Environment and Climate Change Canada
Environnement et Changement climatique Canada

OVERVIEW OF 2016 REPORTED EMISSIONS

JANUARY 2018

FACILITY GREENHOUSE GAS REPORTING PROGRAM

Canada

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HIGHLIGHTS

- For the 2016 calendar year, 596 facilities reported their greenhouse gas (GHG) emissions to Environment and Climate Change Canada, totalling 263 megatonnes[1] (Mt) of carbon dioxide equivalent (CO_2 eq.), essentially unchanged from the 2015 total.
- The reported emissions are, for the most part, evenly distributed across three sectors: (i) Mining, Quarrying, and Oil and Gas Extraction (33%), (ii) Utilities (32%), and (iii) Manufacturing (29%). Among all facilities, those engaged in electricity generation and oil/gas extraction account for 62% of the total.
- Reported GHG emissions increased by 1% (4 Mt) in the last five years. Emissions from non-conventional oil extraction facilities increased by 10 Mt, but were partly offset by the 5 Mt decrease in emissions resulting largely from the discontinuation of coal-fired electric power generation in Ontario.
- Since 2005, total emissions from all reporting facilities decreased by 5% (15 Mt). The Utilities and Manufacturing sectors experienced the largest declines (38 Mt and 15 Mt, respectively), while reported emissions increased by 39 Mt from facilities in the Mining, Quarrying, and Oil and Gas Extraction sector, largely in Alberta (35 Mt).
- The GHG emissions data collected from facilities represent just over one-third (37%) of Canada's total GHG emissions in 2016 (704 Mt) and 58% of Canada's industrial GHG emissions as reported in Canada's National Inventory Report (NIR).[2]
- Environment and Climate Change Canada has expanded the reporting requirements under the GHGRP with changes taking effect, starting with the 2017 data to be reported in 2018. This will facilitate the direct use of the expanded data in the National GHG Inventory, thus better reflecting emission changes occurring at individual facilities and improving the consistency and comparability of GHG data.

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

[2] In this overview report, Canada's industrial GHG emissions include those from the following GHG categories from the *National Inventory Report: Greenhouse Gas Sources and Sinks in Canada 1990–2015:* Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste. The National Inventory Report is available on-line at **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php**.

1 GREENHOUSE GAS REPORTING PROGRAM

Environment and Climate Change Canada's Greenhouse Gas Reporting Program (GHGRP) has completed the collection of GHG emissions information from Canadian facilities for the 2016 calendar year. Any facility with annual GHG emissions of 50 kt of carbon dioxide equivalent (CO_2 eq.) or higher[3] 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 2004 to

3 The reporting threshold was reduced from 100 kt to 50 kt in 2009, increasing the number of facilities reporting to the program by 53%, with a corresponding 4% increase in the level of emissions being reported.

2016. 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, confirm industrial emission estimates presented in the National Greenhouse Gas Inventory and support regulatory initiatives. The data collected are also shared with provinces and territories. The data used in this overview report are current as of September 22, 2017. Subsequent company updates will be included in future data releases.

Environment and Climate Change Canada proposed the expansion of reporting requirements under the GHGRP 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. Consultations on phase I of the expansion took place throughout 2017. The *Notice with respect to reporting of greenhouse gases (GHGs) for 2017*[4] (the 2017 Notice) represents the first year of the phased expansion to the GHG reporting requirements for industrial facilities in Canada. It contains the following key changes:

1. The reporting threshold has been lowered from 50 kilotonnes to 10 kilotonnes. All facilities emitting the equivalent of 10 kilotonnes or more of GHGs in carbon dioxide equivalent units in 2017 are required to submit a report.
2. Requirements to provide additional data related to GHG emissions and apply specific quantification methods to determine emissions. These requirements are specific to: manufacturers of cement, lime, iron & steel and aluminum, as well as facilities engaged in carbon capture, transport and storage activities.

The 2017 Notice, published in the *Canada Gazette* on December 30, 2017, sets out the federal reporting requirements for 2017 data, scheduled to be submitted by facilities to Environment and Climate Change Canada by June 1, 2018.

REPORTED 2016 GREENHOUSE GAS EMISSIONS[5]

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For the purposes of the GHGRP, a facility is defined as an integrated facility, pipeline transportation system, or offshore installation[6]. 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.

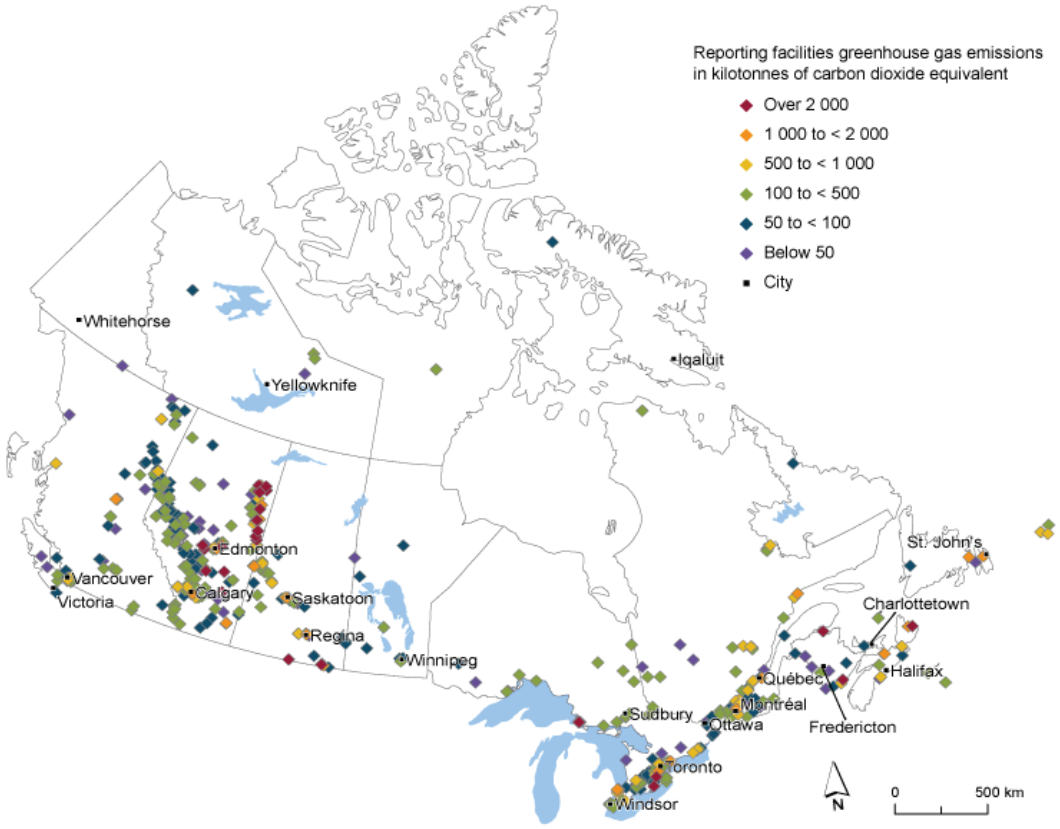
A total of 596 facilities reported their GHG emissions to Environment and Climate Change Canada for the 2016 calendar year, collectively emitting a total of 263 Mt of GHGs (Figure 1). Of these facilities, 310 reported GHG emission levels greater than 100 kt, accounting for 94% (248 Mt) of the total reported emissions, and 58 emitted more than 1 Mt, accounting for 63% (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, non-conventional oil extraction, petroleum refineries and natural gas transportation pipelines. Facilities with emissions falling below the reporting threshold of 50 kt per year can voluntarily report their GHG emissions; 105 facilities did so

4 This notice can be viewed online at **http://www.gazette.gc.ca/rp-pr/p1/2017/2017-12-30/html/notice-avis-eng.html#na2**.

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

6 The term "facility" has been updated as part of the 2017 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.

Figure 1: **2016 Facility GHG Emissions Reported to Environment and Climate Change Canada**[a, b]



a Map excludes pipeline transportation systems.

b Map provided by the Canadian Environmental Sustainability Indicators program available online at **https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions/large-facilities.html**.

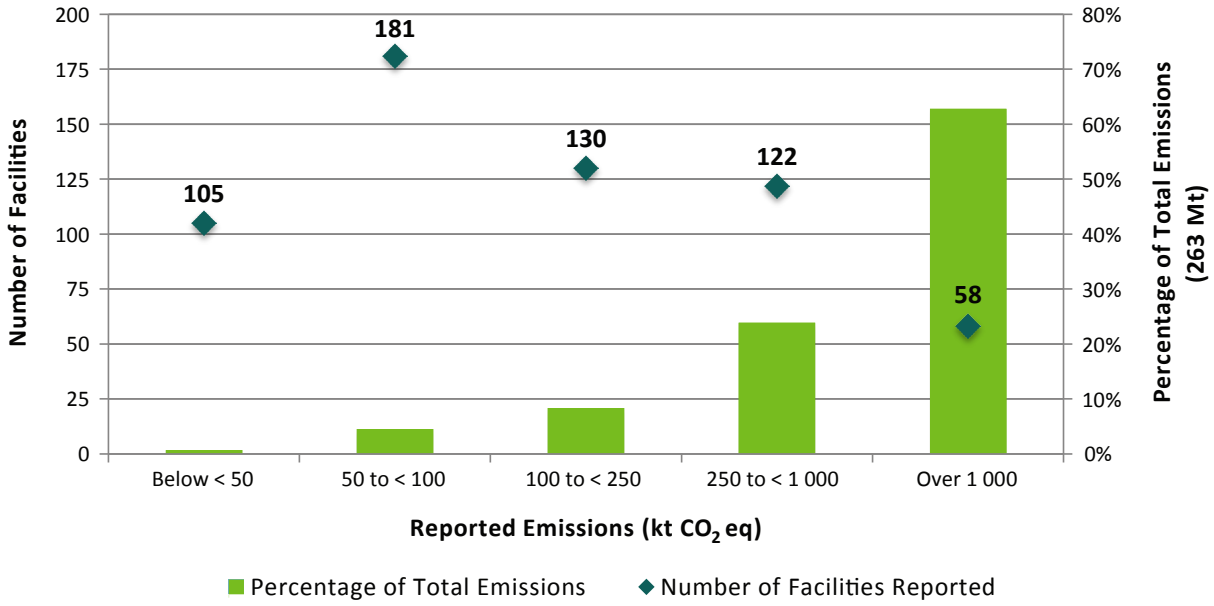
this year, representing 0.8% (2 Mt). All voluntarily reported emissions are included in this report and in the data set published by Environment and Climate Change Canada.

Twenty-one facilities reported their GHG emissions for the first time: they belong to a number of sectors, such as conventional oil and gas extraction (8 facilities), non-conventional oil extraction (2 facilities), and electricity generation (3 facilities). The combined emissions from these new reporters are close to 2 Mt, contributing about 1% to the total reported emissions. These new reporters include facilities that began operation in 2016 (4 facilities) and facilities which have been in operation previous to 2016, and whose emissions have met or exceeded 50 kt CO_2 eq in 2016 reporting year (17 facilities).

2.1 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.

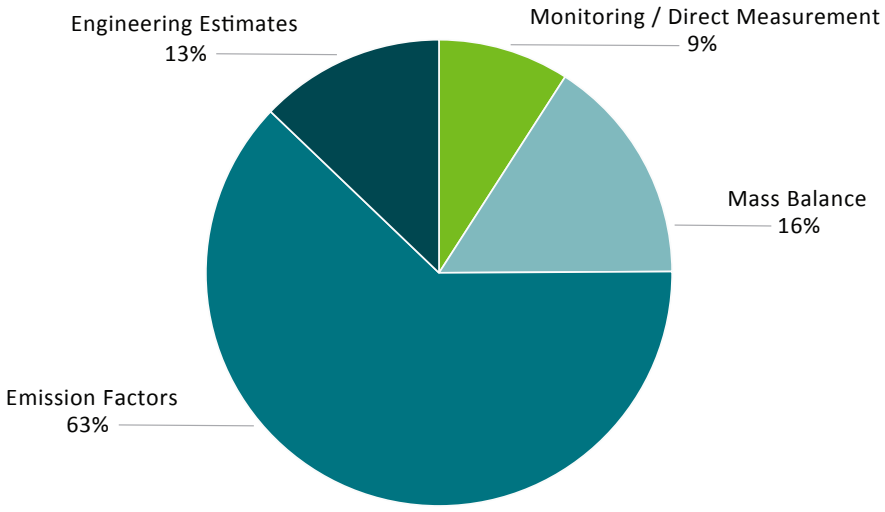
Figure 2: **Contribution of Facilities in Various Emission Ranges to Total Reported Emissions (2016)**



Note: Facilities in the range "below < 50 kt" voluntarily reported their emissions.

Overall, methods incorporating the use of emission factors were the approach preferred by most facilities (Figure 3). An emission factor is a measure that indicates 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**



Note: Totals may not add up due to rounding.

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 CO_2 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 2015*.[7] The GWP values used by the GHGRP are consistent with those used in Canada's National Greenhouse Gas Inventory.

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

a. GWPs were updated in 2013 and applied to all years.

2.3 Reported GHG Emissions by Gas and by Source

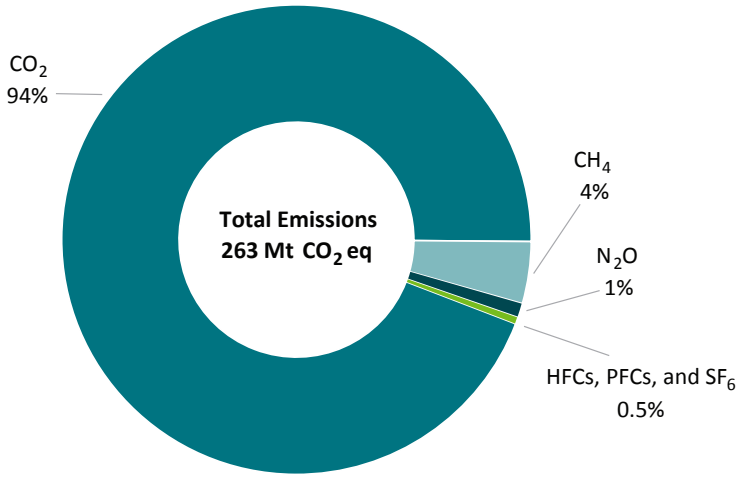
CO_2 represented the majority of the total reported emissions (94%) in 2016, while methane (CH_4) and nitrous oxide (N_2O) emissions contributed 4% and 1%, respectively (Figure 4). Facilities are also required to report emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) stemming from industrial processes or industrial product use. The combined emissions of these gases accounted for the remaining 0.5% (1 Mt).

When reporting to the GHGRP, facilities are required to report emissions of CO_2, CH_4 and N_2O according to the following eight source categories:[8] stationary

7 This notice can be viewed online at **www.gazette.gc.ca/rp-pr/p1/2015/2015-10-17/html/notice-avis-eng.php#ne6**.

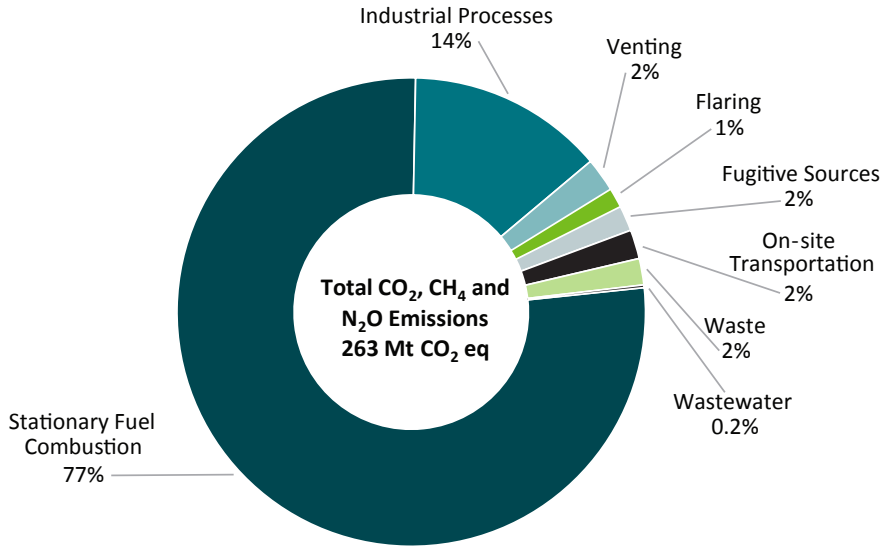
8 Additional information on these emission source categories can be found in the Technical Guidance on Reporting Greenhouse Gas Emissions, available online at **https://www.canada.ca/en/environment-climate-change/services/climate-change/publications/technical-guidance-reporting-greenhouse-gas.html**.

Figure 4: **Reported 2016 GHG Emissions by Gas (263 Mt CO_2 eq.)**



Note: Totals may not add up due to rounding

Figure 5: **Reported 2016 GHG Emissions by Source (CO_2, CH_4 and N_2O Included)**



Note: Totals may not add up due to rounding.

fuel combustion, industrial processes, venting, flaring, fugitive sources, on-site transportation, waste and wastewater[9]. Stationary fuel combustion is the largest source of reported emissions, representing 77% 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 sources like combustion engines in vehicles. 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 (16%), Saskatchewan (9%) and Quebec (7%) (Table 2). The number of facilities, the quantity and type of fuel consumed, and the predominant industry largely explain this ranking.

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).[10] In 2016, three NAICS-defined industry sectors accounted for the majority of GHG emissions: the Mining,

9 Some source categories have been modified and updated. These alterations reflect the GHGRP expansion and are applicable to the 2017 reporting year.

10 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 consists of 20 sectors, 102 subsectors, 323 industry groups, 711 industries and 922 national industries.

Table 2: **Reported 2016 GHG Emissions by Province/Territory**

Province/Territory	Number of Facilities	Total Emissions (kt CO_2 eq)	Percentage of Total Emissions
Newfoundland and Labrador	10	5 308	2%
Prince Edward Island	1	55	0.02%
Nova Scotia	13	7 795	3%
New Brunswick	17	7 793	3%
Quebec	81	19 340	7%
Ontario	133	41 319	16%
Manitoba	11	1 822	1%
Saskatchewan	47	24 872	9%
Alberta	200	140 712	53%
British Columbia	75	13 455	5%
Yukon	1	12	0.00%
Northwest Territories	4	513	0.2%
Nunavut	3	260	0.1%
Total	**596**	**263 256**	**100%**

Quarrying, and Oil and Gas Extraction sector, representing 33% (87 Mt); the Utilities sector, primarily facilities generating electricity from fossil fuels, accounting for 32% (85 Mt); and the Manufacturing sector, accounting for 29% (77 Mt) (Figure 6). The remaining 6% (15 Mt) of emissions captured under "Other" were reported by various types of facilities, mainly natural gas transportation pipelines (9 Mt) and solid waste landfills (5 Mt).

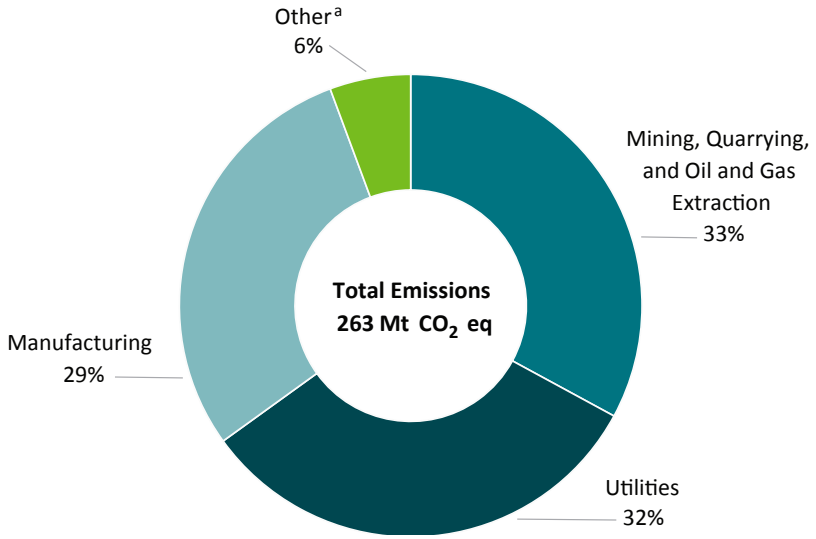
Activities of reporting facilities in the Mining, Quarrying, and Oil and Gas Extraction sector can be further broken down into three main categories (Figure 7):

1. non-conventional oil extraction, the dominant sub-category which includes oil sands mining, in-situ bitumen production and upgrading (75%);
2. conventional extraction of oil and natural gas (17%); and
3. mining of metal ore (e.g., iron) (4%), coal (2%), 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 2016 emissions being (Figure 8):

1. petroleum and coal product manufacturing (22%);
2. iron, steel and ferro-alloy manufacturing (18%);
3. basic chemical manufacturing (e.g., ethylene, polyethylene, hydrogen gas) (15%); and
4. cement and concrete product manufacturing (13%).

Figure 6: **Reported 2016 GHG Emissions by Industry Sector (263 Mt CO_2 eq.)**



Note:

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

Figure 7: **Reported 2016 GHG Emissions by Subsectors of Mining, Quarrying, and Oil and Gas Extraction (87 Mt CO_2 eq.)**

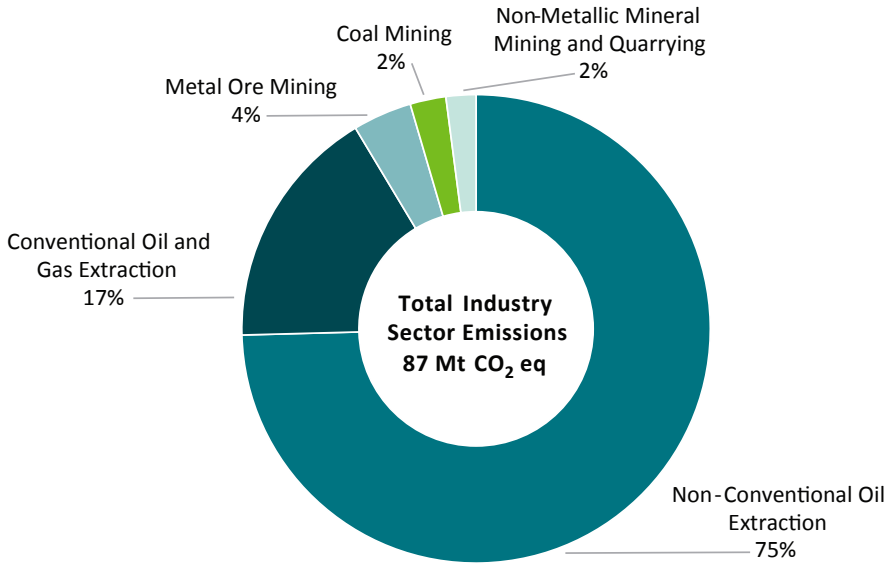
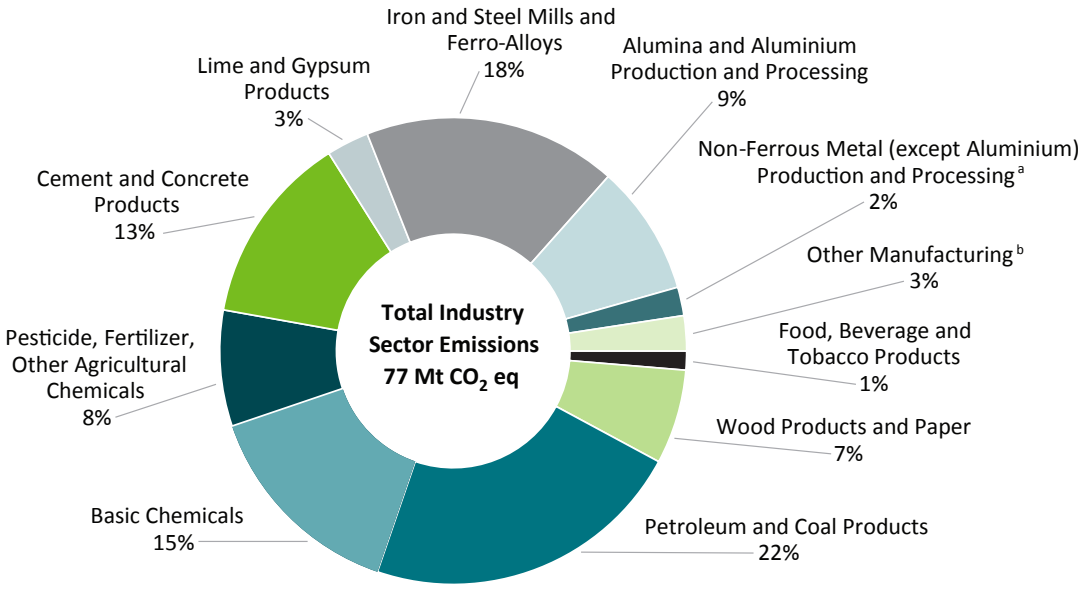


Figure 8: **Reported 2016 GHG Emissions by Subsectors of Manufacturing (77 Mt CO_2 eq.)**



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.

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. Changes in production levels, processes and technologies, the types of fuels used at a facility, and facility start-ups/closures can all result in a change in the annual emissions , so that a facility may fall below or attain the reporting threshold of 50 kt CO_2 eq. from one year to the next. The number of voluntary reporters may also change each year, which can also affect the number of reporting facilities.

Over the 2005–2016 period, the number of reporting facilities increased from 337 to 596 (Table 3). Since 2009, facilities with emissions under 100 kt have accounted, on average, for just over 5% of the total reported emissions. Consequently, emissions from these facilities do not contribute significantly to the observed trends in total reported emissions at the national level; however, these facilities may affect the observed trends at the provincial/territorial levels.

3.1 Overall National-Level Trends

Total reported GHG emissions in 2016, at 263 Mt, were essentially unchanged from 2015 (Table 3).[11] Over the 2005-2016 period, total facility-reported emissions decreased overall by 5% (15 Mt), from 278 to 263 Mt. In contrast with this trend, total emissions since 2011 increased by 3% (8 Mt) and more recently have leveled out.

The number of facilities reporting their emissions has consistently increased over the last several years, following an initial increase of more than 50% in 2009 when the reporting threshold was changed from 100 to 50 kt. However, overall GHG emissions

11 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.

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 9 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).

GHG emissions reported by the Mining, Quarrying, Oil and Gas Extraction sector have increased over the last decade, surpassing those reported by Utilities in 2015 (Figure 9). On the other hand, the Utilities and Manufacturing sectors have reported reduced emissions since 2005 (Figure 9). Various factors have led to these trends and are further discussed in this section.

3.2.1 Short-Term Changes

The 1.4% (4 Mt) increase in total reported emissions over the last five years is mostly due to the 13% increase in emissions from the Mining, Quarrying, and Oil and Gas Extraction sector (10 Mt from 2012 to 2016) (Table 4), largely in Alberta (Table 5).

Non-conventional oil extraction experienced a 10-Mt increase in emissions, consistent with observed increases in synthetic crude oil production (2%) and in non-upgraded bitumen production (67%) during this period. The 2016 Fort McMurray wildfires resulted in decreased production at several facilities directly impacted by the wildfires as companies wound down operations to evacuate employees. Consequently, emissions from some facilities decreased as they were not in operation for the full year. These decreases were somewhat offset by increased production and emissions at those facilities outside of the impacted area.[12] Saskatchewan facilities also contributed to the increase, with several new facilities (potash mines, oil and gas extraction) reporting to the program for the first time in the last few years (Table 5).[13]

The sustained increase in the above sector is offset by emission reductions in the Utilities sector (Figure 9). Electric power generation had a 5 Mt decrease in emissions since 2012 (Table 4), attributed to the closure of coal-fired plants in Ontario and to lower fuel consumption due to energy efficiency improvements.[14]

Overall emissions from the Manufacturing sector have remained largely stable during the last 5 years, with only minor variations in emission levels in certain subsectors (e.g., iron and steel, cement manufacturing) (Table 4).

12 [AER] Alberta Energy Regulator. 2017. Alberta's Energy Reserves 2016 and Supply/Demand Outlook 2017–2026: ST98-2017. Available online at **www.aer.ca/data-and-publications/statistical-reports/st98**

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

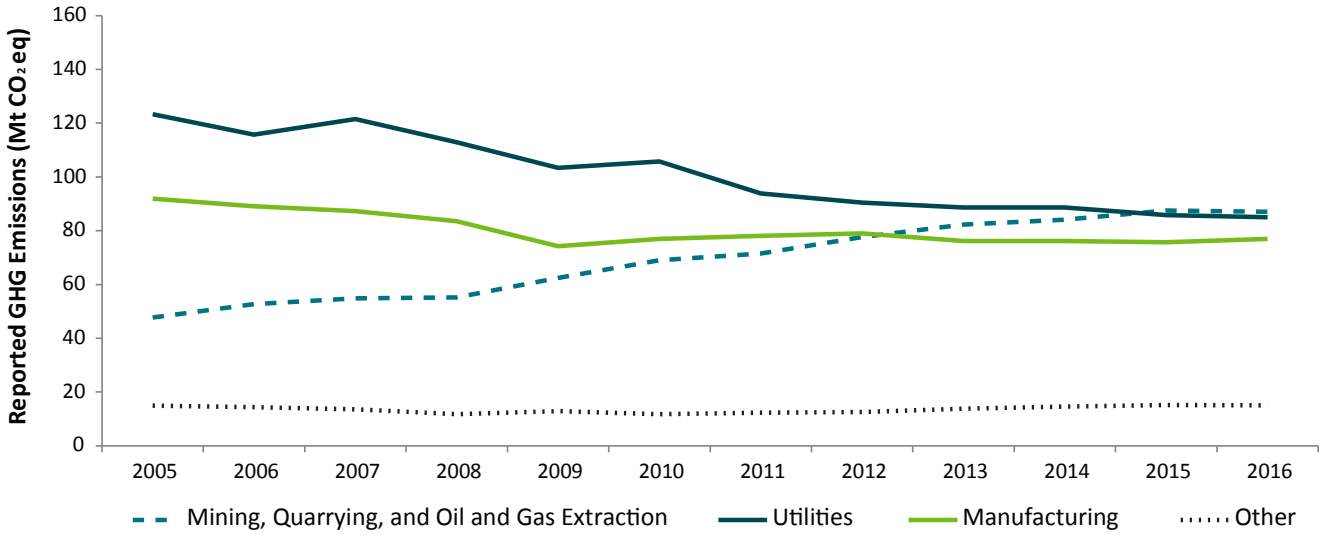
14 Based on GHG emission data reported by facilities to the GHGRP.

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

	2005	2009[a]	2010	2011	2012	2013	2014	2015	2016
Number of facilities	337	538	544	547	561	574	577	566	596
GHG emissions (kt CO_2 eq)	277 997	253 117	263 614	255 800	259 599	261 090	263 948	264 314	263 256
Annual change (%)	N/A[b]	-4%	4%	-3%	1%	1%	1%	0.1%	-0.4%
Change since 2005 (%)	N/A	-9%	-5%	-8%	-7%	-6%	-5%	-5%	-5%

Note: For the complete data set (i.e. yearly data since 2004), visit the website **https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/data.html**.
a. The reporting threshold changed in 2009 from 100 kt to 50 kt.
b. N/A = not applicable.

Figure 9: **Long-Term Sectoral Trend, 2005–2016[a]**



a. 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).

3.2.2 Long-Term Trends

Over the 2005-2016 period, total reported emissions decreased by 5% (15 Mt). The major long-term trends are similar to the short-term trends in that, since 2005, emissions from facilities in the Utilities and Manufacturing sectors have declined overall, while emissions from the Mining, Quarrying, and Oil and Gas Extraction sector have steadily increased (Figure 9).

Up to and including the year 2014, the Utilities sector consistently accounted for the largest portion of reported emissions (Figure 9), with electric power generation being the main contributor. However, emissions from fossil-fuel electric power generation fell significantly (39 Mt) over this period (Table 4), largely the result of the discontinuation of coal-fired electricity production in Ontario as well as emission reductions in New Brunswick, Nova Scotia and Alberta (Table 5). Fuel switching (i.e., from coal to natural gas, a lower carbon fuel) and increased reliance on hydro, nuclear and renewable sources of generation are also contributors to the decrease in utility emissions.[15]

Emissions from the Manufacturing sector remain well below (16% or 15 Mt) their 2005 levels (Figure 9). The industry continues to rebound from the reduced production and slowdowns associated with the 2009 recession[16], with manufacturing sales steadily increasing and surpassing 2006 levels in 2014.[17] Between 2005 and 2016, Ontario and Quebec showed the largest decreases in GHG emissions from the Manufacturing sector. Ontario saw a net decrease of 10 Mt (Table 5), largely observed in iron/steel, cement, and chemical manufacturing (e.g., halted adipic acid production in 2009) (Table 4). Quebec showed an overall decrease in emissions of 4 Mt from 2005 to 2016 (Table 5), with aluminium production and petroleum refining facilities contributing the most to this provincial change (Table 4). Emission decreases resulted from technological change in aluminum production, [18,19,20]

15 Statistics Canada CANSIM 2008-2015, Table 127-0002: Electric power generation, by class of electricity producer (annual).

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

17 Statistics Canada, Manufacturing: The year 2015 in review. Available online at **www.statcan.gc.ca/daily-quotidien/161027/dq161027b-eng.htm**.

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

19 Environment Canada. 2008. Environmental Performance Agreement Concerning Atmospheric Emissions of Polycyclic Aromatic Hydrocarbons between EC and Alcoa. Available online at **www.ec.gc.ca/epe-epa/default.asp?lang=En&n=3C7FB073-1**

20 Environment Canada. 2008. Environmental Performance Agreement Concerning Atmospheric Emissions of Polycyclic Aromatic Hydrocarbons between EC and Rio Tinto Alcan. Available online at **www.ec.gc.ca/epe-epa/default.asp?lang=En&n=5BE979CD-1**

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 9). Most of the increase (39 Mt between 2005 and 2016) was driven by non-conventional oil extraction facilities in Alberta (35 Mt growth since 2005), and Saskatchewan, reflecting this sector's steady growth trend.

Table 4: **Reported GHG Emissions by NAICS Industry Sector, Selected Years**

NAICS[a] Industry Sector *(Units: Mt CO_2 eq)*	**2005**	**2009[a]**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total[c]	**278**	**254**	**264**	**256**	**260**	**261**	**264**	**264**	**263**
21 – Mining, Quarrying, and Oil and Gas Extraction[c]	**48**	**62**	**69**	**72**	**77**	**82**	**84**	**87**	**87**
Conventional oil and gas extraction	14	15	15	15	14	15	16	15	15
Non-conventional oil extraction[d]	28	42	47	49	55	59	61	65	65
Coal mining	2	2	3	3	3	3	3	2	2
Metal ore mining	3	3	3	3	4	4	3	3	4
Non-metallic mineral mining and quarrying	0.9	1	1	2	2	2	2	2	2
Support activities for mining, and oil and gas extraction	N/A[h]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6
22 – Utilities[c]	**123**	**103**	**106**	**94**	**90**	**89**	**89**	**86**	**85**
Electric power generation	122	101	103	92	88	86	87	84	83
Natural gas distribution	1	2	2	2	2	2	2	1	1
Water, sewage and other systems[e]	0.1	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4
31–33 Manufacturing[c]	**92**	**75**	**78**	**79**	**79**	**77**	**77**	**76**	**77**
Food, beverages, and tobacco products	0.3	0.7	0.8	0.7	0.7	0.9	1	0.9	1
Wood products and paper	5	4	4	5	5	5	5	5	5
Petroleum and coal products	20	19	18	17	18	17	17	17	17
Basic chemicals	14	11	11	12	11	11	11	11	11
Pesticide, fertilizer, other agricultural chemicals	6	6	6	6	6	6	6	6	6
Cement and concrete products	13	10	11	11	11	11	11	11	11
Lime and gypsum products	3	2	3	3	3	2	3	2	2
Iron and steel mills and ferro-alloys	17	11	14	14	15	13	14	13	14
Primary production of alumina and aluminium	10	8	8	8	8	8	7	7	7
Non-ferrous metal (except alum.) smelting and refining	3	2	2	2	2	2	2	2	2
Other manufacturing[f]	0.4	1	1	1	1	1	1	1	1
Other[c,g]	**15**	**13**	**12**	**12**	**13**	**14**	**15**	**15**	**15**
Pipeline transportation of natural gas	12	7	6	7	6	8	9	9	9
Waste management and remediation services	3	5	5	5	5	5	5	5	5
Institutional facilities	N/A	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.5
Miscellaneous[i]	N/A	0.1	0.07	0.07	0.06	0.05	0.06	0.09	0.09

Notes:

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.

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 and furniture manufacturing.

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

h. N/A = Not available

i. Includes smaller facilities reporting under various NAICS codes.

Table 5: **Reported GHG 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
Total[b]	**278**	**253**	**264**	**256**	**260**	**261**	**264**	**264**	**263**
21 – Mining, Quarrying, and Oil and Gas Extraction[b]	**48**	**62**	**69**	**72**	**77**	**82**	**84**	**87**	**87**
Newfoundland and Labrador	3	3	3	3	3	3	3	3	3
Nova Scotia	N/A[c]	0.3	0.3	0.2	0.2	0.4	0.5	0.4	0.4
New Brunswick	N/A	N/A	0.06	0.06	0.06	0.02	N/A	0.06	N/A
Quebec	2	1	2	2	2	2	2	2	2
Ontario	0.2	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.3
Manitoba	N/A	0.06	0.05	0.1	0.2	0.2	0.08	0.08	0.06
Saskatchewan	3	3	3	3	4	4	4	5	5
Alberta	35	50	54	56	62	65	67	71	70
British Columbia	5	5	6	6	7	7	7	6	5
Northwest Territories	0.4	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.5
Nunavut	N/A	N/A	0.1	0.2	0.2	0.2	0.2	0.2	0.3
22 – Utilities[b]	**123**	**103**	**106**	**94**	**90**	**89**	**89**	**86**	**85**
Newfoundland and Labrador	1	0.8	0.7	0.7	0.7	0.8	1	1	1
Nova Scotia	11	9	9	9	8	8	7	7	7
New Brunswick	9	6	5	4	4	4	4	4	4
Quebec	0.5	1	0.5	0.6	0.5	0.4	0.4	0.4	0.4
Ontario	36	20	25	18	18	15	10	10	9
Manitoba	0.6	0.2	0.06	0.08	0.07	0.09	0.07	0.1	N/A
Saskatchewan	15	16	16	15	16	15	15	16	15
Alberta	50	48	48	46	44	44	49	47	47
British Columbia	2	2	2	0.9	0.9	1	1	0.8	0.9
Yukon	N/A	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Northwest Territories	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	N/A
31–33 Manufacturing[b]	**92**	**74**	**77**	**78**	**79**	**77**	**77**	**76**	**77**
Newfoundland and Labrador	1	1	1	0.9	1	0.9	1	1	1
Prince Edward Island	0.1	0.07	0.06	0.07	0.05	0.06	0.06	0.05	0.06
Nova Scotia	1	1	1	1	1	0.9	0.3	0.3	0.3
New Brunswick	4	4	4	4	4	4	3	4	4
Quebec	20	18	18	17	18	17	17	17	16
Ontario	38	26	28	28	29	27	28	27	28
Manitoba	1	1	1	1	1	1	1	1	1
Saskatchewan	2	2	3	2	3	3	3	3	3
Alberta	18	17	17	18	18	19	18	19	19
British Columbia	6	5	5	5	5	5	5	5	5
Other[b,d]	**15**	**13**	**12**	**12**	**13**	**14**	**15**	**15**	**15**
Nova Scotia	N/A	0.06	0.04	0.04	N/A	N/A	N/A	N/A	0.01
New Brunswick	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01
Quebec	0.3	0.9	1	0.8	1	1	1	1	1
Ontario	5	4	3	4	3	4	4	5	4
Manitoba	1	0.7	0.7	0.7	0.6	0.7	0.8	0.9	0.8
Saskatchewan	3	2	2	2	2	2	2	2	2
Alberta	4	3	3	3	4	4	4	4	5
British Columbia	1	2	2	2	2	2	2	2	2

a. The reporting threshold changed in 2009 from 100 kt to 50 kt.
b. Totals may not add up due to rounding
c. N/A = not available
d. "Other" includes various types of facilities such as natural gas transportation pipelines, solid waste landfills, airports, universities, hospitals and public administration buildings.
Note: For the complete data set (i.e. yearly data since 2004), visit the website at https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/data.html

FACILITY-REPORTED EMISSIONS AND THE NATIONAL GHG INVENTORY 4

The total facility-reported GHG emissions for 2016 collected under the GHGRP represent just over one third (37%) of Canada's total GHG emissions in 2016 (704 Mt) and over half (58%) of Canada's industrial GHG emissions.[21] The GHGRP applies to large GHG-emitting facilities (mostly industrial) and does not cover other sources of GHG emissions (e.g., road transportation, agricultural sources), whereas the NIR is a complete accounting of all GHG sources and sinks in Canada.

When comparing the provincial and territorial contribution to the facility-reported total from the GHGRP with the national total from the NIR, the distribution of emissions by province shows a similar pattern (Figure 10). Alberta has the highest emissions, followed by Ontario, Quebec and Saskatchewan. 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 58% of industrial GHG emissions nationally, the degree of coverage at the provincial level varies significantly from province to province (Figure 11), due to the size and number of industrial facilities in each province that have emissions above the 50 kt CO_2 eq. reporting threshold.

Where appropriate, the facility-reported emissions data are used by Environment and Climate Change Canada to confirm national GHG inventory (NIR) estimates 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 NIR is dependent on the level of detail and type of data available (the integration of facility data into the NIR is a key objective for the recent expansion to reporting under the GHGRP).

21 In this overview report, Canada's industrial GHG emissions include emissions from the following GHG categories from the National Inventory Report 1990–2016: 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.

Figure 10: **Provincial/Territorial Contribution to 2016 Facility-Reported (GHGRP) Total and NIR Total**

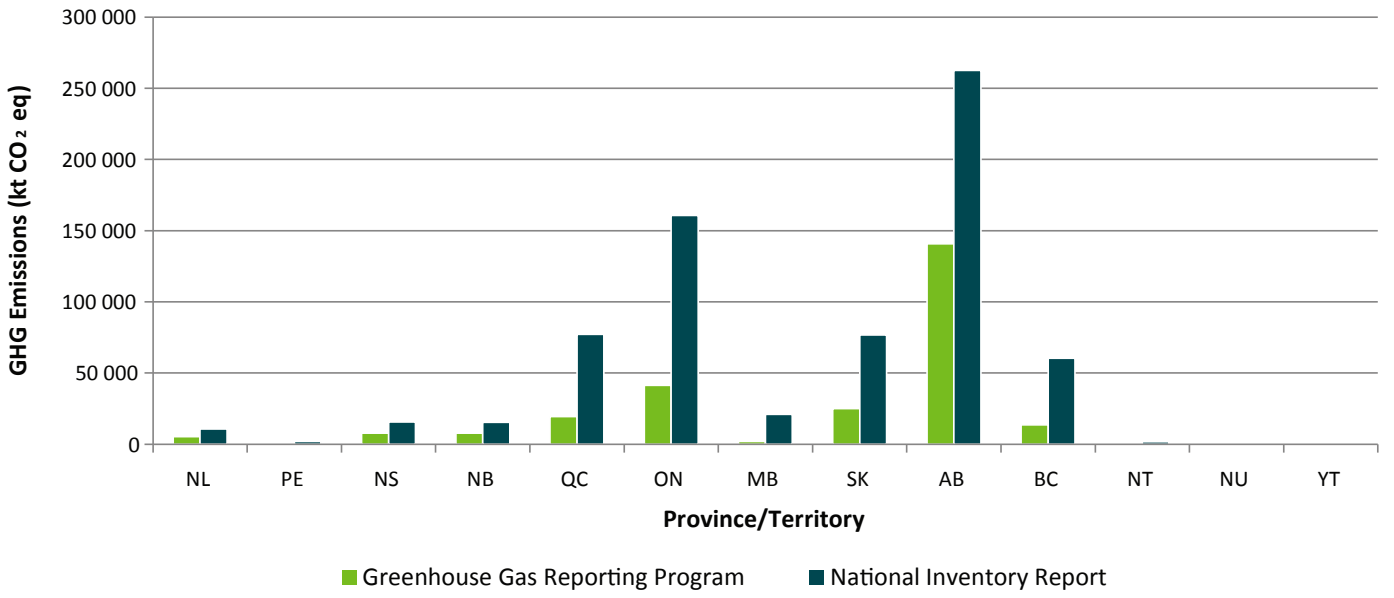
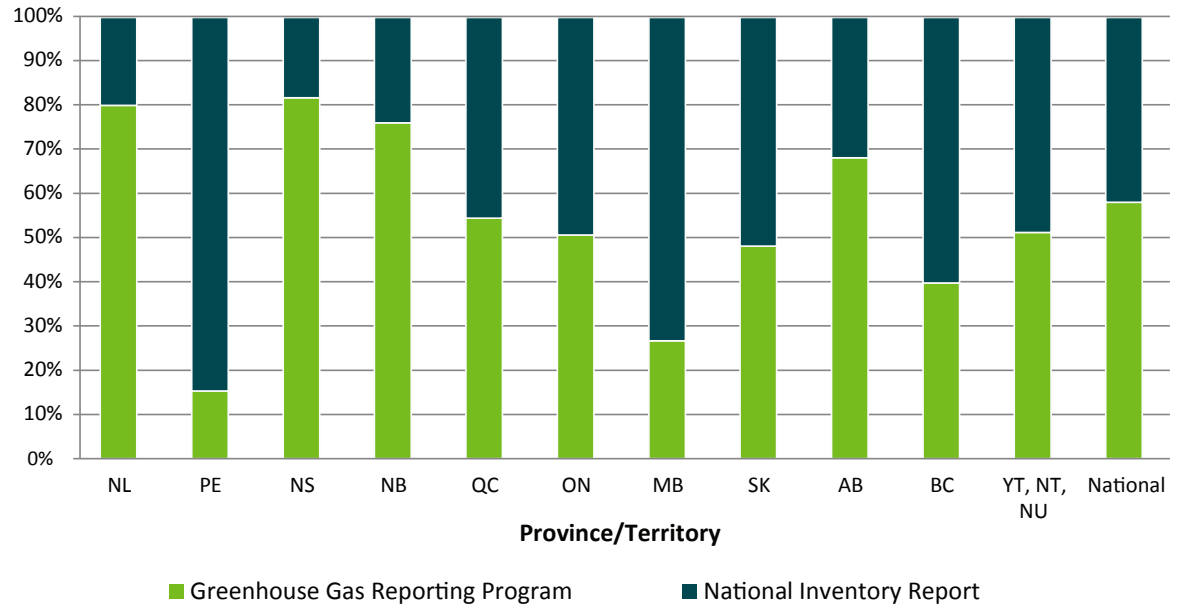


Figure 11: **2016 Facility-Reported Emissions as a Percentage of National and Provincial/Territorial Industrial GHG Emissions[a] (from the NIR)[a]**



a. 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 1990–2016: Stationary Combustion Sources (except Residential), Other Transportation, Fugitive Sources, Industrial Processes and Product Use, and Waste.

5 ADDITIONAL INFORMATION ABOUT THE GHGRP

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 National Pollutant Release Inventory (NPRI) identification

number, by reporting company, by province/territory or city, or by industry sector, using the NAICS[22] code. Users can also access a web-based mapping tool on the Canadian Environmental Sustainability Indicators website, which shows where reporting facilities are located in Canada.

To access the data or obtain further information on the GHGRP or 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/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/reporting.html

Canada's National GHG Inventory
https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html

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 and New Brunswick.

6 CONTACT US

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

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Greenhouse Gas Reporting Program

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E-mail: ec.ges-ghg.ec@canada.ca
GHG Helpline: 1-819-938-3258
Toll free: 1-877-877-8375
Website: https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting.html

22 The NAICS is an industry classification system that was developed by the statistics agencies of Canada, the United States and Mexico to enable them to collect comparable statistical data. It is a comprehensive system that encompasses all economic activities using six-digit codes. In Canada, the NAICS consists of 20 sectors, 102 subsectors, 323 industry groups, 711 industries and 922 national industries.

Additional information can be obtained at:

Environment and Climage Change Canada

Public Inquiries Centre
7th Floor, Fontaine Building
200 Sacré-Coeur Boulevard
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860
Email: ec.enviroinfo.ec@canada.ca