treatment and Disposal	48	108	5 294	6 677	1 804
Pulp, Paper and Paperboard mills	51	74	4 685	5 597	719
Gold and Silver Ore	8	24	632	1 360	340
Grain and Oil Seed Milling	4	17	320	846	225
Other Food grown under cover	0	40	0	743	743

For facilities emitting 50 kt of CO_2 eq. or more, total reported emissions were 270 Mt in 2019, remaining largely unchanged from the total reported for 2018 (Table 4). Over the 2005–2019 period, the number of reporting facilities in this range increased from 323 to 554, largely due to the lower threshold introduced in 2009. The combined emissions from facilities in this range have not changed significantly since 2005.

3.2 Industry Sector and Provincial/ Territorial Trends

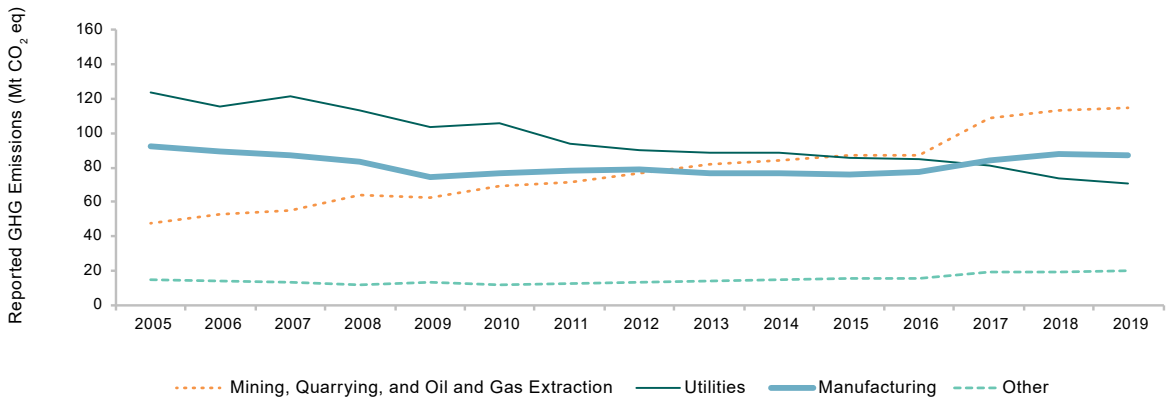
The summary of facility-reported emissions by NAICS industry sector provides a picture of the types of facilities (mostly industrial operations) that report to the GHGRP in response to the annual GHG reporting requirements (Figure 11 and Table 5). The provincial breakdown of each main industry sector highlights the regional presence of key industries accounting for the reported emissions (e.g., large component of emissions from the Manufacturing sector in Ontario, Quebec and Alberta) (Table 6).

Table 4: **Facility-Reported GHG Emissions, Selected Years**

	2005	2009[a]	2011	2012	2013	2014	2015	2016	2017[a]	2018	2019
Total Facility Reported Emissions											
Number of Facilities	337	538	549	564	579	584	572	615	1667	1723	1700
Facility-Reported Emissions (kt CO_2 eq.)	277 997	253 197	256 253	259 543	261 227	264 021	264 324	264 058	293 045	293 713	292 629
Facilities with more than 50 kt CO_2 eq. Emissions											
Number of Facilities	323	465	477	488	499	501	490	504	525	540	554
Facility-Reported Emissions (kt CO_2 eq.)	277 761	252 238	254 805	258 296	259 401	262 150	262 485	262 012	269 792	270 126	269 974
Annual Change	N/A	-7.3%	-2.9%	1.4%	0.4%	1.1%	0.1%	-0.2%	3.0%	0.1%	-0.1%
Change Since 2005	N/A	-9.2%	-8.3%	-7.0%	-6.6%	-5.6%	-5.5%	-5.7%	-2.9%	-2.7%	-2.8%

Notes:
N/A = Not available
The complete data set (i.e. yearly data since 2004), is available on ECCC Website: Facility-reported greenhouse gas data (https://www.canada.ca/ghg-reporting).
a. The reporting threshold changed in 2009 from 100 kt to 50 kt and, from 50 kt to 10 kt in 2017.

Figure 11: **Long-Term Sectoral Trend, 2005–2019**



Note:
Other – not a NAICS sector but a grouping of various NAICS codes reported by the following types of facilities: natural gas transportation pipelines, solid waste landfills, airports and institutional facilities (universities, hospitals and public administration buildings).

Table 5: **Reported Greenhouse Gas Emissions by North American Industry Classification System (NAICS) Industry Sector, Selected Years**

NAICS[a] Industry Sector *(Units: Mt CO_2 eq)*	2005	2011[b]	2012[b]	2013[b]	2014[b]	2015[b]	2016[b]	2017[b]	2018[b]	2019[b]
Total[c]	**278**	**256**	**260**	**261**	**264**	**264**	**264**	**293**	**294**	**293**
21 – Mining, Quarrying, and Oil and Gas Extraction[c]	**48**	**72**	**77**	**82**	**84**	**87**	**87**	**109**	113	**115**
Oil and gas extraction	14	15	14	15	15	15	15	30	30	30
Oil sands extraction[d]	28	49	55	59	61	65	64	69	72	74
Coal mining	2	3	3	3	3	2	2	3	3	3
Metal ore mining	3	3	4	4	3	3	4	5	5	5
Non-metallic mineral mining and quarrying	0.8	2	2	2	2	2	2	2	3	3
Support activities for mining, and oil and gas extraction	N/A	N/A	N/A	N/A	N/A	N/A	0.06	0.05	0.07	0.08
22 – Utilities[c]	**123**	**94**	**90**	**89**	**89**	**86**	**85**	**81**	74	**71**
Electric power generation	122	92	88	86	87	84	83	79	72	69
Natural gas distribution	1	2	2	2	2	1	1	1	1	1
Water, sewage and other systems[e]	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.9	0.8
31–33 Manufacturing[c]	**92**	**78**	**79**	**77**	**77**	**76**	**77**	**84**	88	**87**
Food, beverages, and tobacco products	0.3	0.7	0.7	1	1	1	1	3	3	3
Wood products and paper	5	5	5	5	5	5	5	6	6	6
Petroleum and coal products	20	17	17	17	17	17	17	18	18	18
Basic chemicals	13	11	11	11	11	11	11	12	13	13
Pesticide, fertilizer, other agricultural chemicals	6	6	6	6	6	6	6	6	6	6
Cement and concrete products	13	10	11	10	10	11	10	11	11	11
Lime and gypsum products	3	2	2	2	2	2	2	2	2	2
Iron and steel manufacturing[h]	17	14	15	13	15	13	14	15	17	16
Alumina and aluminum production and processing	10	8	8	8	7	7	7	7	6	6
Non-ferrous metal (except alum.) manufacturing[i]	3	2	2	2	2	2	2	2	2	2
Other manufacturing[f]	0.7	2	2	2	2	2	2	3	3	3
Other[c,g]	**15**	**12**	**13**	**14**	**15**	**15**	**15**	**19**	**19**	**20**
Pipeline transportation of natural gas	12	7	6	8	9	9	9	9	10	10
Waste management and remediation services	3	5	5	5	5	6	6	7	7	7
Institutional facilities	N/A	0.5	0.7	0.6	0.6	0.7	0.6	1	1	1
Miscellaneous	N/A	0.2	0.1	0.1	0.1	0.1	0.1	1	1	1

Notes:

N/A = Not available

a. Facilities required to report to the GHGRP provide a primary NAICS code that describes the main activities occurring at the facility.

b. The reporting threshold changed in 2009 from 100 kt to 50 kt and in 2017 from 50 kt to 10 kt.

c. Totals may not add up due to rounding.

d. Includes facilities engaged in oils sands mining, in-situ bitumen production and upgrading.

e. Includes sewage treatment facilities, heating and steam generation plants.

f. Not a NAICS sector but a grouping of various NAICS codes reported by facilities engaged in other types of manufacturing such as Electrical equipment, Transportation equipment, Furniture manufacturing, and others.

g. Not a NAICS sector but a grouping of various NAICS codes reported by the following types of facilities: natural gas transportation pipelines, solid waste landfills and institutional facilities.

h. Not a NAICS sector but a grouping of various NAICS codes reported by facilities engaged in types of manufacturing such as Iron and steel mills and ferro-alloy manufacturing, Steel product manufacturing from purchased steel (NAICS 3312), and Ferrous metal foundries

i. Not a NAICS sector but a grouping of various NAICS codes reported by facilities engaged in types of manufacturing such as Non-ferrous metal (except aluminium) production and processing, and Non-ferrous metal foundries.

Table 6: **Reported Greenhouse Gas Emissions by Industry Sector and by Province/ Territory, Selected Years**

Industry Sector Province/Territory *(Units: Mt CO_2 eq)*	2005	2011[a]	2012[a]	2013[a]	2014[a]	2015[a]	2016[a]	2017[a]	2018[a]	2019[a]
Total[b]	**278**	**256**	**260**	**261**	**264**	**264**	**264**	**293**	**294**	**293**
21 – Mining, Quarrying, and Oil and Gas Extraction[b]	**48**	**72**	**77**	**82**	**84**	**87**	**87**	**109**	**113**	**115**
Alberta	35	56	62	65	67	71	70	86	90	92
British Columbia	5	6	7	7	7	6	6	8	8	8
Manitoba	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Brunswick	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Newfoundland and Labrador	3	3	3	3	3	3	3	3	3	3
Northwest Territories	0.4	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Nova Scotia	N/A	0.2	0.2	0.4	0.5	0.4	0.4	0.4	0.4	0.1
Nunavut	N/A	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5
Ontario	0.2	0.1	0.1	0.3	0.3	0.3	0.4	1	1	1
Quebec	2	2	2	2	2	2	2	2	2	2
Saskatchewan	3	3	4	4	4	4	5	8	8	8
Yukon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.02	0.02	0.004
22 – Utilities[b]	**123**	**94**	**90**	**89**	**89**	**86**	**85**	**81**	**74**	**71**
Alberta	50	46	44	44	49	47	47	46	38	36
British Columbia	2	0.9	0.9	1	1	0.8	0.9	0.8	0.9	1
Manitoba	0.6	0.1	0.1	0.1	0.1	0.1	N/A	0.1	N/A	0.1
New Brunswick	9	4	4	4	4	4	4	3	4	3
Newfoundland and Labrador	1	0.7	0.7	0.8	1	1	1	1	1	1
Northwest Territories	N/A	N/A	N/A	N/A	N/A	0.06	N/A	0.02	0.02	0.02
Nova Scotia	11	9	8	8	7	7	7	7	7	7
Nunavut	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	0.06
Ontario	36	18	18	15	10	10	9	6	6	6
Prince Edward Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01	0.01	0.003
Quebec	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Saskatchewan	15	15	16	15	15	16	15	16	16	16
Yukon	N/A	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03
31–33 Manufacturing[b]	**92**	**78**	**79**	**77**	**77**	**76**	**77**	**84**	**88**	**87**
Alberta	18	18	18	19	18	19	19	20	22	22
British Columbia	6	5	5	5	5	5	5	5	5	5
Manitoba	1	1	1	1	1	1	1	1	1	1
New Brunswick	4	4	4	4	3	4	4	4	3	4
Newfoundland and Labrador	1	0.9	1	0.9	1	1	1	1	1	2
Nova Scotia	1	1	1	0.9	0.3	0.3	0.3	0.3	0.3	0.3
Ontario	38	28	29	27	28	27	28	30	33	31
Prince Edward Island	0.1	0.07	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.08
Quebec	20	17	17	17	17	17	16	18	18	19
Saskatchewan	2	2	3	3	3	3	3	3	3	3
Other[b,c]	**15**	**12**	**13**	**14**	**15**	**15**	**15**	**19**	**19**	**20**
Alberta	4	3	4	4	4	4	5	6	7	7
British Columbia	1	2	2	2	2	2	2	3	2	2
Manitoba	1	0.7	0.6	0.7	0.8	0.9	0.8	0.8	0.9	0.9
New Brunswick	N/A	N/A	N/A	N/A	N/A	N/A	0.01	0.03	0.04	0.1
Newfoundland and Labrador	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	0.06	0.06
Nova Scotia	N/A	0.04	N/A	N/A	N/A	N/A	0.006	0.08	0.09	0.1
Ontario	5	4	3	4	4	5	4	6	5	6
Quebec	0.3	0.8	1	1	1	1	1	2	2	2
Saskatchewan	3	2	2	2	2	2	2	2	2	2

Notes:

The complete data set (i.e. yearly data since 2004), is available on the ECCC Website: Facility-reported greenhouse gas data.

N/A = Not available

a. The reporting threshold changed in 2009 from 100 kt to 50 kt and in 2017 from 50 kt to 10 kt.

b. Totals may not add up due to rounding.

c. "Other" includes various types of facilities such as natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.

Facilities that emitted 10 kt or more were used for the analysis presented in this section; hence, observed emission changes from 2005 through 2019 reflect the impact of changing the reporting threshold on the number of reporting facilities in some industry sectors (notably in Mining, Quarrying, Oil and Gas Extraction).

Overall, GHG emissions reported by the Utilities sector have steadily decreased over the last decade. On the other hand, the Mining, Quarrying, Oil and Gas Extraction sector has experienced a sustained increase in emissions since 2005, surpassing those reported by Utilities in 2015 (Figure 11). New facilities since 2017 contributed 12 Mt to this sector's emissions. Emissions from the Manufacturing sector have recently risen, exhibiting a 11 Mt increase since 2015, although the sector's emissions had significantly decreased between 2005 and 2009. New facilities since 2017 contributed 5 Mt to this sector. Trends observed from facility-reported sector emissions are similar to trends observed in the National GHG Inventory. Various factors have led to these trends and are further discussed in this section.

3.2.1 Short-Term Changes

Short-term changes in reported emissions reflect the combined effect of actual changes in emissions from the same facilities and additional emissions reported from newly reporting facilities since the implementation of a lower reporting threshold for the 2017 data onwards.

The 11% (29 Mt) increase in total reported emissions over the last five years is mostly due to the 32% increase in emissions from the Mining, Quarrying, and Oil and Gas Extraction sector (i.e. 28 Mt increase from 2015 to 2019) (Table 5), largely in Alberta (Table 6). The increase in newly reported facilities in this sector since 2017 accounts for part of this increase, contributing an additional 12 Mt of emissions to the reported total. Oil sands extraction experienced a 9-Mt increase in emissions, consistent with observed increases in synthetic crude oil production (14%) and in non-upgraded bitumen production (19%) during this period.[13] Saskatchewan facilities also contributed to the increase, mainly due to the increased emissions reported from potash mines and oil and gas extraction sectors.

The sustained increase in the above sector is offset by emission reductions in the Utilities sector (Figure 11). Electric power generation experienced a 15 Mt decrease in emissions since 2015 (Table 5), where 67% of this decrease (10 Mt) occurred in the past three years (from 2017 to 2019) in Alberta. The Utilities sector in Ontario also experienced a 4 Mt decrease in emissions from 2015 to 2019. The reduced emissions in this sector over the last five years are attributed to the reduced use of fossil fuels for electricity generation and the increased reliance on renewable electricity sources in Ontario and Alberta.[14]

Overall emissions from the Manufacturing sector largely remained stable throughout 2014 to 2016, while more recently have shown a 12% increase (10 Mt) from 2016 to 2019. In looking at the large emitters (50 kt and above), part of this increase is observed in the iron and steel and basic chemicals manufacturing sectors (4 Mt).

3.2.2 Long-Term Trends

The major long-term emission trends have shown a declining overall in the Utilities and Manufacturing sectors since 2005, while emissions from the Mining, Quarrying, and Oil and Gas Extraction sector have steadily increased. Long-term trends do not reflect the addition of new facilities to the same extent as the short-term trends.

Up to and including the year 2014, the Utilities sector consistently accounted for the largest portion of reported emissions (Figure 11), with electric power generation being the main contributor. However, emissions from fossil-fuel electric power generation fell significantly (53 Mt) throughout 2005 to 2019 (Table 5), largely from the discontinuation of coal-fired electricity production in Ontario as well as emission reductions in Alberta, New Brunswick and Nova Scotia (Table 6). Fuel switching (e.g., from coal to natural gas or other lower carbon fuel) and increased reliance on hydro, nuclear and renewable sources of generation are also contributors to the decrease in utility emissions.[15, 16]

Overall emissions from the Manufacturing sector remain below (5%, or 5 Mt) their 2005 levels (Figure 11) between 2005 and 2019, with Ontario and Quebec facilities in specific industry sectors contributing the most to this overall decrease. Ontario facilities saw a net decrease of 7 Mt (Table 6) compared to 2005, largely observed in iron/steel, cement, and chemical manufacturing (e.g., halted adipic acid production in 2009) (Table 5). Quebec facilities showed an overall decrease in emissions from 2005 to 2019 (Table 6), with aluminium production and petroleum refining facilities contributing the most to this change (Table 5). Emission decreases resulted from technological change in

13 [AER] Alberta Energy Regulator. 2020. Alberta's Energy Reserves and Supply/Demand Outlook. [revised 2020 Jun]. Available at: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98.

14 Statistics Canada. Table 25-10-0019-01 Electricity from fuels, annual generation by electric utility thermal plants.

15 Statistics Canada. Table 25-10-0019-01 Electricity from fuels, annual generation by electric utility thermal plants.

16 Statistics Canada Table 25-10-0020-01 Electric power, annual generation by class of producer.

aluminium production,[17, 18, 19] the closure of aluminium smelters in Quebec, and the conversion of a petroleum refinery to a storage terminal.

The Mining, Quarrying, and Oil and Gas extraction sector has shown an increasing trend over the last decade (Figure 11). Most of the increase (between 2005 and 2019) was driven by oil sands extraction facilities in Alberta (57 Mt growth since 2005) and thermal heavy oil extraction in Saskatchewan, reflecting this sector's steady growth trend.

4 FACILITY-REPORTED EMISSIONS AND THE NATIONAL GHG INVENTORY

The total facility-reported GHG emissions for 2019 collected under the GHGRP represent 40% of Canada's total GHG emissions in 2019 (730 Mt) and 64% of Canada's industrial GHG emissions.[20] The GHGRP applies to large GHG-emitting facilities (mostly industrial) and does not cover diffuse sources of GHG emissions such as road transportation and agricultural sources, whereas the National GHG Inventory is a complete accounting of all GHG sources and sinks in Canada.

When comparing the provincial and territorial breakdown of the facility-reported emissions to the corresponding information in the National GHG Inventory, the distribution of emissions by province shows a similar pattern (Figure 12). Alberta has the highest emissions, followed by Ontario. Saskatchewan accounted for the third largest portion of total reported emissions in the GHGRP while Quebec is the third major contributor to the total emissions of the National GHG Inventory. This pattern of industrial emissions reflects the regional concentration of large industrial facilities and trends in the use of fossil fuels for energy production.

Although the facility-reported emissions may capture 64% of industrial GHG emissions nationally, the degree of coverage at the provincial level varies from province to province (Figure 13), due to the size and number of industrial facilities in each province that have emissions above the 10 kt CO_2 eq. reporting threshold. The degree of coverage are fairly high for some provinces and territories, for example, the reported emissions in 2019 captured approximately 86% of industrial emissions in Newfoundland and Labrador, and 88% of total industrial emissions in Yukon and the Northwest Territories.

Where appropriate, the facility-reported emissions data are used by Environment and Climate Change Canada in the national GHG inventory, which is developed largely from national and provincial statistics based on internationally-recognised emission estimation methodologies. The extent to which the facility-reported GHG emissions data could be fully integrated into the national inventory is dependent on the level of detail and type of data available. This integration of the facility-reported data is a key objective for the recent expansion to reporting under the GHGRP.

5 ADDITIONAL INFORMATION ABOUT THE GREENHOUSE GAS REPORTING PROGRAM

5.1 Data Quality

Facilities that meet the GHG reporting requirements under the GHGRP must ensure that the reported data are reliable. Facilities are required by law to submit information that is true, accurate and complete to the best of their knowledge. CEPA sets out penalties for companies that fail to report or that knowingly submit false or misleading information. Reporters have a legal obligation to keep copies of the information submitted, along with any calculations, measurements and other data on which the information is based.

17 Based on GHG emission data reported by facilities to the GHGRP.

18 Environment Canada. 2008. Environmental Performance Agreement Concerning Atmospheric Emissions of Polycyclic Aromatic Hydrocarbons between EC and Alcoa.

19 Environment Canada. 2008. Environmental Performance Agreement Concerning Atmospheric Emissions of Polycyclic Aromatic Hydrocarbons between EC and Rio Tinto Alcan.

20 In this overview report, Canada's industrial GHG emissions include emissions from the following GHG categories from the National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada: Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste. Based on preliminary data from the latest National Inventory Report.

Figure 12: **Provincial/Territorial Contribution to 2019 Facility-Reported Greenhouse Gas Reporting Program Total and the National Inventory Total**

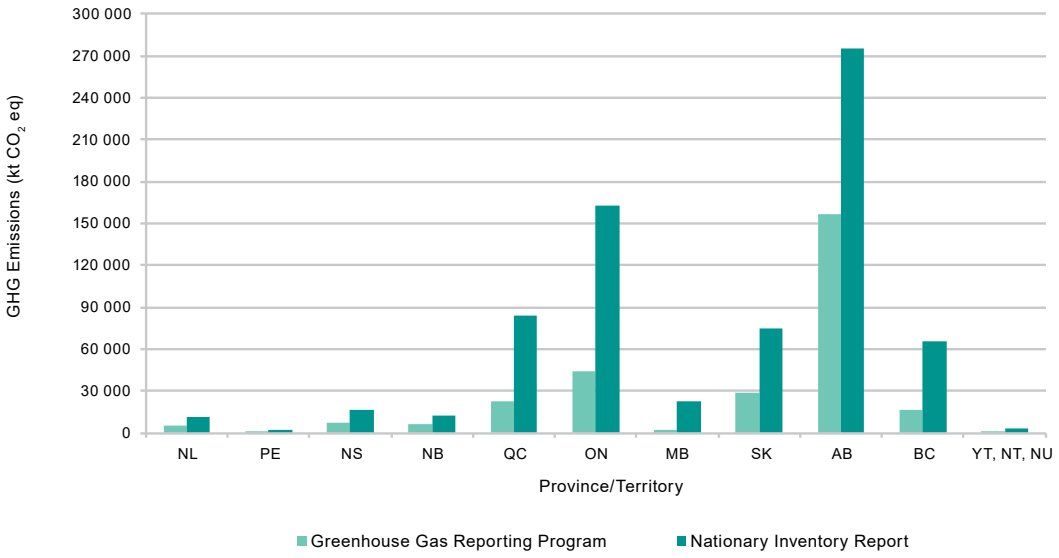
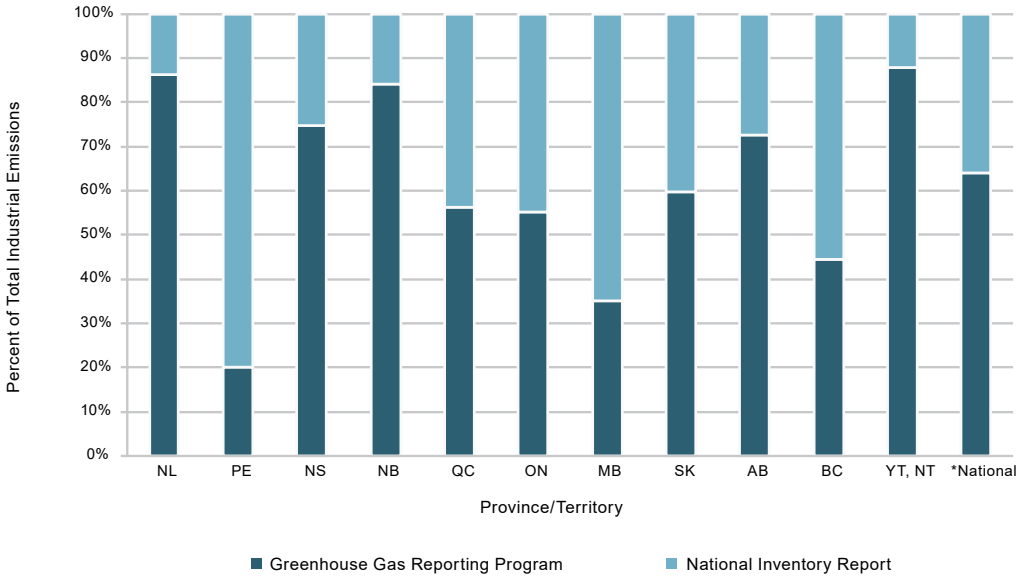


Figure 13: **2019 Facility-Reported Emissions as a Percentage of National and Provincial/Territorial Industrial Greenhouse Gas Emissions from the National Inventory**



Notes:

In this overview report, Canada's industrial GHG emissions include the following GHG categories from the National Inventory Report, Greenhouse Gas Sources and Sinks in Canada 1990–2019: Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste.

* Nunavut is not included due to the lack of data

All information must be kept for a period of three years from the date on which it was required to be reported to Environment and Climate Change Canada.

The data provided in this report are for information purposes only. Environment and Climate Change Canada conducted a number of data quality checks of the submitted data for compliance purposes and for completeness, and it will continue to analyze the data, which may result in periodic updates.

The data received from facilities are subject to various levels of review as part of the quality control/quality assurance (QC/QA) process set out under the GHGRP to resolve data gaps or inconsistencies and potential reporting errors. Examples[21] of the types of checks completed are:

- Review of emitters failing to report emissions (may be below the threshold or notified below threshold)
- Review of significant changes in emissions from previous to current year
- Comparison of expected emissions for specific industries
- Comparison of reported data with alternate or independent sources of the same data
- Review of methods used and results of emission calculations

5.2 Public Access

The GHGRP provides public access to information from all facilities that reported GHG emissions to the program through an annual online publication. In addition to this summary report, the facility-level data are presented in the form of tables, a searchable database and a downloadable format. Users can search by emissions of a specific gas or emissions of all gases, by facility name or GHGRP identification number, by National Pollutant Release Inventory (NPRI) identification number, by reporting company, by province/territory or city, or by industry sector, using the NAICS[22] code. Users can also access a web-based mapping tool on the Canadian Environmental Sustainability Indicators website, which shows where reporting facilities are located in Canada.

To access the data or obtain further information on the GHGRP or the National Greenhouse Gas Inventory program, consult the following websites:

Reported Facility GHG Data
https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/data.html

Reporting to the GHGRP
https://www.canada.ca/ghg-reporting

Canada's Official GHG Inventory
https://www.canada.ca/ghg-inventory

Canadian Environmental Sustainability Indicators
https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/climate.html

5.3 Links to NPRI and Provincial Reporting

The GHGRP is similar to, yet distinct from, the NPRI. Although both programs are delivered by Environment and Climate Change Canada under the authority of section 46 of CEPA, the NPRI collects data from facilities on pollutant releases (to air, water and land), disposals and transfers for recycling, whereas the GHGRP collects data from facilities on GHG emissions. Facilities reporting to the GHGRP are asked to report their NPRI identification number to facilitate searching and comparison of emissions from facilities that report to both programs.

A number of provincial jurisdictions also require facilities to report GHG emissions information annually under specific provincial regulations. Efforts have been undertaken to streamline the reporting process between the national and various provincial jurisdictions, resulting in the launch of a single-window reporting system to help reduce the reporting burden on industry and the overall cost to government. This single-window system allows one-time entry for information commonly required at both levels, while accommodating requirements that are jurisdiction-specific. Provinces currently using this reporting system include Alberta, British Columbia, Ontario, New Brunswick, Nova Scotia and Saskatchewan.

Facilities in the industry sectors subject to the recently expanded federal reporting requirements, and who already report similar data to provincial GHG reporting programs/regulations in British Columbia, Nova Scotia, Quebec, and Newfoundland and Labrador, had the option to include their provincial report as part of their GHGRP report.

21 These are only some of the QC/QA processes that the GHGRP performs on the data to ensure a sufficient and reliable dataset. Many more process checks are also performed.

22 The NAICS is an industry classification system that was developed by the statistics agencies of Canada, the United States and Mexico to enable them to collect comparable statistical data. It is a comprehensive system that encompasses all economic activities using six-digit codes. In Canada, the NAICS 2017 consists of 20 sectors, 102 subsectors, 322 industry groups, 708 industries and 923 national industries.

The GHGRP processes the provincial reports and amends the federal report to include relevant data from those provincial reports that meet the expanded requirements. The GHGRP checks the provincial data provided in order to ensure sufficient and reliable data that fully complies with the federal requirements, and will contact the facility reporter to resolve any gaps or data issues in the submitted data.

CONTACT US 6

If you have questions about this report or for more information about its content, please contact the GHGRP:

Environment and Climate Change Canada
Greenhouse Gas Reporting Program

Place Vincent Massey, 7th Floor

351 St. Joseph Boulevard

Gatineau, Quebec K1A 0H3

E-mail: ec.ges-ghg.ec@canada.ca

Telephone: 1-877-877-8375

Website: canada.ca/ghg-reporting