# OVERVIEW OF 2020 REPORTED EMISSIONS

## FACILITY GREENHOUSE GAS REPORTING PROGRAM

2022

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canada

Cat. No.: En81-6/1E-PDF
ISSN: 2371-1035
EC21276

This report is available in HTML at: canada.ca/ghg-reporting



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: enviroinfo@ec.gc.ca



*Aussi disponible en français*
*Aperçu des émissions déclarées de 2020—Déclaration des gaz à effet de serre par les installations*

# TABLE OF CONTENTS

# HIGHLIGHTS

- 1704 facilities reported their greenhouse gas (GHG) emissions in 2020 to Environment and Climate Change Canada, totalling 273 megatonnes (Mt)[1] of carbon dioxide equivalent ($CO_2$ eq.). Total emissions were 7% less than the reported total in 2019 (293 Mt), due mainly to reduced emissions in the electricity generation and manufacturing sectors (11 Mt and 5 Mt respectively).
- Factors contributing to reduced emissions in 2020 stem from a number of drivers such as lower coal consumption, production slow-downs and impacts on facility operations associated with the COVID-19 pandemic.
- The reported emissions are largely distributed across three sectors: (i) Mining, Quarrying, and Oil and Gas Extraction (41%), (ii) Manufacturing (30%), and (iii) Utilities (22%)—amongst all facilities, those engaged in oil/gas extraction and electricity generation account for 59% of the total reported emissions in 2020.
- 536 facilities reported emitting 50 kilotonnes (kt) of $CO_2$ eq. or more in 2020, accounting for 92% (250 Mt) of the total facility-reported emissions. 1035 facilities reported emission levels in the 10 to 50 kt range, accounting for the remaining 8% (23 Mt) —largely from the oil and gas and manufacturing sectors, followed by the waste treatment and disposal sector.
- Since 2005, total emissions from facilities in the Utilities and Manufacturing sectors declined by 64 Mt and 10 Mt respectively, while emissions reported by facilities in the Mining, Quarrying, and Oil and Gas Extraction sector increased by 65 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.
- The reported emissions reduction in Utilities (64 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 (10 Mt) since 2005 were mostly attributed to the petroleum refining sector and manufacturers of aluminium, cement, and iron and steel.
- The GHG emissions data reported by facilities during the 2020 reporting cycle represent 41% of Canada's total GHG emissions (672 Mt in 2020) and 63% of Canada's industrial GHG emissions, as reported in Canada's Official GHG Inventory.[2]
- The 2020 reporting cycle is the fourth year under the expanded federal GHG reporting program (GHGRP). Under the expansion to date, the reporting threshold was lowered from 50 kt to 10 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.[3] Environment and Climate Change Canada will continue to assess potential changes to reporting requirements and further expansion in future years.

1 1 Mt = 1 million tonnes or 1000 kilotonnes (kt).

2 In this overview report, Canada's industrial GHG emissions include those from the following GHG categories from the *National Inventory Report 1990–2020: 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 the United Nations Framework Convention on Climate Change-National Inventory Submissions website (https://unfccc.int/fr/node/461382).

3 The reporting requirements were expanded progressively over the last three years. The 2020 GHGRP Gazette notice describes the complete reporting requirements for 2020 data. It can be accessed in the *Canada Gazette*: https://canadagazette.gc.ca/rp-pr/p1/2021/2021-02-13/html/sup1-eng.html.

# 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 collect GHG emissions information annually from the largest emitting 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 2020. This program is part of ongoing efforts to develop and maintain, 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. 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. 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 from 50 kilotonnes (kt) to 10 kt of GHGs in carbon dioxide equivalent ($CO_2$ 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 nine additional 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.

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. Further expansion will also continue to focus on improving the granularity, consistency and comparability of GHG data across Canada.

ECCC has completed the collection and review of GHG emissions information for the 2020 calendar year. Any facility with annual GHG emissions of 10 kt $CO_2$ eq. or higher in 2020 was required to report to the program. The *Notice with respect to reporting of greenhouse gases (GHGs) for 2020*, published in the *Canada Gazette* on February 13, 2021,[4] reflects the federal reporting requirements for 2020 data, submitted by facilities to ECCC in 2021. The data used in this overview report are current as of October 28, 2021. 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 2021*[5] was published in the *Canada Gazette* on December 18, 2021. The 2021 Notice sets out the federal reporting requirements for 2021 data, scheduled to be submitted by facilities to ECCC by June 1, 2022. The 2020 and 2021 Notices did not incorporate significant changes in reporting requirements.

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

5 The Notice with respect to reporting of greenhouse gases (GHGs) for 2021 can be accessed in the *Canada Gazette*: https://canadagazette.gc.ca/rp-pr/p1/2021/2021-12-18/html/sup2-eng.html.

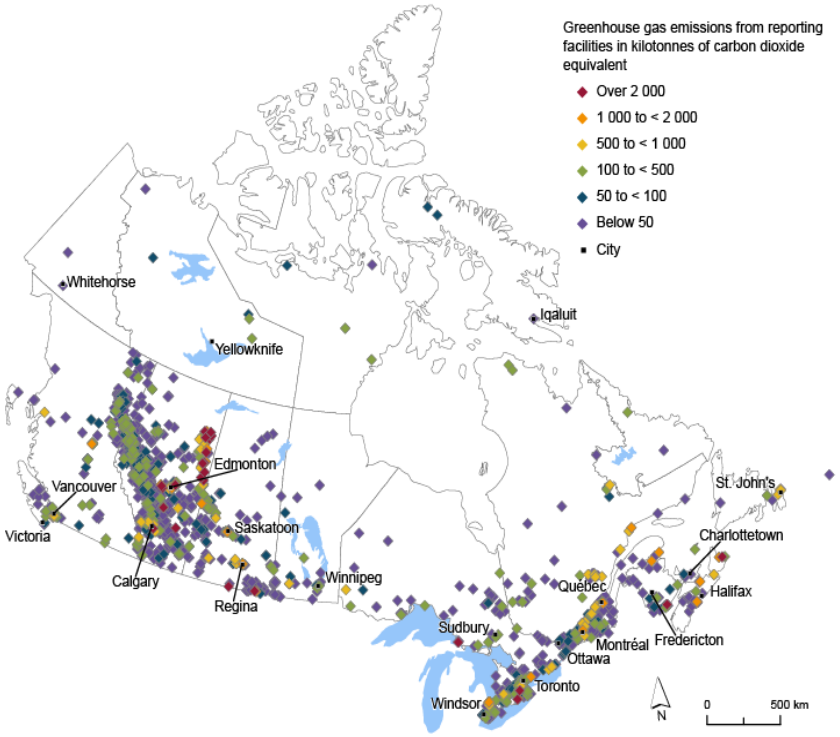
# REPORTED 2020 GREENHOUSE GAS EMISSIONS

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 1704 facilities reported their GHG emissions to Environment and Climate Change Canada for the 2020 calendar year, collectively emitting a total of 273 Mt of GHGs[7] (Figure 1). Of these facilities, 536 reported GHG emission levels greater than 50 kt, accounting for 92% (250 Mt) of the total reported emissions, and 57 emitted more than 1 Mt, accounting for over half (55% or 149 Mt) of the overall total emissions (Figure 2a). Those with emissions over 1 Mt fall within several industrial sectors that include oil sands extraction (44%), electric power generation (27%), petroleum refineries (9%), and primary metal manufacturing (8%) such as iron, steel, and aluminium (Figure 2b).

Among all reported facilities, 1035 reported GHG emission levels in the 10 to 50 kt range, accounting for 8% (23 Mt) of the total reported emissions. These facilities belong to a number of sectors, such as oil and gas extraction (512 facilities), waste treatment and disposal (75 facilities), and food manufacturing (53 facilities).

Figure 1 **2020 Facility Greenhouse Gas (GHG) Emissions Reported to Environment and Climate Change Canada**



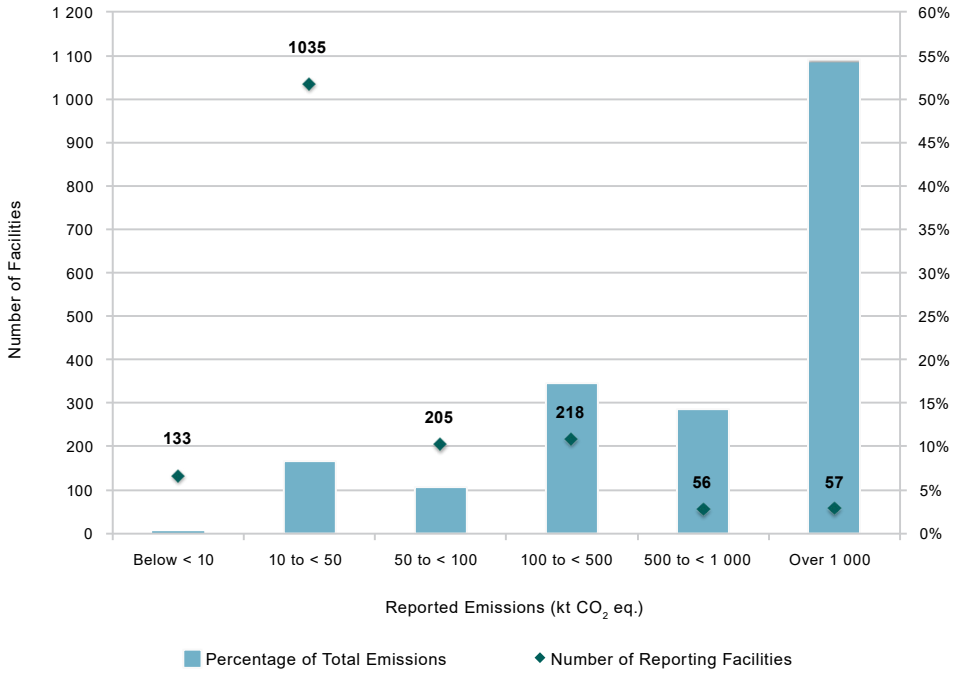

Notes:
Map excludes pipeline transportation systems.
Map is provided by the Canadian Environmental Sustainability Indicators program.

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.

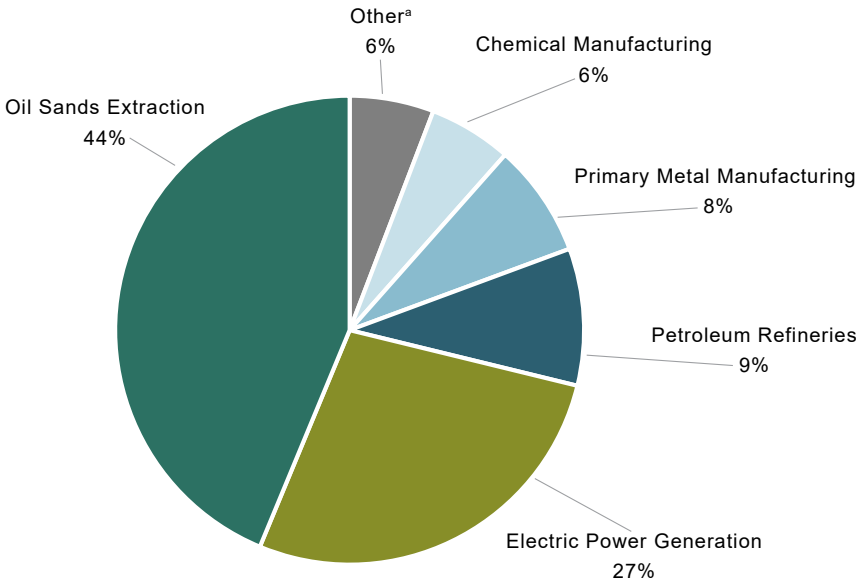
Facilities with emissions falling below the reporting threshold of 10 kt per year can voluntarily report their GHG emissions; 133 facilities did so for the 2020 calendar year, representing 0.2% (0.63 Mt). All voluntarily reported emissions are included in this report and in the data set published by Environment and Climate Change Canada.

Figure 2a **Contribution of Facilities in Various Emission Ranges to Total Reported Emissions (2020)**




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

Figure 2b **Breakdown of 2020 emissions from facilities with reported emissions over 1000 kt $CO_2$ eq. by sector**




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

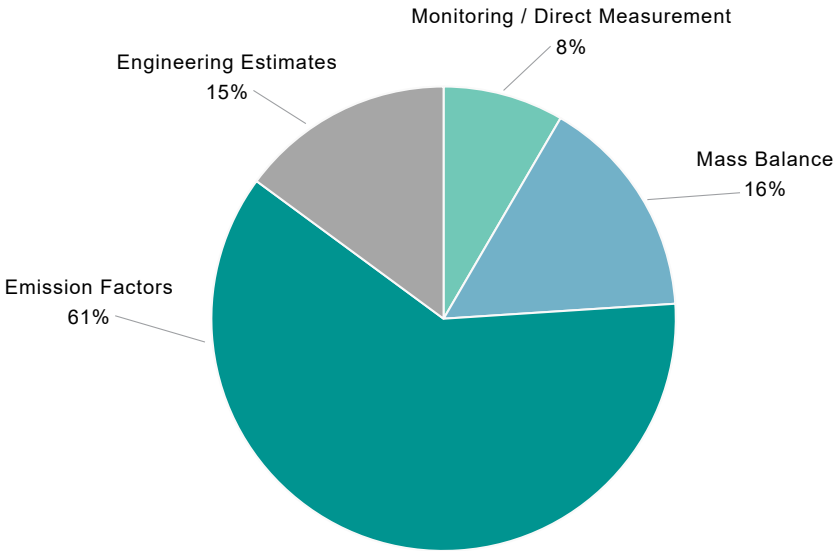
## 2.1. Emission Calculation Methods

Facilities reporting to the GHGRP (except those subject to expanded requirements) may choose among 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.

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




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 the global warming potential (GWP) (Table 1). Environment and Climate Change Canada uses GWP values[9] 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 2020*.

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.

## 2.3. Reported GHG Emissions by Gas and by Source

$CO_2$ represented the majority (93%) of the total reported emissions in 2020, while methane ($CH_4$) and nitrous oxide ($N_2O$) emissions contributed 6% and 0.8%, 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% (1.5 Mt).

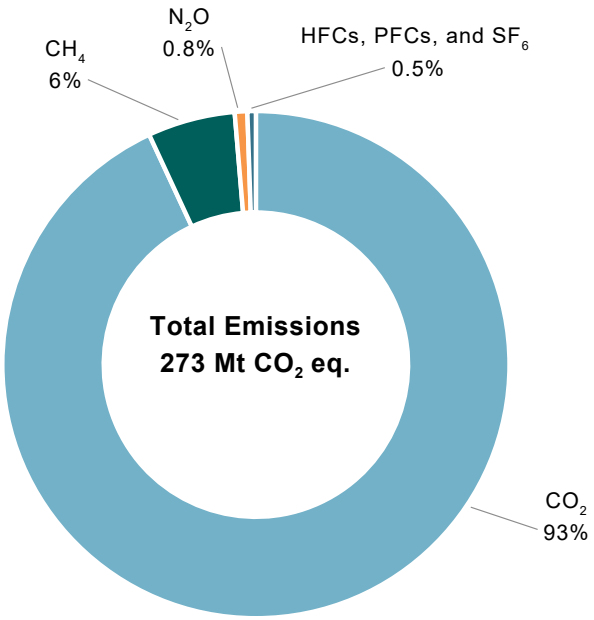
When reporting to the GHGRP, facilities are required to report GHG emissions under the following source categories:[10] stationary fuel combustion, industrial processes, fugitive sources including venting, flaring and leakage, on-site transportation, waste and wastewater.[11] Stationary fuel combustion is the largest source of reported emissions, representing 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. $CO_2$ emissions from the combustion of biomass materials must be reported to the GHGRP, but are not included in the facility-reported total. 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).

9 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.

10 Additional information on these emission source categories can be found in the 2020 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-2020.html.

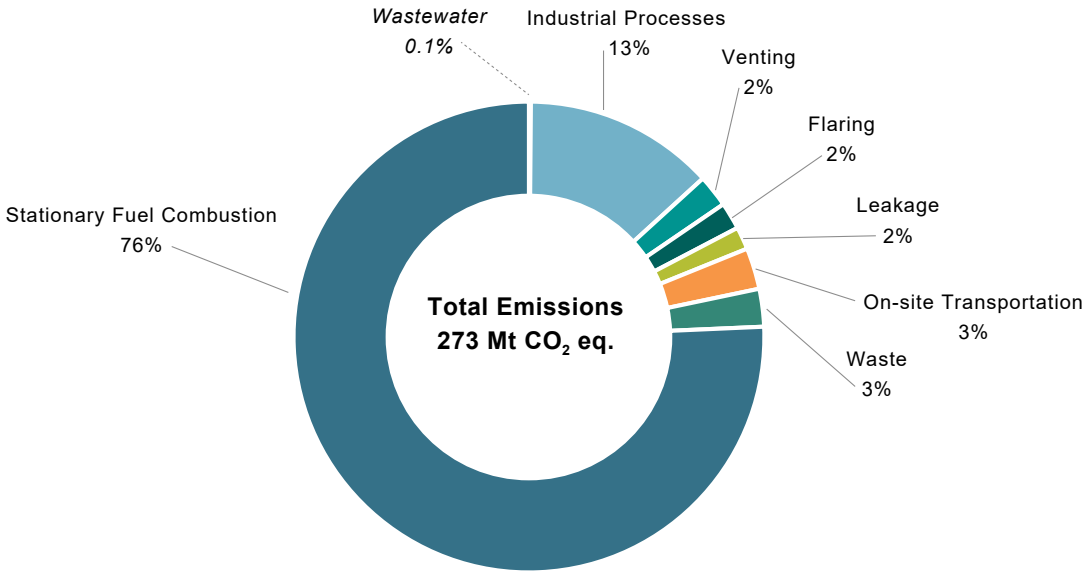
11 Some source categories were modified and updated as part of the GHGRP expansion and are applicable to the data reported since 2017.

Figure 4 **Reported 2020 Greenhouse Gas Emissions by Gas (273 Mt $CO_2$ eq.)**




Note: Totals may not add up due to rounding.

Figure 5 **Reported 2020 Greenhouse Gas Emissions by Source**




Note: Totals may not add up due to rounding.

## 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 (9%) 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 2020 Greenhouse Gas Emissions by Province/Territory**

| Province/Territory | Number of Facilities | Total Emissions ($kt CO_2$ eq) | Percentage of Total Emissions |
|---|---|---|---|
| Newfoundland and Labrador | 13 | 3 764 | 1% |
| Prince Edward Island | 3 | 79 | 0.03% |
| Nova Scotia | 21 | 7 128 | 3% |
| New Brunswick | 26 | 5 884 | 2% |
| Quebec | 187 | 21 623 | 8% |
| Ontario | 361 | 42 021 | 15% |
| Manitoba | 40 | 2 502 | 1% |
| Saskatchewan | 140 | 25 296 | 9% |
| Alberta | 702 | 147 926 | 54% |
| British Columbia | 197 | 15 823 | 6% |
| Nunavut | 7 | 625 | 0.2% |
| Northwest Territories | 5 | 488 | 0.2% |
| Yukon | 2 | 48 | 0.02% |
| **Total** | **1 704** | **273 208** | **100%** |

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).[12] In 2020, three NAICS defined industry sectors accounted for the majority of GHG emissions: the Mining, Quarrying, and Oil and Gas Extraction sector (NAICS 21), representing 41% (113 Mt) of total reported emissions; the Manufacturing sector (NAICS 31-33), accounting for 30% (82 Mt); and the Utilities sector (NAICS 22), primarily facilities generating electricity from fossil fuels, accounting for 22% (60 Mt) (Figure 6). The remaining 7% (19 Mt) of emissions captured under “Other” were reported by various types of facilities, mainly natural gas transportation pipelines (9 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):

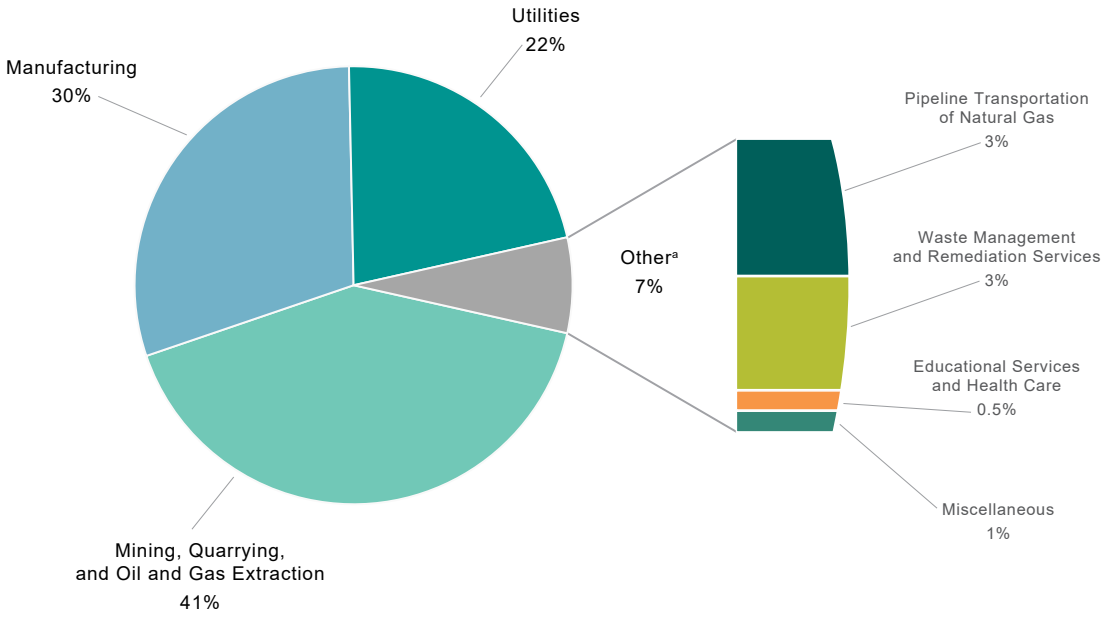
1. Oil sands extraction, the dominant sub-category which includes oil sands mining, in-situ bitumen production and upgrading (64% of sector emissions).
2. Oil and gas extraction (except oil sands) (27%).
3. Mining of metal ore (e.g., iron) (4%), coal (3%), and non-metallic minerals (e.g., potash and diamonds) (2%).

The Manufacturing sector includes a wide range of industrial activities, with important contributors to the reported 2020 emissions being (Figure 8):

1. Petroleum and coal product manufacturing (21% of sector emissions).
2. Iron and steel manufacturing (17%).
3. Basic chemical manufacturing (e.g., ethylene, polyethylene, hydrogen gas) (15%).
4. Cement and concrete product manufacturing (13%).

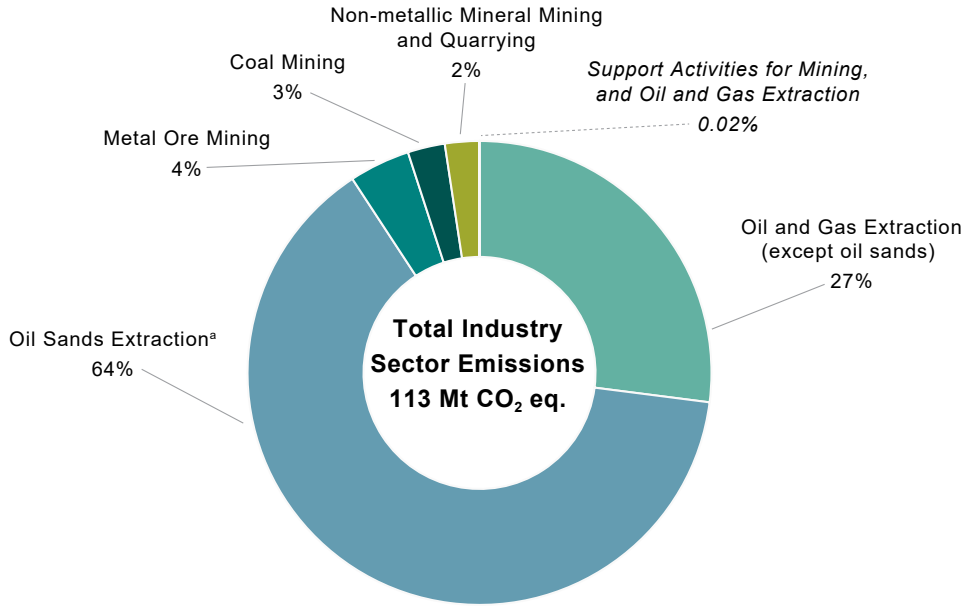
12 The NAICS is an industry classification system that was developed by the statistics agencies of Canada, the United States and Mexico to enable them to collect comparable statistical data. It is a comprehensive system that encompasses all economic activities using six-digit codes. In Canada, the NAICS 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’s website.

Figure 6 **Reported 2020 Greenhouse Gas Emissions by Industry Sector (273 Mt $CO_2$ eq.)**



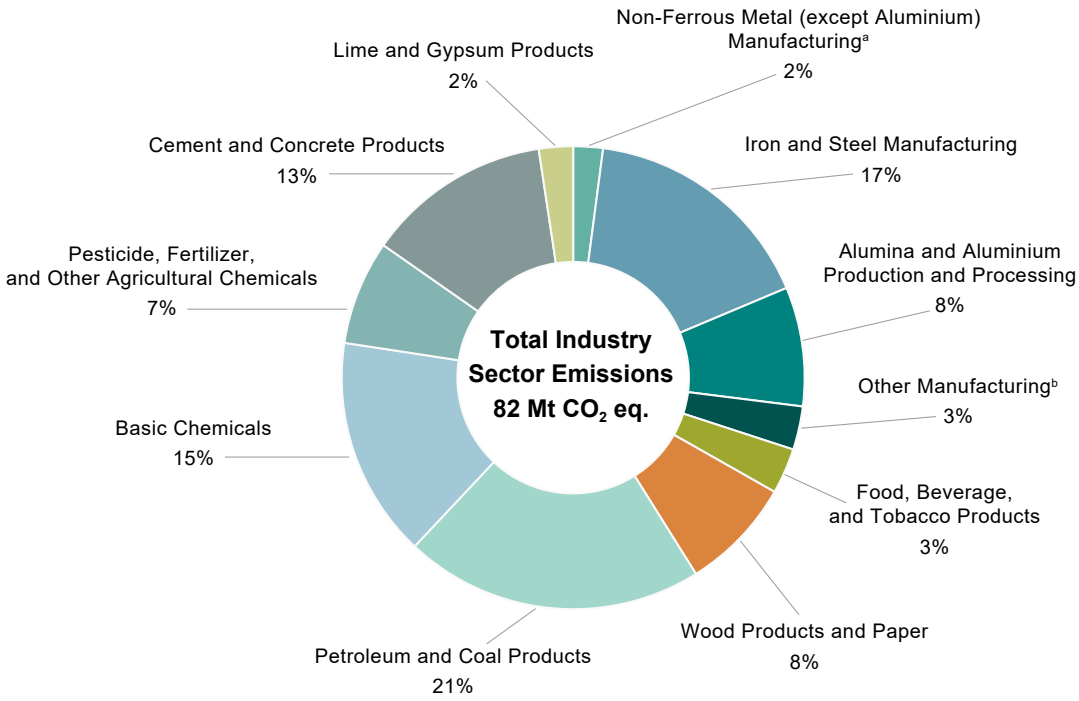

Note:
a. "Other" is not a NAICS sector but a grouping of various NAICS codes reported by the following types of facilities: natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.

Figure 7 **Reported 2020 Greenhouse Gas Emissions by Subsectors of Mining, Quarrying, and Oil and Gas Extraction (113 Mt $CO_2$ eq.)**




Notes:
Totals may not add up due to rounding.
a. Includes facilities engaged in oils sands mining, in-situ bitumen production and upgrading.

Figure 8 **Reported 2020 Greenhouse Gas Emissions by Subsectors of Manufacturing (82 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.

## 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 1704 facilities that reported in 2020, 1035 facilities (61%) reported emissions in the range of 10 to 50 kt. Total emissions from these 1035 facilities are 23 Mt, representing 8% of the 2020 total reported emissions. Over half (53%, or 12 Mt) of the total amount of GHGs emitted by these facilities come from 568 facilities in the Mining, Quarrying, and Oil and Gas Extraction sector (Figure 9). The Manufacturing sector is the second largest contributor (224 facilities reporting), accounting for 21% (5 Mt) of the emissions reported by the 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 the 10 to 50 kt range with a total 450 facilities (43% of the total number of new reporting facilities – Figure 10), followed by 223 in Ontario (22%), 118 in British Columbia (11%), and 99 in Quebec (10%).

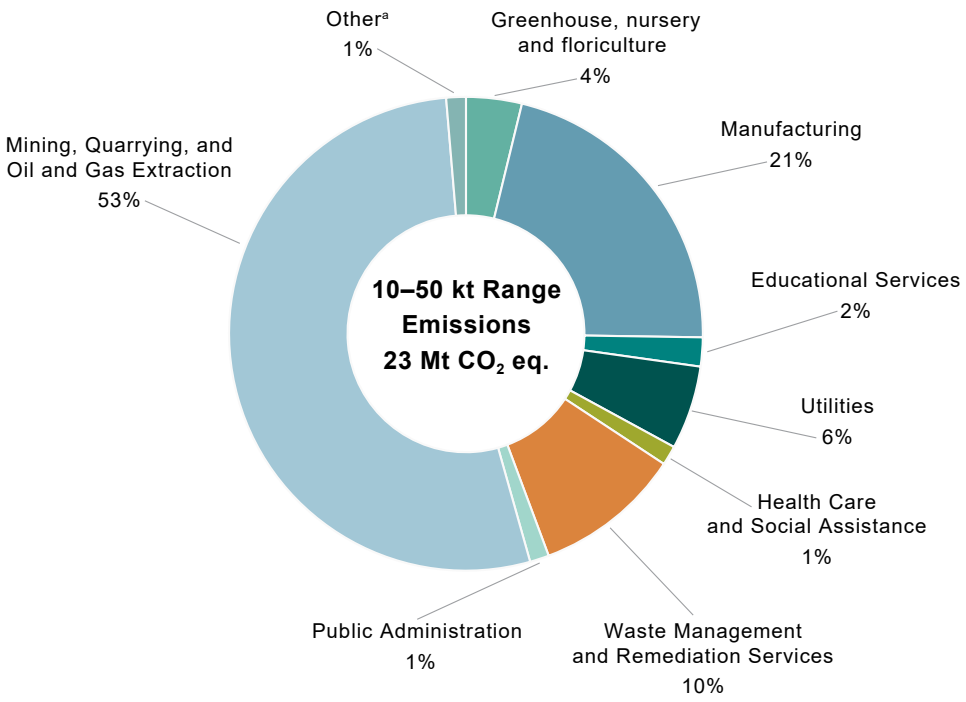
The total number of facilities as well as the coverage of emissions for specific industry subsectors have increased to varying degrees due to the lower reporting threshold, providing more complete tracking of emissions in these subsectors (Table 3).

Comparing the level of reporting in 2016 and in 2020, 670 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 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 120 facilities reporting emissions in 2020 from 49 facilities in 2016. Emissions coverage in this subsector continued to improve each year, as the number of facilities reporting in

the 10 to 50 kt range steadily increased (i.e. from 61 facilities in 2017 to 75 in 2020). In addition, gold and silver ore mining facilities increased from 8 facilities reporting in 2016 to 25 in 2020, increasing the coverage of emissions from this subsector by 33% since 2016.

The lowering of the threshold also resulted in a number of subsectors reporting for the first time. For example, 45 facilities within the "Other food crops grown under cover" subsector (mainly consisting of greenhouses) now report their emissions. Since 2017, the number of facilities reporting in this subsector has also gradually increased (i.e. from 33 facilities in 2017 to 45 in 2020), thereby improving the coverage of emissions from this subsector over this time period (by 36%).

Figure 9 **Reported 2020 Greenhouse Gas Emissions from Facilities in the 10 to 50 kt Range by Sector (23 Mt $CO_2$ eq.)**




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

Figure 10 **Reported 2020 Greenhouse Gas Emissions for Facilities between 10 kt and 50 kt $CO_2$ eq. by Province/Territory**

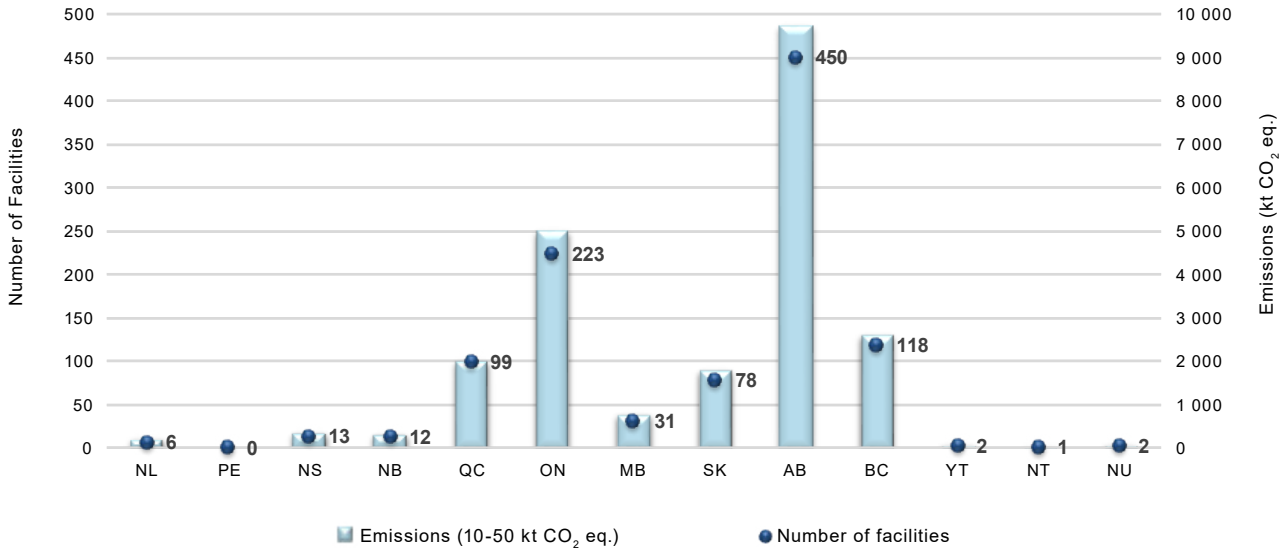



Table 3 **Impact of Lowering the Emissions Threshold, Selected Industry Subsectors**

| Industry Subsectors | 2016 Number of Facilities | 2020 Number of Facilities | 2016 total emissions (kt $CO_2$ eq.) | 2020 total emissions (kt $CO_2$ eq.) | 2020 emissions from new[a] facilities ( < 50 kt $CO_2$ eq.) |
|---|---|---|---|---|---|
| Oil and Gas Extraction (Except Oil Sands) | 113 | 670 | 14 827 | 30 458 | 10 731 |
| Waste Treatment and Disposal | 49 | 120 | 5 517 | 7 069 | 2 180 |
| Pulp, Paper and Paperboard mills | 51 | 72 | 4 685 | 5 774 | 610 |
| Gold and Silver Ore Mining | 8 | 25 | 632 | 1 380 | 343 |
| Grain and Oil Seed Milling | 4 | 20 | 320 | 959 | 338 |
| Other Food grown under cover | 0 | 45 | 0 | 848 | 848 |

Note:
a. New facilities are facilities with emissions below 50 kt that have reported to the GHGRP since 2017.

# 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, 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 2005–2020 period, the number of reporting facilities increased from 337 to 1704 (Table 4).

## 3.1. National-Level Trends

The overall total reported GHG emissions for all facilities were 273 Mt in 2020, a decrease of 20 Mt (7%) from 2019 reported emissions (Table 4).[13]

Over the 2005–2020 period, the number of reporting facilities increased from 337 to 1704, while overall emissions from facilities decreased by 1.7% (4.7 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, given more emissions were progressively reported to the program over this period.

For facilities emitting 50 kt of $CO_2$ eq. or more, total reported emissions were 250 Mt in 2020, compared to 270 Mt for 2019 (Table 4). Over the 2005–2020 period, the number of reporting facilities in this range increased from 323 to 536, largely due to the lower threshold introduced in 2009. By contrast, the combined emissions from facilities in this range have not changed significantly since 2005, with the exception of a 10% drop in emissions observed in 2020 (Table 4).

For facilities emitting between 10 and 50 kt of $CO_2$ eq., total reported emissions were 23 Mt in 2020. Reported emissions from these facilities have remained constant since 2017 (23 Mt) when the 10-kt reporting threshold was implemented.

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

| | 2005 | 2009[a] | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017[a] | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Facility Reported Emissions** | | | | | | | | | | | | | |
| Number of Facilities | 337 | 537 | 544 | 548 | 560 | 579 | 585 | 573 | 613 | 1 681 | 1 737 | 1 732 | 1 704 |
| GHG Emissions (kt $CO_2$ eq.) | 277 997 | 253 113 | 263 649 | 256 150 | 259 406 | 261 077 | 264 051 | 264 401 | 264 281 | 293 487 | 293 678 | 293 111 | 273 208 |
| **Facilities with emissions greater than 50 kt $CO_2$ eq.** | | | | | | | | | | | | | |
| Number of Facilities | 323 | 464 | 479 | 476 | 487 | 498 | 501 | 490 | 505 | 526 | 540 | 554 | 536 |
| GHG Emissions (kt $CO_2$ eq.) | 277 761 | 252 150 | 262 308 | 254 699 | 258 156 | 259 247 | 262 177 | 262 556 | 262 235 | 270 025 | 269 819 | 269 773 | 249 814 |
| Annual Change | N/A | -4.2% | 4.0% | -2.9% | 1.4% | 0.4% | 1.1% | 0.1% | -0.1% | 3.0% | -0.1% | -0.02% | -7.4% |
| Change since 2005 | N/A | -9.2% | -5.6% | -8.3% | -7.1% | -6.7% | -5.6% | -5.5% | -5.6% | -2.8% | -2.9% | -2.9% | -10.1% |

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.

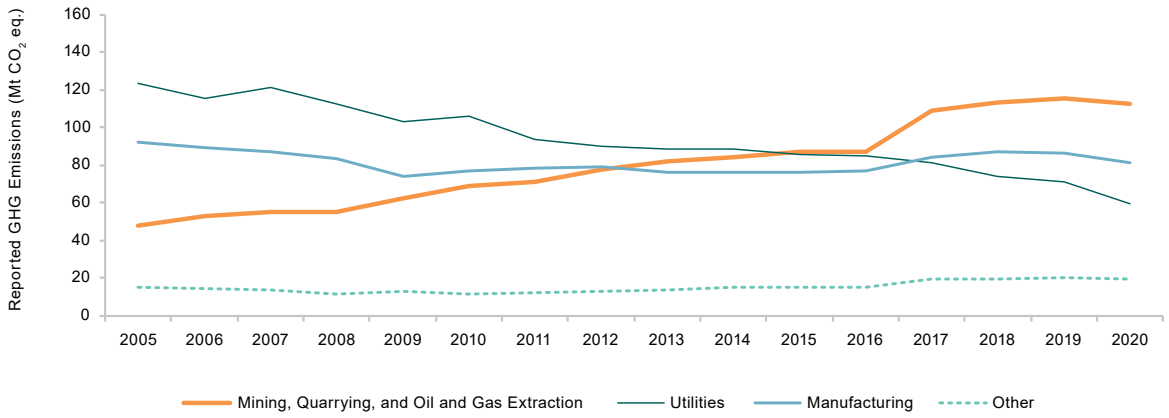
13 A number of facilities submitted new reports or updates to GHG reports for previous years. Environment and Climate Change Canada includes these updates in its annual data release, resulting in some revisions to previously published data.

## 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). Facilities that emitted 10 kt or more were included in the analysis presented in this section. Therefore, observed emission changes from 2005 through 2020 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). This can be attributed in part to new facilities with emissions in the 10 to 50 kt range reporting since 2017 in this sector (see Section 2.6). 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 11 **Long-Term Sectoral Trends, 2005–2020**




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.

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 | 2009[b] | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017[b] | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **278** | **253** | **264** | **256** | **259** | **261** | **264** | **264** | **264** | **293** | **294** | **293** | **273** |
| **21 – Mining, Quarrying, and Oil and Gas Extraction (total)** | **48** | **62** | **69** | **72** | **77** | **82** | **84** | **87** | **87** | **109** | **113** | **115** | **113** |
| Oil and gas extraction | 14 | 15 | 15 | 15 | 14 | 15 | 15 | 15 | 15 | 30 | 31 | 31 | 30 |
| Oil sands extraction[c] | 28 | 42 | 47 | 49 | 55 | 59 | 61 | 65 | 64 | 69 | 72 | 74 | 72 |
| Coal mining | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| Metal ore mining | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 5 | 5 | 5 |
| Non-metallic mineral mining and quarrying | 0.8 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| Support activities for mining, and oil and gas extraction | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 | 0.05 | 0.07 | 0.08 | 0.02 |
| **22 – Utilities (total)** | **123** | **103** | **106** | **94** | **90** | **89** | **89** | **86** | **85** | **81** | **74** | **71** | **60** |
| Electric power generation | 122 | 101 | 103 | 92 | 88 | 86 | 87 | 84 | 83 | 79 | 72 | 69 | 58 |
| Natural gas distribution | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 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 | 0.5 | 0.5 | 0.8 | 0.9 | 0.8 | 0.8 |
| **31-33 Manufacturing (total)** | **92** | **74** | **77** | **78** | **79** | **76** | **76** | **76** | **77** | **84** | **87** | **87** | **82** |
| Food, beverages, and tobacco products | 0.3 | 0.7 | 0.8 | 0.7 | 0.7 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| Wood products and paper | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Petroleum and coal products | 20 | 19 | 18 | 17 | 17 | 17 | 17 | 17 | 17 | 18 | 17 | 18 | 17 |
| Basic chemicals | 13 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 12 | 13 | 13 | 13 |
| Pesticide, fertilizer, other agricultural chemicals | 6 | 5 | 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 |
| Lime and gypsum products | 3 | 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 |
| Alumina and aluminum production and processing | 10 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 7 |
| Non-ferrous metal (except alum.) manufacturing[f] | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Other manufacturing[g] | 0.7 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 |
| **Other[h] (total)** | **15** | **13** | **12** | **12** | **13** | **14** | **15** | **15** | **16** | **19** | **20** | **20** | **19** |
| Pipeline transportation of natural gas | 12 | 7 | 6 | 7 | 6 | 8 | 9 | 9 | 9 | 9 | 10 | 10 | 9 |
| Waste management and remediation services | 3 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 8 | 7 | 7 | 7 |
| 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 |
| Miscellaneous | N/A | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1 | 1 | 1 | 1 |

Notes:

N/A = not available

Totals may not add up 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 6 **Reported Greenhouse Gas Emissions by Industry Sector and by Province/ Territory, Selected Years**

| Industry Sector Province/Territory *(Units: Mt $CO_2$ eq.)* | 2005 | 2009[a] | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017[a] | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **278** | **253** | **264** | **256** | **259** | **261** | **264** | **264** | **264** | **293** | **294** | **293** | **273** |
| **21 – Mining, Quarrying, and Oil and Gas Extraction (total)** | **48** | **62** | **69** | **72** | **77** | **82** | **84** | **87** | **87** | **109** | **113** | **115** | **113** |
| Alberta | 35 | 50 | 54 | 56 | 62 | 65 | 67 | 71 | 70 | 86 | 90 | 92 | 90 |
| British Columbia | 5 | 5 | 6 | 6 | 7 | 7 | 7 | 6 | 6 | 8 | 8 | 8 | 8 |
| 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 |
| 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 |
| Newfoundland and Labrador | 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 | 0.6 | 0.6 | 0.6 | 0.5 |
| Nova Scotia | N/A | 0.3 | 0.3 | 0.2 | 0.2 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.06 | 0.4 |
| Nunavut | N/A | N/A | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 | 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 |
| Quebec | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Saskatchewan | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 8 | 8 | 8 | 8 |
| 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 |
| **22 – Utilities (total)** | **123** | **103** | **106** | **94** | **90** | **89** | **89** | **86** | **85** | **81** | **74** | **71** | **60** |
| Alberta | 50 | 48 | 48 | 46 | 44 | 44 | 49 | 47 | 47 | 46 | 38 | 36 | 30 |
| British Columbia | 2 | 2 | 2 | 0.9 | 0.9 | 1 | 1 | 0.8 | 0.9 | 0.8 | 0.9 | 1 | 0.9 |
| 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 |
| New Brunswick | 9 | 6 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 2 |
| Newfoundland and Labrador | 1 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 |
| 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 |
| Nova Scotia | 11 | 9 | 9 | 9 | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 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 |
| Ontario | 36 | 20 | 25 | 18 | 18 | 15 | 10 | 10 | 9 | 6 | 6 | 6 | 6 |
| 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 |
| 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 |
| Saskatchewan | 15 | 16 | 16 | 15 | 16 | 15 | 15 | 16 | 15 | 16 | 16 | 16 | 13 |
| Yukon | N/A | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 |
| **31-33 Manufacturing (total)** | **92** | **74** | **77** | **78** | **79** | **76** | **76** | **76** | **77** | **84** | **87** | **87** | **82** |
| Alberta | 18 | 17 | 17 | 18 | 18 | 19 | 18 | 19 | 19 | 20 | 22 | 22 | 22 |
| British Columbia | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Manitoba | 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 | 3 |
| Newfoundland and Labrador | 1 | 1 | 1 | 0.9 | 1 | 0.9 | 1 | 1 | 1 | 1 | 1 | 2 | 0.4 |
| Nova Scotia | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Ontario | 38 | 26 | 27 | 28 | 29 | 27 | 28 | 27 | 28 | 30 | 33 | 32 | 29 |
| 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 |
| Quebec | 20 | 17 | 18 | 17 | 17 | 17 | 17 | 17 | 16 | 18 | 18 | 18 | 18 |
| Saskatchewan | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Other[b] (total)** | **15** | **13** | **12** | **12** | **13** | **14** | **15** | **15** | **16** | **19** | **19** | **20** | **19** |
| Alberta | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 7 | 7 | 6 |
| British Columbia | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 |
| Manitoba | 1 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | 0.8 | 0.9 | 0.8 | 0.8 | 0.9 | 0.9 | 0.8 |
| New Brunswick | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 | 0.03 | 0.04 | 0.1 | 0.5 |
| Newfoundland and Labrador | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.05 | 0.06 | 0.06 | 0.05 |
| Nova Scotia | N/A | 0.06 | 0.04 | 0.04 | N/A | N/A | N/A | N/A | 0.006 | 0.08 | 0.09 | 0.1 | 0.2 |
| Ontario | 5 | 4 | 3 | 4 | 3 | 4 | 4 | 5 | 5 | 6 | 5 | 6 | 6 |
| Quebec | 0.3 | 0.9 | 1 | 0.8 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| Saskatchewan | 3 | 2 | 2 | 2 | 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

Totals may not add up 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. "Other" includes various types of facilities such as natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.

### 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.

## IMPACT OF THE COVID-19 PANDEMIC ON 2020 EMISSION LEVELS

Total facility-reported emissions were noticeably lower in 2020 than in previous years. Based on information reported by facilities to the GHGRP, there is evidence to suggest that the COVID-19 pandemic contributed to the 7% drop in emissions between 2019 and 2020 to some extent (e.g. temporary shut downs, reduced demand), particularly in the electric power generation and the iron and steel manufacturing sectors. Overall, factors such as reduced coal consumption, fuel switching and lower production levels, impacted emissions to a larger degree.

Since 2017, total reported emissions have decreased by 7% (20 Mt). This can largely be attributed to the steady year-over-year decreases in reported emissions from facilities in the Utilities sector, where overall emissions have declined by 26% (21 Mt) between 2017 and 2020. This significant decrease is a result of ongoing emissions reductions in the electric power generation subsector, which experienced a 21 Mt decrease in emissions since 2017 (Table 5), with 76% of this decrease (16 Mt) occurring in Alberta. During the same period, the Utilities sector in Saskatchewan also experienced a decrease in emissions, with reported emissions declining by 19% (3 Mt). These observed emission reductions are mainly attributed to the reduced use of fossil fuels, coal in particular,[14] for electricity generation and the increased reliance on renewable electricity sources in Alberta.[15]

Emissions from the Manufacturing sector did not change significantly, showing an overall decrease in emissions of 3% (2 Mt) over this same period (Table 5). The majority of this decrease can be linked to emissions reductions in the petroleum and coal products sector in Newfoundland and Labrador (1.0 Mt, due to a refinery closure), and in the iron and steel manufacturing sector in Ontario and Quebec (0.7 Mt), notably between 2019 and 2020 (Table 5 and Table 6).

While the above sectors' emissions have declined since 2017, reported emissions from the Mining, Quarrying, and Oil and Gas Extraction sector increased by 3% (4 Mt). Oils sands extraction contributed the most to this increase, with reported emissions from this sector increasing by 3 Mt between 2017 and 2020, with minor inter-annual fluctuations, especially in Alberta, consistent with observed changes in synthetic crude oil production (+7%)[16] and in crude oil and crude bitumen production (-5% in 2020).[17]

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

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

16 [AER] Alberta Energy Regulator. 2021. Alberta's Energy Reserves and Supply/Demand Outlook. [Revised 2021 Jun]. Available at: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98.

17 Statistics Canada. Table 25-10-0063-01 Supply and disposition of crude oil and equivalent.

### 3.2.2. Long-Term Trends

The major long-term emission patterns illustrate two large off-setting trends of a 65 Mt increase in emissions in Mining, Quarrying and Oil and Gas Extraction since 2005, compensated by 64 Mt and 10 Mt emission decreases in Utilities and Manufacturing respectively (Table 5). Long-term trends were not impacted by the addition of newly reporting 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 experienced a significant decline of 64 Mt throughout 2005 to 2020 (Table 5), largely from the discontinuation of coal-fired electricity production in Ontario, Alberta, New Brunswick and Nova Scotia (Table 6). Over the same period, the number of large-emitting facilities (1 Mt or above) in the fossil-fuel electric power generation subsector declined from 24 in 2005 to 16 in 2020. Other contributors to the decrease in utility emissions include 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.[18, 19]

Between 2005 and 2020, overall emissions from the Manufacturing sector remain below (11%, or 10 Mt) their 2005 levels (Figure 11), with Ontario and Quebec facilities in specific industry sectors contributing the most to this overall decrease. Ontario facilities saw a net decrease of 9 Mt (Table 6) compared to 2005, largely observed in iron/steel, cement, primary magnesium production, and chemical manufacturing (e.g., halted adipic acid production in 2009) (Table 5). Quebec facilities showed an overall 2-Mt decrease in emissions from 2005 to 2020 (Table 6), with aluminium production and petroleum refining facilities contributing the most to this change (Table 5). Emission decreases resulted from technological change in aluminium production,[20, 21, 22] and the closure of a magnesium production facility and aluminium smelters in Quebec.

In contrast, Alberta facilities in the Manufacturing sector saw a 29% increase (5 Mt) in reported emissions since 2009, with 46% (2.2 Mt) of the observed increase in the basic chemicals sector, and 21% (1.0 Mt) in the petroleum and coal products sector, driven by the opening of a new refinery in Alberta in 2017. Between 2005 and 2020, overall emissions from the petroleum and coal products sector have decreased by 16% (3 Mt) as a result of 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 11). Most of the increase (between 2005 and 2020) was driven by oil sands extraction facilities in Alberta (45 Mt growth since 2005) as existing facilities expanded operations and new facilities came online and thermal heavy 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 from this sector reporting their emissions to the program, as a result of the lowering of the reporting threshold (see section 2.6).

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

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

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

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

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

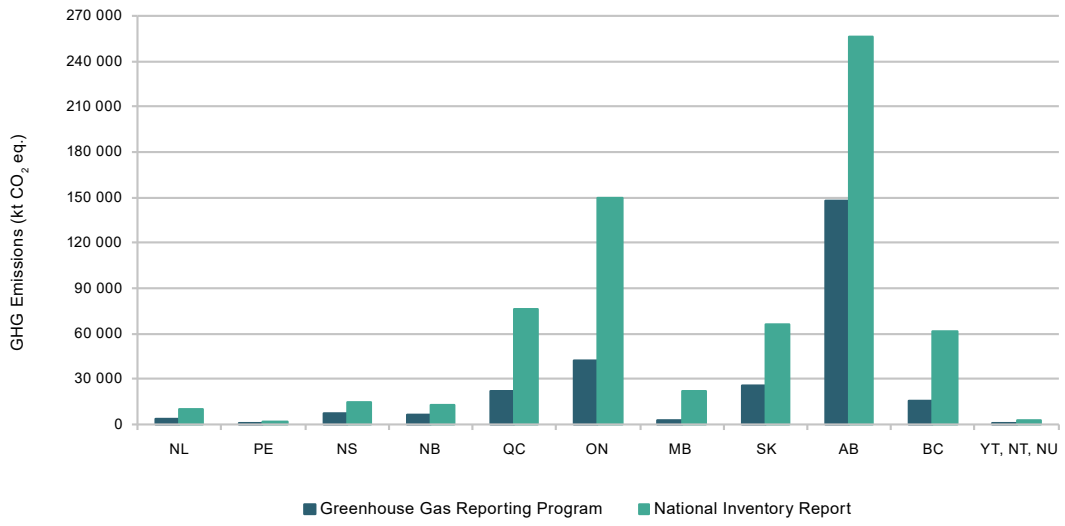
# FACILITY-REPORTED EMISSIONS AND THE NATIONAL GHG INVENTORY

The total facility-reported GHG emissions for 2020 collected under the GHGRP represent 41% of Canada's total GHG emissions in 2020 (672 Mt) and 63% of Canada's industrial GHG emissions.[23] 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 63% 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 2020 captured approximately 79% of industrial emissions in Nova Scotia, and 72% of total industrial emissions in Alberta.

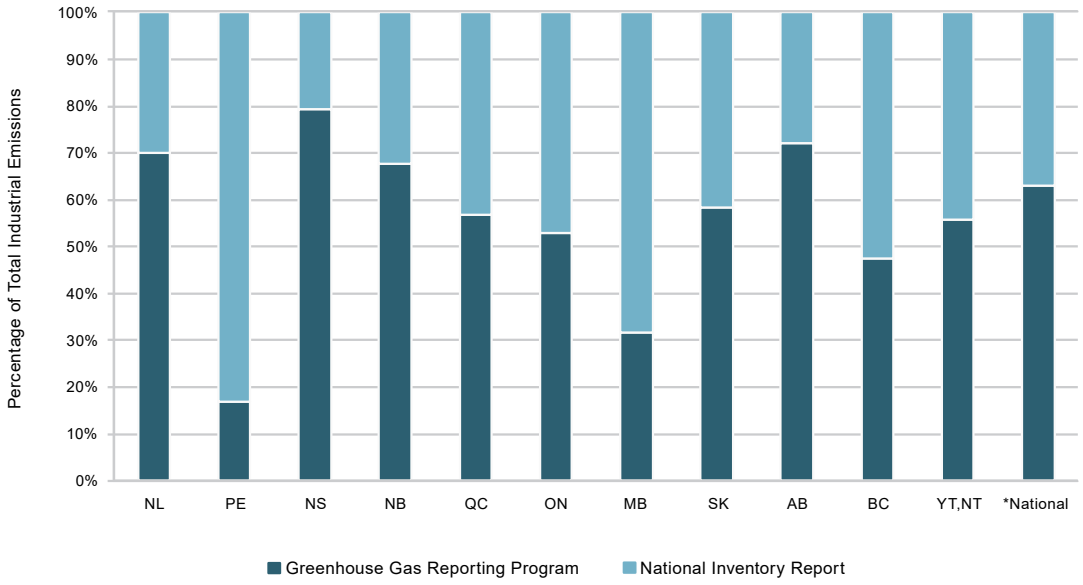
Figure 12 **Provincial/Territorial Contribution to 2020 Facility-Reported Greenhouse Gas Reporting Program Total and the National Inventory Total**




23 In this overview report, Canada's industrial GHG emissions include emissions from the following GHG categories from the *National Inventory Report 1990–2020: 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.

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.

Figure 13 **2020 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 1990–2020: Greenhouse Gas Sources and Sinks in Canada*: 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.

# 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 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[24] 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[25] 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

24 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.

25 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 National Pollutant Release Inventory 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.

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.

# 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
Place Vincent Massey, 7th Floor
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