Environment and Climate Change Canada
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GREENHOUSE GAS EMISSIONS FROM LARGE FACILITIES

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

Canada

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

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March 2025

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Greenhouse gas emissions from large facilities

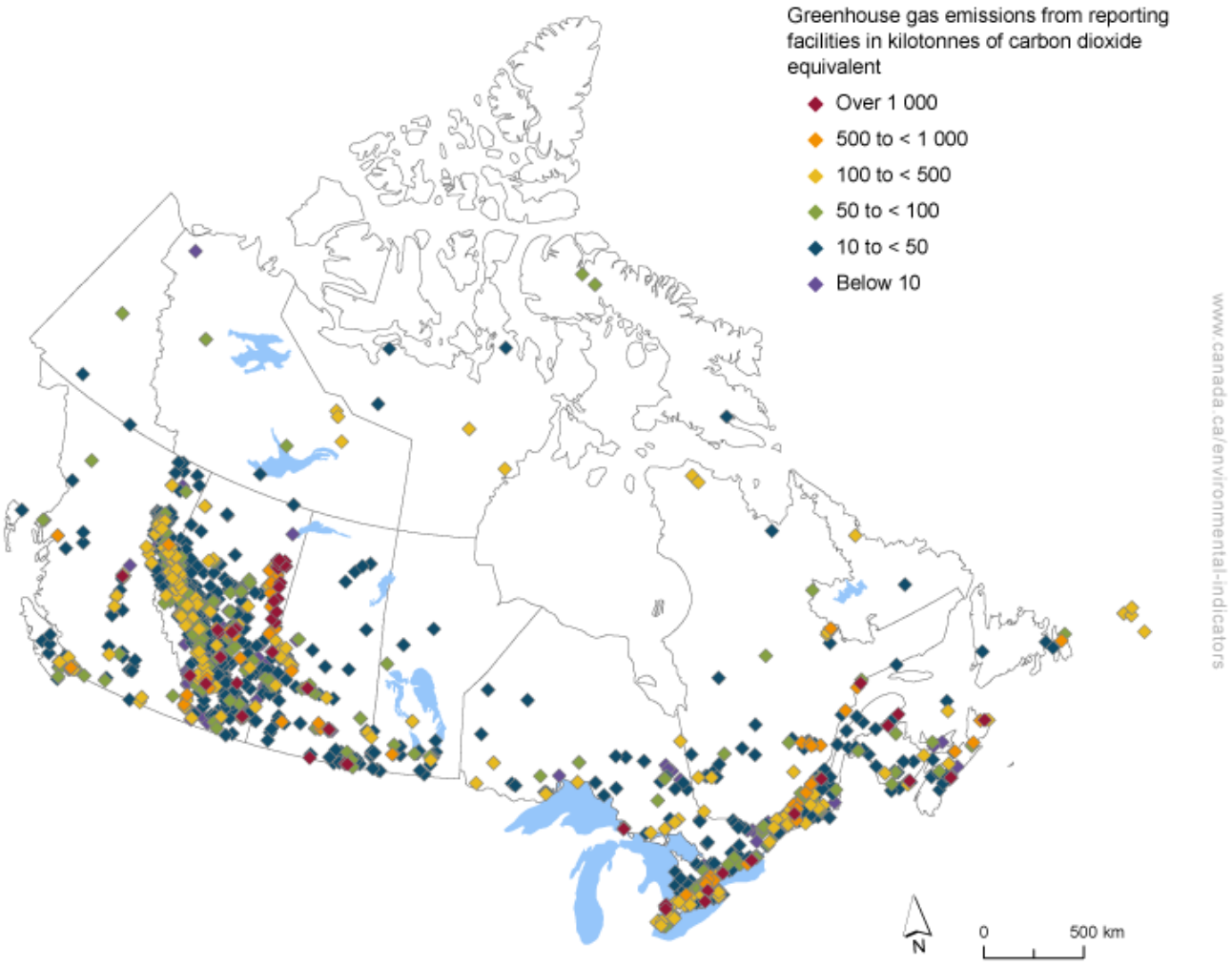
Releases of greenhouse gases (GHGs) and their increasing concentrations in the atmosphere are leading to a changing climate. This change has an impact on the environment, human health and the economy. This indicator tracks GHG emissions from the largest emitting facilities in Canada. The indicator complements the Greenhouse gas emissions indicators and provides information on an important source of Canada's industrial GHG emissions.

Key results

In 2023,

- 291 megatonnes (Mt) of GHGs in carbon dioxide equivalent (CO_2 eq) were emitted by 1 862 facilities reporting to the Government of Canada's GHG Reporting Program
- emissions from the reporting facilities accounted for 42% of Canada's total GHG emissions

Figure 1. Greenhouse gas emissions from large facilities, Canada, 2023



Navigate data using the interactive map

Source: Environment and Climate Change Canada (2025) Greenhouse Gas Reporting Program - Overview of 2023 Reported Emissions.

In 2023, the mining, quarrying, and oil and gas extraction sectors accounted for 42% of the emissions reported by large facilities; the manufacturing sector for 29%; and the utilities sector for 20%. Of the 1 862 reporting facilities,

- 168 facilities with emissions below 10 kilotonnes (kt) reported voluntarily[1] (accounting for 0.7 Mt or 0.2%)
- 1 092 facilities reported emissions in the 10 to 50 kt range (accounting for 24 Mt or 8.2%)
- 248 facilities reported emissions in the 50 to 100 kt range (accounting for 17 Mt or 5.9%)
- 228 facilities reported emissions in the 100 to 500 kt range (accounting for 48 Mt or 16.6%)
- 69 facilities reported emissions in the 500 to 1 000 kt range (accounting for 50 Mt or 17.1%)
- 57 facilities reported emissions over 1 000 kt (accounting for 151 Mt or 52.0%)

Total facility-reported GHG emissions in 2023 remained stable compared to 2022. In 2023, there were 25 more facilities reporting to the GHG Reporting Program compared to the previous year (1 837 in 2022).

Between 2017 and 2023, total emissions have decreased by 5 Mt (-1.7%), remaining consistently lower than pre-pandemic levels following a rebound in 2021.

Between 2005 and 2023, facility-reported GHG emissions increased from 278 Mt to 291 Mt (+4.5%) and the number of reporting facilities increased from 337 to 1 862. Note that in 2005, only facilities emitting more than 100 kt were required to report their emissions, while in 2023 the applicable threshold for reporting was 10 kt. Therefore, the increase in reported emissions is partly due to the increased number of facilities reporting over that period. Between 2005 and 2023, facility-reported emissions by sector:

- increased by 75 Mt in the mining, quarrying, and oil and gas extraction sector
- decreased by 65 Mt in the utilities sector
- decreased by 6 Mt in the manufacturing sector

About the indicator

What the indicator measures

The indicator reports total GHG emissions from the largest GHG emitters in Canada for the 2023 reporting year.

In March 2004, the Government of Canada announced the introduction of the Greenhouse Gas Reporting Program to annually collect emission information for facilities across Canada. Unlike Canada's National Inventory Report, which compiles GHG data at the national and provincial/territorial levels and covers all GHG sources and sinks in Canada, the GHG Reporting Program applies only to specific emission sources that exist at large GHG-emitting facilities (industrial and other types of facilities).

The GHG Reporting Program requires all facilities that emit the equivalent of 10 000 tonnes (10 kilotonnes) or more of GHGs (in carbon dioxide equivalent units) per year to submit a report to Environment and Climate Change Canada. Mandatory reporting of GHG emissions by facilities was established by the Minister of the Environment under the authority of section 46 of the *Canadian Environmental Protection Act, 1999*.

Why this indicator is important

The release of GHGs and their increasing concentrations in the atmosphere are having significant impacts on the environment, human health and the economy. The indicator informs the public and decision makers on the release of GHG emissions from the largest emitting facilities in Canada.

The GHG Reporting Program ensures that the GHG emissions from Canada's largest emitters are tracked and reported. This mandatory reporting contributes to the development, implementation and evaluation of climate change and energy policies and strategies in Canada.

[1] The GHG Reporting Program requires all facilities that emit the equivalent of 10 000 tonnes (10 kilotonnes) or more of GHGs (in carbon dioxide equivalent units) per year to submit a report to Environment and Climate Change Canada. Facilities with emissions below 10 kilotonnes per year can voluntarily report their GHG emissions.

Greenhouse gas emissions data reported through the GHG Reporting Program are used to inform the development of estimates of GHG emissions in Canada in the National Inventory Report, and to support regulatory initiatives.

Related indicators

The Greenhouse gas emissions indicators report trends in total anthropogenic (human-made) GHG emissions at the national level, per person and per unit gross domestic product, by province and territory and by economic sector.

The Global greenhouse gas emissions indicator provides a global perspective on Canada's share of global GHG emissions.

The Greenhouse gas emissions from a consumption perspective indicator shows the impact of Canada's consumption of goods and services, regardless of where they are produced, on the levels of carbon dioxide released into the atmosphere.

The Greenhouse gas emissions projections indicator provides an overview of Canada's projected GHG emissions up to 2040.

The Land-based greenhouse gas emissions and removals indicator tracks exchanges of GHG emissions and removals between the atmosphere and Canada's managed lands.

The Greenhouse gas concentrations indicators present atmospheric concentrations as measured from sites in Canada and at a global scale for 2 greenhouse gases: carbon dioxide and methane.

Data sources and methods

Data sources

The data used in the indicator are from Environment and Climate Change Canada's Greenhouse Gas Reporting Program.

More information

The Greenhouse gas emissions from large facilities indicator uses data from the GHG Reporting Program. The data are collected on an annual basis. Facilities are required to report their GHG emissions to Environment and Climate Change Canada by June 1 of each year.

The GHG Reporting Program provides local GHG emissions data from large emitters in Canada (those producing 10 kilotonnes (kt) or more of carbon dioxide equivalent emissions per year). Facilities with emissions below 10 kt per year can voluntarily report their GHG emissions.

Starting with the 2017 reporting year, the GHG reporting threshold was lowered from 50 kt to 10 kt. As a result, more facilities were required to report their emissions compared to the previous years.

The Canadian Environmental Sustainability Indicators' interactive map provides facility GHG data for the years 2004 to 2023.

Methods

The quantity of GHGs released by each facility is calculated or measured by the reporting facility. The methods used to determine emissions are based on monitoring or direct measurement, mass balance, emission factors, engineering estimates and/or fuel and activity data. See the Technical guidance on reporting greenhouse gas emissions for more information.

More information

Environment and Climate Change Canada requires facilities involved in certain industrial activities to follow prescribed methods to determine their emissions. This is part of the reporting program's expansion initiated in 2017 to improve the quality and usability of the facility data. See Canada's Greenhouse Gas Quantification Requirements for more information. For reporting facilities that are not subject to the expanded requirements, they can choose the quantification methodologies most appropriate to their

particular industry or application. However, these facilities must use methods for estimating emissions that are consistent with the guidelines developed by the Intergovernmental Panel on Climate Change and adopted by the United Nations Framework Convention on Climate Change, for the preparation of national GHG inventories. See the Technical guidance on reporting greenhouse gas emissions for more information.

Greenhouse gas emissions are reported in carbon dioxide equivalents (CO_2 eq), determined by multiplying the amount of emissions of a particular greenhouse gas by the global warming potential of that gas. Greenhouse gases differ in their ability to absorb heat in the atmosphere due to their differing chemical properties and atmospheric lifetimes. For example, over a period of 100 years, methane's potential to trap heat in the atmosphere is 28 times greater than carbon dioxide's potential. Therefore, methane is considered to have a global warming potential of 28.

The Intergovernmental Panel on Climate Change (IPCC) publishes the global warming potentials and atmospheric lifetimes for each GHG. Note that the global warming potentials in this indicator have been updated and now correspond to the values as presented in IPCC's Fifth Assessment Report. In previous editions, global warming potentials from the Fourth Assessment Report were used.

Caveats and limitations

A facility is required to report to the Greenhouse Gas Reporting Program only if its GHG emissions exceed the reporting threshold of 10 000 tonnes (10 kilotonnes) in carbon dioxide equivalent for a given year. Since 2004, there have been 2 changes to the reporting threshold. In 2009, the reporting threshold was lowered from 100 kilotonnes to 50 kilotonnes and in 2017, it was further reduced from 50 kilotonnes to 10 kilotonnes.

Comparisons among years may be made, bearing in mind that some facilities might not have been required to report in years for which they did not exceed the reporting threshold. Attention to consistency and comparability in the dataset is needed when comparing emissions from year to year. Observed changes in reported emissions may be due to actual changes in emissions or revisions of data from facilities and additional emissions reported from facilities that are newly reporting their emissions (for example, due to the changes in the reporting threshold).

Different facilities in a given type of industry may also use different methods for estimating emissions.

For more information on the caveats and limitations with respect to facility-reported greenhouse gas emissions data, refer to the Overview of 2023 Reported Emissions.

Resources

References

Environment and Climate Change Canada (2023) Reporting greenhouse gas emissions data: Technical guidance. Retrieved on January 31, 2025.

Environment and Climate Change Canada (2025) Facility Greenhouse Gas Reporting Program - Overview of 2023 Reported Emissions. Retrieved on March 21, 2025.

Related information

Canada's action on climate change

Climate change

Additional information can be obtained at:

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