

OVERVIEW OF 2018 REPORTED EMISSIONS

FACILITY GREENHOUSE GAS REPORTING PROGRAM



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HIGHLIGHTS

- 1706 facilities reported their greenhouse gas (GHG) emissions in 2018 to Environment and Climate Change Canada, totalling 295 megatonnes (Mt)¹ of carbon dioxide equivalent (CO₂ eq.).
- The 2018 reporting cycle is the second year of the expansion to the federal GHG reporting program (GHGRP)—under the expansion to date, the reporting threshold was lowered to 10 kilotonnes (kt) CO₂ eq (in 2017) and facilities in 14 industry sectors were also required to provide additional data and use prescribed methods to determine emissions².
- 1066 facilities reported emission levels in the 10 to 50 kt range, accounting for 8% (23 Mt) of the total facility-reported emissions for 2018—largely from the oil and gas and manufacturing sectors.
- The reported emissions are largely distributed across three sectors: (i) Mining, Quarrying, and Oil and Gas Extraction (38%), (ii) Manufacturing (30%), and (iii) Utilities (25%)—amongst all facilities, those engaged in oil/gas extraction and electricity generation account for 59% of the total.
- 540 facilities reported emitting 50 kt of CO₂ eq. or more in 2018 for a total of 271 Mt, 0.6% higher than the 2017 total.
- Since 2005, total emissions from the larger emitting facilities (50 kt or more) in the Utilities and Manufacturing sectors declined by 51 Mt and 9 Mt respectively, while reported emissions increased by 52 Mt from the larger emitting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector. These sectoral trends mirror those reported in Canada's National GHG Inventory.
- The reported emissions reduction in Utilities (51 Mt) since 2005 were primarily from the Electricity sector in Ontario and Alberta, driven by the reduced use of fossil fuels to generate electricity and increased use of renewable energy sources. The reported decrease from the Manufacturing sector (9 Mt) since 2005 were mostly attributed to manufacturers of aluminium, chemicals and cement, as well as petroleum refining.
- The GHG emissions data reported by facilities represents 40% of Canada's total GHG emissions (729 Mt in 2018) and 65% of Canada's industrial GHG emissions as reported in Canada's National GHG Inventory.³
- Environment and Climate Change Canada is continuing the expanded reporting requirements under the GHGRP for the 2019 data year, which aims to facilitate the direct use of the facility data in the National GHG Inventory, thus better reflecting emission changes occurring at individual facilities and improving the granularity, consistency and comparability of GHG data across Canada.

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

2 The reporting requirements were expanded progressively over the last two years. The 2018 GHGRP Gazette notice describes the complete reporting requirements for 2018 data. It can be accessed on the Canada Gazette: <http://gazette.gc.ca/rp-pr/p1/2019/2019-01-19/html/notice-avis-eng.html>.

3 In this overview report, Canada's industrial GHG emissions include those from the following GHG categories from the National Inventory Report: Greenhouse Gas Sources and Sinks in Canada 1990–2018: 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 Climate Change-National Inventory Submissions: <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2018>.

GREENHOUSE GAS REPORTING PROGRAM 1

Environment and Climate Change Canada's Greenhouse Gas Reporting Program (GHGRP) has completed the collection of GHG emissions information from Canadian facilities for the 2018 calendar year. Any facility with annual GHG emissions of 10 kilotonnes (kt) of carbon dioxide equivalent (CO₂ eq.) or higher is required to report to the program.

The Government of Canada established the GHGRP in March 2004 under the authority of section 46 of the *Canadian Environmental Protection Act, 1999* (CEPA) to collect GHG emissions information annually from the largest emitting Canadian facilities. To date, facility-reported GHG information has been collected and published through Environment and Climate Change Canada's GHGRP for the period of 2004 to 2018. This program is part of Canada's ongoing effort to develop, in collaboration with Canadian provinces and territories, a harmonized and efficient mandatory GHG reporting system that minimizes duplication and reporting burden for industry and governments. Key objectives of the program are to provide Canadians with consistent information on GHG emissions, inform the development of the National Greenhouse Gas Inventory and support regulatory initiatives. The data collected are also shared with provinces and territories.

In December 2016, the Government of Canada published a Notice of Intent to inform stakeholders of its intent to expand the GHGRP. It is pursuing this expansion in order to: enable the direct use of the reported data in Canada's National GHG Inventory, increase the consistency and comparability of GHG data across jurisdictions, and obtain a more comprehensive picture of Canadian facility emissions. The 2017 data reporting cycle represented Phase 1 of the GHGRP expansion. In this phase, the reporting threshold was lowered to require all facilities emitting 10 kt or more of GHGs (in CO₂ eq. units) to report. 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 CO₂ capture, transport, and geological storage activities.

The *Notice with respect to reporting of greenhouse gases (GHGs) for 2018*⁴ represented the second year of the phased expansion to the GHGRP. Under Phase 2 of the expansion, the reporting threshold was 10kt CO₂ eq. (from 2017) and facilities in 9 industry sectors were also 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. Environment and Climate Change Canada will continue to assess further expansion in future years.

The 2018 Notice, published in the *Canada Gazette* on January 19, 2019, reflects the federal reporting requirements for 2018 data, submitted by facilities to Environment and Climate Change Canada in 2019. The data used in this overview report are current as of November 14, 2019. 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 2019*⁵ was published in the *Canada Gazette* on February 1, 2020. The 2019 Notice sets out the federal reporting requirements for 2019 data, scheduled to be submitted by facilities to Environment and Climate Change Canada by June 1, 2020. The 2019 Notice does not incorporate significant changes in reporting requirements.

REPORTED 2018 GREENHOUSE GAS EMISSIONS 2

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 1706 facilities reported their GHG emissions to Environment and Climate Change Canada for the 2018 calendar year, collectively emitting a total of 295 Mt of GHGs⁷ (Figure 1). Of these facilities, 339 reported GHG emission levels greater than 100 kt, accounting for 87% (257 Mt) of the total reported emissions, and 58 emitted more than 1 Mt, accounting for 56% (166 Mt) of the total reported emissions (Figure 2). Those with emissions over 1 Mt fall within several industrial sectors such as electric power generation, oil sands extraction, petroleum refineries and primary metal manufacturing (e.g. iron, steel and aluminum). Facilities with emissions falling below the reporting threshold of 10 kt per year can voluntarily report their GHG emissions; 100 facilities did so this year, representing 0.1% (0.3 Mt). All voluntarily reported emissions are included in this report and in the data set published by Environment and Climate Change Canada.

Among all reported facilities, 1066 reported GHG emission levels in the 10 to 50kt 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 (563 facilities), food manufacturing (54 facilities), and waste treatment and disposal (61 facilities).

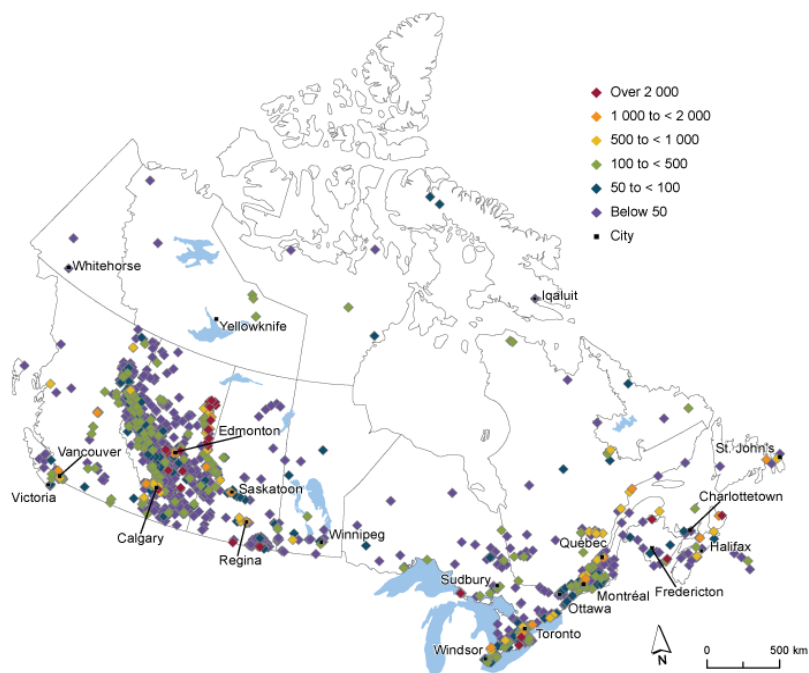
4 The Notice with respect to reporting of greenhouse gases (GHGs) for 2018 can be accessed at the Canada Gazette: <http://gazette.gc.ca/rp-pr/p1/2019/2019-01-19/html/notice-avis-eng.html>

5 The Notice with respect to reporting of greenhouse gases (GHGs) for 2019 can be accessed at the Canada Gazette: <http://gazette.gc.ca/rp-pr/p1/2020/2020-02-01/html/sup1-eng.html#591>.

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.

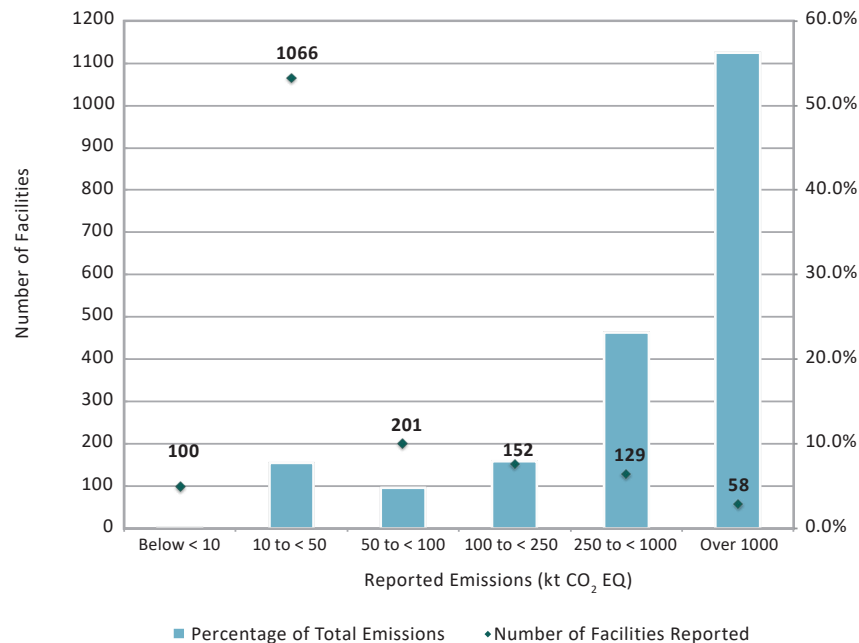
7 Unless explicitly stated otherwise, all emissions data presented in this report are expressed in CO₂ eq. units.

Figure 1: **2018 Facility Greenhouse Gas (GHG) Emissions Reported to Environment and Climate Change Canada**



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

Figure 2: **Contribution of Facilities in Various Emission Ranges to Total Reported Emissions (2018)**



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

2.1 Emission Calculation Methods

A facility may choose among a number of available methods to calculate its GHG emissions. The methods selected by reporting 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/activities covered under phases 1 and 2 of the GHGRP expansion were required to use specific quantification methods, described in Canada's Greenhouse Gas Quantification Requirements⁸.

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

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

2.2 Greenhouse Gases and Global Warming Potentials

GHGs are not equal in their effect on the atmosphere. Each GHG has its own average atmospheric lifetime and heat-trapping potential. GHG emissions are often calculated and reported in terms of how much CO₂ would be required to produce a similar warming effect over a given time horizon. This is called the CO₂ eq. value and is calculated by multiplying the amount of the gas by its associated global warming potential (GWP) (Table 1). Environment and Climate Change Canada uses the GWP values from the IPCC Fourth Assessment Report adopted by the UNFCCC, a complete list of which can be found in the Notice with respect to reporting of greenhouse gases (GHGs) for 2019. The GWP values used by the GHGRP are consistent with those used in Canada's National Greenhouse Gas Inventory.

2.3 Reported GHG Emissions by Gas and by Source

CO₂ represented the majority (93%) of the total reported emissions in 2018, while methane (CH₄) and nitrous oxide (N₂O) emissions contributed 5% and 1%, 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 Mt).

Figure 3: Types of Methods Used by Facilities

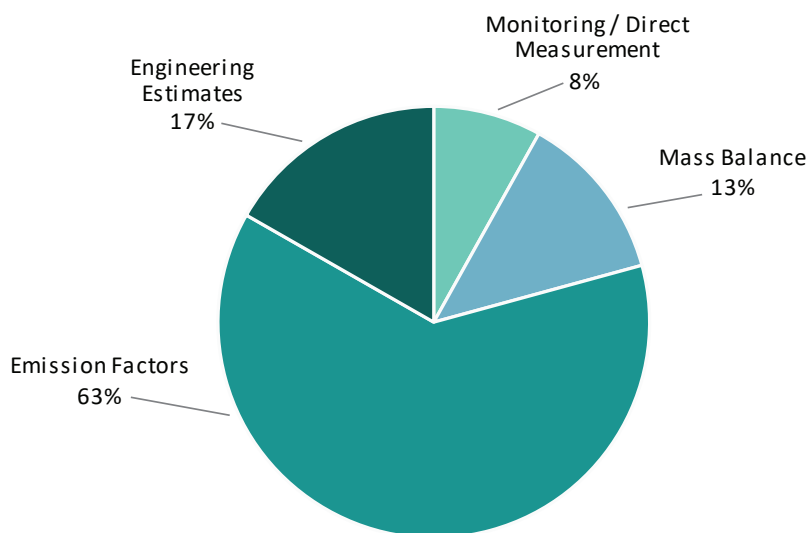


Table 1: **Global Warming Potential Values for the Main Greenhouse Gases**

Greenhouse Gas	100-year GWPs ^a
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous oxide (N ₂ O)	298
Sulphur hexafluoride (SF ₆)	22 800
Hydrofluorocarbons (HFCs), 13 species	Ranges from 92 to 14 800
Perfluorocarbons (PFCs), 7 species	Ranges from 7 390 to 12 200

Note:

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

When reporting to the GHGRP, facilities are required to report GHG emissions under the following source categories:⁹ stationary fuel combustion, industrial processes and industrial product use, fugitive sources including venting, flaring and leakage, on-site transportation, waste and wastewater¹⁰. Stationary fuel combustion is the largest source of reported emissions, representing 75% of the total (Figure 5).

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

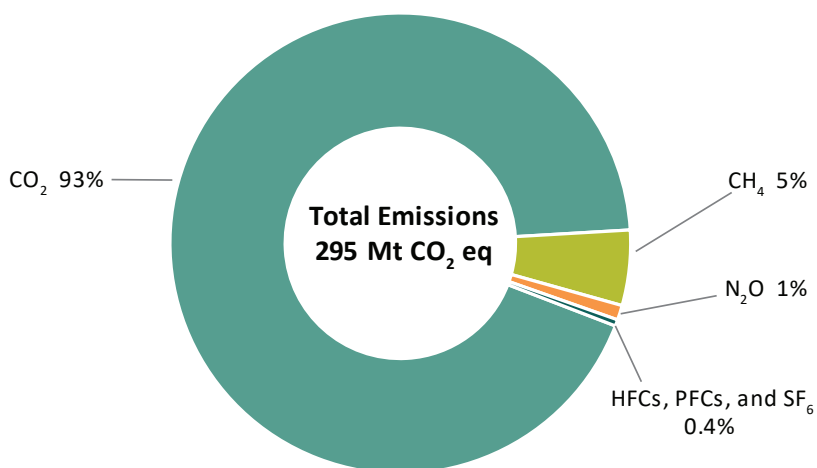
¹⁰ Some source categories have been modified and updated. These alterations reflect the GHGRP expansion and are applicable to the 2018 reporting year.

This source includes emissions resulting from the burning of fuels for the purpose of producing energy (e.g., to generate electricity, heat or steam), but does not include emissions from combustion engines in vehicles or mobile equipment, which are grouped under On-site Transportation. Any waste material burned or incinerated at a facility to produce energy is also included in stationary combustion. Industrial process emissions, the second-largest source of reported emissions at 14%, refer to emissions stemming from specific industrial processes involving chemical or physical reactions other than combustion. Such reactions occur, for example, in the processes of mineral production (e.g., lime, cement), metal production (e.g., iron, steel, aluminium) and chemical production (e.g., nitric acid and ammonia production).

2.4 Reported GHG Emissions by Province/Territory

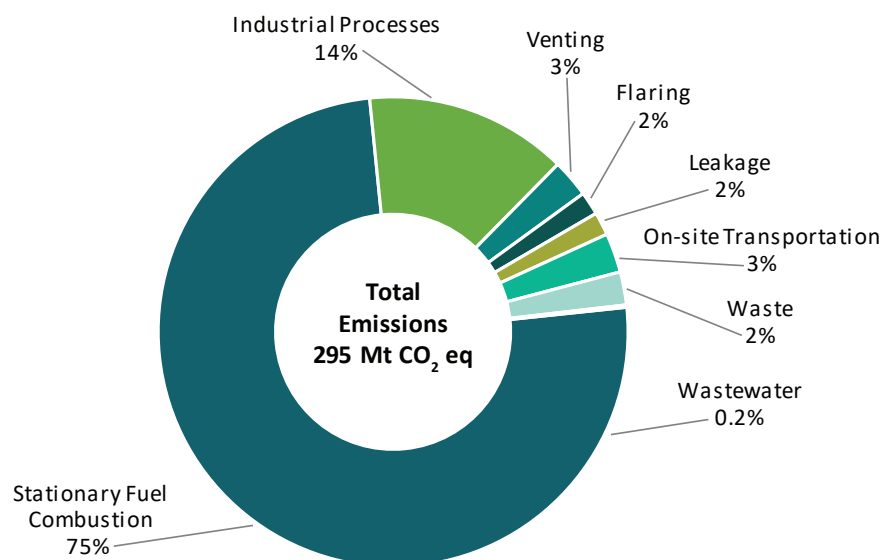
Facilities in the province of Alberta accounted for the largest share of reported emissions, with approximately 53% of the total, followed by facilities in Ontario (15%), Saskatchewan (10%) and Quebec (7%) (Table 2). The number of facilities, the quantity and type of fuel consumed, and the predominant industry largely explain this ranking.

Figure 4: **Reported 2018 Greenhouse Gas Emissions by Gas (295 Mt of CO₂ eq)**



Note: Totals may not add up due to rounding.

Figure 5: **Reported 2018 Greenhouse Gas Emissions by Source**



Note: Totals may not add up due to rounding.

Table 2: **Reported 2018 Greenhouse Gas Emissions by Province/Territory**

Province / Territory	Number of Facilities	Total Emissions (kt CO ₂ eq)	Percentage of Total Emissions
Newfoundland and Labrador	16	5 434	2%
Prince Edward Island	5	96	0.03%
Nova Scotia	25	7 636	3%
New Brunswick	18	6 982	2%
Quebec	191	21 872	7%
Ontario	324	45 609	15%
Manitoba	35	2 595	1%
Saskatchewan	180	29 359	10%
Alberta	713	156 558	53%
British Columbia	185	17 236	6%
Yukon	2	36	0.01%
Northwest Territories	5	611	0.2%
Nunavut	7	507	0.2%
Total	1 706	294 530	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).¹¹ In 2018, three NAICS defined industry sectors accounted for the majority of GHG emissions: the Mining, Quarrying, and Oil and Gas Extraction sector, representing 38% (113 Mt) of total reported emissions; the Manufacturing sector, accounting for 30% (89 Mt); and the Utilities sector, primarily facilities generating electricity from fossil fuels, accounting for 25% (74 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 (10 Mt) and waste management (7 Mt).

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

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

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

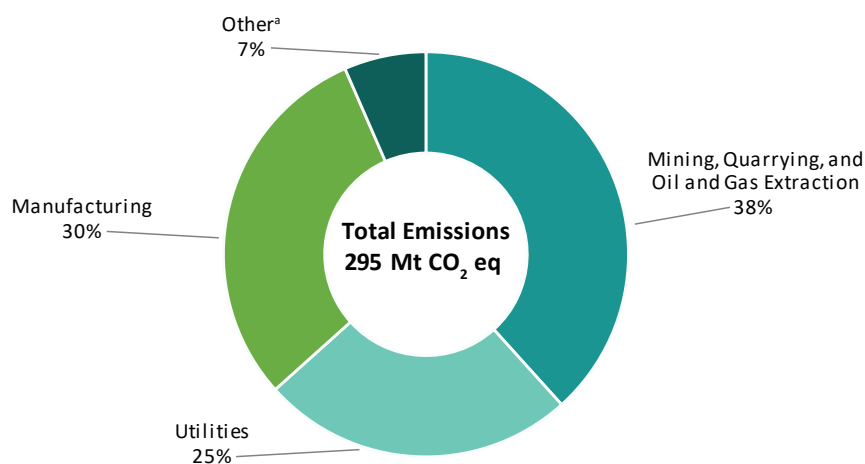
The Manufacturing sector includes a wide range of industrial activities, with important contributors to the reported 2018 emissions being (Figure 8):

1. Petroleum and coal product manufacturing (20%).
2. Iron, steel and ferro-alloy manufacturing (18%).
3. Basic chemical manufacturing (e.g., ethylene, polyethylene, hydrogen gas) (15%).
4. Cement and concrete product manufacturing (13%).

2.6 Reported Emissions in the 10 to 50 kt Range

Starting with the 2017 data collection, the mandatory reporting threshold was lowered from 50 kt CO₂ eq. to 10 kt CO₂ eq. This means any facility emitting 10kt 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 1706 reported facilities in 2018, 1066 facilities' emissions are in the range of 10kt to 50kt, accounting for 62% of the total number of reported facilities. The emissions from these 1066 facilities are 23 Mt, representing 8% of the 2018 total reported emissions. Over half (55%) of the 23 Mt of GHGs emitted by facilities of 10–50 kt range, come from the Mining, Quarrying and Oil and Gas Extraction sector, where a total 629 facilities are reporting (Figure 9). The Manufacturing sector is the second largest contributor (226 facilities reporting), accounting for 23% of the emissions reported by the facilities in this range. Many landfills, universities and hospitals were required to report because of the 10kt threshold.

Figure 6: **Reported 2018 Greenhouse Gas Emissions by Industry Sector (295 Mt CO₂ eq.)**



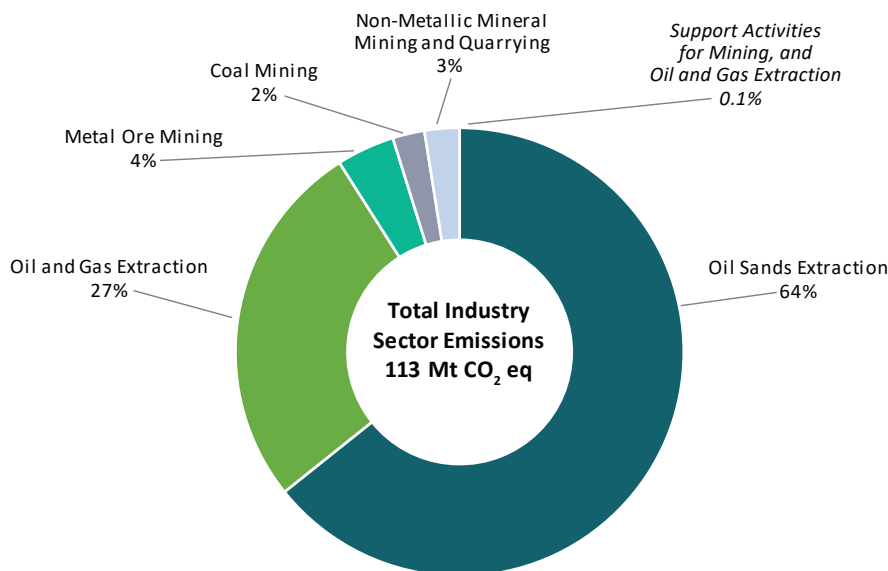
Note:

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

The reporting threshold change from 50 kt CO₂ eq. to 10 kt CO₂ eq. resulted in 1066 facilities reporting in this range across Canada in 2018 (Figure 10). Alberta experienced the highest number of reporters in this range with a total 469 reported facilities (44% of the total number of new reporting facilities), followed by

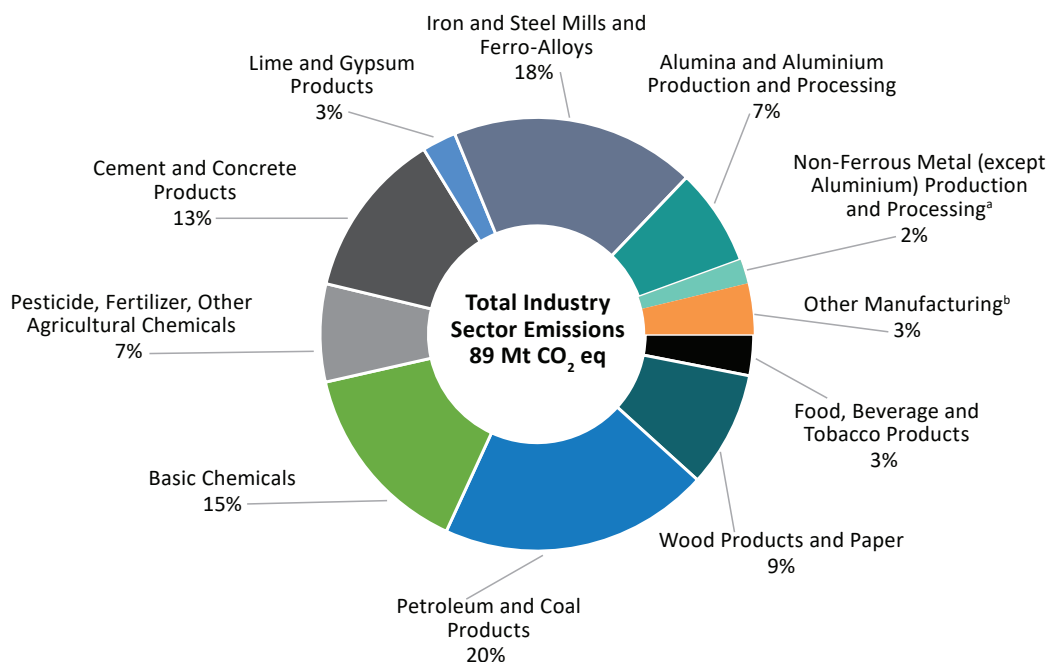
198 in Ontario (19%), 120 in Saskatchewan (11%) and 112 in British Columbia (11%). Facilities in this range accounted for 23 Mt of total reported facility emissions for 2018, with the highest share being in Alberta (10 Mt), followed by Ontario (4 Mt), Saskatchewan (2.4 Mt) and British Columbia (2.4 Mt).

Figure 7: **Reported 2018 Greenhouse Gas Emissions by Subsectors of Mining, Quarrying, and Oil and Gas Extraction (113 Mt CO₂ eq.)**



Note: Totals may not add up due to rounding.

Figure 8: **Reported 2018 Greenhouse Gas Emissions by Subsectors of Manufacturing (89 Mt CO₂ eq.)**

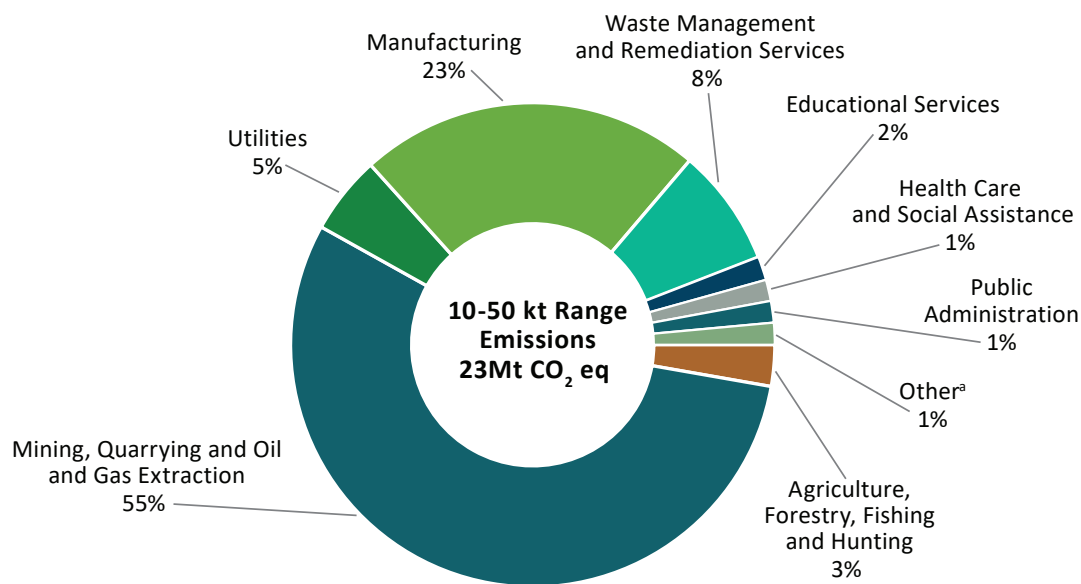


Note:

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

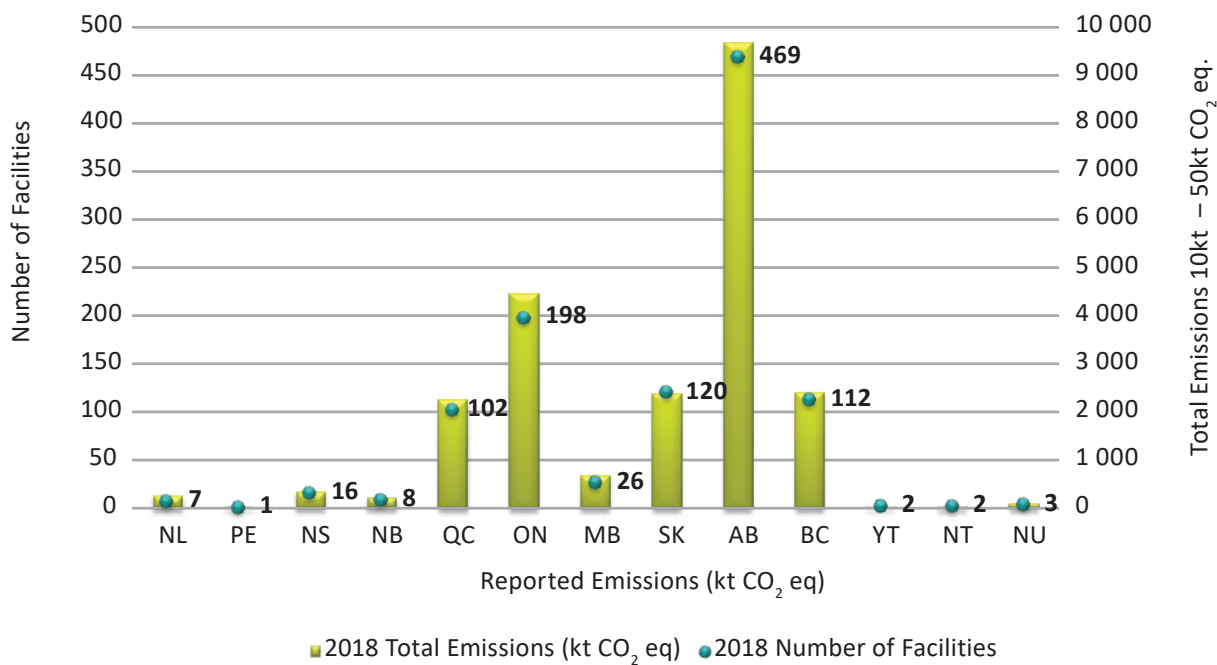
b. "Other Manufacturing" represents other types of manufacturing, including electrical equipment, transportation equipment and furniture manufacturing.

Figure 9: **Reported 2018 Greenhouse Gas Emissions from Facilities in the 10 to 50 kt Range by Sector (23 Mt CO₂ eq.)**



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

Figure 10: **Reported 2018 Greenhouse Gas Emissions for Facilities Between 10 to 50 kt CO₂ eq. by Province/Territory**



TRENDS IN REPORTED GHG EMISSIONS

3

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

Since the reporting threshold was lowered from 50 kt to 10 kt in 2017, facilities with emissions below 50kt were excluded from the trend analysis presented in section 3. This exclusion is necessary to remove the impact of lowering the reporting threshold on observed changes in emission levels from 2005 through 2018. Over the 2005–2018 period, the number of reporting facilities increased from 337 to 540 (Table 3),¹² while emissions from these facilities decreased by 2% (i.e. 7 Mt) since 2005.

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

3.1 National-Level Trends

Total reported GHG emissions for facilities emitting 50 kt of CO₂ eq. or more were 271 Mt in 2018, compared to 270 Mt for 2017 (Table 3). Over the 2005–2018 period, the number of reporting facilities in this range increased from 337 to 540, while emissions from these facilities decreased by 2% (7 Mt). In contrast with this overall trend, total emissions since 2011 increased by 7% (17 Mt), with some levelling out between 2012 and 2016.

While the number of facilities reporting their emissions has steadily increased over the last several years, overall GHG emissions did not increase accordingly: their variations are mainly driven by the evolution of important industry sectors and the influence of the largest emitters (i.e. emissions above 100 kt) (Figure 2).

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 4). 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 5). Only facilities that emitted 50 kt or more were used for the analysis presented in this section: this is to remove the impact of changing the reporting threshold on observed emission changes from 2005 through 2018.

Table 3: **Total Facility-Reported GHG Emissions, Selected Years**

	2005	2009 ^a	2011	2012	2013	2014	2015	2016	2017 ^a	2018 ^a
Number of facilities	337	464	475	489	500	500	490	504	525	540
GHG emissions (kt CO ₂ eq)	277 997	252 158	254 352	257 862	259 582	262 111	262 549	261 998	269 821	271 339
Annual change (%)	N/A	-4.13%	-3.02%	1.38%	0.67%	0.97%	0.17%	-0.21%	2.99%	0.56%
Change since 2005 (%)	N/A	-9%	-9%	-7%	-7%	-6%	-6%	-6%	-3%	-2%

Notes:

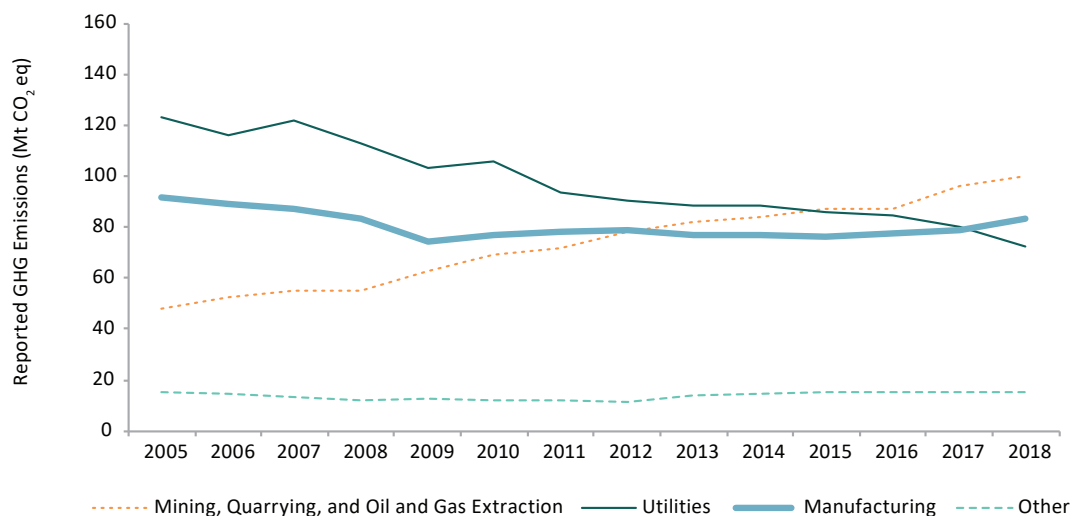
N/A not applicable

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>).

Only facilities with emissions above 50 kt were included in the analysis for 2009-2018.

a. The reporting threshold changed in 2009 from 100 kt to 50 kt and, from 50 kt to 10 kt in 2017. For 2017 and 2018, emissions data for facilities between 10kt to 50kt CO₂ eq. are not included.

Figure 11: Long-Term Sectoral Trend, 2005–2018



Note:

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

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). Emissions from the Manufacturing sector have recently risen, exhibiting a 6 Mt increase since 2016 although the sector's emissions had significantly decreased between 2005 and 2009. Trends observed from facility-reported sector emissions are similar to trends observed in the National GHG Inventory. Various factors have led to these trends and are further discussed in this section.

3.2.1 Short-Term Changes

The 3.4% (9 Mt) increase in total reported emissions over the last five years is mostly due to the 20% increase in emissions from the Mining, Quarrying, and Oil and Gas Extraction sector (i.e. 17 Mt increase from 2014 to 2018) (Table 4), largely in Alberta (Table 5). Oil sands extraction experienced an 11-Mt increase in emissions, consistent with observed increases in synthetic crude oil production (11%) and in non-upgraded bitumen production (47%) during this period.¹³ Saskatchewan facilities also

contributed to the increase, mainly due to the increased emissions reported from potash mines and oil and gas extraction sectors.

The sustained increase in the above sector is offset by emission reductions in the Utilities sector (Figure 11). Electric power generation experienced a 16 Mt decrease in emissions since 2014 (Table 4), where 50% of this decrease (8 Mt) occurred in the past year (from 2017 to 2018) in Alberta. The Utilities sector in Ontario also experienced a 4 Mt decrease in emissions from 2014 to 2018. The reduced emissions in this sector over the last five years are attributed to the reduced use of fossil fuels for electricity generation and the increased reliance on renewable electricity sources in Ontario and Alberta.¹⁴

Overall emissions from the larger emitters (i.e. 50+ kt) in the Manufacturing sector largely remained stable throughout 2014 to 2016, while more recently have shown an 8% increase (6 Mt) from 2016 to 2018. This increase is mainly observed in the iron and steel, chemical, and wood products and paper manufacturing sectors (Table 4).

¹³ [AER] Alberta Energy Regulator. 2019. Alberta's Energy Reserves and Supply/Demand Outlook. [revised 2019 May]. Available at: <https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98>.

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

Table 4: **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	2011	2012	2013	2014	2015	2016	2017 ^b	2018 ^b
Total^c	278	252	254	258	260	262	263	262	270	271
21 - Mining, Quarrying, and Oil and Gas Extraction^c	48	62	71	77	82	83	87	86	96	100
Oil and gas extraction	14	15	15	14	15	15	14	15	19	19
Oil sands extraction ^d	28	42	49	55	59	61	65	64	69	72
Coal mining	2	2	3	3	3	2	2	2	3	2
Metal ore mining	3	2	3	3	4	3	3	4	4	4
Non-metallic mineral mining and quarrying	1	1	2	2	2	2	2	2	2	3
Support activities for mining, and oil and gas extraction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	N/A	N/A
22 - Utilities^c	123	103	94	90	88	88	85	84	80	72
Electric power generation	122	101	91	88	86	86	84	83	78	71
Natural gas distribution	1	2	2	2	2	2	1	1	1	1
Water, sewage and other systems ^e	0	0.49	0.38	0.36	0.43	0.43	0.42	0.41	0.37	0.44
31-33 Manufacturing^c	92	74	77	79	76	76	76	77	79	83
Food, beverages, and tobacco products	0.34	0.65	0.72	0.69	0.91	1	1	1	1	1
Wood products and paper	5	4	4	5	5	5	5	5	5	6
Petroleum and coal products	20	19	17	18	17	17	17	17	18	18
Basic chemicals	14	11	11	11	11	11	11	11	11	12
Pesticide, fertilizer, other agricultural chemicals	6	5	6	6	6	6	6	6	6	6
Cement and concrete products	13	9	10	11	10	10	11	10	11	11
Lime and gypsum products	3	2	2	2	2	2	2	2	2	2
Iron and steel mills and ferro-alloys	17	11	14	15	13	14	13	14	14	16
Primary production of alumina and aluminium	10	8	8	8	7	7	7	7	7	6
Non-ferrous metal (except alum.) smelting and refining	3	2	1	2	2	2	2	2	1	1
Other manufacturing ^f	0	1	2	2	2	2	2	2	2	2
Other^{c,g}	15	13	12	12	14	15	15	15	15	15
Pipeline transportation of natural gas	12	7	7	6	8	9	9	9	9	10
Waste management and remediation services	3	5	5	5	5	5	5	5	6	5
Institutional facilities	N/A	0.34	0.53	0.54	0.48	0.53	0.52	0.40	0.53	0.62
Miscellaneous	N/A	0.10	0.07	0.06	0.00	0.06	0.09	0.07	0.20	0.08

Notes:

N/A not available

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

b. The reporting threshold changed in 2009 from 100 kt to 50 kt and in 2017 from 50 kt to 10 kt. The analysis for 2009–2018 only includes emissions information for facilities that emit ≥ 50kt of CO₂ eq.

c. Totals may not add up due to rounding.

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

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

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

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

3.2.2 Long-Term Trends

The major long-term emission trends have shown a declining overall in the Utilities and Manufacturing sectors since 2005, while emissions from the Mining, Quarrying, and Oil and Gas Extraction sector have steadily increased.

Up to and including the year 2014, the Utilities sector consistently accounted for the largest portion of reported emissions (Figure 11), with electric power generation being the main contributor. However, emissions from fossil-fuel electric power generation fell significantly (51 Mt) throughout 2005 to 2018 (Table 4), largely from the discontinuation of coal-fired electricity production in Ontario as well as emission reductions in Alberta, New Brunswick and Nova Scotia (Table 5). Fuel switching (e.g., from coal to natural gas or other lower carbon fuel) and increased reliance on hydro, nuclear and renewable sources of generation are also contributors to the decrease in utility emissions.¹⁵

Overall emissions from the Manufacturing sector remain below (10%, or 9 Mt) their 2005 levels (Figure 11) between 2005 and 2018, with Ontario and Quebec facilities showing the largest decreases in GHG emissions from the Manufacturing sector. Ontario facilities saw a net decrease of 7 Mt (Table 5) compared to 2005, largely observed in iron/steel, cement, and chemical manufacturing (e.g., halted adipic acid production in 2009) (Table 4). Quebec facilities showed an overall decrease in emissions of 4 Mt from 2005 to 2018 (Table 5), with aluminium production and petroleum refining facilities contributing the most to this change (Table 4). Emission decreases resulted from technological change in aluminum production^{16, 17, 18} the closure of aluminium smelters in Quebec, and the conversion of a petroleum refinery to a storage terminal.

The Mining, Quarrying, and Oil and Gas extraction sector has shown an increasing trend over the last decade (Figure 11). Most of the increase (52 Mt between 2005 and 2018) was driven by oil sands extraction facilities in Alberta (47 Mt growth since 2005) and Saskatchewan, reflecting this sector's steady growth trend.

FACILITY-REPORTED EMISSIONS AND THE NATIONAL GHG INVENTORY 4

The total facility-reported GHG emissions for 2018 collected under the GHGRP represent 40% of Canada's total GHG emissions in 2018 (729 Mt) and 65% of Canada's industrial GHG emissions¹⁹. 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 65% 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 CO₂ eq. reporting threshold. The degree of coverage are fairly high for some provinces and territories, for example, the reported emissions in 2018 captured approximately 82% of industrial emissions in Newfoundland and Labrador (NL), and 98% of total industrial emissions in Yukon (YT) and the Northwest Territories (NT).

¹⁵ Statistics Canada Table 25-10-0020-01 Electric power, annual generation by class of producer.

¹⁶ Based on GHG emission data reported by facilities to the GHGRP.

¹⁷ Environment Canada. 2008. Environmental Performance Agreement Concerning Atmospheric Emissions of Polycyclic Aromatic Hydrocarbons between EC and Alcoa.

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

¹⁹ In this overview report, Canada's industrial GHG emissions include emissions from the following GHG categories from the National Inventory Report 1990–2018: 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.

Table 5: **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	2011	2012	2013	2014	2015	2016	2017 ^a	2018 ^a
Total^b	278	252	254	258	260	262	263	262	270	271
21 - Mining, Quarrying, and Oil and Gas Extraction^b	48	62	71	77	82	83	87	86	96	100
Newfoundland and Labrador	3	3	3	3	3	3	3	3	3	3
Nova Scotia	N/A	0.3	0.2	0.2	0.4	0.5	0.4	0.4	0.3	0.2
New Brunswick	N/A	N/A	0.06	0.06	0.02	N/A	0.06	N/A	N/A	N/A
Quebec	2	1	2	2	2	2	2	2	2	2
Ontario	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.4	0.6	1
Manitoba	N/A	0.06	0.1	0.2	0.2	0.08	0.1	0.07	0.06	0.06
Saskatchewan	3	3	3	4	4	4	4	5	6	6
Alberta	35	50	56	61	65	67	71	70	78	82
British Columbia	5	5	6	7	7	7	6	5	6	6
Northwest Territories	0.4	0.5	0.6	0.9	0.6	0.6	0.6	0.6	0.5	0.6
Nunavut	N/A	N/A	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4
22 - Utilities^b	123	103	94	90	88	88	85	84	80	72
Newfoundland and Labrador	1	0.8	0.7	0.7	0.8	1	1	1	1	1.0
Nova Scotia	11	9	9	8	8	7	7	7	7	7
New Brunswick	9	6	4	4	4	4	4	4	3	4
Quebec	0.5	1	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.3
Ontario	36	20	17	18	15	10	10	9	6	6
Manitoba	0.6	0.2	0.08	0.07	0.09	0.07	0.1	N/A	N/A	N/A
Saskatchewan	15	16	15	16	15	15	16	15	16	16
Alberta	50	48	46	44	44	49	47	47	46	38
British Columbia	2	2	0.9	0.8	1	1	0.8	0.8	0.7	0.9
31-33 Manufacturing^b	92	74	77	79	76	76	76	77	79	83
Newfoundland and Labrador	1	1	0.9	1	0.9	1.0	1	1	1	1
Prince Edward Island	0.10	0.07	0.07	N/A	0.06	0.06	0.05	0.06	0.06	0.06
Nova Scotia	1	1	1.0	1	0.9	0.3	0.3	0.3	0.2	0.2
New Brunswick	4	4	4	4	4	3	4	4	4	3
Quebec	20	18	17	18	17	17	17	16	17	16
Ontario	38	26	28	29	27	28	27	28	28	31
Manitoba	1	1	1	0.9	1	1.0	1	1.0	0.9	1
Saskatchewan	2	2	2	2	3	3	3	3	3	3
Alberta	18	17	18	18	18	18	19	19	20	21
British Columbia	6	5	5	5	5	5	5	5	5	6
Other^{b, c}	15	13	12	12	14	15	15	15	15	15
Quebec	0.3	0.8	0.8	0.9	1	1	1	1	1	1
Ontario	5	4	4	3	3	4	5	4	4	3
Manitoba	1	0.7	0.7	0.6	0.7	0.8	0.9	0.8	0.7	0.8
Saskatchewan	3	2	2	2	2	2	2	2	2	2
Alberta	4	3	3	4	4	4	4	5	5	6
British Columbia	1	2	2	2	2	2	2	2	2	2

Notes:

N/A not available

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

a. The reporting threshold changed in 2009 from 100 kt to 50 kt and in 2017 from 50 kt to 10 kt. The analysis for 2009-2018 only includes emissions information for facilities that emit ≥ 50 kt of CO₂ eq.

b. Totals may not add up due to rounding

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

Figure 12: **Provincial/Territorial Contribution to 2018 Facility-Reported Greenhouse Gas Reporting Program Total and the National Inventory Total**

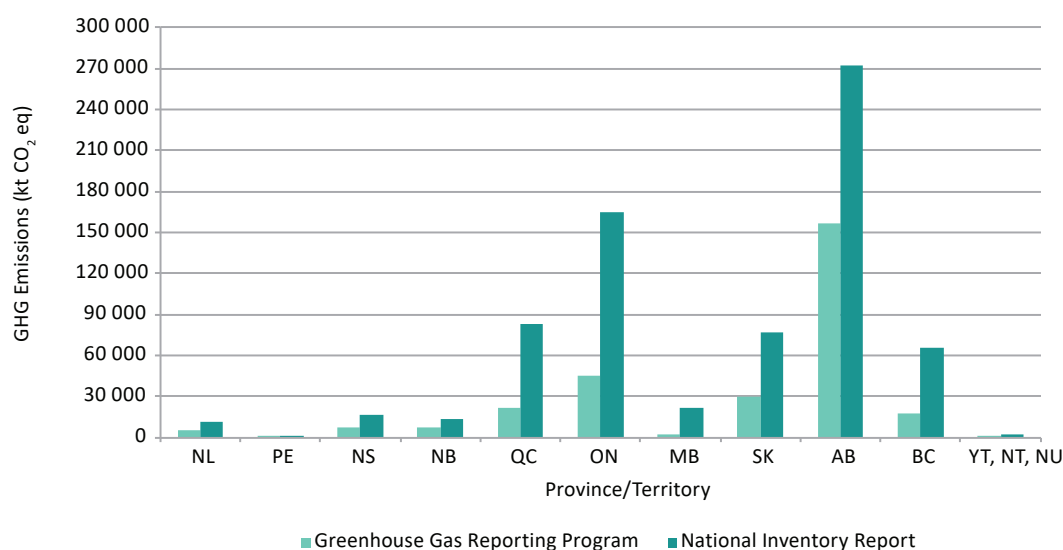
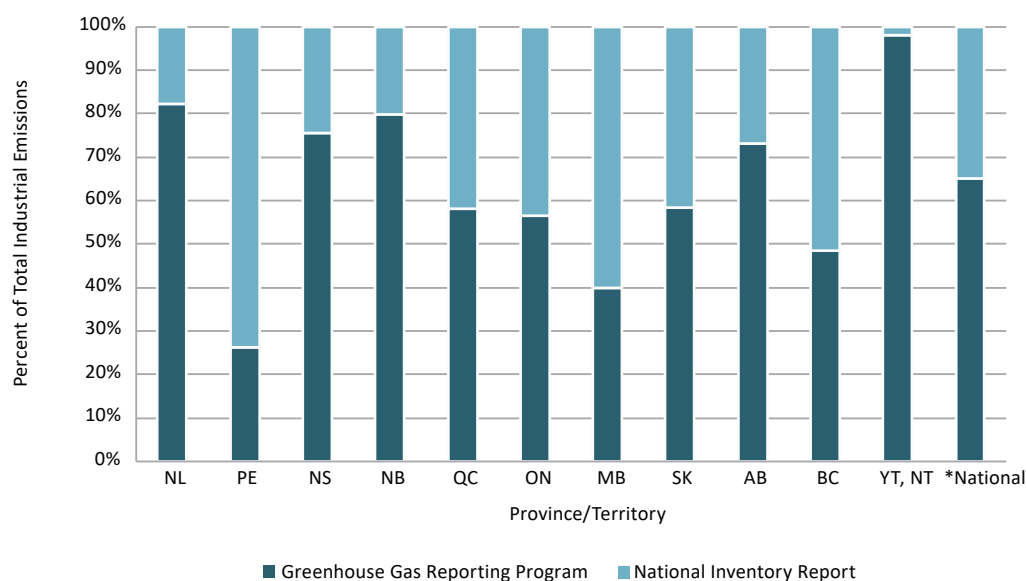


Figure 13: **2018 Facility-Reported Emissions as a Percentage of National and Provincial/Territorial Industrial Greenhouse Gas Emissions from the National Inventory**



Notes:

In this overview report, Canada's industrial GHG emissions include the following GHG categories from the National Inventory Report, Greenhouse Gas Sources and Sinks in Canada 1990–2018: 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

Where appropriate, the facility-reported emissions data are used by Environment and Climate Change Canada to confirm estimates in the national GHG inventory developed largely from national and provincial statistics and 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.

ADDITIONAL INFORMATION ABOUT THE GREENHOUSE GAS REPORTING PROGRAM

5

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.

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 NAICS²⁰ 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 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 National GHG Inventory

<https://www.canada.ca/ghg-inventory>

Canadian Environmental Sustainability Indicators

<https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/climate.html>

5.3 Links to Other Programs

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.

20 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.

CONTACT US



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

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