

OVERVIEW OF 2022 REPORTED EMISSIONS



Suggested citation for this document: Environment and Climate Change Canada. 2024. *Overview of 2022 Reported Emissions—Facility Greenhouse Gas Emissions Reporting Program*. Available online at: canada.ca/ghg-reporting.

Cat. No.: En81-6/1E-PDF

ISSN: 2371-1035

EC21276

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from Environment and Climate Change Canada's copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

Environment and Climate Change Canada

Public Information Centre

Place Vincent Massey building

351 St-Joseph boulevard

Gatineau Quebec K1A 0H3

Toll free: 1-800-668-6767

Email: enviroinfo@ec.gc.ca

Photo: © Getty Images

© His Majesty the King in Right of Canada, represented by the Minister of Environment and Climate Change, 2024

Aussi disponible en français

Aperçu des émissions déclarées de 2022—Déclaration des gaz à effet de serre par les installations

TABLE OF CONTENTS

Highlights	2
1 Greenhouse Gas Reporting Program	3
2 Reported 2022 Greenhouse Gas Emissions	4
2.1. Emission Calculation Methods	6
2.2. Greenhouse Gases and Global Warming Potentials	7
2.3. Reported GHG Emissions by Gas	8
2.4. Reported GHG Emissions by Source	8
2.5. Reported GHG Emissions by Province/Territory	10
2.6. Reported GHG Emissions by Sector	10
3 Trends in Reported GHG Emissions.....	14
3.1. National-Level Trends	14
3.2. Trends by Industry Sector and by Province/Territory	15
3.2.1. Short-Term Changes	16
3.2.2. Long-Term Trends	19
4 Facility-Reported Emissions and the National GHG Inventory	21
5 Additional information about the Greenhouse Gas Reporting Program	23
5.1. Data quality	23
5.2. Public access	23
5.3. Links to Other Federal Facility Reporting and Provincial Reporting	24
6 Contact Us.....	24

HIGHLIGHTS

- 1814 facilities reported their greenhouse gas (GHG) emissions in 2022 to Environment and Climate Change Canada (ECCC), totalling 293 megatonnes (Mt)¹ of carbon dioxide equivalent (CO₂ eq.). Total emissions were 1.6% greater than the reported total in 2021 (289 Mt), due mainly to increased emissions in the Mining, Quarrying, and Oil and Gas Extraction sector (7Mt).
- The majority of reported emissions are distributed across three sectors: (i) Mining, Quarrying, and Oil and Gas Extraction (43%), (ii) Manufacturing (29%), and (iii) Utilities (21%) — amongst all facilities, those engaged in oil/gas extraction and electricity generation account for 58% of the total reported emissions in 2022.
- 58 facilities reported emissions of 1 Mt of CO₂ eq. or more in 2022, accounting for just over half (53% or 156 Mt) of the total facility-reported emissions. 538 facilities reported emission levels in the 50 kilotonne (kt) to 1 Mt range (39% or 113 Mt), while 1218 facilities emitted below 50 kt in 2022, accounting for the remaining 8% (24 Mt).
- Since 2005, total emissions from facilities in the Utilities and Manufacturing sectors declined by 63 Mt and 7 Mt, respectively, while emissions reported by facilities in the Mining, Quarrying, and Oil and Gas Extraction sector increased by 77 Mt (mainly due to continued growth in the oil and gas sector and, to a lesser extent, an increased number of facilities reporting since 2017). These sectoral trends mirror those reported in [Canada's Official GHG Inventory](#).²
- The reported emissions reduction in Utilities (63 Mt) since 2005 was 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 (7 Mt) since 2005 was mostly attributed to the petroleum refining sector and manufacturers of aluminium, cement, and iron and steel.
- The GHG emissions reported by facilities during the 2022 reporting cycle represent 41% of Canada's total GHG emissions (708 Mt in 2022) and 62% of Canada's industrial GHG emissions, as reported in Canada's Official GHG Inventory.
- Starting in 2022, key program changes were introduced through the publication of a 2-year notice for the reporting of 2022 and 2023 emissions. Environment and Climate Change Canada continues to assess potential changes to reporting requirements and further expansion in future years.
- The global warming potentials (GWPs) of each GHG were updated to reflect values from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.³ Environment and Climate Change Canada applied these updated GWPs to the historical facility reported emissions data and will use them going forward.

1 1 Mt = 1 megatonne = 1 million tonnes or 1 000 kilotonnes (kt)

2 In this overview report, Canada's industrial GHG emissions include those from the following GHG categories from the *National Inventory Report 1990–2022: Greenhouse Gas Sources and Sinks in Canada*: Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste. The National Inventory Report is available on Canada's official greenhouse gas inventory website: canada.ca/ghg-inventory.

3 IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

GREENHOUSE GAS REPORTING PROGRAM

The Government of Canada established the Greenhouse Gas Reporting Program (GHGRP) in March 2004 under the authority of section 46 of the *Canadian Environmental Protection Act, 1999* (CEPA) to annually collect GHG emissions information from Canadian facilities. A notice is published annually in the *Canada Gazette* that describes the reporting requirements under the program, and any facility subject to the reporting criteria is required to report. To date, facility-reported GHG information has been collected and published through the GHGRP for the period of 2004 to 2022. This program is part of ongoing efforts to develop and maintain, in collaboration with several Canadian provincial government jurisdictions, 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. Data collected are also shared with provinces and territories.

In December 2016, Environment and Climate Change Canada (ECCC) published a Notice of Intent to inform stakeholders of its intent to expand the GHGRP, and specific requirements were expanded progressively over two phases during 2017 and 2018. Starting with 2017 data, the reporting threshold was lowered from 50 kilotonnes (kt) to 10 kt of GHGs in carbon dioxide equivalent (CO₂ eq.) units. Facilities in 13 industry sectors were also required to use prescribed methods issued by ECCC to quantify their emissions and to report additional information on their calculations. These industry sectors were: cement, lime, aluminium, iron and steel manufacturing, mining, ethanol production, electricity and heat generation, ammonia production, nitric acid production, hydrogen production, petroleum refineries, pulp and paper production, and base metal production. As part of the expansion efforts in 2017, ECCC also began collecting information from facilities engaged in CO₂ capture, transport, injection, and geological storage activities.

ECCC will continue to assess potential changes and further expand reporting requirements under the GHGRP, with the aim of facilitating the direct use of the facility data in the National GHG Inventory, thus better reflecting emission changes occurring at individual facilities. Expansion will also continue to focus on improving the granularity, consistency and comparability of GHG data across Canada, and obtain a more comprehensive picture of facility emissions.

ECCC has completed the collection and review of GHG emissions information for the 2022 calendar year. Any facility with annual GHG emissions of 10 kt CO₂ eq. or higher in 2022 was required to report to the program. The *Notice with respect to reporting of greenhouse gases (GHGs) for 2022 and 2023*, published in the *Canada Gazette* on January 28, 2023,⁴ reflects the federal reporting requirements for 2022 data, submitted by facilities to ECCC in 2023. The data used in this overview report are current as of October 31, 2023. Subsequent company updates or new reports received will be included in future data releases.

The above 2-year notice similarly applies to reporting by facilities for the upcoming 2023 cycle (data scheduled to be submitted by June 3, 2024). ECCC also published the *Notice with respect to reporting of greenhouse gases (GHGs) for 2024 and 2025*⁵ in the *Canada Gazette* on December 9, 2023. This notice covers two years of reporting, setting out the federal reporting requirements for 2024 and 2025 data, scheduled to be submitted by facilities to ECCC by June 2, 2025, and June 1, 2026, respectively. This combined notice continues the expanded requirements for the sectors and activities identified above while also introducing several changes that were consulted on in summer 2023. Further expansion of the program will be assessed in future reporting cycles.

4 The *Notice with respect to reporting of greenhouse gases (GHGs) for 2022 and 2023* can be accessed in the *Canada Gazette*: <https://canadagazette.gc.ca/rp-pr/p1/2023/2023-01-28/html/sup1-eng.html>. This notice represents the first 2-year notice issued under the GHGRP, an important program change from previous years when annual notices were issued.

5 The *Notice with respect to reporting of greenhouse gases (GHGs) for 2024 and 2025* can be accessed in the *Canada Gazette*: <https://canadagazette.gc.ca/rp-pr/p1/2023/2023-12-09/html/sup1-eng.html>.

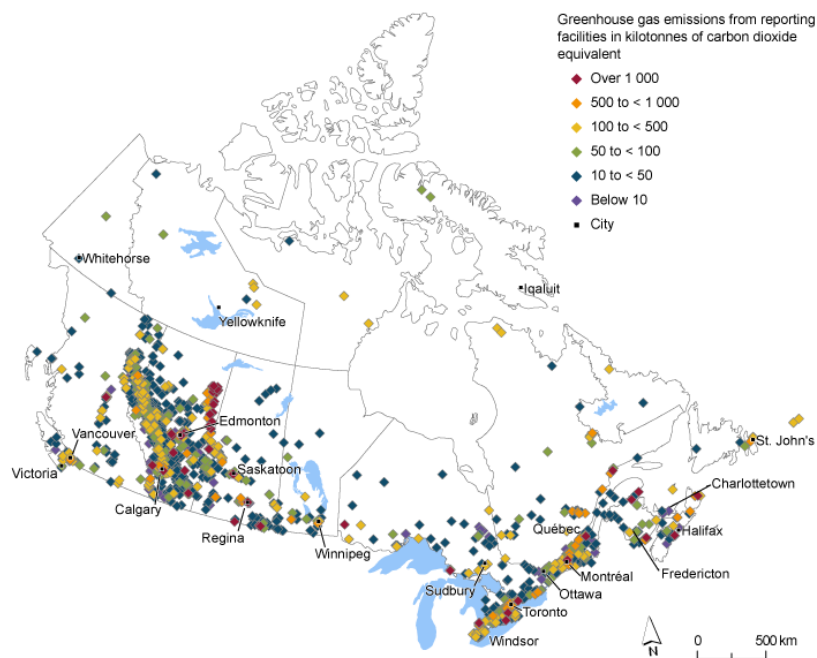
REPORTED 2022 GREENHOUSE GAS EMISSIONS

For the purposes of the GHGRP, a facility⁶ 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 1814 facilities reported their GHG emissions to Environment and Climate Change Canada for the 2022 calendar year, collectively emitting a total of 293 Mt of GHGs⁷ (Figure 1). Of these facilities, 596 reported GHG emission levels greater than 50 kt, accounting for 92% (269 Mt) of the total reported emissions, and 58 emitted more than 1 Mt, accounting for over half (53% or 156 Mt) of the overall total emissions (Figure 2a). These highest emitters fall within several industrial sectors that include oil sands extraction (45%), electric power generation (22%), petroleum refineries (9%), and primary metal manufacturing (8%) such as iron, steel, and aluminium (Figure 2b).

Among all reported facilities, 1071 reported GHG emission levels in the 10 to 50 kt range, accounting for 8% (24 Mt) of the total reported emissions. These facilities belong to a number of sectors, such as oil and gas extraction (519 facilities), waste treatment and disposal (78 facilities), and food manufacturing (72 facilities).

Figure 1 **Map of Facilities Reporting 2022 Greenhouse Gas (GHG) Emissions to Environment and Climate Change Canada**



Notes:

a. Map excludes pipeline transportation systems.

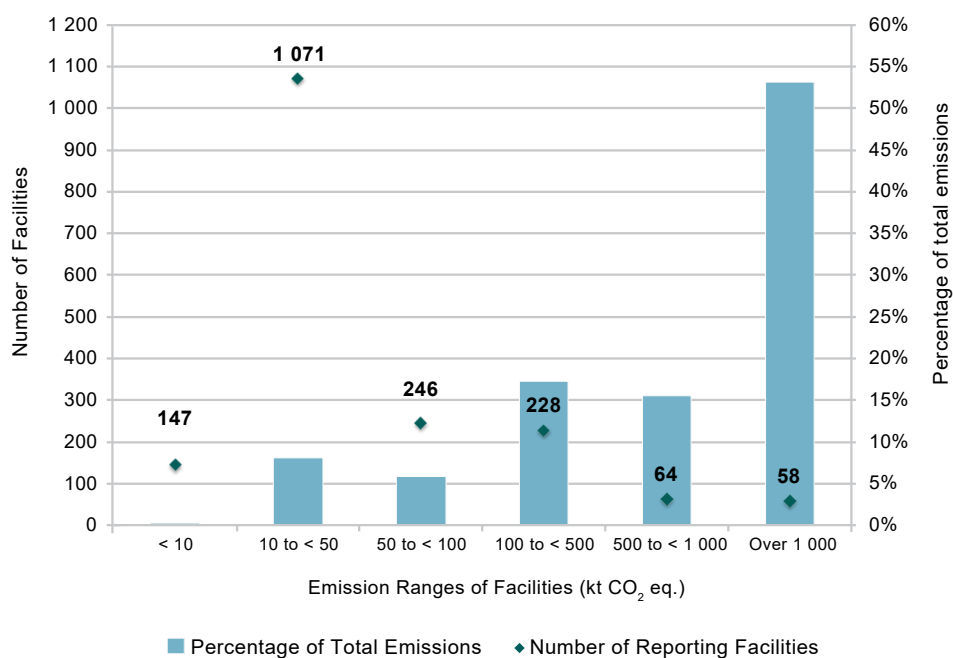
b. Map provided by the Canadian Environmental Sustainability Indicators program (<https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions/large-facilities.html>).

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 CO₂ eq. units (see section 2.2)

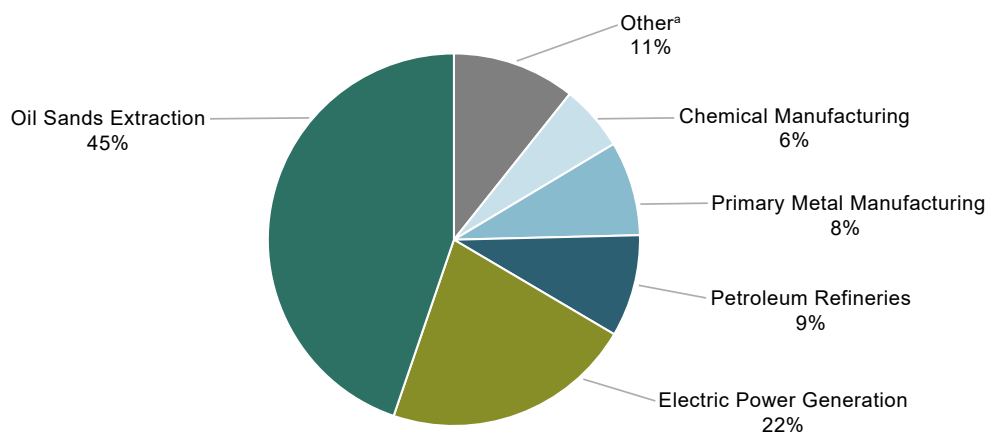
Facilities with emissions falling below the reporting threshold of 10 kt per year can voluntarily report their GHG emissions; 147 facilities did so for the 2022 calendar year, representing 0.2% (0.70 Mt) of total emissions. All voluntarily reported emissions are included in this report and in the dataset published by Environment and Climate Change Canada.

Figure 2a **Contribution of Facilities in Various Emission Ranges to Total Reported Emissions (2022)**



Note:
a. Facilities in the 0-10 kt range voluntarily reported their emissions.

Figure 2b **Breakdown of 2022 Emissions by Sector for Facilities with Total Emissions over 1000 kt CO₂ eq.**



Note:
a. "Other" includes various types of facilities such as natural gas transportation pipelines and cement manufacturers.

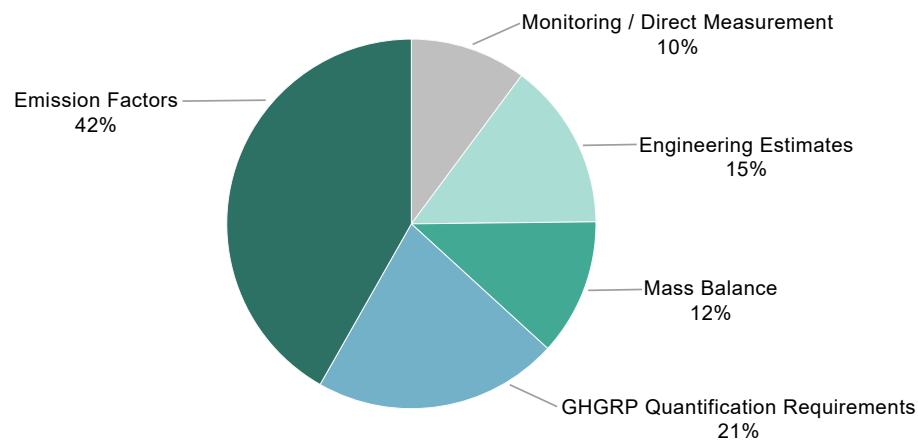
2.1. Emission Calculation Methods

Facilities reporting to the GHGRP (except those subject to expanded requirements) may choose among several 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, emission factor-based methods are the most popular among facilities (Figure 3). Generally, a CO₂ emission factor is a measure of the available carbon from a fuel, a feedstock, or a mass balance of an industrial or manufacturing process, such as burning a specific fuel type or producing a specific industrial product. CH₄ and N₂O emission factors take into consideration technology abatement and efficiency; as such, emission factors used may be general or technology-specific. Mass balance methods apply the law of conservation of mass to a facility, process, or piece of equipment, examining the difference between inputs and outputs of an operation. Direct measurement methods may use a continuous monitoring system to detect CO₂ concentration in gas streams, predictive emission monitoring based on measured emissions rates and process parameters, or source testing (e.g. stack sampling). Engineering estimates involve estimating emissions based on engineering principles and judgement, incorporating knowledge of the chemical or physical processes involved. Many facilities used more than one calculation method to determine their emissions.

Figure 3 **Types of Methods Used by Facilities to Determine GHG Emissions in 2022**



Note: Totals may not sum to the expected value due to rounding.

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 warming effect on the atmosphere. Each GHG species has its own atmospheric lifetime and radiative forcing potential (i.e. ability to trap heat), referred to as a global warming potential (GWP). GHG emissions are often calculated and reported in terms of how much CO₂ would be required to produce a similar warming effect over a given time horizon. This is called the carbon dioxide equivalent (CO₂ eq.) value and is calculated by multiplying the amount of gas by its associated metric, such as the GWP (Table 1). For example, the 100-year GWP for methane (CH₄) is 28, which means that each tonne of CH₄ released to the atmosphere is considered to have a cumulative warming effect over the next 100 years equivalent to emitting 28 tonnes of CO₂.

ECCC 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 2022 and 2023*. Starting with the collection of 2022 emissions, the GHGRP has incorporated the use of updated GWP values provided in the Fifth Assessment Report of the IPCC⁹ (Table 1).

Greenhouse Gas	Previous 100-year GWP (Fourth Assessment Report ^a)	Updated 100-year GWP (Fifth Assessment Report ^{b, c})
Carbon dioxide (CO ₂)	1	1
Methane (CH ₄)	25	28
Nitrous oxide (N ₂ O)	298	265
Sulphur hexafluoride (SF ₆)	22 800	23 500
Hydrofluorocarbons (HFCs), 13 species	Ranges from 92 to 14 800	Ranges from 116 to 12 400
Perfluorocarbons (PFCs), 7 species	Ranges from 7 390 to 12 200	Ranges from 6 630 to 11 100

Note:

a. United Nations Framework Convention on Climate Change (UNFCCC), 2014. FCCC/CP/2013/10/Add.3. Decision 24/CP.19. Revision of the UNFCCC Reporting on annual inventories for Parties included in Annex I to the Convention, November 2013.

b. IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

c. GWPs were updated in 2024 and applied to all years.

The emissions expressed in CO₂ eq. values from facility data reported in previous years have been recalculated to ensure that the entire time series (2004–2022) is consistent and comparable, and that the GWP change does not affect emission trends. The changes resulting from the application of the updated GWP values did not alter the actual emissions data reported by facilities. The GWP values used by the GHGRP are consistent with those used in Canada's 2024 edition of the National Greenhouse Gas Inventory, as required by international reporting guidelines under the United Nations Framework Convention on Climate Change (UNFCCC). Both reports are using the same approach to incorporate the updated GWP values.

To better understand how updating the GWPs affected the historically-reported emissions data, ECCC compared the total emissions data from 2021 before and after incorporation of the updated GWPs. This change to the GWP values resulted in a very minor revision (+0.5% or 1.4 Mt) in the overall total reported emissions for 2021. In recalculating the quantities for the individual gases, the largest changes are observed in total CH₄ emissions (+12% or 1.7 Mt) given the larger GWP value (from 25 to 28) and in N₂O emissions (-11% or 0.4 Mt) where the GWP value was reduced (from 298 to 265; Table 2). Certain subsectors have a significant portion of their emissions coming from these gases. For example, CH₄ accounts for 75% of the emissions from the pipeline transportation of natural gas subsector, and their reported emissions in 2021 were revised up by 95 kt CO₂ eq. or 8.7% with the adjusted GWPs. Other sectors with emissions influenced by changes in the methane GWP include coal mining (137 kt or 4.8%) and waste management and remediation services (862 kt or 10.8%).

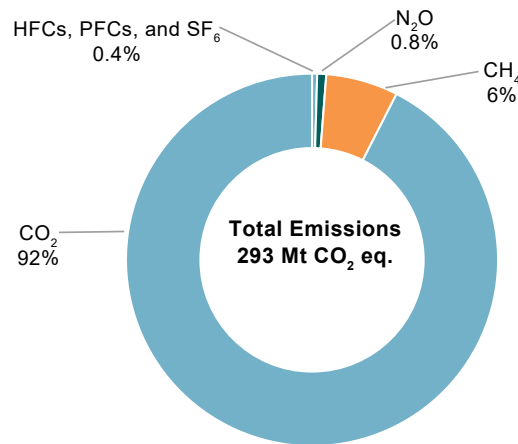
GHG emissions (kt CO ₂ eq.)	CO ₂	CH ₄	N ₂ O	SF ₆	HFC	PFC	Total
Previous 100-year GWPs (Fourth Assessment Report)	266 957	15 571	3 465	204	392	739	287 329
Updated 100-year GWPs (Fifth Assessment Report)	266 957	17 440	3 081	210	367	665	288 720
% change	0.0%	12.0%	-11.1%	3.1%	-6.3%	-10.1%	0.5%

9 IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

2.3. Reported GHG Emissions by Gas

CO₂ represented the majority (92%) of the total reported emissions in 2022, while methane (CH₄) and nitrous oxide (N₂O) emissions contributed 6% and 0.8%, respectively (Figure 4). Facilities are also required to report emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) stemming from industrial processes or industrial product use. The combined emissions of these gases accounted for the remaining 0.4% (1.3 Mt).

Figure 4 Reported 2022 Greenhouse Gas Emissions by Gas



Note: Totals may not sum to the expected value due to rounding.

2.4. Reported GHG Emissions by Source

When reporting to the GHGRP, facilities are required to report GHG emissions under the following emission source categories:¹⁰ stationary fuel combustion, industrial processes, fugitive sources including venting, flaring and leakage, on-site transportation, waste and wastewater.¹¹ Stationary fuel combustion is the largest source of reported emissions, representing 75% of the total (Figure 5) and CO₂ is the predominant gas released from this activity (Figure 6). 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. CO₂ emissions from the combustion of biomass materials must be reported to the GHGRP but are not included in the facility-reported total.¹² 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). Key sources of reported CH₄ emissions include waste emissions from the disposal and treatment of solid waste at landfills and fugitive emissions from fossil fuel production (coal, oil, and natural gas).

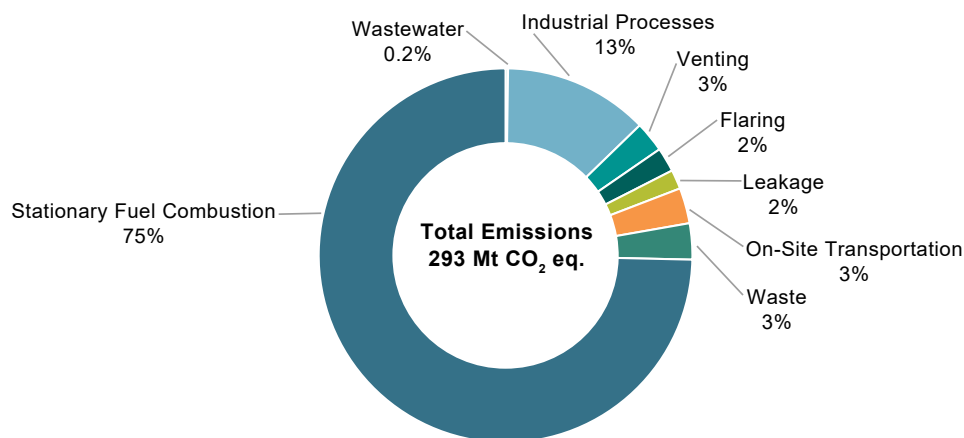
As of 2017, ECCC began collecting information from facilities engaged in CO₂ capture, transport, injection, and geological storage (collectively called carbon capture, transport and storage, or CCTS) activities. In 2022, 16 facilities reported quantities of CO₂ from different components under this set of CCTS activities. These facilities were located in Alberta, Manitoba, and Saskatchewan. Among these, four facilities engaged in long-term geological storage, reporting a collective total of 1086 kt of captured CO₂ that was injected and stored underground. Additionally, six facilities utilized CO₂ injection for enhanced fossil fuel recovery, using a total of 6352 kt of CO₂.

¹⁰ Additional information on these emission source categories can be found in the latest Technical Guidance on Reporting Greenhouse Gas Emissions: <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/reporting/technical-guidance-2022.html>

¹¹ Some source categories were modified and updated as part of the GHGRP expansion and are applicable to the data reported since 2017.

¹² In 2022, the combustion of biomass materials accounted for 34 Mt of CO₂ emissions. These emissions are not included in this report.

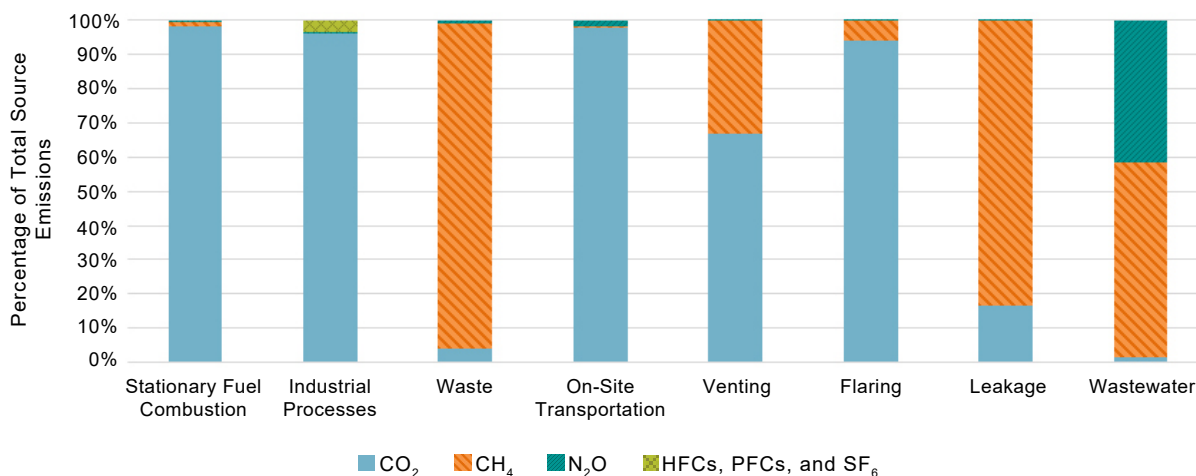
Figure 5 **Reported 2022 Greenhouse Gas Emissions by Emission Source**



Note: Totals may not sum to the expected value due to rounding.

The distribution of gases within each emission source varies (Figure 6). The emissions stemming from stationary fuel combustion, industrial processes, venting, flaring, and on-site transportation are dominated by CO₂. However, the emission sources including wastewater, waste, and fugitive leakage are the main contributors to the reported emissions of methane (CH₄). Emissions of HFCs, PFCs, and SF₆ are captured under the industrial processes category and include quantities released when used as an industrial product (e.g., used as a cover gas, foam blowing). N₂O emissions were reported, mostly in very small quantities (< 2% of total emissions in most categories), but make up a significant portion of the emissions captured in the wastewater category (42%).

Figure 6 **Distribution of Greenhouse Gases from Each Emission Source (2022)**



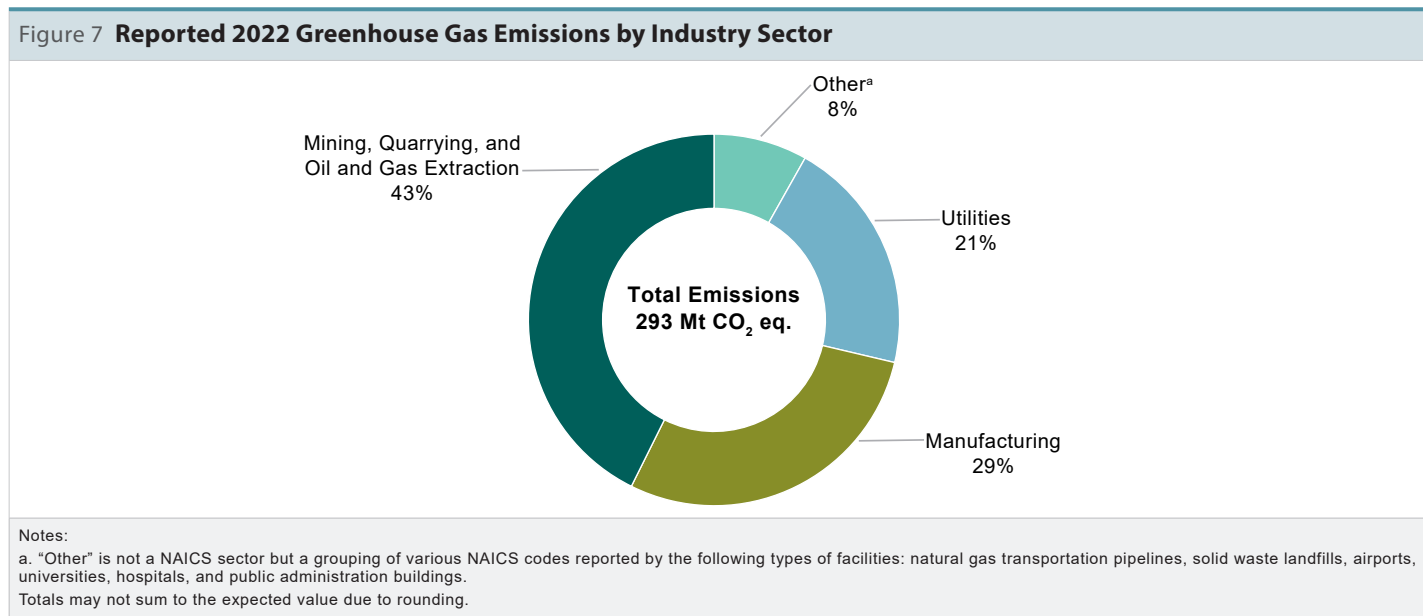
2.5. Reported GHG Emissions by Province/Territory

Facilities in the province of Alberta accounted for the largest share of reported emissions, with approximately 53% of the total, followed by facilities in Ontario (16%), Saskatchewan (10%) and Quebec (8%; Table 3). The number of facilities, the quantity and type of fuel consumed, and the predominant industry largely explain this regional distribution. For example, over half of the reported emissions from Alberta are from the oil and gas extraction and oil sands subsectors, while in Ontario and Quebec, reported emissions from the manufacturing sector dominate the facility-level data collected under the program. More information on the regional distribution of reported emissions across different industry sectors is provided in section 3.2.

Province/Territory	Number of Facilities	Total Emissions (kt CO ₂ eq.)	Percentage of Total Emissions
Newfoundland and Labrador	13	3 179	1%
Prince Edward Island	3	52	0.02%
Nova Scotia	22	6 447	2%
New Brunswick	25	7 342	3%
Quebec	197	22 633	8%
Ontario	400	47 806	16%
Manitoba	45	2 896	1%
Saskatchewan	139	28 399	10%
Alberta	750	156 144	53%
British Columbia	207	17 213	6%
Nunavut	5	597	0.2%
Northwest Territories	6	575	0.2%
Yukon	2	29	0.01%
Total	1 814	293 311	100%

2.6. 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).¹³ In 2022, three NAICS defined industry sectors accounted for the majority of GHG emissions: the Mining, Quarrying, and Oil and Gas Extraction sector (NAICS 21), representing 43% (125 Mt) of total reported emissions; the Manufacturing sector (NAICS 31-33), accounting for 29% (84 Mt); and the Utilities sector (NAICS 22), primarily facilities generating electricity from fossil fuels, accounting for 21% (60 Mt; Figure 7). The remaining 8% (24 Mt) of emissions captured under “Other” were reported by various types of facilities, mainly natural gas transportation pipelines (12 Mt) and waste management facilities (9 Mt).



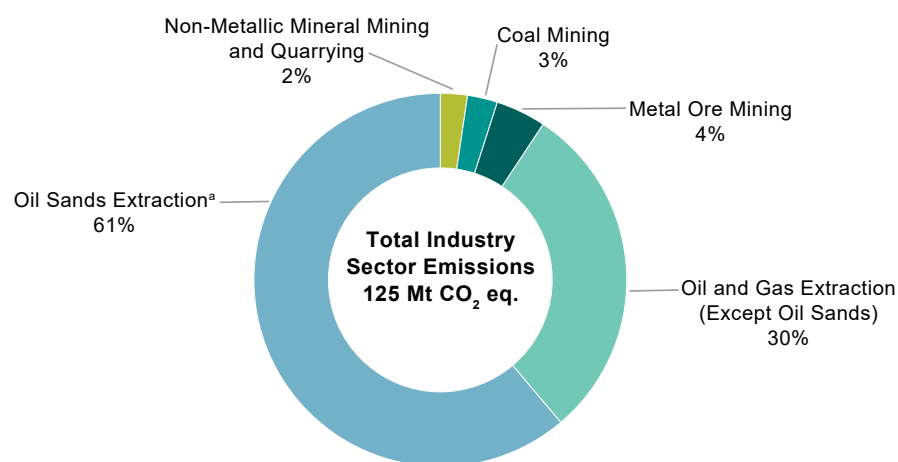
13 The NAICS is an industry classification system that was developed by the statistics agencies of Canada, the United States and Mexico to enable them to collect comparable statistical data. It is a comprehensive system that encompasses all economic activities using six-digit codes. In Canada, the NAICS 2022 version 1.0 consists of 20 sectors, 99 subsectors, 323 industry groups, 694 industries and 923 national industries. NAICS 2022 can be accessed on Statistics Canada’s website (<https://www.statcan.gc.ca/en/subjects/standard/naics/2022/v1/index>).

Activities of reporting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector (Figure 8) can be further broken down into three main subcategories:

1. Oil sands extraction (61% of sector emissions)
2. Oil and gas extraction (except oil sands) (30%)
3. Mining (9%)
 - a) Metal ore mining (e.g. iron ore) (4%)
 - b) Coal mining (3%)
 - c) Non-metallic mineral mining and quarrying (2%)

The oil sands extraction subsector includes facilities involved in oil sands mining as well as in-situ bitumen production and heavy oil/bitumen upgrading. Coverage of emissions from the oil and gas extraction (except oil sands) subsector grew considerably when more natural gas processing plants, oil/gas battery operations and compressor stations were required to report to the GHGRP due to the threshold change in 2017 (from 50 kt to 10 kt). The number of reporting facilities in this subsector rose from 117 (17% of reported emissions in this sector) to 775 (30%). Between 2021 and 2022, there was an increase of 24 facilities reporting to this subsector.

Figure 8 **Reported 2022 Greenhouse Gas Emissions by Subsectors of Mining, Quarrying, and Oil and Gas Extraction**



Notes:

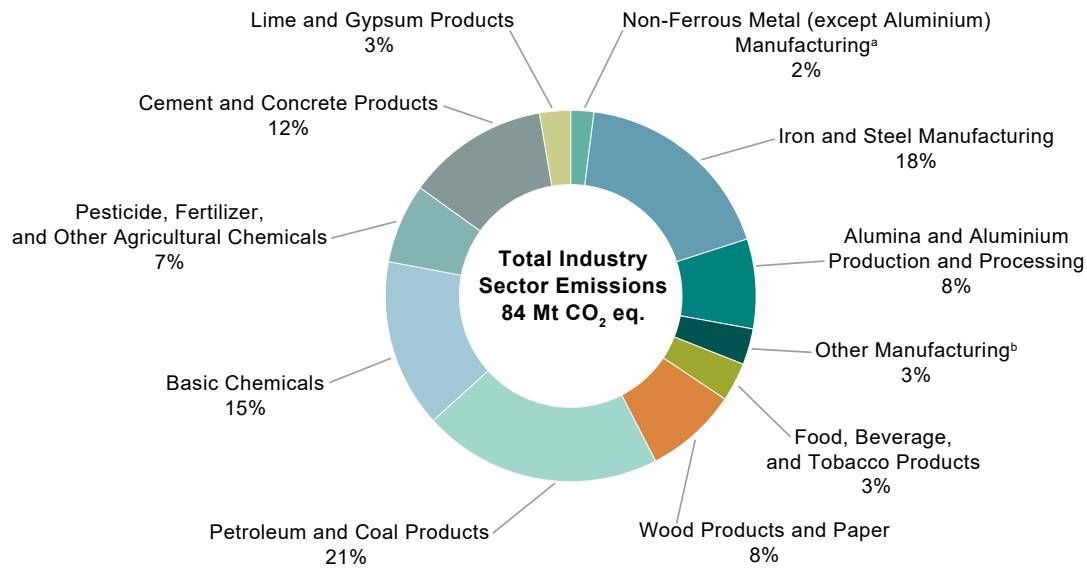
a. Includes facilities engaged in oils sands mining, in-situ bitumen production and upgrading.
Totals may not sum to the expected value due to rounding.

The Manufacturing sector (Figure 9) includes a wide range of industrial activities, with important contributors to the reported 2022 emissions being:

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 (12%).

Similar to the Mining, Quarrying, and Oil and Gas Extraction sector, the number of reporting facilities within the Manufacturing sector increased due to the threshold change in 2017. For example, the number of reporting facilities in the food, beverage, and tobacco products manufacturing subsector grew from 15 in 2016 to 101 in 2022, and their respective contribution to the reported total for Manufacturing increased from 1% to 3%.

Figure 9 **Reported 2022 Greenhouse Gas Emissions by Subsectors of Manufacturing**



Notes:

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

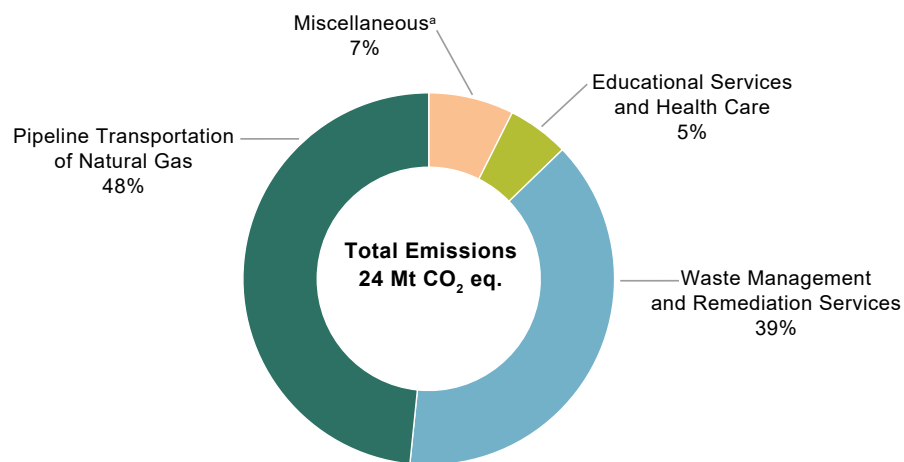
b. "Other Manufacturing" represents other types of manufacturing, including electrical equipment, transportation equipment and furniture manufacturing.

Totals may not sum to the expected value due to rounding.

Reported emissions from facilities with activities outside of the Mining, Quarrying, and Oil and Gas Extraction, Manufacturing, and Utilities sectors are grouped under the "Other" category (Figure 10). Natural gas transportation pipelines account for 48% of the reported emissions in this group, followed by facilities in the waste management and remediation services subsector (mostly landfills), with 39% of reported emissions.

In the waste management and remediation services subsector, more facilities are now required to report to the GHGRP following the 2017 threshold change from 50 to 10 kt CO₂ eq. As a result, the number of reporting facilities in this subsector increased from 59 in 2016 to 145 in 2022. Though facilities in this subsector represented only a small portion (8%) of all reporting facilities for 2022, these facilities are an important source of reported methane emissions, accounting for 47% (or 9 Mt CO₂ eq.) of the total reported methane emissions (18 Mt CO₂ eq.) in 2022.

Figure 10 **Reported 2022 Greenhouse Gas Emissions by Facility Types Grouped under "Other" Category**



Notes:

a. "Miscellaneous" is a grouping of various NAICS codes reported by facilities such as greenhouses and public administration buildings.

Totals may not sum to the expected value due to rounding.

The sources of emissions from the different industry sectors vary by subsector; most have fuel combustion as the major source from their activities (Table 4). One notable exception is iron and steel manufacturing, where most emissions come from industrial processes. Other subsectors with significant industrial process emissions include basic chemical manufacturing, alumina and aluminium production and processing, and cement and concrete product manufacturing. Venting emissions are mainly reported by petroleum refineries, oil and gas extraction facilities, and pipeline operations. Facilities involved in oil sands extraction, coal mining, and metal ore mining accounted for the majority of emissions from on-site transportation.

Table 4 Breakdown of Reported Greenhouse Gas Emissions by Emission Source and by North American Industry Classification System (NAICS) Industry Sector for 2022

NAICS ^a Industry Sector	Number of facilities	Stationary Fuel Combustion	Industrial Processes	Fugitive			On-site Transportation	Waste	Wastewater
				Venting	Flaring	Leakage			
kt CO ₂ eq.									
Total	1 785	208 795	31 853	6 579	5 566	4 888	8 985	9 154	608
21 – Mining, Quarrying, and Oil and Gas Extraction (total)	841	99 708	3 967	2 713	4 233	3 643	8 415	20	26
Oil and gas extraction (except oil sands)	697	30 626	312	2 374	3 248	350	15	0	21
Oil sands extraction ^b	35	63 409	3 244	196	985	2 007	4 289	3	4
Coal mining	21	419	82	142	N/A	1 286	1 338	N/A	0.2
Metal ore mining	62	2 605	326	N/A	N/A	N/A	2 502	17	0.3
Non-metallic mineral mining and quarrying	26	2 651	3	N/A	N/A	N/A	273	0.1	0.1
22 – Utilities (total)	172	58 346	37	64	28	809	28	152	360
Electric power generation	130	57 405	37	1	1	18	5	37	1
Natural gas distribution	12	280	N/A	62	11	791	21	N/A	N/A
Water, sewage and other systems ^c	30	661	0.3	1	16	N/A	2	115	359
31–33 Manufacturing (total)	478	37 158	27 839	2 812	1 204	139	438	228	150
Food, beverages, and tobacco products	97	2 613	26	28	8	7	17	25	65
Wood products and paper	122	6 345	33	N/A	3	1	152	202	48
Petroleum and coal products	20	6 299	41	2 412	654	96	6	N/A	32
Basic chemicals	48	7 503	821	218	389	7	13	1	5
Pesticide, fertilizer, other agricultural chemicals	9	3 243	2 326	152	98	9	12	N/A	0.1
Cement and concrete products	13	3 414	6 244	N/A	N/A	1	29	N/A	N/A
Lime and gypsum products	9	321	41	N/A	N/A	N/A	4	N/A	N/A
Iron and steel manufacturing ^d	28	3 711	11 319	N/A	2	16	102	N/A	0
Alumina and aluminum production and processing	17	871	5 667	N/A	N/A	N/A	32	N/A	N/A
Non-ferrous metal (except alum.) manufacturing ^e	18	1 005	638	2	0.1	1	50	N/A	N/A
Other manufacturing ^f	97	1 833	684	N/A	51	0.1	22	N/A	0.1
Other^g (total)	294	13 583	10	990	101	297	103	8 754	72
Pipeline transportation of natural gas	17	10 485	0	797	58	253	0	N/A	N/A
Waste management and remediation services	142	211	N/A	175	6	39	66	8 739	71
Educational services and health care	40	1 283	1	0	N/A	N/A	2	N/A	N/A
Miscellaneous	95	1 604	9	17	37	5	35	14	1

Notes:

The above table excludes information that is treated as confidential pursuant to sections 51 to 53 of the *Canadian Environmental Protection Act, 1999*.

N/A = not available

Totals may not sum to the expected value due to rounding.

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

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

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

d. 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.

e. 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.

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, airports, universities, hospitals and public administration buildings.

TRENDS IN REPORTED GHG EMISSIONS

The number of facilities reporting GHG emissions to ECCC 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, new facility operations starting up, facility closures and unplanned events can all result in a change in the annual emissions reported. A facility may fall below or attain the reporting threshold from one year to the next or the number of voluntary reporters may also change, affecting the number of reporting facilities. Over the 2005–2022 period, the number of reporting facilities increased from 337 to 1814 (Table 5).

3.1. National-Level Trends

The overall total reported GHG emissions for all facilities were 293 Mt in 2022, an increase of 5 Mt (1.6%) from 2021 reported emissions (Table 5).¹⁴

Over the 2005–2022 period, the number of reporting facilities increased from 337 to 1814, while overall emissions from facilities increased by 6% (15 Mt). The significant increase in the number of reporting facilities since 2005 is largely attributed to the lower thresholds introduced in 2009 (50 kt) and in 2017 (10 kt). Emission changes were also partly impacted by this since more emissions were progressively reported to the program over this period.

For facilities emitting 50 kt of CO₂ eq. or more, total reported emissions were 269 Mt in 2022, compared to 265 Mt for 2021 (Table 5). Over the 2005–2022 period, the number of reporting facilities in this range increased from 323 to 596, largely due to the lower threshold introduced in 2009. However, despite the increase in the number of facilities emitting over 50 kt of CO₂ eq., the combined emissions from facilities in this range have decreased by 3% (9 Mt) since 2005 (Table 5).

For facilities emitting between 10 and 50 kt of CO₂ eq., total reported emissions were 24 Mt in 2022. Reported emissions from these facilities have remained constant since 2017 (24 Mt) when the 10 kt reporting threshold was implemented.

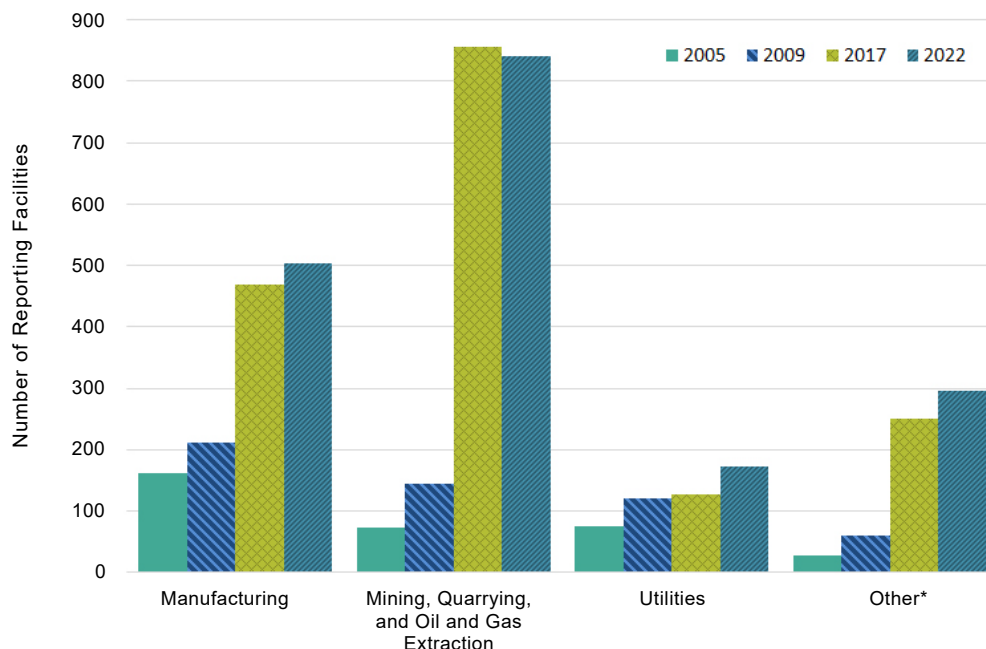
In 2005, the Manufacturing sector had the most reporting facilities with 162 facilities (48%), followed by the Utilities sector with 75 facilities (22%), and the Mining, Quarrying, and Oil and Gas Extraction sector with 72 facilities (21%). However, with each threshold change, first in 2009 and then in 2017, the number of reporting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector grew, and in 2017, this sector overtook Manufacturing to become the industry sector with the highest number of reporting facilities. For 2022, 842 facilities in the Mining, Quarrying, and Oil and Gas Extraction sector reported their emissions, which represents 46% of all reporting facilities (Figure 11). The large number of reporting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector is a reflection of the nature of this industry, particularly the oil and gas extraction (except oil sands) subsector, which is made up of many small operations, such as natural gas processing plants, oil/gas battery operations, and compressor stations.

Table 5 Facility-Reported GHG Emissions, Selected Years

	2005	2009 ^a	2011	2012	2013	2014	2015	2016	2017 ^a	2018	2019	2020	2021	2022
Total Facility Reported Emissions														
Number of Facilities	337	535	548	560	580	587	576	616	1 703	1 763	1 777	1 763	1 768	1 814
GHG Emissions (kt CO ₂ eq.)	278 192	253 352	257 074	260 437	262 364	265 297	265 602	265 498	295 800	296 184	296 613	276 595	288 720	293 311
Facilities with emissions greater than 50 kt CO₂ eq.														
Number of Facilities	323	462	478	488	498	503	494	509	542	556	569	550	576	596
GHG Emissions (kt CO ₂ eq.)	277 959	252 393	255 712	259 224	260 491	263 431	263 821	263 512	272 067	271 940	272 449	252 313	265 094	268 956
Annual Change	N/A	-4.1%	-2.5%	1.4%	0.5%	1.1%	0.1%	-0.1%	3.2%	0.0%	0.2%	-7.4%	5.1%	1.5%
Change since 2005	N/A	-9.2%	-8.0%	-6.7%	-6.3%	-5.2%	-5.1%	-5.2%	-2.1%	-2.2%	-2.0%	-9.2%	-4.6%	-3.2%
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 in 2017 from 50 kt to 10 kt.														

¹⁴ 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.

Figure 11 Number of Reporting Facilities by Sector in Selected Years between 2005 and 2022



Note:

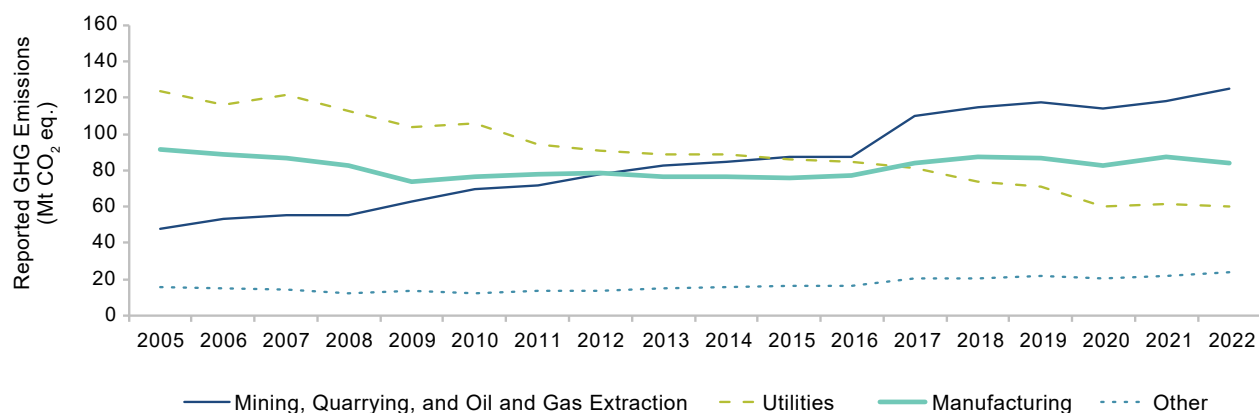
* "Other" is not a NAICS sector but a grouping of various NAICS codes reported by the following types of facilities: natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.

3.2. Trends by Industry Sector and by Province/Territory

The summary of facility-reported emissions by NAICS industry sector provides a picture of the types of facilities that report to the GHGRP in response to the annual GHG reporting requirements (Figure 11 and Table 6). The provincial breakdown of each main industry sector highlights the regional presence of key industries accounting for the reported emissions (Table 7). All reported facilities were included in the analysis presented in this section, including those that emitted less than 10 kt CO₂ eq. (147 facilities accounting for 0.2% of total emissions). Observed emission changes from 2005 through 2022 reflect the impact of changing the reporting threshold in 2009 and 2017 (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 the Utilities sector in 2015 (Figure 12). This can be attributed in part to new facilities with emissions in the 10 to 50 kt range reporting since 2017 in 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.

Figure 12 Long-Term Sectoral Trends, 2005–2022



Note: "Other" is 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, universities, hospitals and public administration buildings.

3.2.1. Short-Term Changes

Short-term changes focus on changes in reported emissions from facilities in the main industry sectors over the past five years (from 2017 to 2022). Following disruptions to facility operations in the context of the COVID-19 pandemic, the previous reporting year (2021) saw a substantial increase in overall emissions as a result of increased production in the oil sands extraction and manufacturing sectors amid ongoing economic recovery. In 2022, emissions continue to trend upwards towards their pre-pandemic levels.

Since 2017, total reported emissions have decreased by 0.8% (2 Mt). This can largely be attributed to the steady decreases in reported emissions from facilities in the Utilities sector, where overall emissions declined by 26% (21 Mt) between 2017 and 2022 (Figure 13). The decrease of emissions within the Utilities sector is counterbalanced by the increase in emissions from the Mining, Quarrying, and Oil and Gas Extraction Sector (15 Mt or 14%).

The observed decrease in the Utilities sector is due to emissions reductions in the electric power generation subsector (21 Mt since 2017; Table 6). The majority (20 Mt) of the decrease in the Utilities sector occurred in Alberta, and 2 Mt occurred in Saskatchewan. Meanwhile, Ontario had a 2 Mt increase in the Utilities sector between 2017 and 2022. Overall, the observed emission reductions in the Utilities sector since 2017 are the result of reduced fossil fuel usage (notably coal¹⁵) for electricity generation and increased reliance on renewable electricity sources in Alberta.¹⁶

Over this same period (2017-2022), overall emissions from Manufacturing did not change significantly, but exhibited varying interannual fluctuations. In 2018, 2019, and 2021, Manufacturing emissions were 3 Mt higher than in 2017. In 2020, they were 2 Mt lower than in 2017 (due, in part, to reduced production at one facility in Ontario as a result of a rehabilitation project, as well as temporary facility shutdowns in Quebec as a result of the COVID-19 pandemic¹⁷). Between 2021 and 2022, emissions decreased by 3 Mt, returning to the level observed in 2017. This levelling-out of emissions was due to decreases in British Columbia, particularly in the subsectors of alumina and aluminium production and processing, and non-ferrous metal manufacturing. There were small decreases in emissions from the wood production subsector, mainly due to slowdowns in production. There was also a decrease in emissions from cement and concrete manufacturing due to decreased production at some facilities in Ontario and Quebec.

¹⁵ Based on GHG emission data reported by facilities to the GHGRP.

¹⁶ Statistics Canada. Table 25-10-0019-01 Electricity from fuels, annual generation by electric utility thermal plants.

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

Table 6 Reported Greenhouse Gas Emissions by North American Industry Classification System (NAICS) Industry Sector, Selected Years

NAICS ^a Industry Sector	2005	2009 ^b	2010	2011	2012	2013	2014	2015	2016	2017 ^b	2018	2019	2020	2021	2022
	Mt CO ₂ eq.														
Total	278	253	264	257	260	262	265	266	266	296	296	297	277	289	293
21 – Mining, Quarrying, and Oil and Gas Extraction (total)	48	63	69	72	78	83	84	88	87	110	115	117	114	118	125
Oil and gas extraction (except oil sands)	14	15	15	15	14	15	16	15	15	31	31	32	31	32	37
Oil sands extraction ^c	28	42	47	49	55	59	61	65	64	69	73	74	72	76	77
Coal mining	2	2	3	3	3	3	3	2	2	3	3	4	3	3	3
Metal ore mining	3	3	3	3	4	4	3	3	4	5	5	5	5	5	5
Non-metallic mineral mining and quarrying	0.8	1	1	2	2	2	2	2	2	2	3	3	3	3	3
22 – Utilities (total)	123	103	106	94	90	89	89	86	85	81	74	71	60	61	60
Electric power generation	122	101	103	91	88	86	86	84	83	79	72	69	58	59	58
Natural gas distribution	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1
Water, sewage and other systems ^d	0.1	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.8	0.8	0.8	0.8	0.9	1.2
31–33 Manufacturing (total)	91	73	77	78	79	76	76	76	77	84	87	87	82	87	84
Food, beverages, and tobacco products	0.3	0.7	0.8	0.7	0.7	1	1	1	1	3	3	3	3	3	3
Wood products and paper	5	4	4	4	5	5	5	5	5	6	6	7	7	8	7
Petroleum and coal products	20	19	18	17	17	17	17	17	17	18	17	18	17	18	18
Basic chemicals	13	11	10	11	11	11	11	11	11	12	13	13	13	13	12
Pesticide, fertilizer, other agricultural chemicals	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6
Cement and concrete products	13	9	10	10	11	10	10	11	10	11	11	11	11	11	10
Lime and gypsum products	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Iron and steel manufacturing ^e	17	11	14	14	15	13	14	13	14	14	16	16	14	15	15
Alumina and aluminum production and processing	9	8	8	8	7	7	7	7	7	7	6	6	7	7	7
Non-ferrous metal (except alum.) manufacturing ^f	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Other manufacturing ^g	0.7	1	1	2	2	2	2	2	2	3	3	3	3	3	3
Other^h (total)	16	14	12	13	13	15	16	16	16	20	21	21	20	22	24
Pipeline transportation of natural gas	12	7	6	7	7	8	9	9	9	9	10	10	9	10	12
Waste management and remediation services	3	6	5	6	6	6	6	7	7	9	8	8	9	9	9
Educational services and health care	N/A	0.4	0.5	0.5	0.7	0.6	0.6	0.7	0.6	1	1	1	1	1	1
Miscellaneous	N/A	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	1	1	1	1	2	2

Notes:

N/A = not available

Totals may not sum to the expected value due to rounding.

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

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

e. 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.

f. 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.

g. 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.

h. 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, universities, hospitals and public administration buildings.

Table 7 Reported Greenhouse Gas Emissions by Industry Sector and by Province/ Territory, Selected Years

Industry Sector Province/Territory	2005	2009 ^a	2010	2011	2012	2013	2014	2015	2016	2017 ^a	2018	2019	2020	2021	2022
	Mt CO ₂ eq.														
Total	278	253	264	257	260	262	265	266	265	296	296	297	277	289	293
21 – Mining, Quarrying, and Oil and Gas Extraction (total)	48	63	69	72	78	83	84	88	87	110	114	117	114	118	125
Alberta	35	50	55	56	62	65	67	71	71	86	91	93	91	94	100
British Columbia	5	5	6	7	7	7	7	6	6	8	8	8	8	8	9
Manitoba	N/A	0.06	0.05	0.1	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.4	0.3	0.3	0.3
New Brunswick	N/A	N/A	0.06	0.06	0.06	0.02	N/A	0.06	N/A	0.01	0.01	0.01	0.004	0.007	N/A
Newfoundland and Labrador	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Northwest Territories	0.4	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.5
Nova Scotia	N/A	0.3	0.3	0.2	0.2	0.4	0.5	0.4	0.4	0.5	0.6	0.5	0.4	0.2	0.2
Nunavut	N/A	N/A	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.6
Ontario	0.2	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.4	1	1	1	1	1	1
Quebec	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Saskatchewan	3	3	3	3	4	4	4	5	5	8	8	8	8	8	9
Yukon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.02	0.02	0.004	0.01	0.01	N/A
22 – Utilities (total)	123	103	106	94	90	89	89	86	85	81	74	71	60	61	60
Alberta	50	48	48	46	44	44	49	47	47	46	38	36	30	28	27
British Columbia	2	2	2	1.0	0.9	1	1	0.9	0.9	0.8	1.0	1	0.9	1	1
Manitoba	0.6	0.2	0.06	0.08	0.07	0.09	0.07	0.1	N/A	0.06	0.03	0.06	0.05	0.06	0.06
New Brunswick	9	6	5	4	4	4	4	4	4	3	4	3	2	3	3
Newfoundland and Labrador	1	0.8	0.7	0.7	0.7	0.8	1	1	1	1	1	1	0.8	0.6	0.7
Northwest Territories	N/A	0.06	N/A	N/A	N/A	N/A	N/A	0.06	N/A	0.02	0.02	0.02	0.02	0.02	0.02
Nova Scotia	11	9	9	9	8	8	7	7	7	7	7	7	6	6	6
Nunavut	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	0.06	0.05	N/A	N/A
Ontario	36	20	25	18	18	15	10	10	9	6	6	6	6	7	8
Prince Edward Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01	0.003	0.002	0.003	0.003
Quebec	0.5	1	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5
Saskatchewan	15	16	16	15	16	15	15	16	15	16	16	16	13	15	14
Yukon	N/A	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.04	0.04	0.04	0.03
31–33 Manufacturing (total)	91	73	77	78	79	76	76	76	77	84	87	87	82	87	84
Alberta	18	17	17	18	18	19	18	19	19	20	22	22	22	22	22
British Columbia	6	5	5	5	5	5	5	5	5	5	5	5	5	6	5
Manitoba	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
New Brunswick	4	4	4	4	4	4	3	4	4	4	3	4	4	4	4
Newfoundland and Labrador	1	1	1	0.9	1	0.9	1	1	1	1	1	2	0.4	0.2	0.1
Nova Scotia	1	1	1	1	1	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Ontario	38	25	27	28	29	27	28	27	28	30	33	32	29	32	31
Prince Edward Island	0.1	0.07	0.06	0.07	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.08	0.08	0.09	0.05
Quebec	20	17	18	17	17	16	17	17	16	18	18	18	18	19	18
Saskatchewan	2	2	3	2	3	3	3	3	3	3	3	3	3	3	3
Other^b (total)	16	14	12	13	13	15	16	16	16	20	21	21	20	22	24
Alberta	4	3	3	4	4	5	4	5	5	6	7	7	6	7	8
British Columbia	2	2	2	2	2	2	2	2	2	3	3	3	2	3	3
Manitoba	1	0.8	0.7	0.8	0.7	0.8	0.9	0.9	0.8	0.9	1.0	1.0	0.9	1.0	1.1
New Brunswick	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01	0.03	0.04	0.2	0.5	0.5	0.5
Newfoundland and Labrador	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	0.07	0.06	0.05	0.07	0.06
Northwest Territories	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01
Nova Scotia	N/A	0.07	0.05	0.04	N/A	N/A	N/A	N/A	0.006	0.08	0.09	0.1	0.2	0.2	0.3
Ontario	5	5	4	4	4	4	5	5	5	6	6	7	6	7	7
Prince Edward Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	N/A	N/A	N/A
Quebec	0.4	0.9	1	0.9	1	2	2	1	2	2	2	2	2	2	2
Saskatchewan	3	2	2	2	2	2	2	2	2	2	2	2	2	2	3

Notes:

For the complete data set (i.e. yearly data since 2004), visit the ECCC Website: Facility-reported greenhouse gas data (<https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/data.html>).

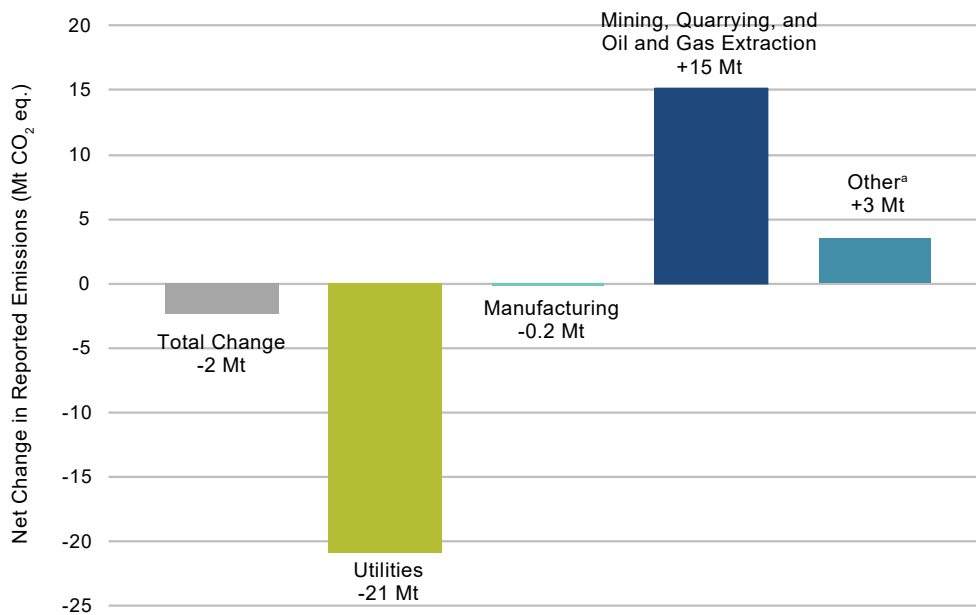
N/A = not available

Totals may not sum to the expected value due to rounding.

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

b. 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, universities, hospitals and public administration buildings.

Figure 13 **Changes in Reported Emissions by Sector (2017–2022)**



Note:

a. "Other" is 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, universities, hospitals and public administration buildings.

Reported emissions from the Mining, Quarrying, and Oil and Gas Extraction sector increased by 14% (15 Mt) between 2017 and 2022. Oil sands extraction contributed the most to this increase, with reported emissions from this subsector increasing by 8 Mt between 2017 and 2022, especially in Alberta, consistent with observed increases in synthetic crude oil production (+11%) and in crude bitumen production (+20%) during this period.¹⁸ In 2022, reported emissions from oil sands extraction reached 77 Mt, surpassing their pre-pandemic levels (74 Mt in 2019; Table 6).

Outside of the three above NAICS industry sectors, subsectors grouped under the 'Other' category experienced a 17% (3 Mt) increase in emissions between 2017 and 2022. This is mainly caused by increases in the pipeline transportation of natural gas subsector. Emissions from the waste management and remediation services subsector have been generally consistent since 2017.

3.2.2 Long-Term Trends

The major long-term emission patterns (2005–2022) illustrate two large offsetting trends: a 77 Mt increase in emissions in the Mining, Quarrying and Oil and Gas Extraction sector balanced by 63 Mt and 7 Mt decreases in the Utilities and Manufacturing sectors, respectively (Table 6). Long-term trends were impacted to a certain extent by the addition of newly reporting facilities in 2017, particularly in the Mining, Quarrying, and Oil and Gas Extraction sector. For example, between 2012 and 2017, total emission changes ranged from -0.04% to 1.3%. Between 2016 and 2017, total emissions increased by 11.4%. By contrast, for facilities emitting 50 kt or more (i.e., larger GHG-emitting facilities annually reporting prior to the threshold change in 2017), there has been a small reduction in emissions (3.2%) since 2005.

Up to and including the year 2014, the Utilities sector consistently accounted for the largest portion of reported emissions (Figure 12), with electric power generation being the main contributor. However, emissions from fossil-fuel electric power generation experienced a significant decline of 64 Mt from 2005 to 2022 (Table 6), largely attributed to the discontinuation of coal-fired electricity production in Ontario, New Brunswick and Nova Scotia, and, more recently, Alberta (Table 7). Over the same period, the number of large-emitting facilities (1 Mt or above) in the fossil-fuel electric power generation subsector

18 [AER] Alberta Energy Regulator. 2023. Alberta's Energy Reserves and Supply/Demand Outlook. Available at: <https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98>.

declined from 24 in 2005 to 13 in 2022. Other contributors to the decrease in utility emissions include fuel switching (e.g., from coal to natural gas or other lower-carbon fuels) and increased reliance on hydro, nuclear and renewable sources of electricity generation.^{19, 20}

In 2022, overall emissions from the Manufacturing sector remain below their 2005 levels (7 Mt or -8%; [Figure 12](#)), with Ontario and Quebec facilities in specific industry subsectors contributing the most to this decrease. Ontario facilities saw a net decrease of 6 Mt ([Table 7](#)) compared to 2005, largely observed in iron and steel manufacturing, cement, primary magnesium production, and chemical manufacturing (e.g., halted adipic acid production in 2009; [Table 6](#)). Quebec facilities had a 2 Mt decrease in emissions from 2005 to 2022 ([Table 7](#)), with aluminium production and petroleum refining facilities contributing the most to this change ([Table 6](#)). Emission decreases resulted from technological changes in aluminium production,^{21, 22, 23} and the closure of a magnesium production facility and aluminium smelters in Quebec.

In contrast, Alberta facilities in the Manufacturing sector saw a 31% increase (5 Mt) in reported emissions since 2009, with 40% (2.1 Mt) of the observed increase occurring in the basic chemicals subsector, and 19% (1.0 Mt) in the petroleum and coal products subsector, driven by the opening of a new refinery in Alberta in 2017. Between 2005 and 2022, overall emissions from the petroleum and coal products subsector have decreased by 14% (3 Mt) due to refinery closures. Since 2005, four refineries have either closed or been converted to terminal facilities in several provinces: Ontario (2005), Quebec (2010), Nova Scotia (2013), and Newfoundland and Labrador (2020).

The Mining, Quarrying, and Oil and Gas extraction sector has shown an increasing trend over the last decade ([Figure 12](#)). Most of the increase (between 2005 and 2022) was driven by oil sands extraction facilities in Alberta (50 Mt growth since 2005) as existing facilities expanded operations and new facilities came online, and by thermal oil extraction in Saskatchewan, reflecting this sector's steady growth trend. In more recent years, the increase in reported emissions from the Mining, Quarrying, and Oil and Gas extraction sector is partly due to the increased number of facilities reporting their emissions to the program, mostly in the oil and gas extraction (except oil sands) subsector, as a result of the lowering of the reporting threshold.

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

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

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

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

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

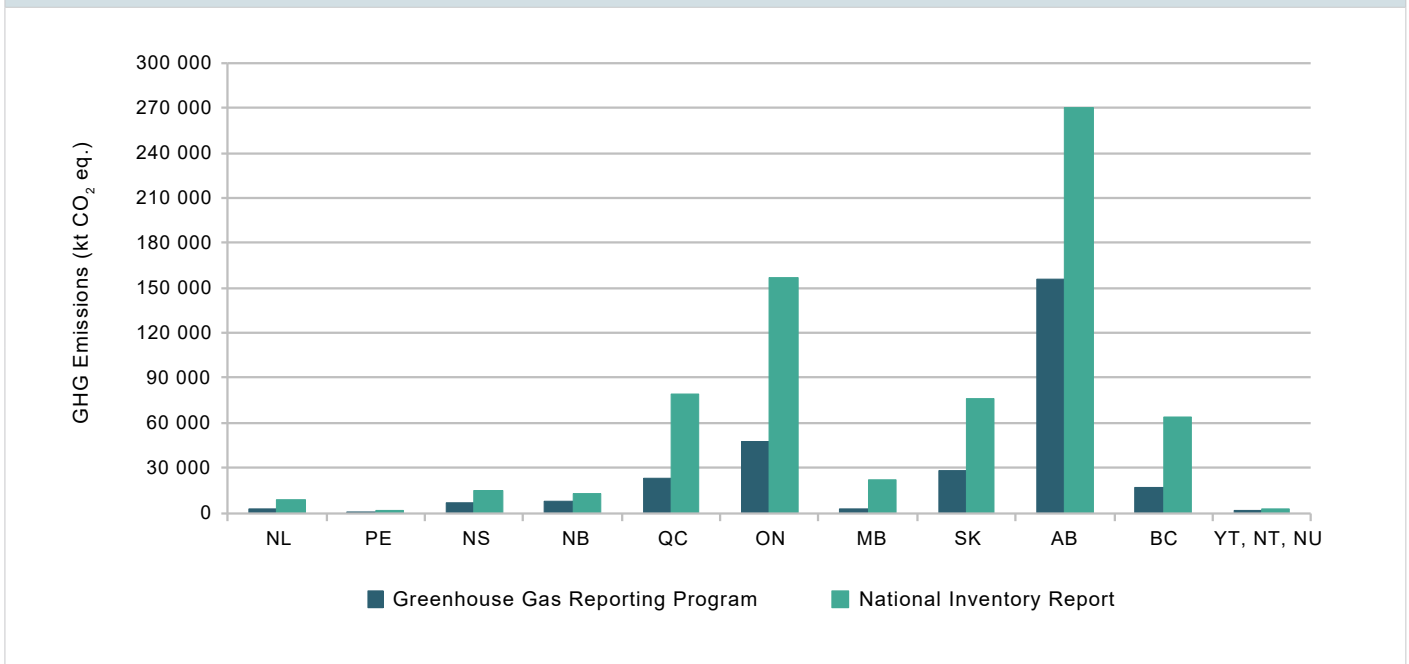
FACILITY-REPORTED EMISSIONS AND THE NATIONAL GHG INVENTORY

The total facility-reported GHG emissions for 2022 collected under the GHGRP represent 41% of Canada's total GHG emissions in 2022 (708 Mt) and 62% of Canada's industrial GHG emissions.²⁴ The GHGRP applies to large GHG-emitting facilities (mostly industrial) and does not cover diffuse sources of GHG emissions such as road transportation, residential housing (e.g. home heating) 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 14). 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 captured by the GHGRP reflects the regional concentration of large industrial facilities and trends in the use of fossil fuels for energy production.

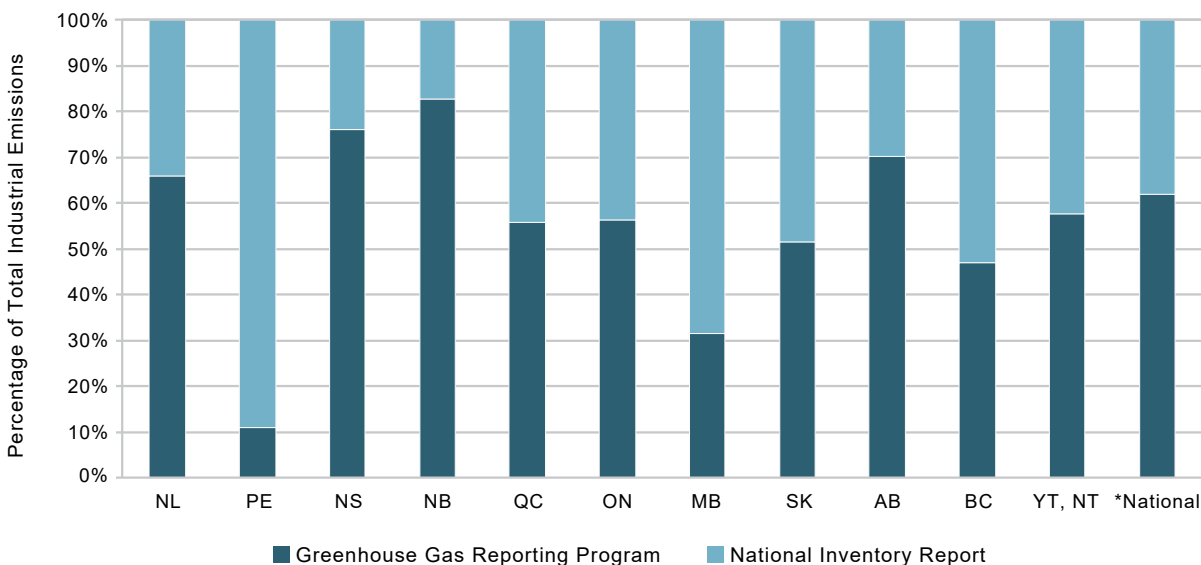
Although the facility-reported emissions capture 62% of industrial GHG emissions nationally, the degree of coverage at the provincial level varies from province to province (Figure 15) due to the size and number of industrial facilities in each province that have emissions above the 10 kt CO₂ eq. reporting threshold. The degree of coverage is fairly high for some provinces and territories. For example, the GHGRP reported emissions in 2022 captured approximately 83% of industrial emissions in New Brunswick, and 76% of total industrial emissions in Nova Scotia.

Figure 14 Provincial/Territorial Contribution to 2022 Facility-Reported Greenhouse Gas Reporting Program Total and the National Inventory Total



²⁴ In this overview report, Canada's industrial GHG emissions include emissions from the following GHG categories from the *National Inventory Report 1990–2022: 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 15 **2022 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 1990–2022: Greenhouse Gas Sources and Sinks in Canada*: Stationary Combustion Sources (except Residential), Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste.

*The national total does not include data for Nunavut.

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 of the recent expansion of the GHGRP. More information on the specific uses of facility-reported data collected through the GHGRP in the National GHG Inventory is provided in Chapter 1 of the latest [National Inventory Report](#).²⁵

25 The *National Inventory Report 1990–2022: Greenhouse Gas Sources and Sinks in Canada* is available on Canada's official greenhouse gas inventory website: canada.ca/ghg-inventory.

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. 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 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. Examples²⁶ of the types of checks completed are:

- Review of emitters failing to report emissions (may be below the 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 NAICS²⁷ 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.html>

²⁶ 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.

²⁷ 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.

5.3. Links to Other Federal Facility Reporting and Provincial Reporting

Facilities that report their emissions to the GHGRP may also report their pollutant releases to the National Pollutant Release Inventory (NPRI). The GHGRP is similar to, yet distinct from, the NPRI. Although both programs are delivered by ECCC 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 directly 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 facilities that report to the GHGRP also submit annual reports to the federal Output Based Pricing System (OBPS). These facilities report similar emissions information to both programs; therefore, significant efforts have been undertaken to harmonize reporting requirements between the two programs wherever possible.

A number of provincial jurisdictions also require facilities to report GHG emission 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 and ongoing updating of ECCC's 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 of information commonly required at both levels, while accommodating requirements that are jurisdiction-specific. Provinces currently using this reporting system include Alberta, British Columbia, Ontario, and New Brunswick. Nova Scotia and Saskatchewan previously used this system to collect data together with ECCC's GHGRP but will discontinue collecting data through this system starting with 2023 data collection.

As of the 2022 reporting year, the GHGRP no longer accepts or processes provincial GHG reports. The GHGRP also connects with the federal OBPS program and provincial partners to compare reported data and assess discrepancies, where appropriate.

6

CONTACT US

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

Celebrating 20 years of tracking GHG emissions

Place Vincent Massey Building

351 Saint-Joseph Boulevard

Gatineau, Quebec K1A 0H3

E-mail: GES-GHG@ec.gc.ca

Telephone: 1-877-877-8375

Website: <https://www.canada.ca/ghg-reporting>