



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

AIR POLLUTANT EMISSIONS

CANADIAN ENVIRONMENTAL
SUSTAINABILITY INDICATORS



Canada 

Suggested citation for this document: Environment and Climate Change Canada (2025) Canadian Environmental Sustainability Indicators: Air pollutant emissions. Consulted on *Month day, year*. Available at: www.canada.ca/en/environment-climate-change/services/environmental-indicators/air-pollutant-emissions.html

Cat. No.: En4-144/22-2025E-PDF
ISBN: 978-0-660-77269-1
Project code: EC25115

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

Environment and Climate Change Canada
Public Inquiries Centre
Place Vincent Massey Building
351 Saint-Joseph Boulevard
Gatineau QC K1A 0H3
Toll Free: 1-800-668-6767
Email: enviroinfo@ec.gc.ca

Photos: © Environment and Climate Change Canada

© His Majesty the King in Right of Canada, represented by the Minister of Environment and Climate Change, 2025

Aussi disponible en français

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

AIR POLLUTANT EMISSIONS

June 2025

Table of contents

Air pollutant emissions.....	7
National air pollutant trends	7
Air pollutant emissions by source	8
Air pollutant emissions by province and territory.....	9
Sulphur oxide emissions by source	10
Sulphur oxide emissions by province and territory.....	11
Sulphur oxide emissions by facilities	12
Nitrogen oxide emissions by source	13
Nitrogen oxide emissions by province and territory.....	15
Nitrogen oxide emissions by facilities	16
Volatile organic compound emissions by source	17
Volatile organic compound emissions by province and territory	18
Volatile organic compound emissions by facilities	19
Ammonia emissions by source.....	20
Ammonia emissions by province and territory	21
Ammonia emissions by facilities	21
Carbon monoxide emissions by source	23
Carbon monoxide emissions by province and territory	24
Carbon monoxide emissions by facilities	24
Fine particulate matter emissions by source	26
Fine particulate matter emissions by province and territory	27
Fine particulate matter emissions by facilities.....	28
Black carbon emissions by source	30
Black carbon emissions by province and territory	31
Air pollutant emissions from the oil and gas industry.....	32
Changes in emissions from the oil and gas industry	33

Air pollutant emissions from transportation, off-road vehicles and mobile equipment	34
Changes in emissions from transportation, off-road vehicles and mobile equipment	35
Air pollutant emissions from electric utilities	36
Changes in emissions from electric utilities	37
About the indicators	38
What the indicators measure.....	38
Why these indicators are important.....	38
Related initiatives	39
Related indicators	39
Data sources and methods.....	40
Data sources	40
Methods	41
Recent changes	48
Caveats and limitations.....	48
Resources	49
References	49
Related information	49
Annex	50
Annex A. Data tables for the figures presented in this document	50

List of Figures

Figure 1. Air pollutant emissions, Canada, 1990 to 2023.....	7
Figure 2. Distribution of air pollutant emissions by source, Canada, 2023	8
Figure 3. Distribution of air pollutant emissions by province and territory, Canada, 2023	9
Figure 4. Total sulphur oxide emissions by source, Canada, 1990 to 2023.....	10
Figure 5. Sulphur oxide emissions by province and territory, Canada, 1990, 2005 and 2023	11
Figure 6. Sulphur oxide emissions by reporting facilities, Canada, 2023.....	13
Figure 7. Total nitrogen oxide emissions by source, Canada, 1990 to 2023.....	14
Figure 8. Nitrogen oxide emissions by province and territory, Canada, 1990, 2005 and 2023	15
Figure 9. Nitrogen oxide emissions by reporting facilities, Canada, 2023	16
Figure 10. Total volatile organic compound emissions by source, Canada, 1990 to 2023	17
Figure 11. Volatile organic compound emissions by province and territory, Canada, 1990, 2005 and 2023	18
Figure 12. Volatile organic compound emissions by reporting facilities, Canada, 2023	19
Figure 13. Total ammonia emissions by source, Canada, 1990 to 2023	20
Figure 14. Ammonia emissions by province and territory, Canada, 1990, 2005 and 2023.....	21
Figure 15. Ammonia emissions by reporting facilities, Canada, 2023	22
Figure 16. Total carbon monoxide emissions by source, Canada, 1990 to 2023	23
Figure 17. Carbon monoxide emissions by province and territory, Canada, 1990, 2005 and 2023	24
Figure 18. Carbon monoxide emissions by reporting facilities, Canada, 2023	25
Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to 2023.....	26
Figure 20. Fine particulate matter emissions by province and territory, Canada, 1990, 2005 and 2023	28

Figure 21. Fine particulate matter by reporting facilities, Canada, 2023	29
Figure 22. Total black carbon emissions by source, Canada, 2013 to 2023	30
Figure 23. Black carbon emissions by province and territory, Canada, 2013 and 2023	31
Figure 24. Contribution of the oil and gas industry to total air pollutant emissions by activity type, Canada, 2023	32
Figure 25. Changes in emissions of key air pollutants from the oil and gas industry, Canada, 1990 to 2023 ...	33
Figure 26. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada, 2023	34
Figure 27. Changes in emissions of key air pollutants from transportation, off-road vehicles and mobile equipment, Canada, 1990 to 2023	35
Figure 28. Contribution of electric utilities to total air pollutant emissions by fuel source, Canada, 2023	36
Figure 29. Changes in emissions of key air pollutants from electric utilities, Canada, 1990 to 2023	37

List of Tables

Table 1. Alignment of sources reported in the indicators with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory	44
Table 2. Alignment of sources reported in the transportation, off-road vehicles and mobile equipment indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory	47
Table 3. Alignment of sources reported in the electric utilities indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory	48
Table 4. Alignment of sources reported in the oil and gas industry indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory	48
Table A. 1. Data for Figure 1. Air pollutant emissions, Canada, 1990 to 2023	50
Table A. 2. Data for Figure 2. Distribution of air pollutant emissions by source, Canada, 2023	51
Table A. 3. Data for Figure 3. Distribution of air pollutant emissions by province and territory, Canada, 2023 ..	51
Table A. 4. Data for Figure 4. Total sulphur oxide emissions by source, Canada, 1990 to 2023	52
Table A. 5. Data for Figure 5. Sulphur oxide emissions by province and territory, Canada, 1990, 2005 and 2023	53
Table A. 6. Data for Figure 7. Total nitrogen oxide emissions by source, Canada, 1990 to 2023	54
Table A. 7. Data for Figure 8. Nitrogen oxide emissions by province and territory, Canada, 1990, 2005 and 2023	55
Table A. 8. Data for Figure 10. Total volatile organic compound emissions by source, Canada, 1990 to 2023 ..	56
Table A. 9. Data for Figure 11. Volatile organic compound emissions by province and territory, Canada, 1990, 2005 and 2023	58
Table A. 10. Data for Figure 13. Total ammonia emissions by source, Canada, 1990 to 2023	58
Table A. 11. Data for Figure 14. Ammonia emissions by province and territory, Canada, 1990, 2005 and 2023	59
Table A. 12. Data for Figure 16. Total carbon monoxide emissions by source, Canada, 1990 to 2023	60
Table A. 13. Data for Figure 17. Carbon monoxide emissions by province and territory, Canada, 1990, 2005 and 2023	61
Table A. 14. Data for Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to 2023	61
Table A. 15. Additional information for Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to 2023	63
Table A. 16. Data for Figure 20. Fine particulate matter emissions by province and territory, Canada, 1990, 2005 and 2023	65
Table A. 17. Data for Figure 22. Total black carbon emissions by source, Canada, 2013 to 2023	66

Table A. 18. Data for Figure 23. Black carbon emissions by province and territory, Canada, 2013 and 2023 ..	66
Table A.19. Data for Figure 24. Contribution of the oil and gas industry to total air pollutant emissions by activity type, Canada, 2023.....	67
Table A. 20. Data for Figure 25. Changes in emissions of key air pollutants from the oil and gas industry, Canada, 1990 to 2023	67
Table A. 21. Data for Figure 26. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada, 2023	69
Table A. 22. Data for Figure 27. Changes in emissions of key air pollutants from transportation, off-road vehicles and mobile equipment, Canada, 1990 to 2023	70
Table A.23. Data for Figure 28. Contribution of electric utilities to total air pollutant emissions by fuel source, Canada, 2023	72
Table A. 24. Data for Figure 29. Changes in emissions of key air pollutants from electric utilities, Canada, 1990 to 2023.....	73

Air pollutant emissions

Air pollution problems, such as smog and acid rain, result from the release of pollutants into the atmosphere. These pollutants can affect the health of people in Canada, the environment, infrastructure and the economy. The majority of these pollutants are released through human activities, such as the burning of fuels for electricity and heating, transportation, and industrial activities. The indicators on [sulphur oxides](#) (SO_x), [nitrogen oxides](#) (NO_x), [volatile organic compounds](#) (VOCs), [carbon monoxide](#) (CO), [ammonia](#) (NH₃), [fine particulate matter](#) (PM_{2.5}) and [black carbon](#), a component of PM_{2.5}, report emissions released through human activities.

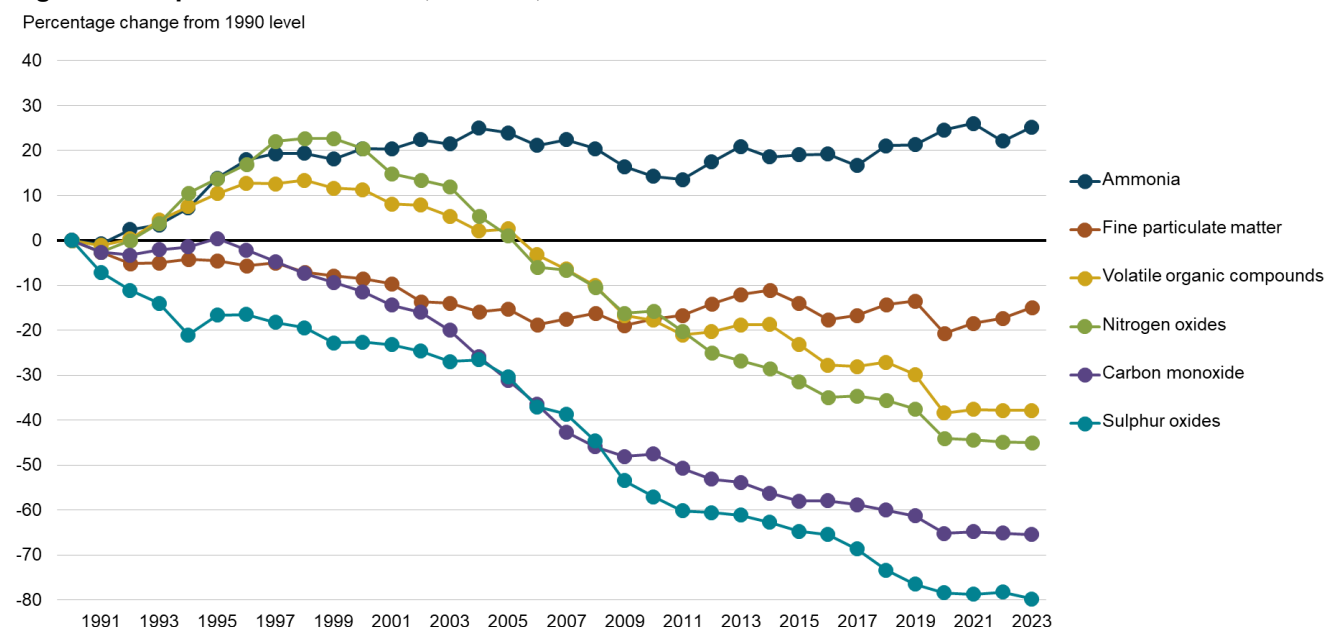
National air pollutant trends

This section presents a summary of Canada's emissions of 6 key air pollutants between 1990 to 2023, highlighting the main sources and provincial and territorial distributions for 2023. Detailed analysis by pollutant, including information from industrial and commercial facilities, accessible through an [interactive map](#), are presented following this section. Information on black carbon, a component of particulate matter, along with emissions from 3 of the largest source sectors in Canada, are presented following the indicators.

Key results

- In 2023, emissions of 5 key air pollutants were lower than in 1990:
 - SO_x 80% lower
 - NO_x 45% lower
 - VOCs 38% lower
 - CO 65% lower, and
 - PM_{2.5} 15% lower
- Emissions of NH₃ were 25% higher in 2023 than in 1990

Figure 1. Air pollutant emissions, Canada, 1990 to 2023



[Data for Figure 1](#)

Note: This indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. Consult the [black carbon](#) section for a detailed analysis of the pollutant or the [interactive figures](#) to explore the national results and emissions from black carbon in a dynamic and customizable format.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

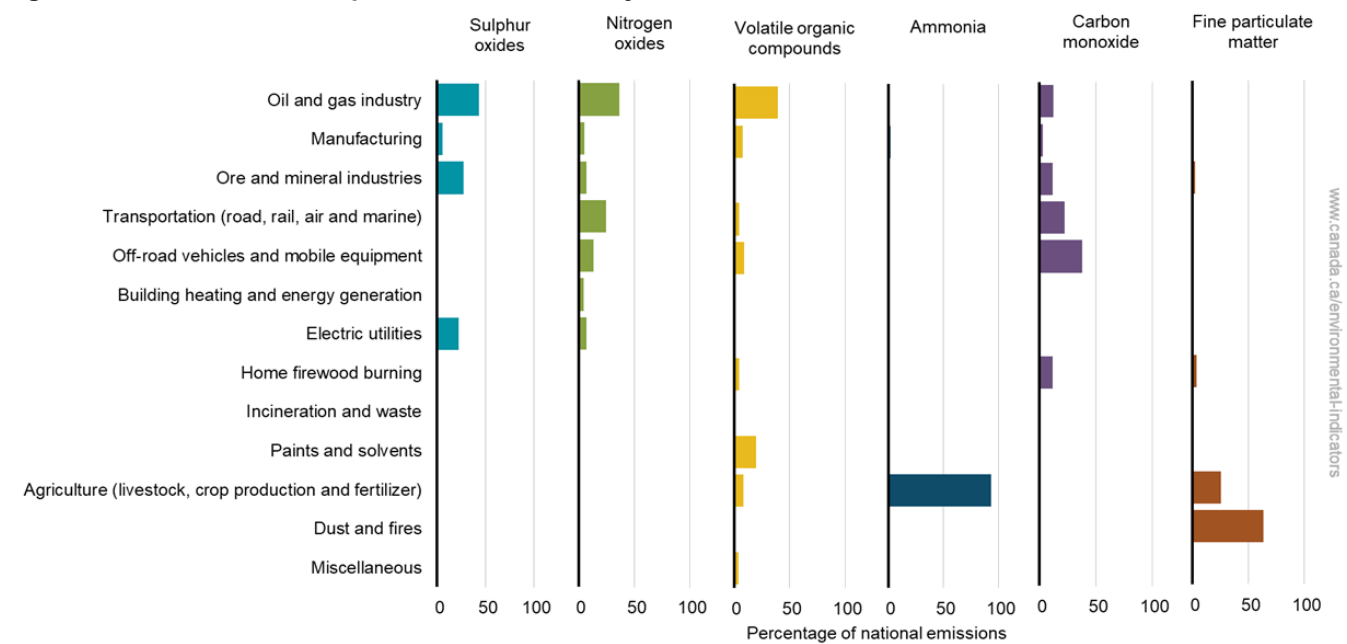
The years 2020 and 2021 were marked by the COVID-19 pandemic. This coincides with decreases in emissions between the years 2019 and 2020 for all the pollutants, except for NH₃. In 2021, the second year of the pandemic, most of the pollutant emissions increased compared to 2020 levels but stayed below their 2019 pre-pandemic levels. The year 2023 has shown decreases in SO_x, CO and NO_x compared to 2022. In contrast, emissions of PM_{2.5}, NH₃, and VOCs increased between 2022 and 2023. For all pollutants except NH₃, emissions in 2023 remained below 2019 pre-pandemic levels.

Air pollutant emissions by source

Key results

- In 2023, the largest sources of emissions of the 6 key air pollutants in Canada were the oil and gas industry, off-road vehicles and mobile equipment, agriculture, and dust and fires (for example, road dust, dust from construction operations and prescribed burning, but excluding forest fires)

Figure 2. Distribution of air pollutant emissions by source, Canada, 2023



[Data for Figure 2](#)

Note: The indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. Consult the [black carbon](#) section for a detailed analysis of the pollutant. The category "dust and fires" includes emissions from human activities such as prescribed burning and dust from roads. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, the human-made sources most contributing to Canada’s air pollutant emissions were the following:

- the oil and gas industry, ore and mineral industries and electric utilities together represented the majority of SO_x emissions
- the oil and gas industries, transportation (road, rail, air and marine) and off-road vehicles and mobile equipment were major sources of NO_x emissions
- most of the VOC emissions came from the oil and gas industry and from the use of paints and solvents
- agriculture (livestock, crop production and fertilizer) accounted for the majority of NH₃ emissions
- off-road vehicles and mobile equipment, transportation, the oil and gas industry, home firewood burning and ore and mineral industries were major sources of CO emissions
- dust and fires were the largest sources of PM_{2.5} emissions, agriculture being the second largest source

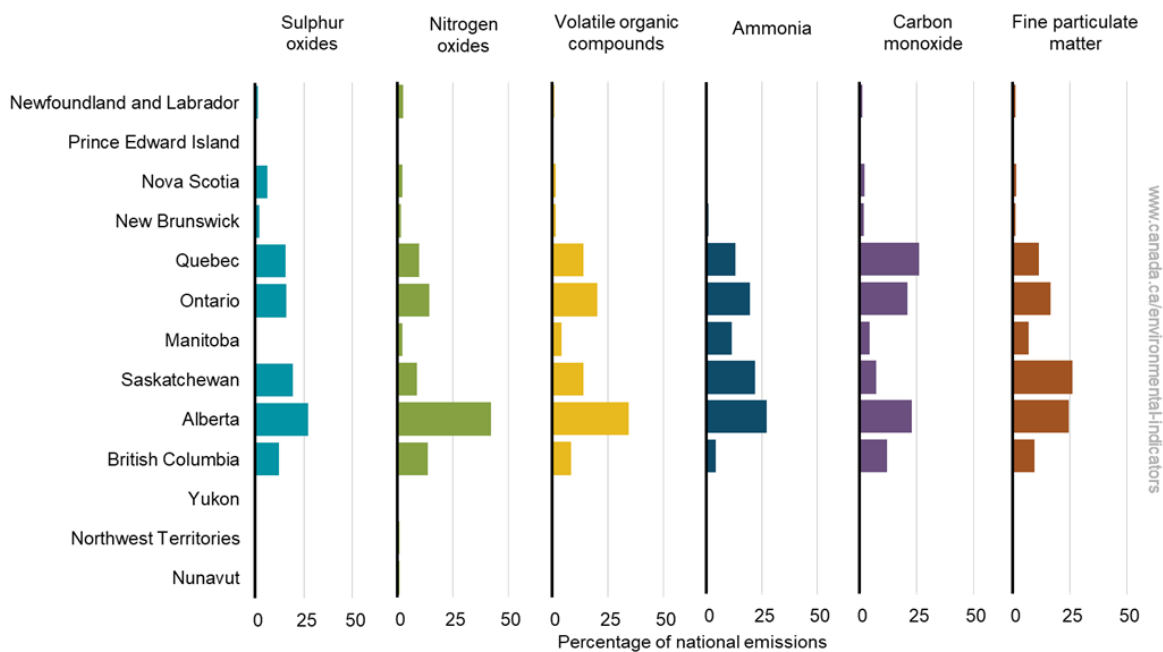
Air pollutant emissions by province and territory

Key results

At the provincial and territorial level, emissions of the 6 key air pollutants in 2023 were:

- the highest in Alberta for SO_x (27% of national emissions), NO_x (42%), VOCs (35%), and NH₃ (27%); second highest for CO (23%) and PM_{2.5} (25%)
- the highest in Quebec for CO (26%)
- the highest in Saskatchewan for PM_{2.5} (26%); second highest for SO_x (19% of national emissions) and NH₃ (22%)
- the second highest in Ontario for VOCs (20% of national emissions) and NO_x (14%),
- also important in:
 - British Columbia for NO_x, accounting for 14% of the national emissions of this pollutant
 - Quebec for SO_x, VOCs and NH₃, accounting for 15%, 14% and 13% of the national emissions of these pollutants, respectively
 - Saskatchewan for VOCs, accounting for 14% of the national emissions of this pollutant
 - Ontario for SO_x, NH₃, CO, PM_{2.5}, accounting for 16%, 20%, 21%, and 17% of the national emissions of these pollutants, respectively

Figure 3. Distribution of air pollutant emissions by province and territory, Canada, 2023



[Data for Figure 3](#)

Note: The indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. Consult the [black carbon](#) section for a detailed analysis of the pollutant.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

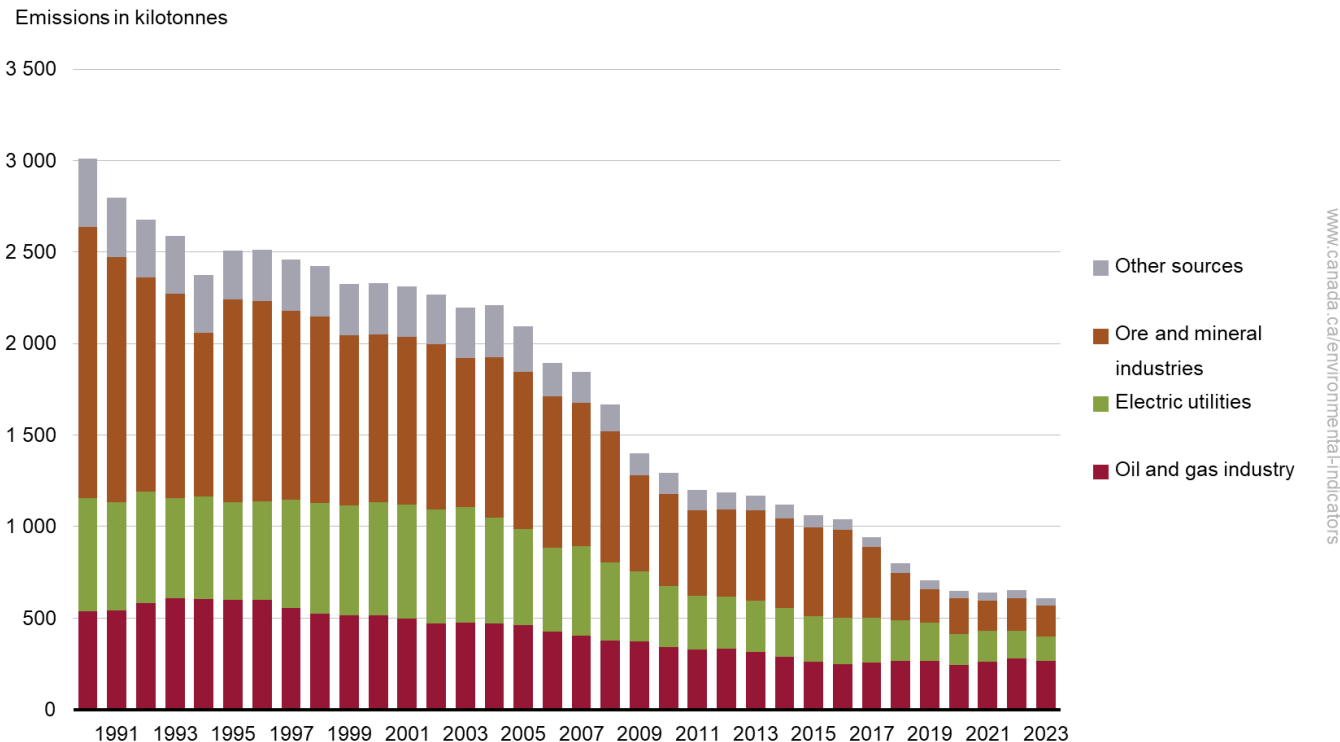
Sulphur oxide emissions by source

Emissions of [sulphur oxides](#) (SO_x) to the atmosphere can result in adverse effects on human health and the environment. The SO_x emissions released by human activities are mostly in the form of sulphur dioxide (SO₂). Sulphur dioxide can affect the respiratory systems of humans and animals and can cause damage to vegetation, buildings and materials. It also contributes to the formation of fine particulate matter (PM_{2.5}) and acid rain.

Key results

- Between 1990 and 2023, SO_x emissions decreased by 80% from 3 010 kilotonnes (kt) to 608 kt
- In 2023, 3 sources accounted for 93% (567 kt) of the total SO_x emissions: the oil and gas industry, the ore and mineral industries and electric utilities

Figure 4. Total sulphur oxide emissions by source, Canada, 1990 to 2023



[Data for Figure 4](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from transportation (road, rail, air and marine), off-road vehicles and mobile equipment, home firewood burning, incineration and waste, agriculture (livestock, crop production and fertilizer), dust and fires, paints and solvents, building heating and energy generation, manufacturing, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, the [oil and gas industry](#) accounted for approximately 43% of total national SO_x emissions (264 kt). [Electric utilities](#) and ore and mineral industries followed with 22% (135 kt) and 28% (168 kt) of national emissions, respectively. For the ore and mineral industries, 35% (59 kt) of its SO_x emissions came from the non-ferrous refining and smelting industry.

The largest reduction in emissions between 1990 and 2023 was from ore and mineral industries with a reduction in emissions of approximately 1 316 kt. The largest driver of the reduction from this source was from the non-ferrous refining and smelting industry with a reduction of 1 207 kt over the period.

This significant decrease in SO_x emissions from 1990 to 2023 (80%) is due in large part to government actions to fight acid rain and related federal-provincial and United States agreements^{1,2} on capping SO_x emissions by 1994. Further reductions were also realized through:

- technological upgrades, new air pollution controls for non-ferrous metal smelters and the closure of 4 major smelters in Manitoba, Ontario, Quebec and New Brunswick
- fossil-fuel-fired (such as, coal-fired) power-generating utilities due to better technologies and plant closures (for example, the phase-out of coal electricity generation in Ontario and Alberta)
- implementation of regulations on low-sulphur fuels^{3,4}

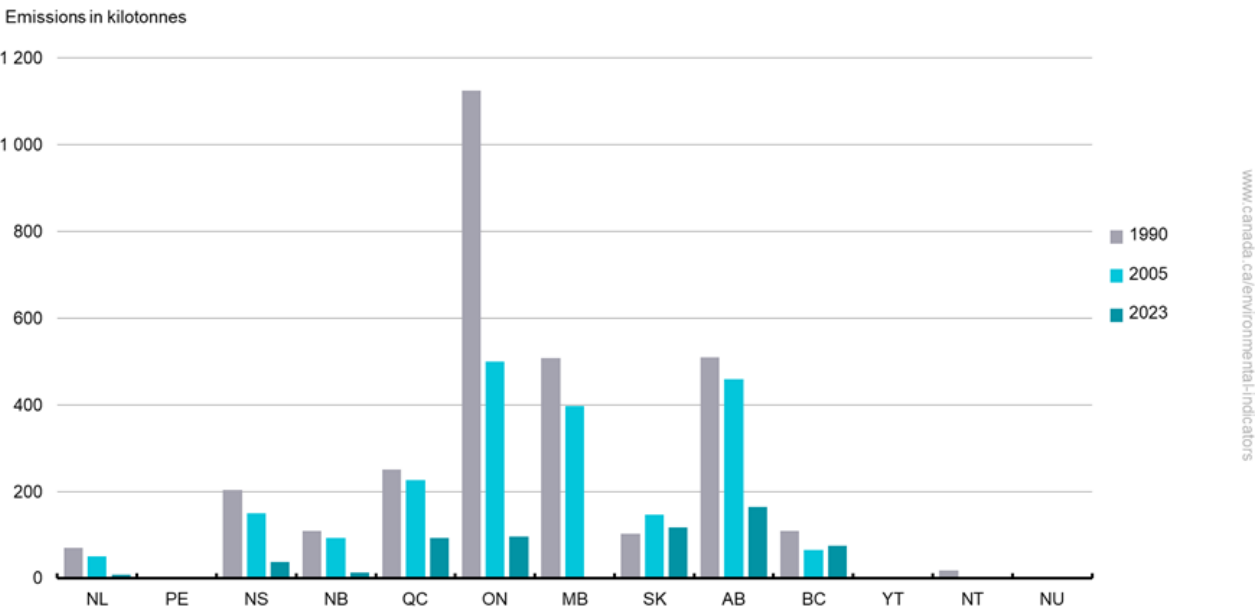
More recently, between 2022 and 2023, SO_x emissions have declined due to decreases in emissions from the electric utilities industry of 19 kt (13%), largely driven by reduced use of coal power plants and increased use of cleaner fuels.

Sulphur oxide emissions by province and territory

Key results

- In 2023, Alberta and Saskatchewan accounted for 27% (164 kt) and 19% (117 kt) of national SO_x emissions
- Between 1990 and 2023
 - the largest reductions were observed in Ontario and Manitoba. Emissions in these provinces decreased by 1 028 kt (91%) and 507 kt (99.6%), respectively
 - Saskatchewan was the only province that had an increase in SO_x emissions (15% or 15 kt)

Figure 5. Sulphur oxide emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 5](#)

¹ Environment and Climate Change Canada (1991) [Canada-United States Air Quality Agreement](#). Retrieved on March 18, 2025.

² Canadian Council of Ministers of the Environment (1998) [The Canada-Wide Acid Rain Strategy for Post-2000](#). Retrieved on March 18, 2025.

³ Environment and Climate Change Canada (2020) [Sulphur in Gasoline Regulations](#). Retrieved on March 18, 2025.

⁴ Environment and Climate Change Canada (2017) [Sulphur in Diesel Fuel Regulations](#). Retrieved on March 18, 2025.

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Alberta had the highest SO_x emissions level in 2023, accounting for 27% (164 kt) of total national emissions. Emissions in the province mainly came from the oil and gas industry and electric utilities, combined, accounting for 94% (155 kt) of the emissions. Between 2005 and 2023, the province experienced a 64% decline in emissions (295 kt) with the oil and gas industry, notably reductions from natural gas processing and oil sands mining extraction and processing, accounting for a large part of the reductions since 2005.

Saskatchewan was the second-highest emitter of SO_x in 2023, accounting for 19% (117 kt) of total national emissions. Emissions from electric utilities, specifically coal electric power generation, was the largest contributor to SO_x emissions in the province.

Ontario ranked third, with 16% (96 kt) of total national emissions of SO_x; the ore and mineral industries sector was the most important source of emissions in the province in 2023.

Sulphur oxide emissions by facilities

The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.⁵

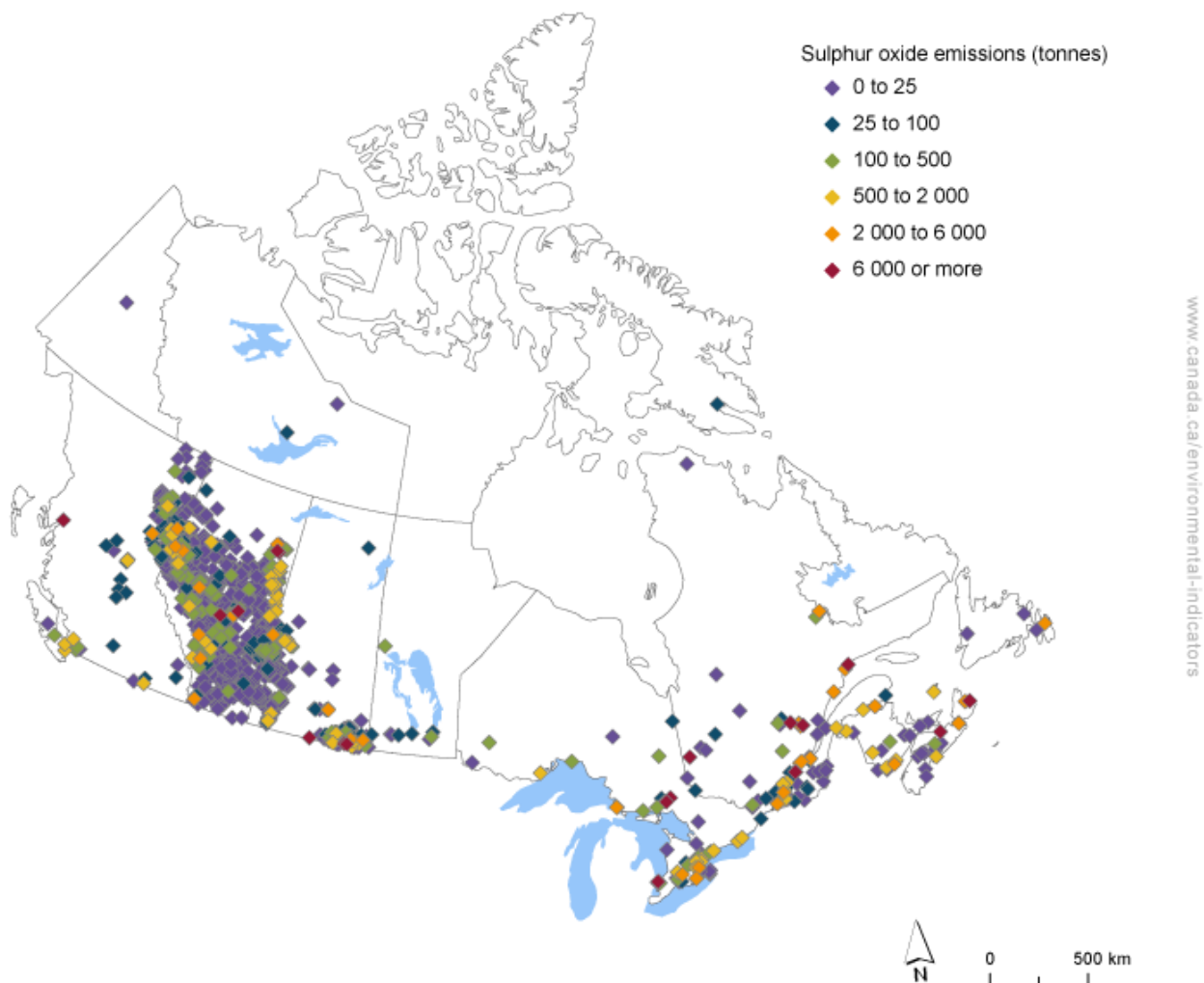
The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore SO_x emissions from individual facilities.

Key results

- In 2023, 2 653 facilities across Canada reported SO_x emissions representing 90% of total national emissions. Of these facilities:
 - 2 206 facilities reported emissions under 25 tonnes (t)
 - 428 facilities reported emissions between 25 to 6 000 t
 - 19 facilities reported emissions of 6 000 t or more located in Quebec (5), Ontario (4), Alberta (4), Saskatchewan (3), Nova Scotia (2) and British Columbia (1)

⁵ The National Pollutant Release Inventory only collects data for sulphur dioxide (SO₂), which is the predominant member of the SO_x group of gases.

Figure 6. Sulphur oxide emissions by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

Nitrogen oxide emissions by source

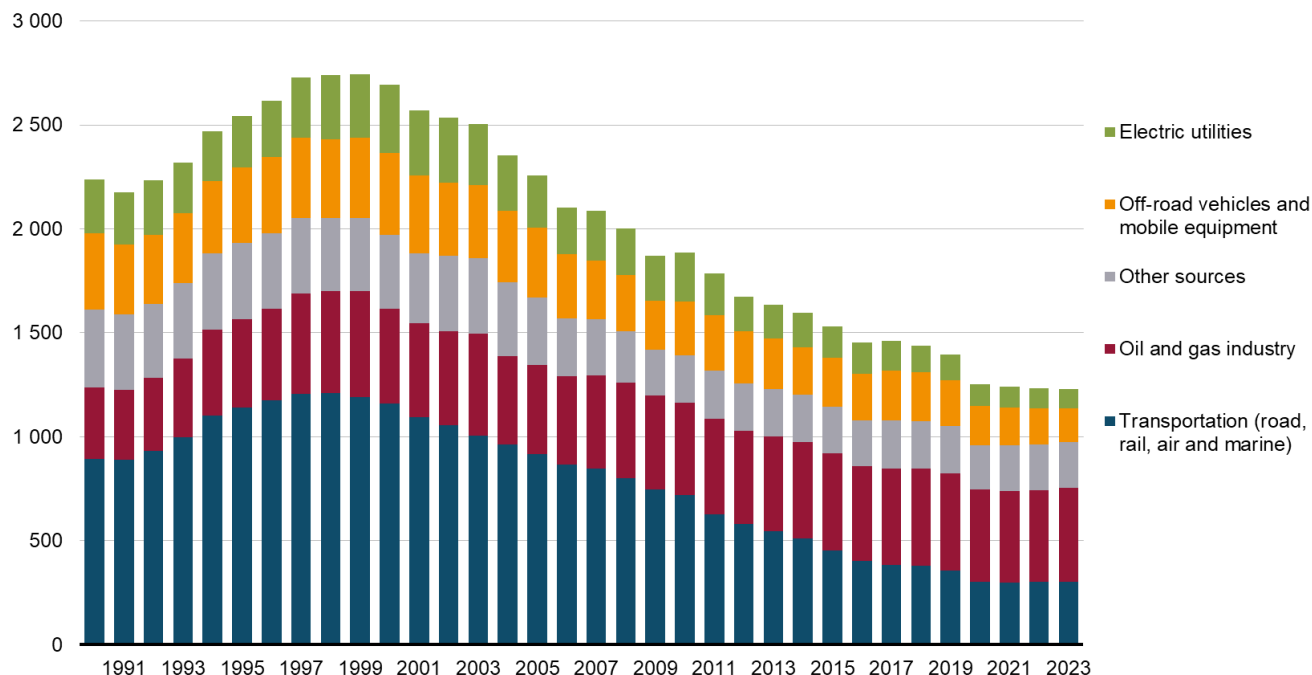
[Nitrogen oxides](#) (NO_x) include emissions of nitric oxide (NO) and nitrogen dioxide (NO₂). Nitrogen dioxide can have adverse effects on human health and the environment. Nitrogen oxides contribute to acid rain, which can lead to the acidification of aquatic and terrestrial ecosystems. It also contributes to the eutrophication of lakes and to the formation of ground-level ozone (O₃) and fine particulate matter (PM_{2.5}).

Key results

- In 2023, NO_x emissions were 1 228 kilotonnes (kt); this is 45% lower than in 1990
- The oil and gas industry was the largest source of NO_x, representing 37% (452 kt) of total emissions in 2023

Figure 7. Total nitrogen oxide emissions by source, Canada, 1990 to 2023

Emissions in kilotonnes



www.canada.ca/environmental-indicators

[Data for Figure 7](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from ore and mineral industries, manufacturing, building heating and energy generation, home firewood burning, incineration and waste, agriculture (livestock, crop production and fertilizer), dust and fires, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

The [oil and gas industry](#) was the largest contributor of NO_x emissions between 1990 and 2023. Emissions of NO_x from this sector increased by 108 kt (31%) during that period.

The transportation (road, rail, air, and marine) sector emitted the next largest proportion of NO_x emissions in 2023, representing 25% (303 kt) of total national emissions. This sector also experienced the largest decrease in emissions (592 kt or 66%) between 1990 and 2023.

The decline in NO_x emissions between 1990 and 2023 is mostly attributable to 2 factors:

- the reduction in emissions from [transportation](#) after 2000, given the progressive introduction of cleaner technology and fuels for vehicles
- lower emissions from fossil-fuel-fired (for example, coal-fired) power-generating utilities as a result of better emission control technologies and certain plant closures (for example, the closure of coal power plants in Ontario)

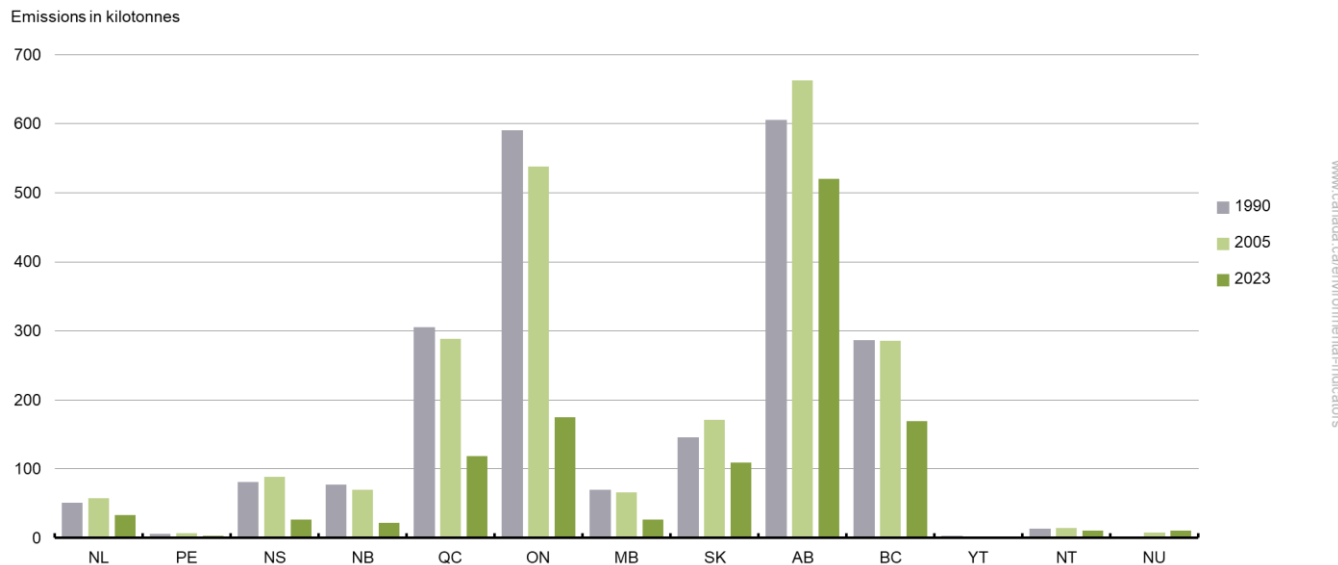
More recently, between 2022 and 2023, NO_x emissions from transportation (road, rail, air and marine) sources have increased by 1 kt (0.4%), notably from domestic marine navigation. Likewise, the oil and gas industry saw NO_x emissions increase by 8 kt (2%) between 2022 and 2023.

Nitrogen oxide emissions by province and territory

Key results

- In 2023, among provinces and territories, Alberta emitted the most NO_x. The province accounted for 42% (520 kt) of national emissions
- Between 1990 and 2023,
 - the largest reduction was observed in Ontario. Emissions decreased by 415 kt (70%) in the province
 - NO_x emissions increased in Northwest Territories and Nunavut by 61% (8 kt)⁶

Figure 8. Nitrogen oxide emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 8](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

The oil and gas industry is an important source of NO_x emissions in Alberta, accounting for 68% (352 kt) of the province's NO_x emissions in 2023. The increasing contribution of this sector to the province's emissions between 1990 and 2023 was more than offset by emission reductions from the transport and electric utilities sectors.

British Columbia and Ontario contributed the second and third largest proportions of NO_x emissions in 2023, with British Columbia accounting for 14% (169 kt) and Ontario accounting for 14% (175 kt) of total national emissions, with transportation (road, rail, air and marine) being the most important source in both provinces followed by the oil and gas industry in British Columbia and off-road vehicles and mobile equipment in Ontario. However, Ontario experienced the largest decrease in emissions (415 kt) between 1990 and 2023 in large part due to emission reductions from transportation (road, rail, air and marine), electric utilities, manufacturing, ore and mineral industries and off-road vehicles and mobile equipment. In Ontario, the majority of total NO_x emission reductions occurred between 2005 and 2023 (363 kt).

Quebec ranked fourth, with 10% (119 kt) of total national emissions. Transportation (road, rail, air and marine) was the most important source of NO_x in this province. Quebec also experienced a large decrease in emissions (169 kt) between 2005 and 2023 mainly due to emission reductions from transportation (road, rail, air and marine).

⁶ 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. Therefore, emissions for Northwest Territories and Nunavut are measured together and displayed as one value.

Nitrogen oxide emissions by facilities

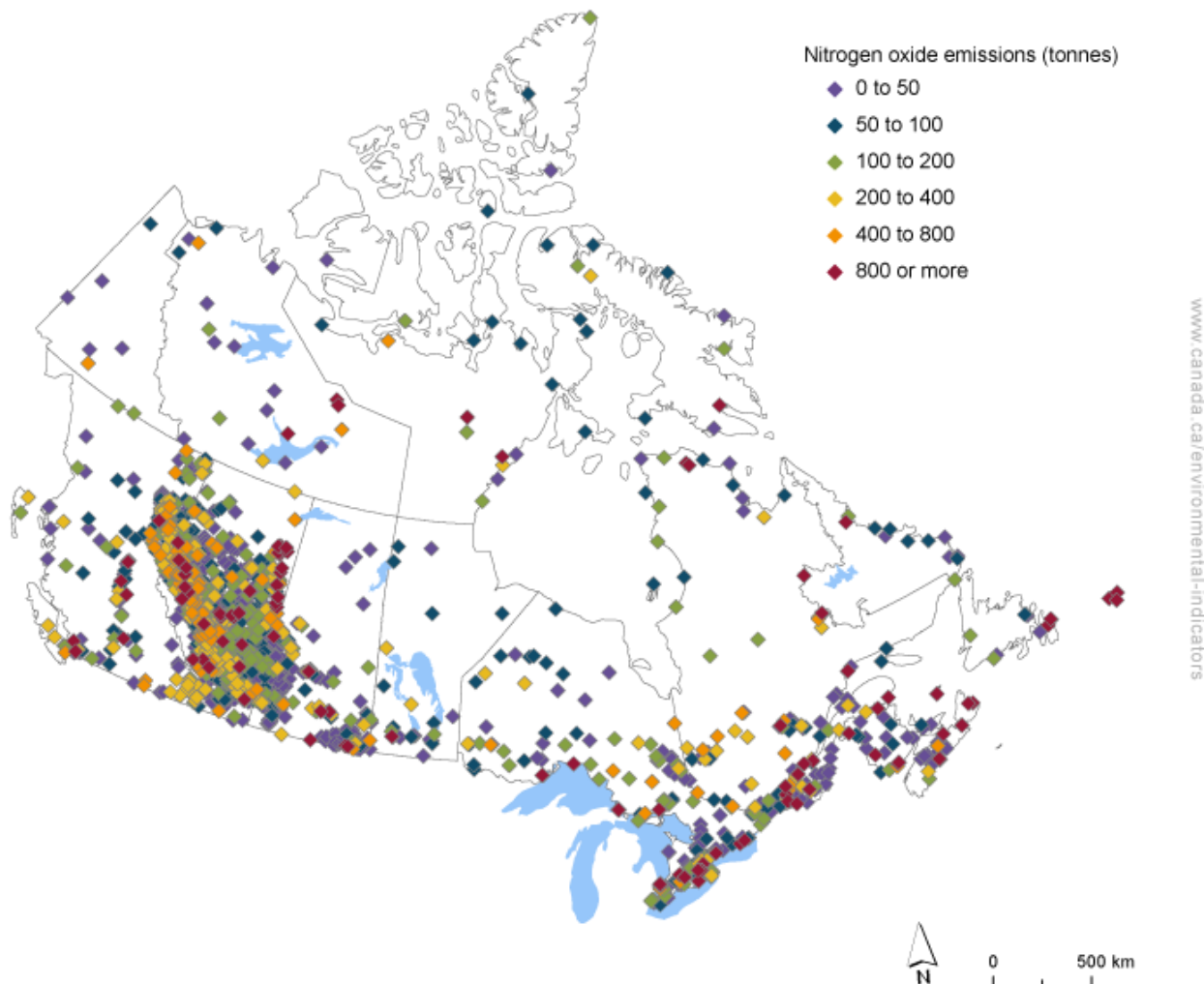
The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore NO_x emissions from individual facilities.

Key results

- In 2023, 3 917 facilities across Canada reported NO_x emissions representing 43% of total national emissions. Of these facilities:
 - 2 452 facilities reported emissions under 50 tonnes (t)
 - 1 348 facilities reported emissions between 50 to 800 t
 - 117 facilities reported emissions of 800 t or more located in Alberta (43), Ontario (18), Quebec (14), British Columbia (9), Saskatchewan (8), Newfoundland and Labrador (7), Nova Scotia (6), New Brunswick (5), Northwest Territories (3), Nunavut (3), and Manitoba (1)

Figure 9. Nitrogen oxide emissions by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

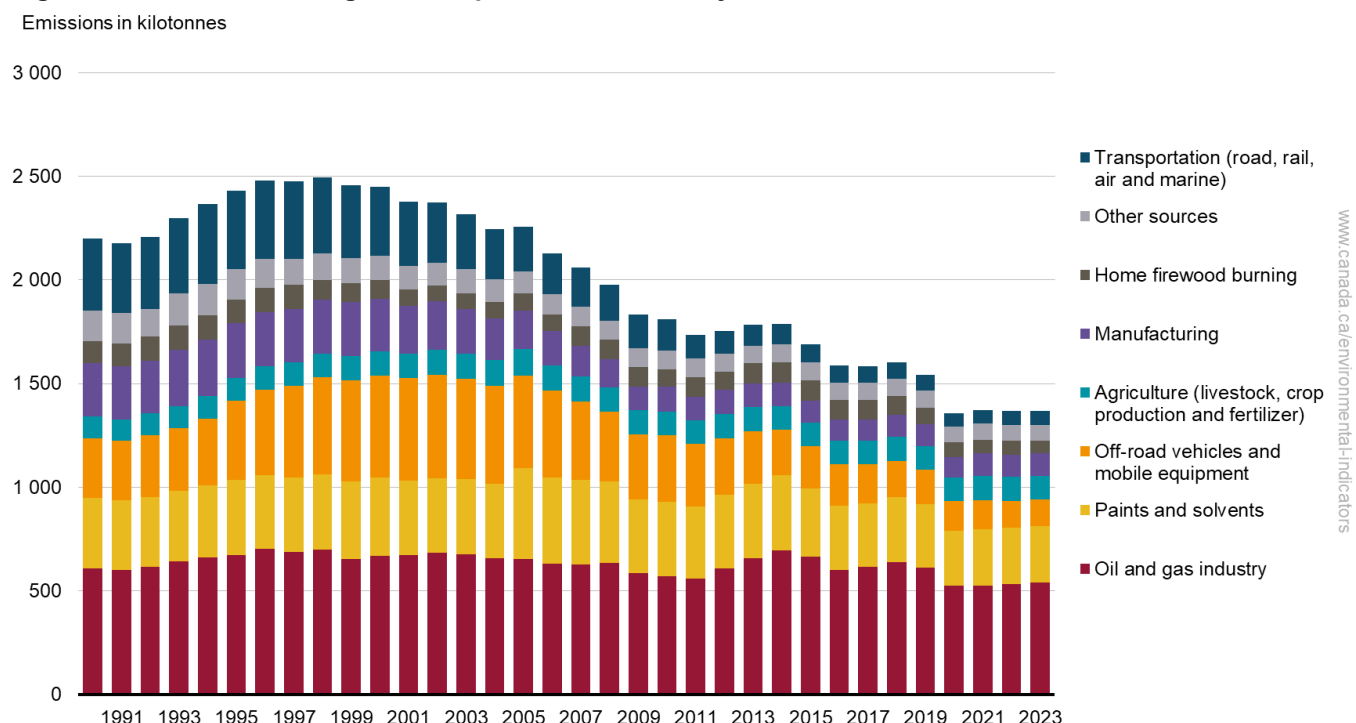
Volatile organic compound emissions by source

[Volatile organic compounds](#) (VOCs) are carbon-containing gases and vapours released into the atmosphere by natural sources and human activities.⁷ There are hundreds of VOCs that are emitted and that affect the health of Canadians and the environment. VOCs are primary precursors to the formation of ground-level ozone and particulate matter which are the main pollutants contributing to the formation of smog.

Key results

- In 2023, VOC emissions in Canada were 1 368 kilotonnes (kt); this is a 38% (832 kt) decrease from 1990 levels
- Since 1990, the oil and gas industry has been the highest contributor to VOC emissions. In 2023, the sector accounted for 40% (541 kt) of total emissions

Figure 10. Total volatile organic compound emissions by source, Canada, 1990 to 2023



[Data for Figure 10](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from incineration and waste, ore and mineral industries, dust and fires, building heating and energy generation, electric utilities and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Apart from the oil and gas industry, paints and solvents, and off-road vehicles and mobile equipment were also important sources of VOC emissions in 2023 contributing 20% (271 kt) and 9% (128 kt) of total emissions, respectively.

The largest emissions reduction between 1990 and 2023 was from transportation (road, rail, air and marine), with emissions reductions of 281 kt (81%).

⁷ Under the *Canadian Environmental Protection Act*, carbon dioxide, carbon monoxide, methane and chlorofluorocarbons are not considered volatile organic compounds.

The long-term decrease in VOC emissions is mainly attributable to 3 factors:

- the progressive introduction of cleaner technologies and fuels resulting in emission reductions from [transportation, off-road vehicles and mobile equipment](#)
- emission reductions from most industrial and non-industrial sources from facility closures, decrease in production and improved emission controls
- lower levels of VOCs in products such as paints, solvents and cleaners

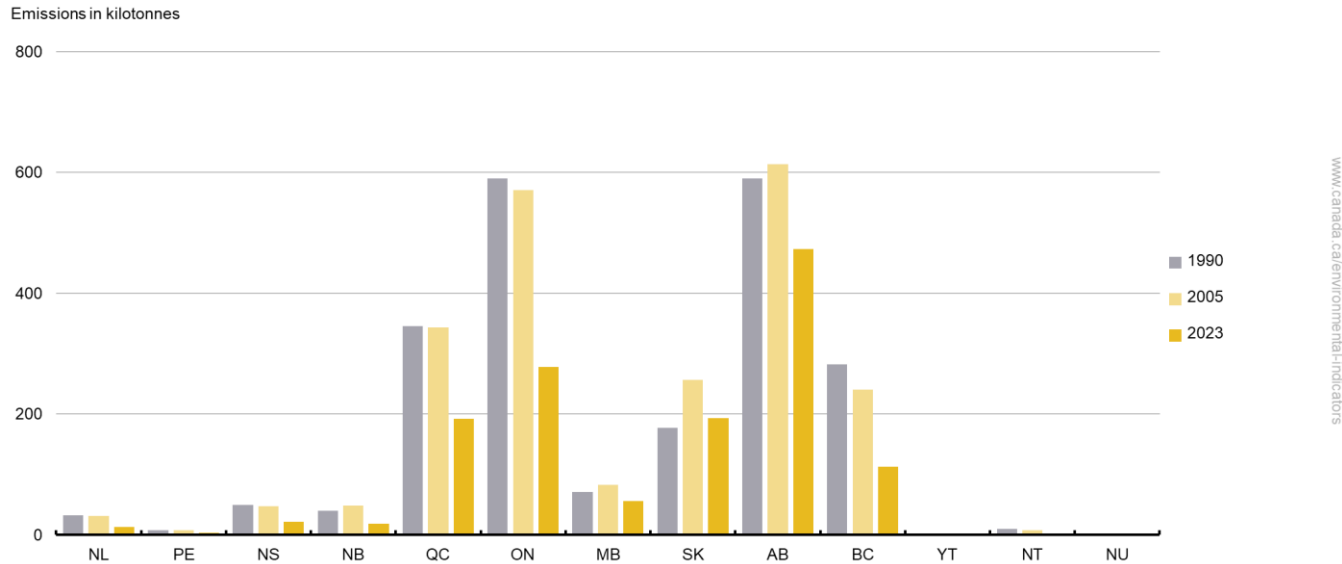
Compared to the previous year, VOC emissions increased by 1 kt (0.1%) in 2023. The largest increase was from the oil and gas industry 7 kt (1%), notably light medium crude oil production which accounted for just under half of the overall oil and gas increase (3.4 kt).

Volatile organic compound emissions by province and territory

Key results

- Alberta emitted the highest proportion of VOCs in 2023, representing 35% (474 kt) of national emissions
- Between 1990 and 2023,
 - Ontario experienced the largest reduction in VOC emissions; emissions in the province decreased by 311 kt (53%)
 - Saskatchewan was the only province that experienced an increase in VOC emissions, with 16 kt (9%), primarily due to the oil and gas industry

Figure 11. Volatile organic compound emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 11](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Alberta was the highest emitting province of VOCs in 2023 (474 kt), with the oil and gas industry as the main source, contributing 74% (349 kt) of the province's emissions.

Ontario was the second-highest emitter of VOCs, accounting for 20% (279 kt) of total national emissions in 2023. The main emission sources are paints and solvents, off-road vehicles and mobile equipment, and manufacturing. Ontario also experienced the largest reduction in emissions, with 311 kt (53%) between 1990 and 2023, mainly as a result of emission reductions from manufacturing and transportation (road, rail, air and marine). The majority of the reductions in Ontario occurred between 2005 and 2023 (292 kt).

Saskatchewan was the third largest emitter, with 14% (193 kt) of total national emissions in 2023, where the oil and gas industry accounted for 73% of the emissions in that province.

Volatile organic compound emissions by facilities

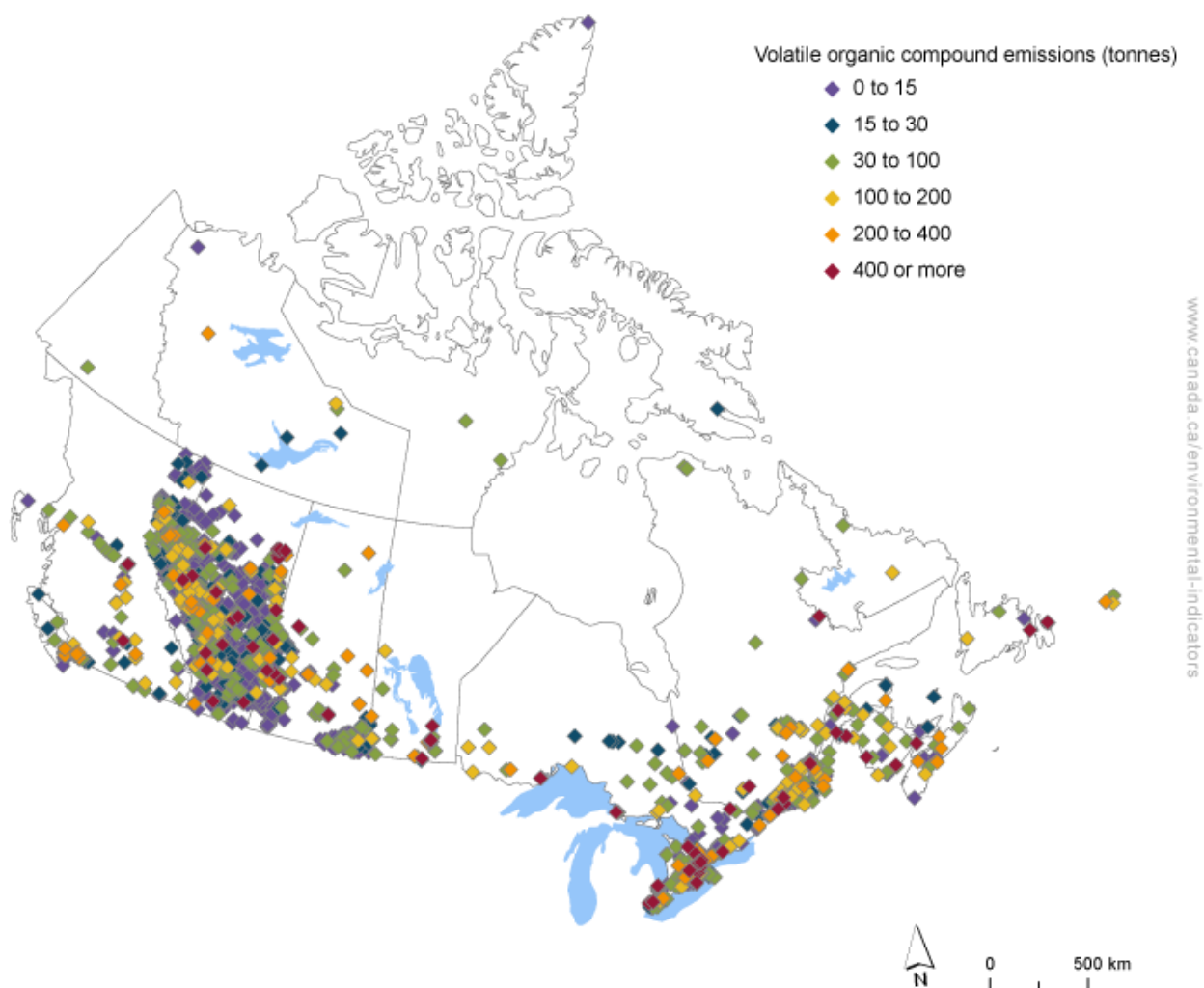
The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore VOC emissions from individual facilities.

Key results

- In 2023, 4 755 facilities across Canada reported VOC emissions representing 17% of total national emissions. Of these facilities:
 - 3 099 facilities reported emissions under 15 tonnes (t)
 - 1 579 facilities reported emissions between 15 to 400 t
 - 77 facilities reported emissions of 400 t or more located in Alberta (27), Ontario (21), Saskatchewan (8), Quebec (8), Manitoba (4), New Brunswick (3), Newfoundland and Labrador (3), British Columbia (2) and Nova Scotia (1)

Figure 12. Volatile organic compound emissions by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

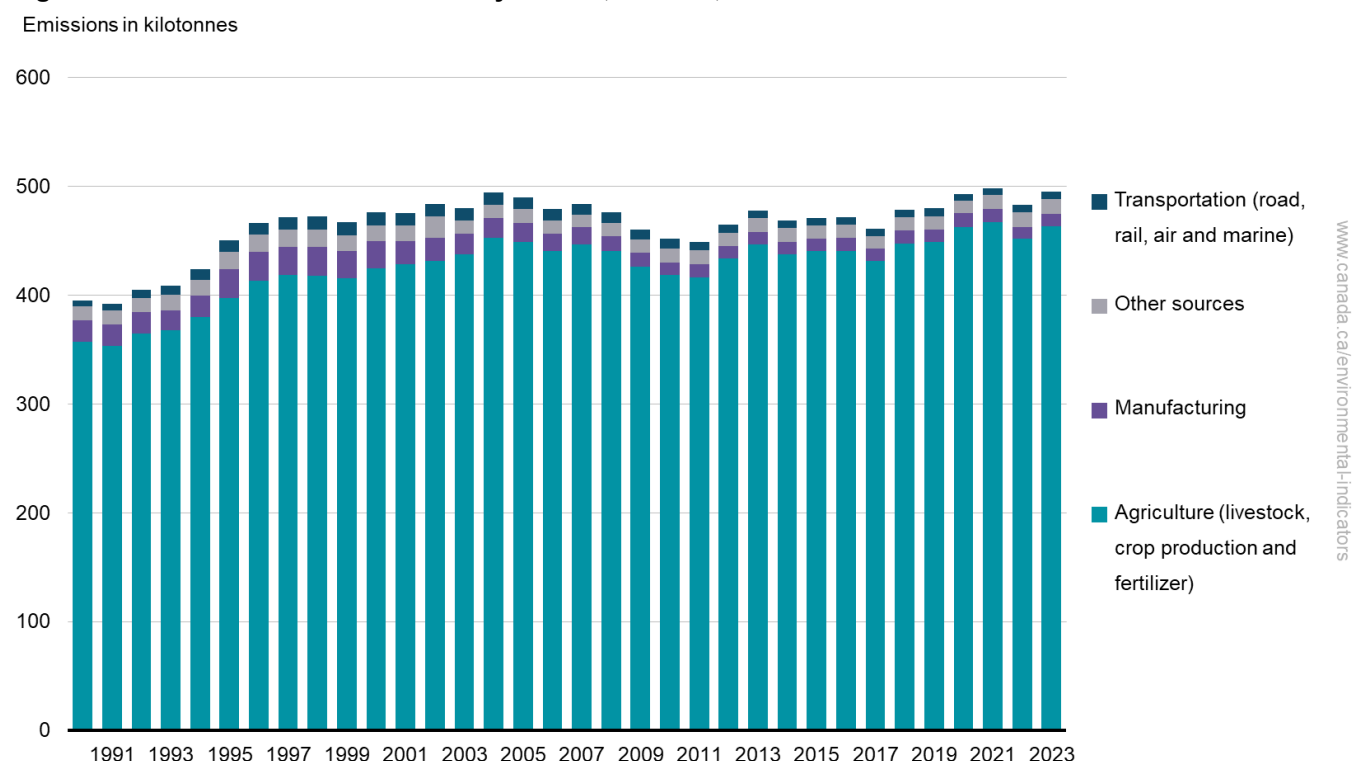
Ammonia emissions by source

[Ammonia](#) (NH₃) is a colourless gas with a noticeable odour at high concentrations. It can be poisonous if inhaled in great quantities and is irritating to the eyes, nose, and throat. It can also contribute to the nitrification and eutrophication of aquatic systems. In the air, the gas combines with sulphates and nitrates to form secondary fine particulate matter (PM_{2.5}).

Key results

- In 2023, NH₃ emissions were 495 kilotonnes (kt), which is 25% higher than in 1990
- Agriculture (livestock, crop production and fertilizer) was the main source of NH₃ emissions in 2023. Emissions from this source accounted for 94% (463 kt) of total national emissions

Figure 13. Total ammonia emissions by source, Canada, 1990 to 2023



[Data for Figure 13](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from incineration and waste, the oil and gas industry, home firewood burning, ore and mineral industries, electric utilities, building heating and energy generation, off-road vehicles and mobile equipment, dust and fires, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Between 1990 and 2023, agriculture (livestock, crop production and fertilizer) experienced the largest increase (106 kt or 30%) in NH₃ emissions. It also remained the key source of NH₃ emissions throughout that period. Emissions from manufacturing (11 kt), other sources (14 kt) and transportation (road, rail, air and marine) (6 kt) combined represented 6% of national emissions in 2023.

The growth in NH₃ emissions from agriculture (livestock, crop production and fertilizer) between 1990 and 2023 is mainly due to the increased use of synthetic nitrogen fertilizers in crop production. Up to 2005, increasing livestock populations also added to the growth. However, from 2006 to 2011, livestock populations decreased and

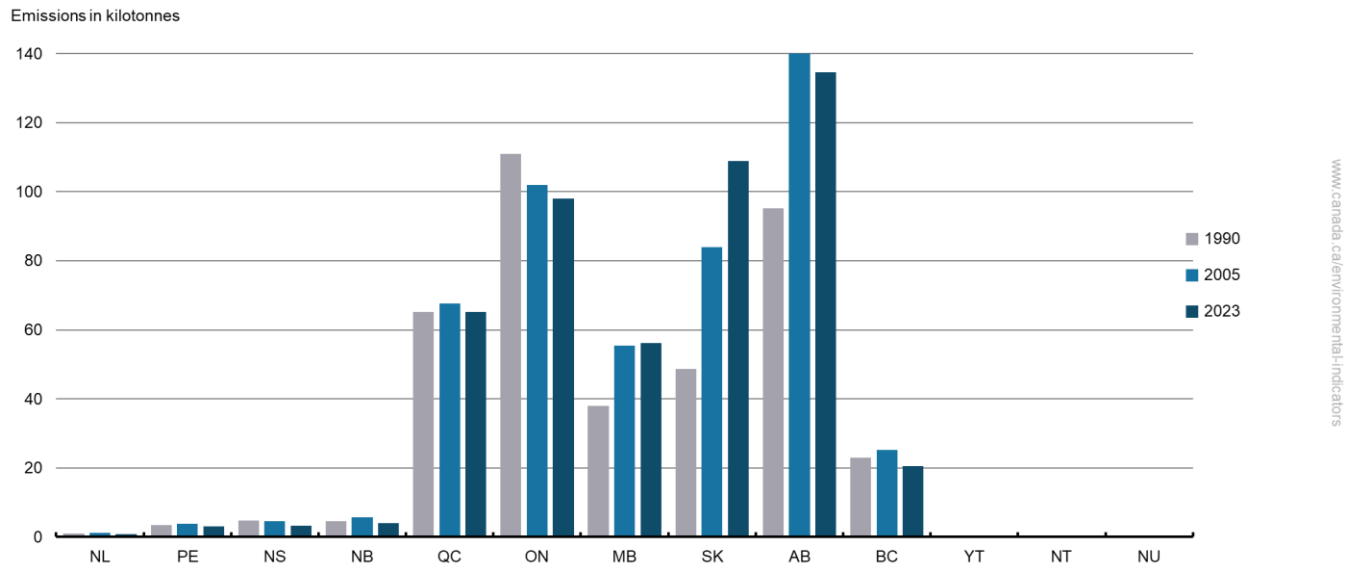
NH₃ emissions from that source have since declined slowly. More recently, emissions from crop production have been steadily increasing since 2006.⁸

Ammonia emissions by province and territory

Key results

- In 2023, Alberta and Saskatchewan accounted for almost half (243 kt) of national NH₃ emissions
- Between 1990 and 2023,
 - Ontario experienced the largest emissions reduction with 13 kt (12%)
 - The largest increase in NH₃ emissions was in Saskatchewan with emissions more than doubling (a 60 kt increase)
 - Alberta and Manitoba also increased in NH₃ emissions by 39 kt and 18 kt, respectively

Figure 14. Ammonia emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 14](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, Alberta emitted the most NH₃ of all the provinces and territories, accounting for 27% (135 kt) of total national emissions. Saskatchewan contributed the second-largest proportion of NH₃, representing 22% (109 kt).

Ontario followed with 20% (98 kt) of total national emissions. Livestock farms and the application of fertilizers were the most important sources of NH₃ emissions in Ontario.

Virtually almost all of the increase in national emissions between 1990 and 2023 took place in Saskatchewan, Alberta and Manitoba.

Ammonia emissions by facilities

The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.

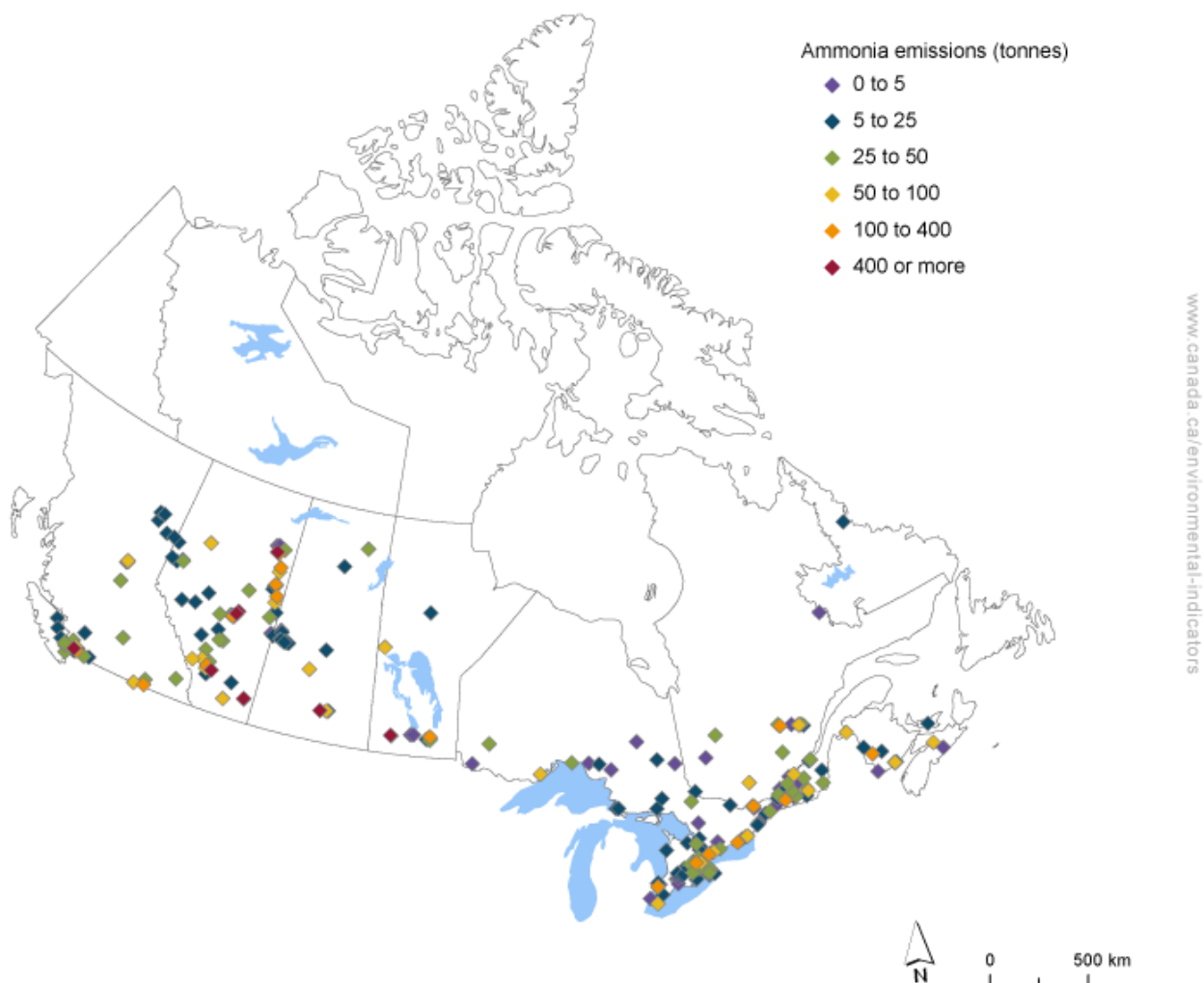
⁸ [Figure 2.6 in the Air Pollutant Emissions Inventory Report 2025](#) displays the 3 major contributors to national ammonia emissions; Animal Production, Crop Production and Other.

The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore NH₃ emissions from individual facilities.

Key results

- In 2023, 305 facilities across Canada reported NH₃ emissions representing 4% of total national emissions. Of these facilities:
 - 199 facilities reported emissions under 25 tonnes (t)
 - 98 facilities reported emissions between 25 to 400 t
 - 8 facilities reported emissions of 400 t or more located in Alberta (5), British Columbia (1), Manitoba (1) and Saskatchewan (1)

Figure 15. Ammonia emissions by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

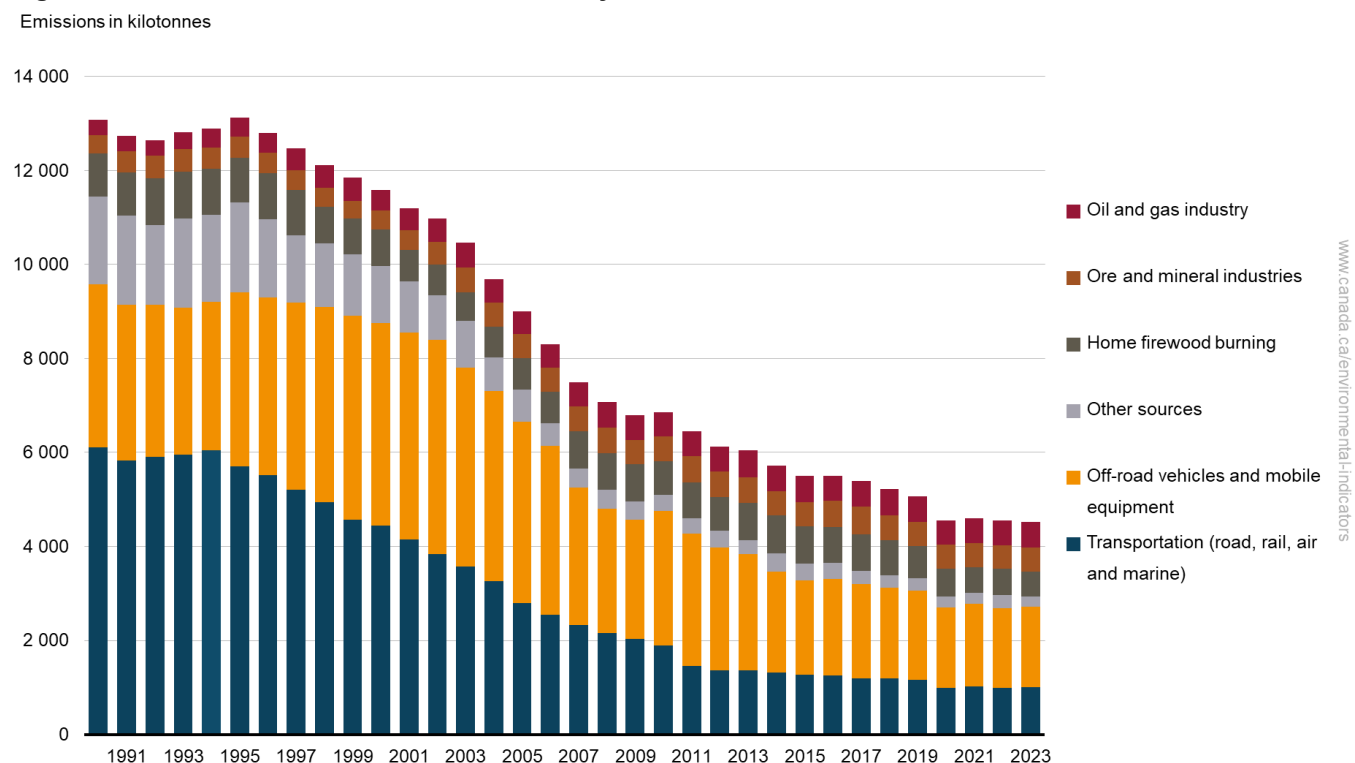
Carbon monoxide emissions by source

[Carbon monoxide](#) (CO) is a colourless, odourless, tasteless and poisonous gas. Once inhaled into the bloodstream, it can inhibit the blood's capacity to carry oxygen to organs and tissues, affecting human health.

Key results

- In 2023,
 - CO emissions in Canada were 4 518 kilotonnes (kt), a decrease of 65% from 1990 levels
 - Off-road vehicles and mobile equipment was the largest source of CO emissions in Canada, representing 38% (1 713 kt) of total emissions
 - Transportation (road, rail, air and marine) was the second largest source, representing 22% (1 001 kt) of CO emissions in Canada

Figure 16. Total carbon monoxide emissions by source, Canada, 1990 to 2023



[Data for Figure 16](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from dust and fires, electric utilities, building heating and energy generation, incineration and waste, agriculture (livestock, crop production and fertilizer), paints and solvents, manufacturing and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, [transportation, and off-road vehicles and mobile equipment](#) were the 2 most important sources of CO. These sources combined represented 60% (2 714 kt) of national emissions.

The largest reduction in emissions between 1990 and 2023 occurred in transportation (road, rail, air and marine) with an emission decrease of 5 104 kt (84%).

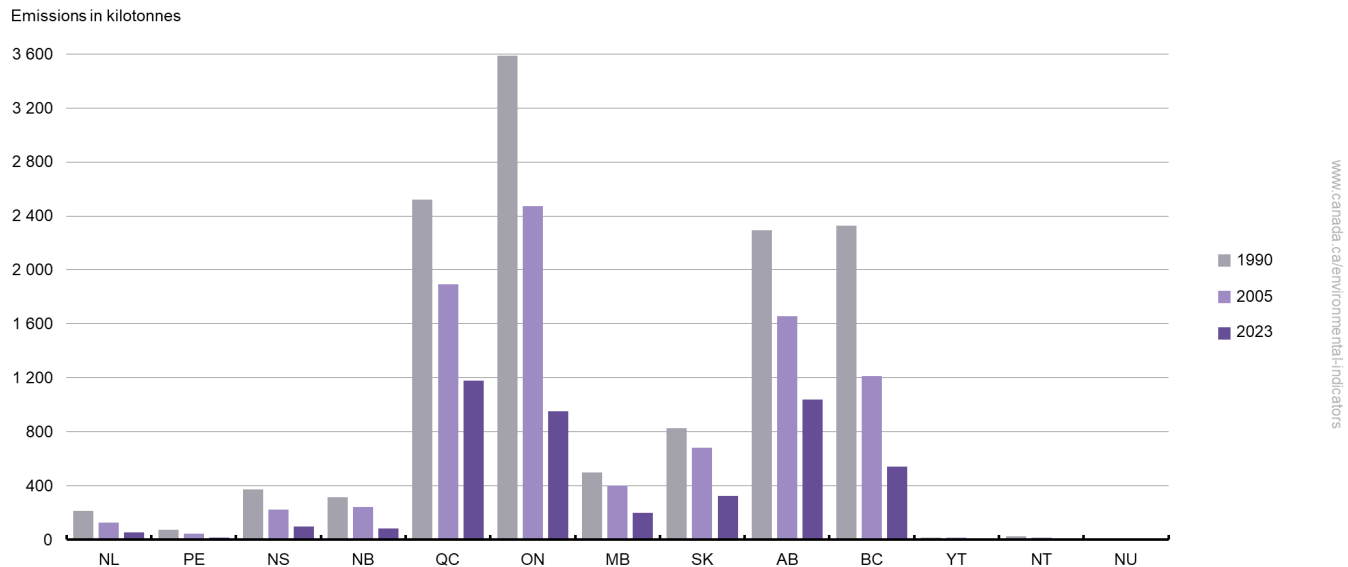
The decline in CO emissions between 1990 and 2023 was mainly due to increasingly stringent engine and vehicle regulations and the progressive introduction of cleaner and more efficient technology in vehicles (for example, catalytic converters).

Carbon monoxide emissions by province and territory

Key results

- In 2023, Quebec, Alberta and Ontario accounted for 70% (3 172 kt) of national CO emissions
- Between 1990 and 2023,
 - all provinces and territories experienced reductions in emissions
 - the largest reductions occurred in Ontario (2 637 kt or 73%), British Columbia (1 788 kt or 77%) and Quebec (1 339 kt or 53%)

Figure 17. Carbon monoxide emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 17](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, Quebec emitted the most CO of all the provinces and territories, representing 26% (1 180 kt) of the total national emissions. Ore and mineral industries was the largest contributor to CO emissions in Quebec, representing 32% (376 kt) of the province's total emissions. Within this sector, the aluminum industry accounted for 92% (346 kt) of the emissions.

The province of Alberta ranked second, with 23% (1 040 kt) of total national emissions in 2023, with 78% of those emissions from 2 sources; off-road vehicles and mobile equipment and the oil and gas industry.

Ontario, the third largest CO emitter, accounted for 21% (952 kt) of total national emissions. The off-road vehicles and mobile equipment sector accounted for 42% of the province's CO emissions.

The sharp decrease in emissions between 1990 and 2023 in all provinces and territories is mainly attributable to emission reductions from transportation (road, rail, air and marine), largely driven by improvements in fuel efficiency. Some of the largest reductions occurred between 2005 and 2023, notably for Ontario, with emissions decreasing by 1 519 kt (62%).

Carbon monoxide emissions by facilities

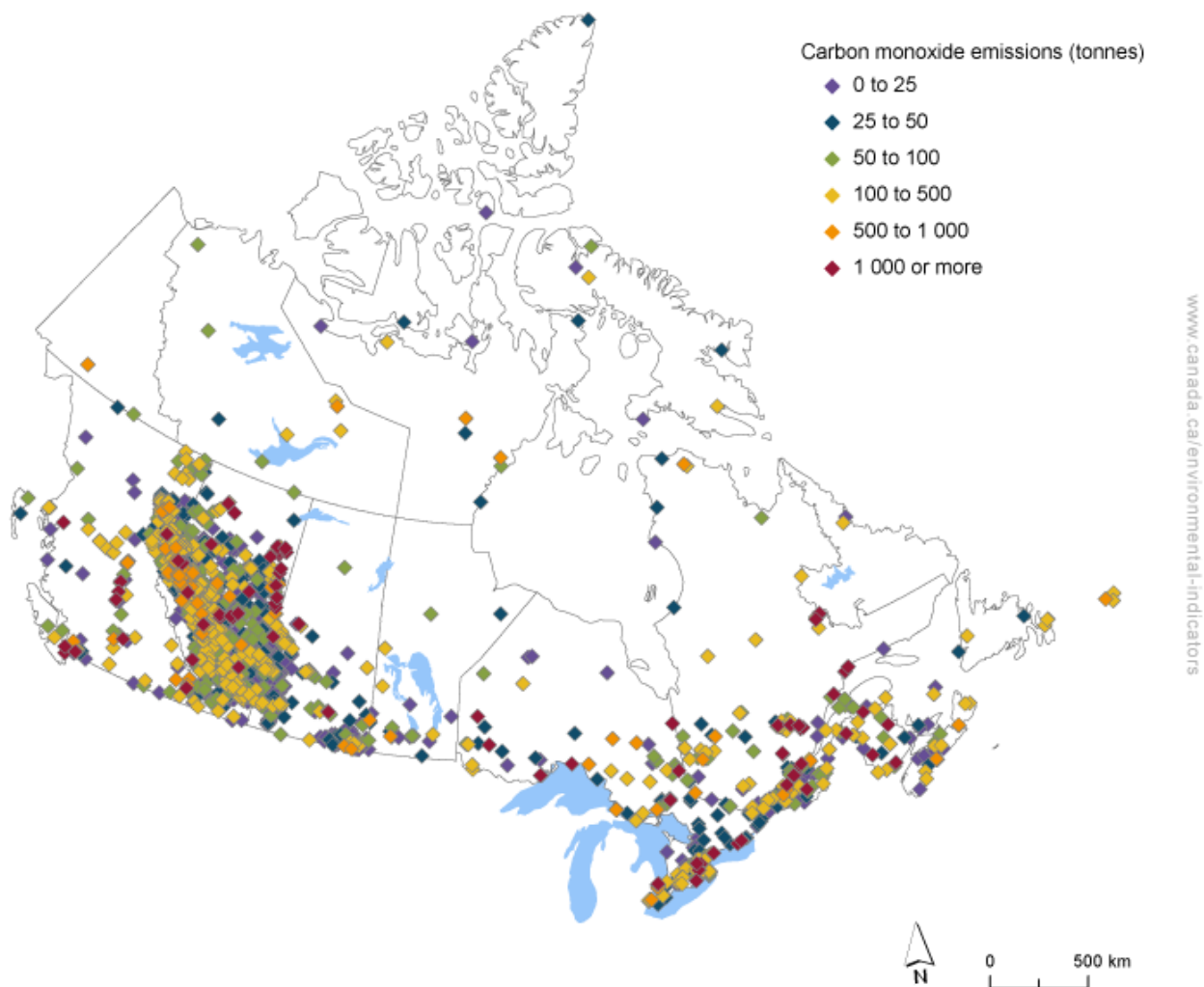
The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore CO emissions from individual facilities.

Key results

- In 2023, 3 732 facilities across Canada reported CO emissions representing 19% of total national emissions. Of these facilities:
 - 1 835 facilities reported emissions under 25 tonnes (t)
 - 1 812 facilities reported emissions between 25 to 1 000 t
 - 85 facilities reported emissions of 1 000 t or more located in Alberta (29), Ontario (18), Quebec (17), British Columbia (10), New Brunswick (6), Saskatchewan (4) and Newfoundland and Labrador (1)

Figure 18. Carbon monoxide emissions by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

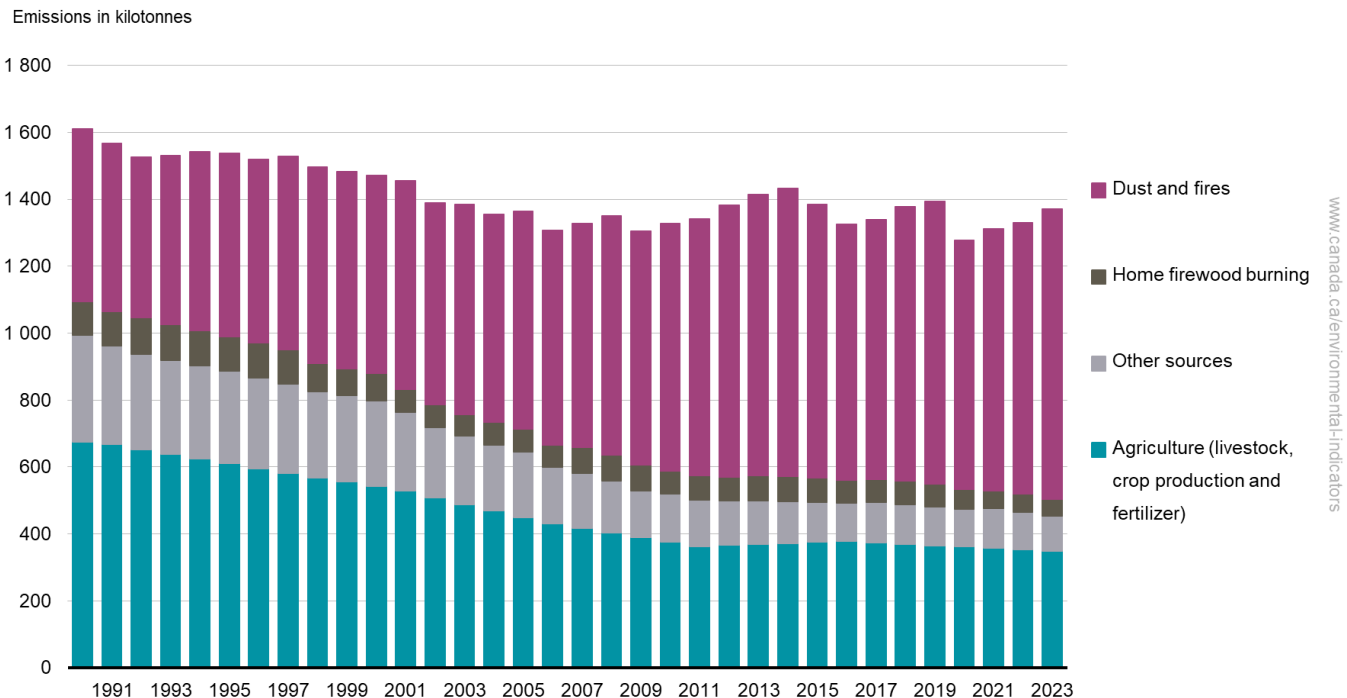
Fine particulate matter emissions by source

Particulate matter (PM) is directly emitted into the air in solid or liquid form. It is also formed in the air from precursor substances such as sulphur oxides, nitrogen oxides, volatile organic compounds and ammonia.⁹ Fine particulate matter (PM_{2.5}) refers to particulate matter with a size of less than 2.5 micrometres (also called microns). It is one of the major components of smog. When inhaled deeply into the lungs, even small amounts of PM_{2.5} can cause serious health problems. It can also damage vegetation and structures, contribute to haze and reduce visibility.

Key results

- In 2023, PM_{2.5} emissions were 1 370 kilotonnes (kt); this is 15% lower than in 1990
- Emissions from dust and fires (for example, road dust, dust from construction operations and prescribed burning¹⁰) accounted for the majority of PM_{2.5} emissions, reaching 63% (865 kt) of total national emissions in 2023
 - These emissions increased by 68% (352 kt) between 1990 and 2023, the majority of the increase coming from dust from construction operations, specifically non-residential construction, and unpaved roads

Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to 2023



[Data for Figure 19](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from ore and mineral industries, transportation (road, rail, air and marine), manufacturing, off-road vehicles and mobile equipment, the oil and gas industry, building heating and energy generation, electric utilities, incineration and wastes, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

⁹ PM formed in the air from chemical and physical reactions involving the precursor substances are not included in the indicator.

¹⁰ Prescribed burning is a technique used to help reduce the intensity or duration of wildfires and can also be used to control problematic insects.

In 2023, 89% of PM_{2.5} emissions came from open source emissions, such as dust and fires and agriculture (livestock¹¹, crop production and fertilizer). PM_{2.5} emissions does not include emissions from natural sources such as wildfires and vegetation. In general, these open source emissions are spread over large geographical areas, are highly dependent on weather conditions (for example, wind and rain) and are located outside of urban areas. As such, for most people in Canada, exposure to PM_{2.5} is not driven by emissions from open sources, but rather from direct emissions from other sources and from PM_{2.5} that forms when pollutants react in the atmosphere.

The remaining 11% of PM_{2.5} emissions in 2023 came from home firewood burning (51 kt or 4%) and other sources, including:

- ore and mineral industries, representing 2% (31 kt) of the emissions
- manufacturing and miscellaneous sources, such as emissions from commercial cooking, each representing about 1% (15 kt and 16 kt) of emissions
- off-road vehicles and mobile equipment, representing about 1% (16 kt)
- the oil and gas industry, representing about 1% (13 kt)
- transportation (road, rail, air and marine), representing less than 1% (7 kt)
- other emissions (less than 1%; 7 kt) coming from building heating and energy generation, electric utilities, incineration and waste, and the use of paints and solvents

Many of the sources above, despite representing a small proportion of national emissions, can have a disproportionate health impact on the population because they are generally concentrated in or near populated areas.

The decreases in PM_{2.5} emissions between 1990 and 2023 are mainly attributable to emission reductions from agriculture (crop production) (327 kt or 48%), manufacturing (99 kt or 87%) and home firewood burning (50 kt or 50%). These reductions outweigh the increase in emissions from dust and fires (352 kt or 68%), specifically road dust and dust from construction operations, over the period. The adoption of conservation practices in crop production and the use of new fireplace inserts, furnaces and stoves that burn more efficiently to control home firewood burning emissions were the main drivers leading to the reductions.

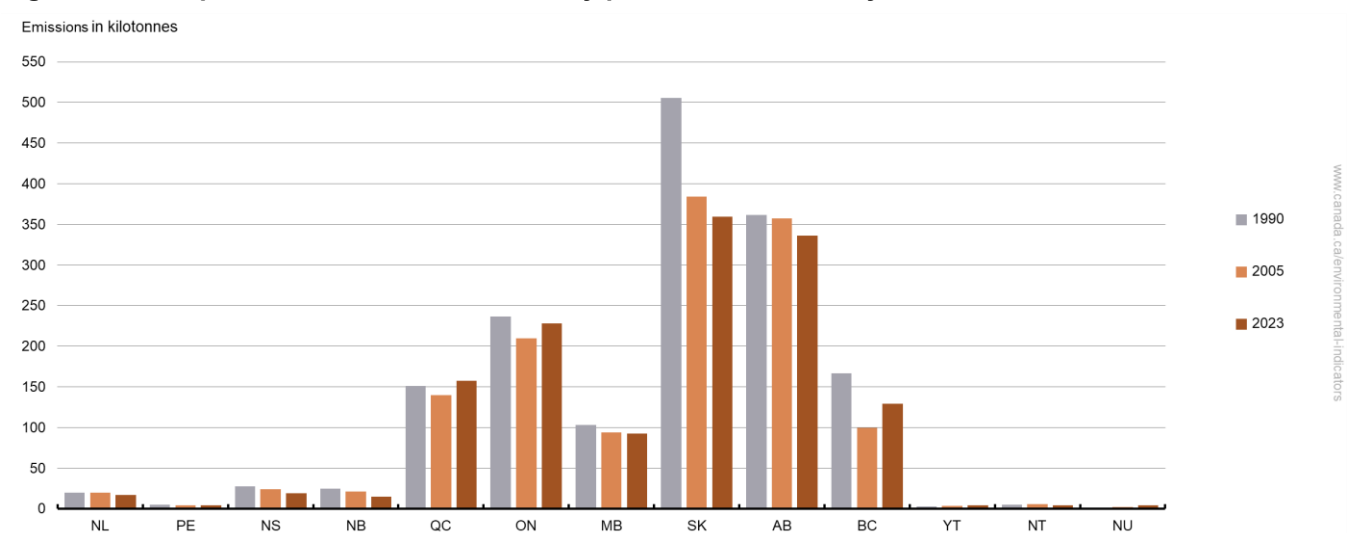
Fine particulate matter emissions by province and territory

Key results

- In 2023, Saskatchewan and Alberta emitted the most PM_{2.5}, representing 51% (695 kt) of total national emissions
- Between 1990 and 2023,
 - the largest decrease was observed in Saskatchewan with 147 kt (29%)
 - PM_{2.5} emissions increased by 6 kt (4%) in Quebec, 1 kt (50%) in Yukon and 4 kt (81%) in Northwest Territories and Nunavut

¹¹ PM_{2.5} emissions are produced as a result of the aerial transport of feed particles, feather fragments, fecal material, dander, etc. from ventilation systems in livestock buildings.

Figure 20. Fine particulate matter emissions by province and territory, Canada, 1990, 2005 and 2023



[Data for Figure 20](#)

Note: The indicator reports air pollutant emissions from human activities only, including open sources. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, Saskatchewan was the highest emitting province of PM_{2.5} emissions, accounting for 26% (359 kt) of total national emissions. Agriculture (specifically wind erosion) and dust and fires (specifically dust from unpaved roads) were the largest sources of PM_{2.5} emissions in the province.

Alberta ranked second in 2023, with 25% (336 kt) of total national PM_{2.5} emissions. Dust and fires (specifically dust from unpaved roads) were the largest sources, with agriculture (livestock, crop production and fertilizer) being the second-largest source of PM_{2.5}, specifically from wind erosion, tillage practices and harvesting.

Ontario ranked third, with 17% (228 kt), and Quebec ranked fourth with 11% (157 kt). For these 2 provinces, dust and fires were the largest source of emissions.

The exclusion of emissions from dust and fires and agriculture (livestock, crop production and fertilizer) provide a different breakdown of PM_{2.5} emissions in each province and territory. With these emissions removed, Quebec becomes the largest emitting province of PM_{2.5} in 2023, representing 31% (48 kt) of total emissions (156 kt); home firewood burning being the largest emitting source. Ontario ranks second with 24% (38 kt) of emissions, with home firewood burning and ore and mineral industries equally being the largest sources of emissions. Alberta and British Columbia rank third and fourth, representing 15% (24 kt) (the largest source being from the oil and gas industry) and 12% (19 kt) (the largest source being from the ore and mineral industries) of emissions. Between 1990 and 2023, with dust, fires and agriculture excluded, all of the provinces and territories experienced emissions reductions between 80% (British Columbia, with a 75 kt emission reduction; the primary source of emissions being from manufacturing) and 41% (Northwest Territories and Nunavut, with a 0.6 kt emission reduction; with off-road vehicles and mobile equipment being the largest sources of emissions).

Fine particulate matter emissions by facilities

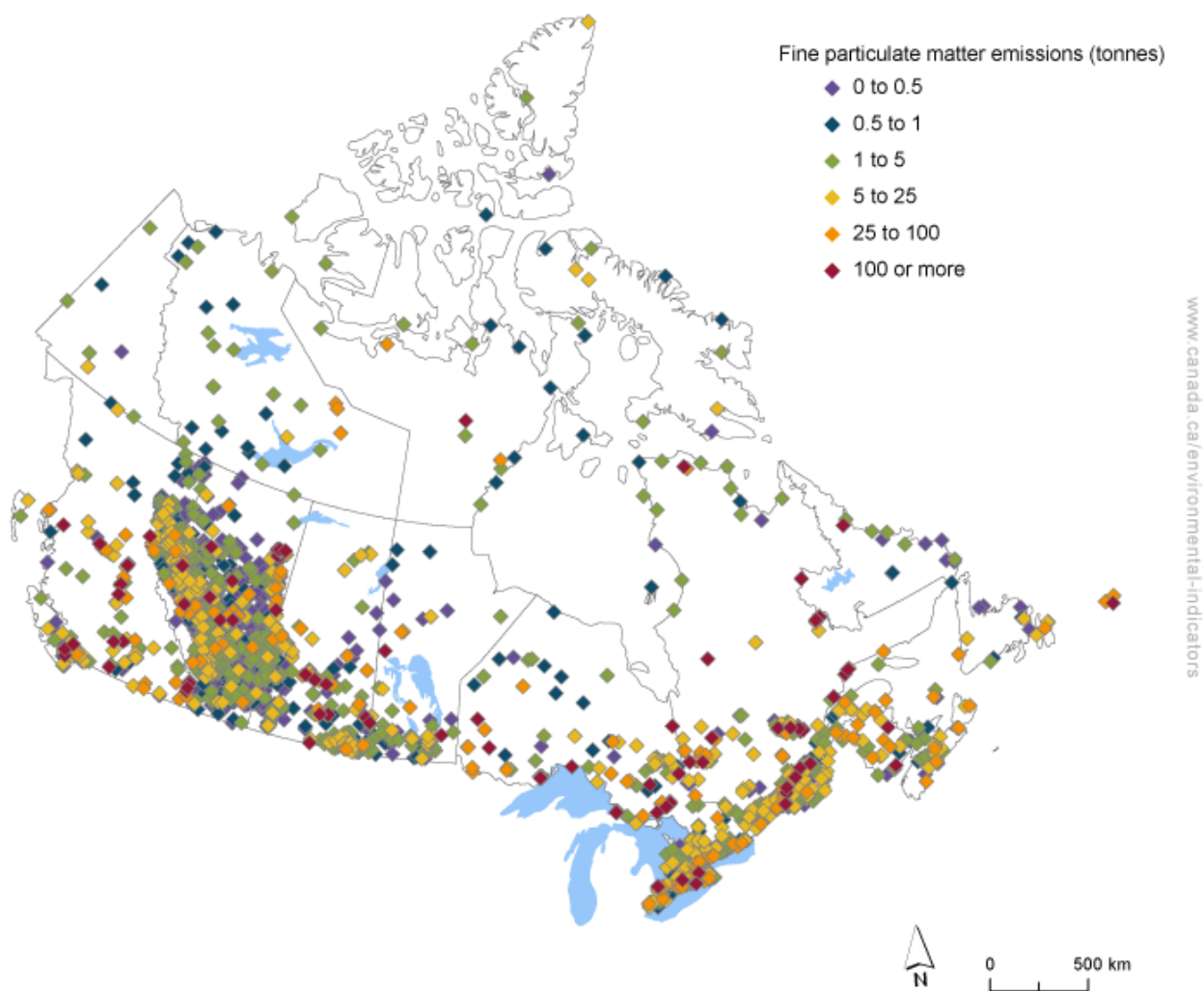
The National Pollutant Release Inventory provides detailed information on air pollutant emissions from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an [interactive map](#). The map allows you to explore PM_{2.5} emissions from individual facilities.

Key results

- In 2023, 4 921 facilities across Canada reported PM_{2.5} emissions representing 4% of total national emissions. Of these facilities:
 - 2 737 facilities reported emissions under 1 tonne (t)
 - 2 091 facilities reported emissions between 1 to 100 t
 - 93 facilities reported emissions of 100 t or more located in Quebec (22), British Columbia (18), Ontario (18), Alberta (16), Saskatchewan (9), Newfoundland and Labrador (5), New Brunswick (2), Manitoba (2), and Nunavut (1)

Figure 21. Fine particulate matter by reporting facilities, Canada, 2023



Source: Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#).

Navigate data using the [interactive map](#)

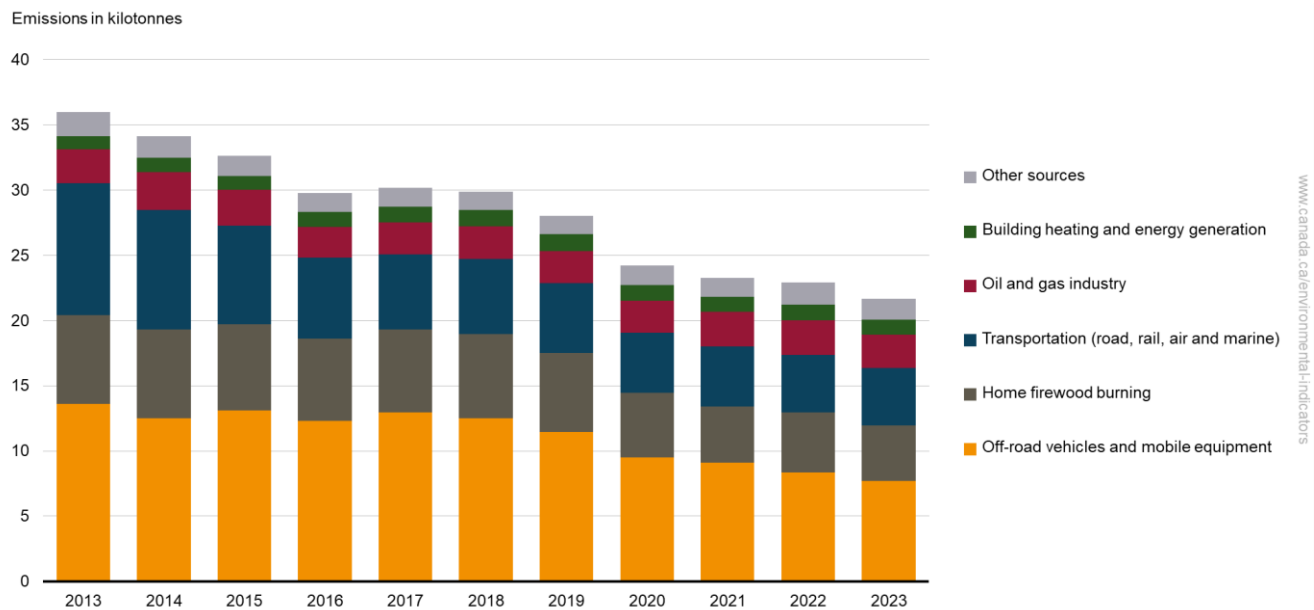
Black carbon emissions by source

Black carbon is a component of PM_{2.5} and is generated by the incomplete combustion of fossil fuels and biomass. It is a short-lived climate pollutant, contributing to climate warming and linked to adverse human health effects. Reductions in black carbon emissions have near-term climate and health and environmental benefits such as improving air quality, slowing climate warming, reducing snow and ice melts, increasing crop yields and reducing negative impacts to ecosystem health and human health.

Key results

- Emissions of black carbon were 22 kt in 2023, a decrease of 40% from 2013
- In 2023, 3 sectors accounted for 76% of national black carbon emissions:
 - off-road vehicles and mobile equipment
 - home firewood burning
 - transportation (road, rail, air and marine)

Figure 22. Total black carbon emissions by source, Canada, 2013 to 2023



[Data for Figure 22](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires. The chart includes emissions from the most significant sources of black carbon. “Other sources” includes emissions from ore and mineral industries, incineration and waste, manufacturing, electric utilities and agriculture. Consult [Table 1](#) in the Data sources and methods for more details. The [interactive figures](#) provide a dynamic and customizable format to explore the emissions.

Source: Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory](#).

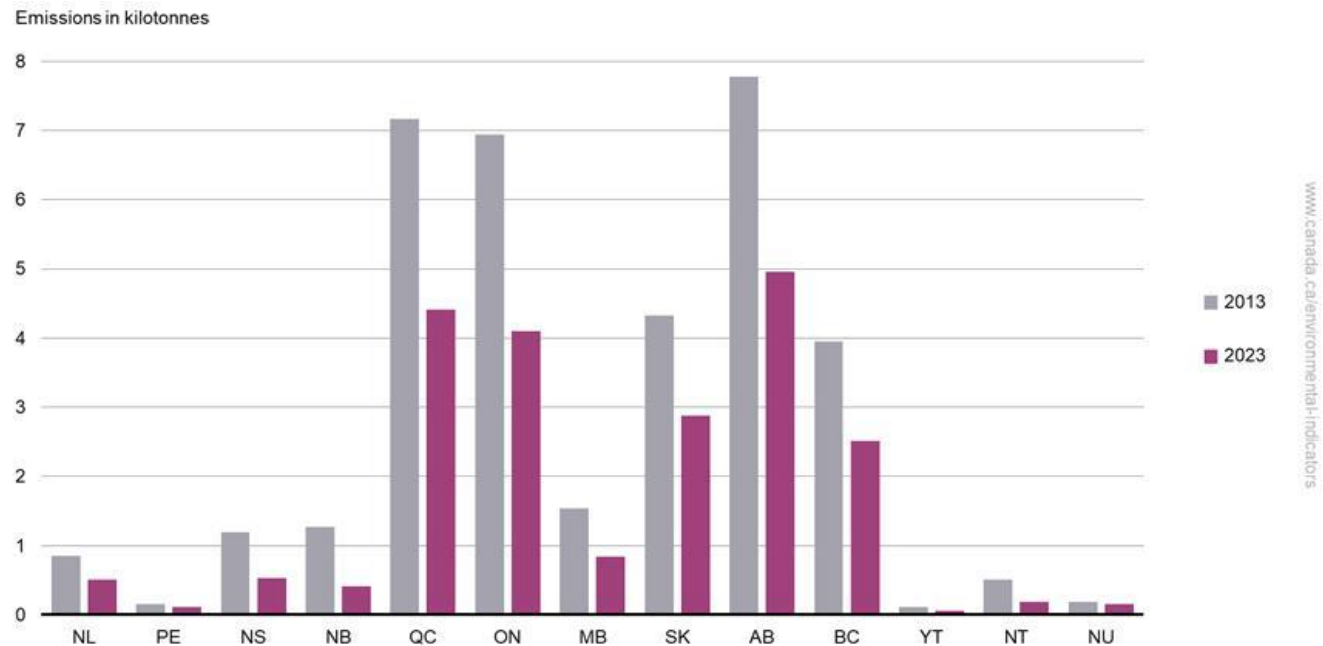
In 2023, off-road vehicles and mobile equipment (for example, lawn and garden equipment, recreational vehicles, excavators, graders) accounted for the largest proportion of total national emissions, representing 35% (8 kt) of emissions. Home firewood burning and transportation (road, rail, air and marine) were also large contributors, each representing 20% (4 kt) of total national emissions. The remaining emissions came from the oil and gas industry, building heating and energy generation and other sources (such as the ore and mineral industries).

Black carbon emissions by province and territory

Key results

- In 2023, 3 provinces, Alberta, Quebec and Ontario, accounted for 62% (13 kt) of total national black carbon emissions
- Between 2013 and 2023:
 - all provinces and territories experienced reductions in black carbon emissions between 18% to 68%, with the main sources of national reductions coming from the off-road vehicles and mobile equipment (44%, 5 937 kt), transportation (road, rail, air and marine) (56%, 5 685 kt) and home firewood burning (37%, 2 549 kt) sectors
 - Alberta, Ontario and Quebec experienced the largest reductions in emissions with decreases of 2.8 kt each. For these 3 provinces, the reductions were mainly attributable to lower emissions from transportation (road, rail, air and marine) and off-road vehicles and mobile equipment

Figure 23. Black carbon emissions by province and territory, Canada, 2013 and 2023



[Data for Figure 23](#)

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires.

Source: Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory](#).

Alberta, Ontario and Quebec had the highest black carbon emissions in 2023:

- Emissions in Alberta primarily came from 3 sources: off-road vehicles and mobile equipment (2 kt, 41%), the oil and gas industry (1.7 kt, 34%) and transportation (road, rail, air and marine) (0.8 kt, 16%), representing 91% (4.5 kt) of the emissions
- Ontario's emissions also came primarily from off-road vehicles and mobile equipment (1.4 kt, 34%), and transportation (road, rail, air and marine) (1.0 kt, 24%) as well as home firewood burning (0.9 kt, 21%), representing 78% (3.2 kt) of emissions in the province
- In Quebec, emissions came primarily from home firewood burning (53%, 2.3 kt), as well as from off-road vehicles and mobile equipment (23%, 1 kt), representing 76% (3.3 kt) of emissions

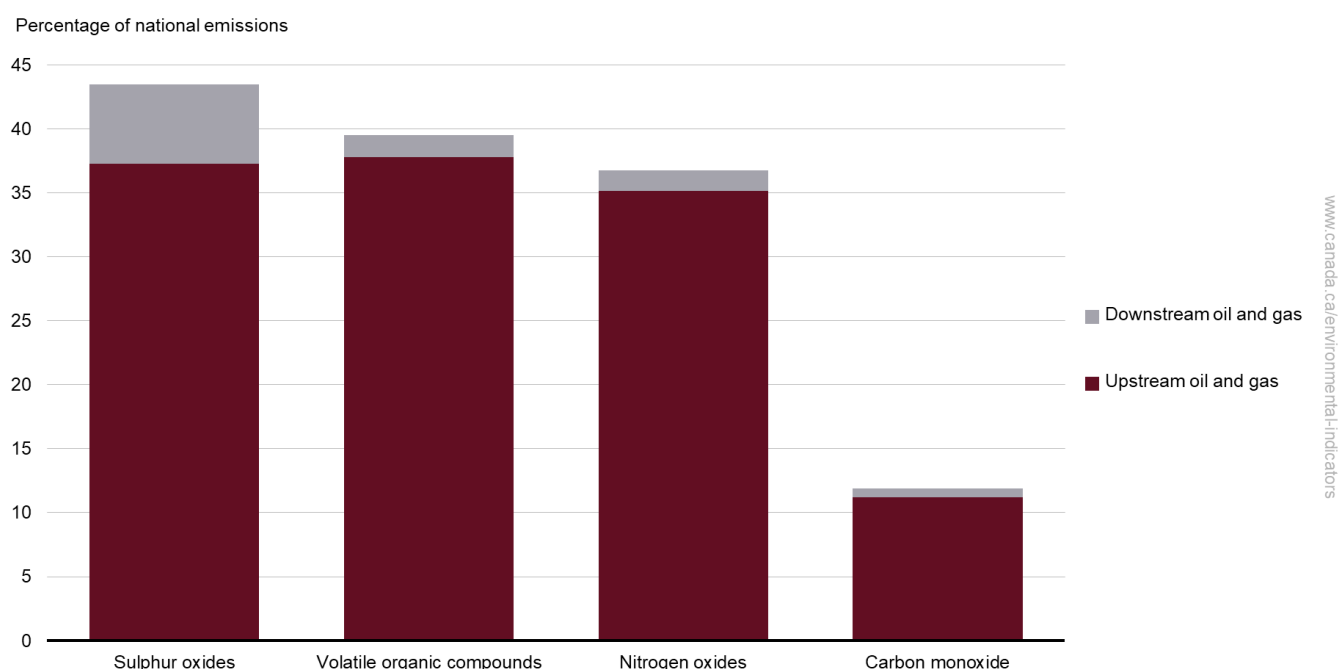
Air pollutant emissions from the oil and gas industry

The oil and gas sector is an important contributor to air pollutant emissions. Most emissions from the oil and gas sector come from upstream activities (i.e., exploration, drilling, production and field processing) and to a lesser extent from downstream activities (i.e., refining, storage and distribution). Air pollutants emitted by this sector contribute to the formation of fine particulate matter (PM_{2.5}), ozone (O₃), smog and acid rain. They also adversely affect human health, the environment and the economy.¹²

Key results

- In 2023, the oil and gas industry was a major contributor to total national emissions of [sulphur oxides](#) (SO_x) (43%), [volatile organic compounds](#) (VOCs) (40%), [nitrogen oxides](#) (NO_x) (37%) and [carbon monoxide](#) (CO) (12%)
- The oil and gas industry is also a source of emissions of [fine particulate matter](#) (PM_{2.5}) and [ammonia](#) (NH₃). However, in 2023, it made up only 1% of the respective total emissions of these pollutants

Figure 24. Contribution of the oil and gas industry to total air pollutant emissions by activity type, Canada, 2023



[Data for Figure 24](#)

Note: Fine particulate matter and ammonia are not shown in the chart due to their low share ($\leq 1\%$) of total emissions in 2023. In the oil and gas industry, upstream activities include exploration, drilling, production and field processing and downstream activities include refining, storage and distribution.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, the oil and gas industry sector was the largest contributor to the total national emissions of SO_x, VOCs and NO_x. It was also the third-largest contributor to emissions of CO.

Most emissions from the oil and gas industry came from upstream activities compared to downstream activities. In 2023, 98% of NH₃, 96% of VOC and NO_x, 94% of CO, 88% of PM_{2.5} and 86% of SO_x emissions from the oil and gas sector were from upstream activities.

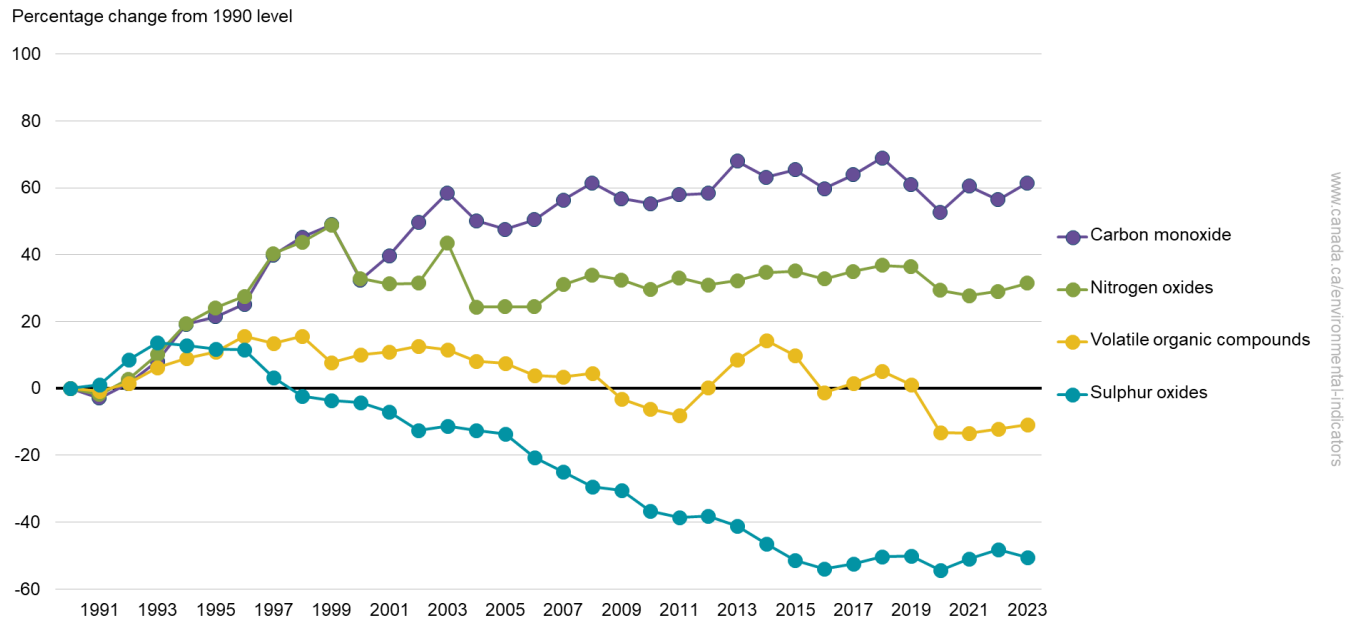
¹² Air pollutant emissions can have both direct and indirect impacts on the economy, including increased healthcare costs from pollution-related illnesses, agricultural losses from reduced crop yields impacting farmers, and higher infrastructure maintenance expenses caused by accelerated weathering of materials and structural damages.

Changes in emissions from the oil and gas industry

Key results

- Emissions of SO_x and VOC emissions decreased 51% and 11%, respectively, between 1990 and 2023
- CO and NO_x increased by 61% and 31%, respectively, over that period

Figure 25. Changes in emissions of key air pollutants from the oil and gas industry, Canada, 1990 to 2023



[Data for Figure 25](#)

Note: Fine particulate matter and ammonia are not shown in the chart due to their low share ($\leq 1\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

The increases in CO and NO_x emissions between 1990 and 2023 were due to growth in oil and gas production (the upstream sector of the industry), as emissions from the downstream sector declined due to facility closures during that period.¹³ This increase is in part explained by the fact that crude oil production in Canada more than doubled since 1990. The growth was mostly driven by a rapid increase in oil sands production, particularly by in-situ oil sands extraction. During the same period, production of natural gas from unconventional sources, such as those requiring the use of multi-stage fracturing techniques, also increased significantly.

The decrease in SO_x emissions was mostly the result of a decrease in emissions from oil sands mining, extraction and upgrading, and natural gas production and processing, attributed to better emission control technologies.

For VOCs, the recent decline was partly due to reductions in light/medium crude oil production and petroleum refining, storage and distribution. The decrease in VOC emissions is also driven by reduced venting emissions from crude oil production since 2014 (over this period, operators took measures to conserve gas under provincial directives, even prior to the implementation of federal and provincial regulations). In addition, federal and provincial regulations to reduce fugitive emissions from the sector came into effect in 2020, contributing further to the decline.

¹³ In the oil and gas industry, upstream activities include exploration, drilling, production and field processing and downstream activities include refining, storage and distribution.

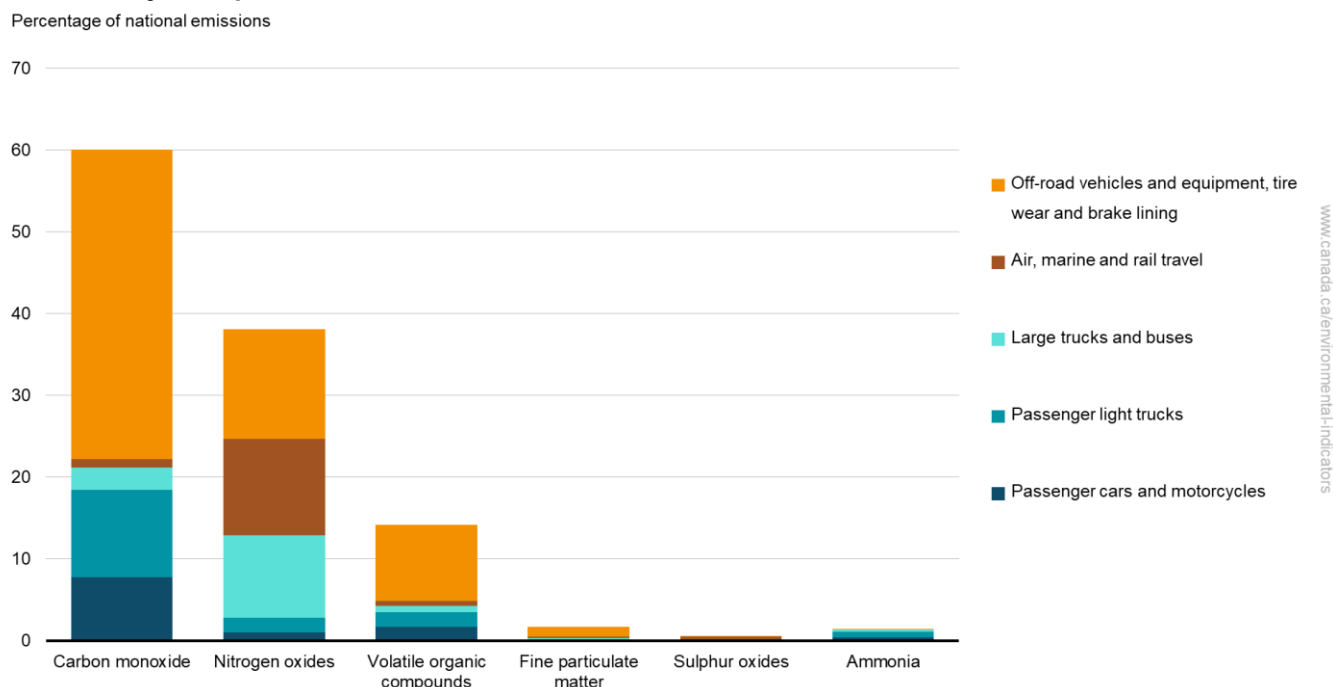
Air pollutant emissions from transportation, off-road vehicles and mobile equipment

Transportation, off-road vehicles and mobile equipment are among the largest sources of air pollutants in Canada. Burning fossil fuels to power vehicles and engines causes emissions of many air pollutants. These air pollutants lead to the formation of fine particulate matter, ozone, smog and acid rain. These pollutants and resulting impacts also adversely affect human health, the environment and the economy.

Key results

- In 2023, transportation, off-road vehicles and mobile equipment accounted for more than half (60%) of total national emissions of [carbon monoxide](#) (CO), 38% of [nitrogen oxides](#) (NO_x) and 14% of total emissions of [volatile organic compounds](#) (VOCs)
 - While also a source of emissions for [fine particulate matter](#) (PM_{2.5}), [ammonia](#) (NH₃) and [sulphur oxides](#) (SO_x), the sector represented less than 2% of those emissions in 2023

Figure 26. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada, 2023



[Data for Figure 26](#)

Note: "Passenger cars and motorcycles" include cars powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines as well as all types of motorcycles. "Passenger light trucks" include light-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines. "Large trucks and buses" include heavy-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

The contribution of each transportation mode to emissions of different air pollutants is in large part explained by the mix of fuels used in these modes.

[Large trucks and buses](#) and [rail and marine](#) travel rely predominantly on diesel fuel, which emits significantly more PM_{2.5} and NO_x than gasoline per kilometre traveled. Aviation relies on turbo aviation fuel. These transportation modes are the largest sources of NO_x transportation-related emissions accounting for 22% (268 kilotonnes [kt]) of total NO_x emissions.

[Passenger cars and light trucks](#) mostly use gasoline and are an important source of multiple pollutants, especially in urban centres. In 2023, emissions from passenger cars, motorcycles and light trucks amounted to 834 kt of CO,

34 kt of NO_x and 48 kt of VOCs. These emissions represented 18%, 3% and 4% of the national total emissions of these pollutants, respectively.

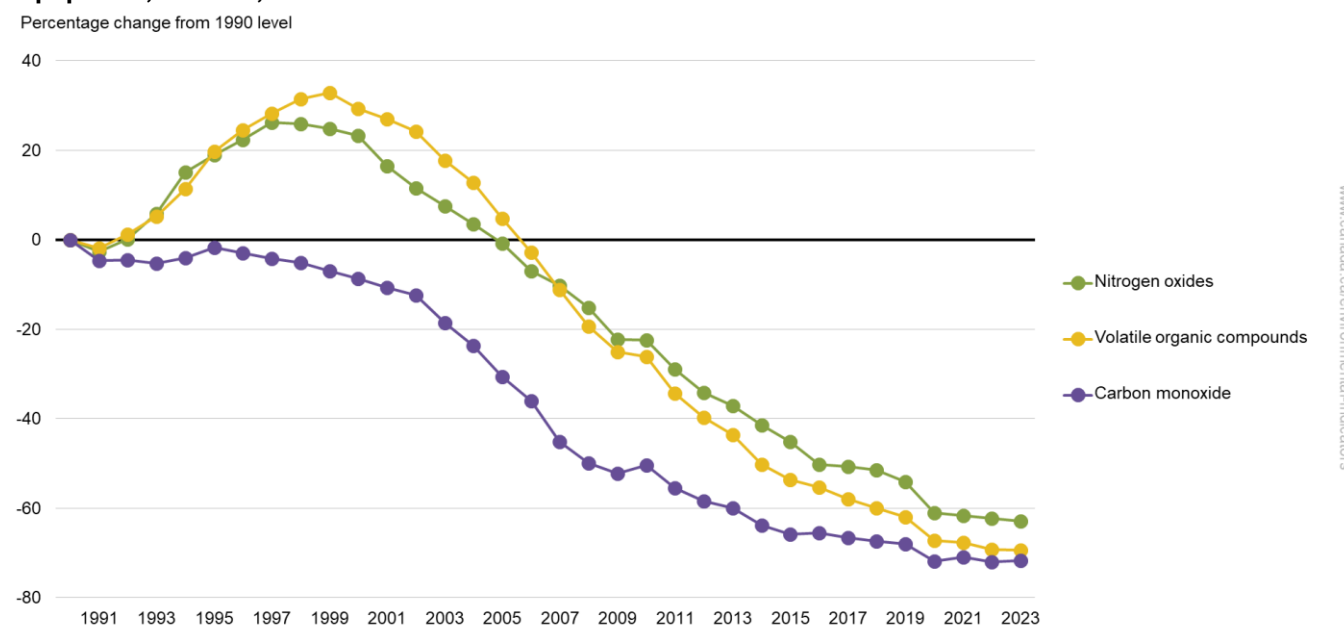
Off-road vehicles and equipment¹⁴ are also a significant source of pollution. Their combined emissions make up 38%, 13% and 9% of the total emissions of CO, NO_x and VOCs, respectively. Emissions mostly come from household use of gasoline- or diesel-powered recreational and lawn and garden equipment, and from the operation of agricultural, construction and mining equipment. In 2023, commercial equipment use produced higher emissions of NO_x, PM_{2.5}, SO_x, and NH₃ compared to recreational and lawn and garden equipment use. However, emissions of CO and VOCs were greater from recreational and lawn and garden equipment use than from commercial use of equipment.

Changes in emissions from transportation, off-road vehicles and mobile equipment

Key results

- Between 1990 and 2023, total emissions of NO_x, VOCs and CO from transportation, off-road vehicles and mobile equipment decreased by 63%, 69% and 72%, respectively
- Since 2000, all 3 pollutants demonstrated the same downward trend in their emissions level

Figure 27. Changes in emissions of key air pollutants from transportation, off-road vehicles and mobile equipment, Canada, 1990 to 2023



[Data for Figure 27](#)

Note: Fine particulate matter, sulphur oxides and ammonia are not shown in the chart due to their low share ($\leq 5\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Pollutant emissions have decreased despite economic and population growth as well as growth in transport activities for the period between 1990 and 2023. This decrease is mainly attributable to the adoption of new regulations that lead to the gradual introduction of emission control technologies and clean fuel for vehicles.

¹⁴ Off-road vehicles and mobile equipment include airport ground support equipment, commercial equipment (such as [forklifts and ice resurfacers](#)), [farming](#), [construction](#), [forestry and mining equipment](#), industrial equipment, lawn and garden equipment, railway maintenance equipment, and [recreational equipment and recreational marine equipment](#).

Between 1990 and 2000, NO_x emissions increased by 23%. It includes the increase in emissions from light trucks (116%), large trucks and buses (19%) and marine and air transportation (17% and 19%), which can be linked to economic and population growth during that time. From 2000 to 2023, new regulations contributed to a decrease in NO_x emissions (33%, 71 kt) from light trucks (91%), large trucks and buses (72%) and emissions from rail travel (52%).

Transportation emissions are influenced by a variety of factors. These include population and economic growth, volume of passenger and freight travel, vehicle type, emission control technologies, transportation infrastructure, fuel efficiency and fuel type.

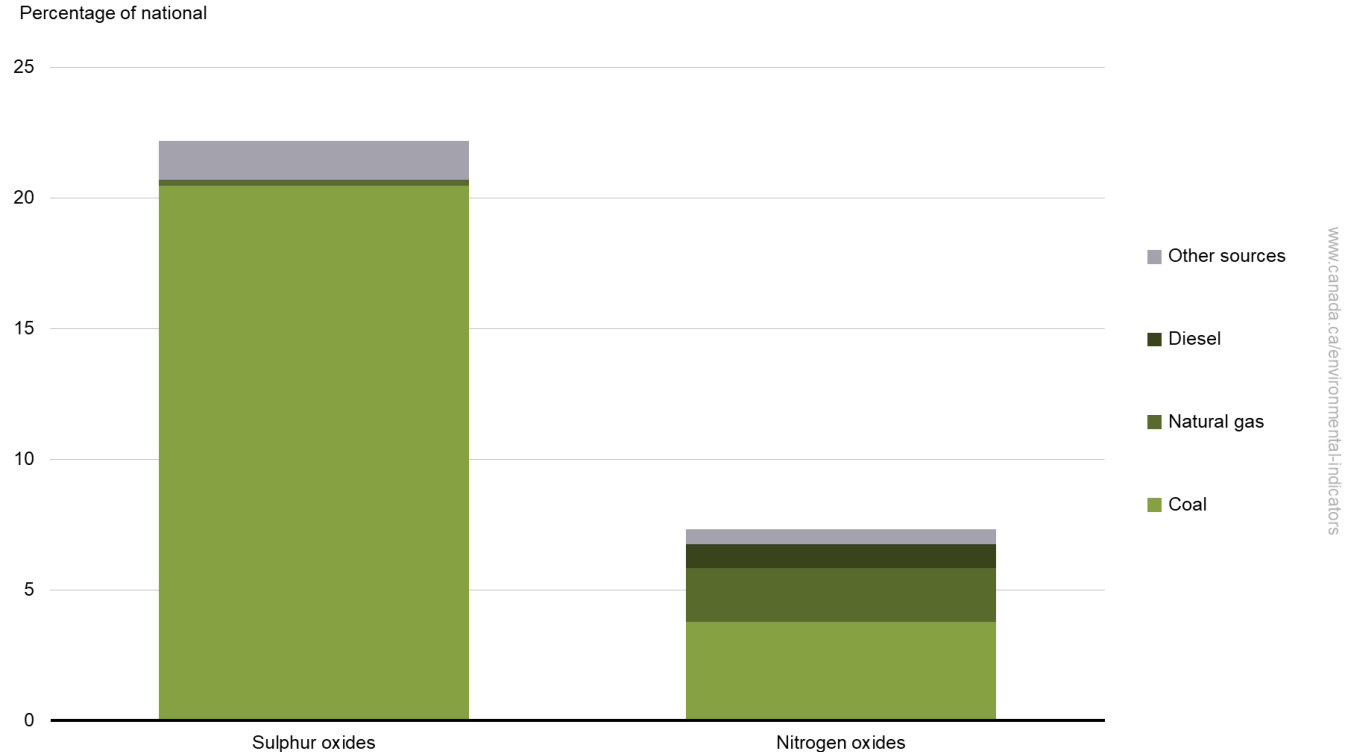
Air pollutant emissions from electric utilities

Electricity generation produces sulphur oxides (SO_x) and nitrogen oxides (NO_x). SO_x and NO_x are mostly emitted from power plants burning [fossil fuels](#) such as coal and, to a lesser extent, natural gas and diesel. These air pollutants contribute to the formation of fine particulate matter, ozone, smog and acid rain. They also adversely affect human health, the environment, and the economy.

Key results

- In 2023, electric utilities were the source of 22% and 7% of total national emissions of [sulphur oxides](#) (SO_x) and [nitrogen oxides](#) (NO_x), respectively
- Most of the air pollutant emissions from electric utilities come from burning coal
- Electric utilities are also a source of [carbon monoxide](#) (CO), [volatile organic compounds](#) (VOCs), [fine particulate matter](#) (PM_{2.5}) and [ammonia](#) (NH₃) emissions. However, they account for only 1% of the total national emissions of these pollutants

Figure 28. Contribution of electric utilities to total air pollutant emissions by fuel source, Canada, 2023



[Data for Figure 28](#)

Note: Carbon monoxide, fine particulate matter, volatile organic compounds and ammonia are not shown in the chart due to their low share ($\leq 1\%$) of total emissions in 2023. The indicator excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose. "Other sources" include fuel sources such as waste material and other uncategorized sources of electricity generation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

In 2023, 92% of SO_x and 51% of NO_x emissions from electric utilities came from burning coal.

While generating electricity by burning fossil fuels causes air pollutant emissions, the use of non-fossil energy sources, such as hydroelectric, nuclear and other renewable sources to generate electricity, does not emit air pollutants.

A large share of the electricity generated in Canada comes from sources that do not directly emit air pollutants:

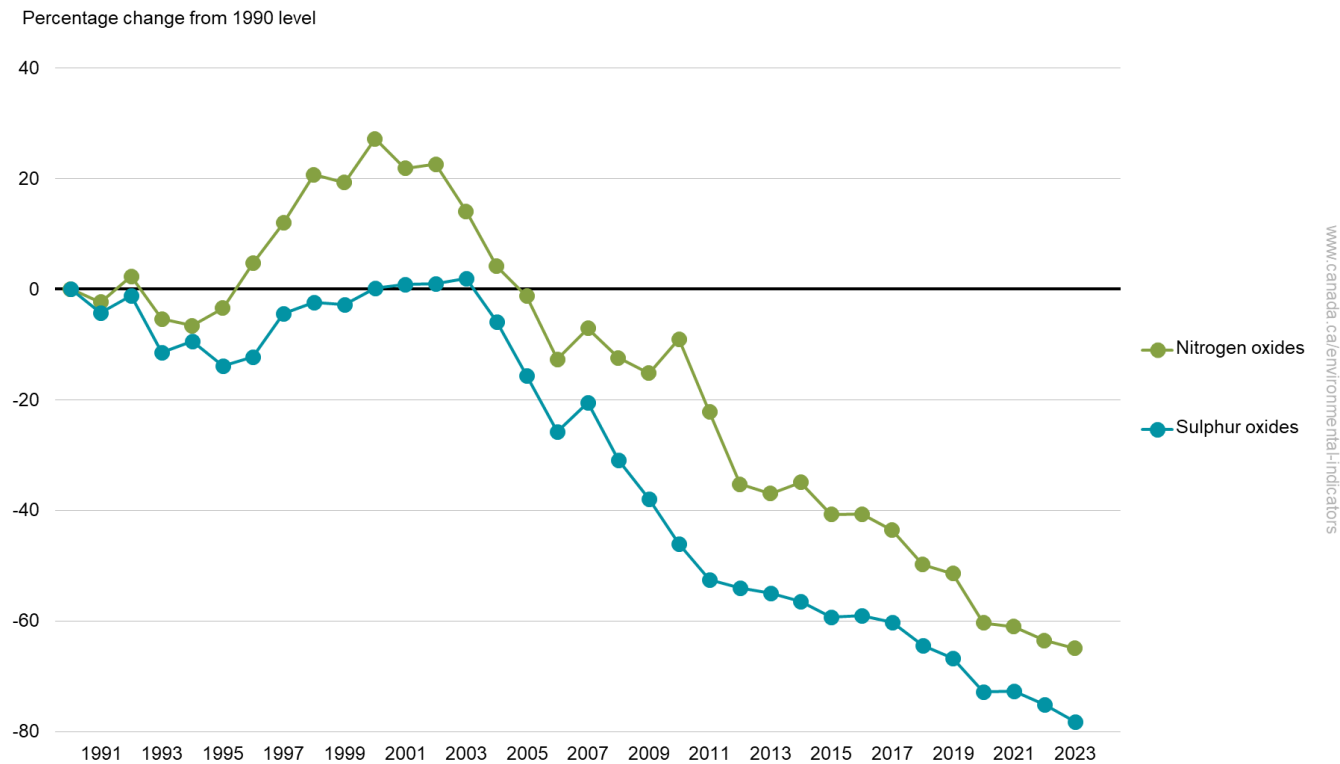
- 62% of electricity comes from hydroelectric power generation
- 13% comes from nuclear power plants
- 8% comes from non-hydroelectric renewable sources, such as wind, solar, tidal power and biomass¹⁵

Changes in emissions from electric utilities

Key results

- Emissions of SO_x and NO_x from electric utilities declined by 78% and 65%, respectively, between 1990 and 2023
- Most of the decrease in emissions occurred from 2005 onward

Figure 29. Changes in emissions of key air pollutants from electric utilities, Canada, 1990 to 2023



[Data for Figure 29](#)

Note: Carbon monoxide, fine particulate matter, volatile organic compounds and ammonia are not shown in the chart due to their low share ($\leq 1\%$) of total emissions in 2023. Excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

The majority of the decline in SO_x and NO_x emissions between 1990 and 2023 occurred from 2005 onwards. Between 2005 and 2023, the share of electricity that came from burning fossil fuels fell from 25% to 18%. This

¹⁵ Natural Resources Canada (2024) [About renewable energy in Canada](#). Retrieved on March 18, 2025.

decrease was mostly the result of a reduction in the use of coal power plants for electricity generation.¹⁶ The emissions reductions since 2005 are mainly due to:

- the change in the mix of energy sources used to generate electricity
- the introduction of regulations targeting air pollutants and greenhouse gases emitted from electricity generation facilities
- domestic and international agreements
- better pollutant removal technologies used in smokestacks
- power plant closures

About the indicators

What the indicators measure

Air pollutant emissions indicators track emissions from human activities of 6 key air pollutants: sulphur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), ammonia (NH₃), carbon monoxide (CO) and fine particulate matter (PM_{2.5}). Black carbon, which is a component of PM_{2.5}, produced by combustion, is also reported.¹⁷ Sectoral indicators on air pollutant emissions from the oil and gas industry, transportation, off-road vehicles and mobile equipment and electric utilities provide additional analysis on the largest sources of Canada's air pollutant emissions.

For each air pollutant, the indicators are provided at the national and provincial/territorial levels. They also identify the major sources of emissions and provide links to detailed information on air pollutant emissions from facilities.¹⁸

The graphs of emissions by province/territory, included in each pollutant's section (except black carbon), refer to the year 2005 to allow comparison with the amended Gothenburg Protocol reference year (reductions from 2005 levels to be achieved by 2020 and maintained thereafter). The Gothenburg Protocol is an international treaty that commits countries to reduce their emissions of air pollutants. This ultimately improve Canadian air quality by reducing the transboundary flow of pollution Canada receives from other countries that are parties to the Protocol. The year 1990 (2013 for black carbon) is also included in these graphs as it marks the first year these substances were reported by the Air Pollutant Emissions Inventory (Black Carbon Emissions Inventory), while 2023 represents the most recent year for which data is available.

Why these indicators are important

Canadians are exposed to air pollutants on a daily basis, which can cause adverse health and environmental effects. Fine particulate matter (PM_{2.5}) and ground-level ozone (O₃) are key components of smog and have been associated with pulmonary and cardiovascular health issues even at very low levels. Nitrogen oxides, NO_x (such as nitrogen dioxide [NO₂]) and volatile organic compounds (VOCs) are the main contributors to the formation of O₃, and also have negative health effects on their own. Nitrogen oxides, SO_x (such as sulphur dioxide [SO₂]), NH₃ and VOCs also lead to the formation of particulate matter (PM_{2.5}) in the air, in addition to the PM_{2.5} that is emitted directly. Sulphur oxides and NO_x can also lead to the formation of acid deposition (e.g. acid rain) that can harm the environment, materials, living organisms, and humans.

The *Canadian Environmental Protection Act* (1999) contains more information on the federal regulations related to addressing air pollution. Additionally, [Chapter 1](#) of Canada's Air Pollutant Emissions Inventory Report outlines relevant regulations.

Black carbon is an air pollutant as well as a powerful climate forcer. Black carbon is of particular significance in polar regions, where the deposition of particles on ice and snow darkens the surface, increasing the absorption of

¹⁶ Statistics Canada (2025) [Table 25-10-0020-01 Electric power, annual generation by class of producer](#). Retrieved on March 18, 2025.

¹⁷ Black carbon, a soot-like substance, is emitted from combustion processes as a component of PM_{2.5}, along with other components, such as organic carbon and inorganic compounds like sulphates. Fine particulate matter emissions from non-combustion sources, such as dust raised by traffic on paved and unpaved roads or by wind and machinery on open fields or mine sites, are not considered sources of black carbon. Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory](#). Retrieved on March 18, 2025.

¹⁸ Only facilities that had air pollutant emissions over a certain reporting threshold were included in the National Pollutant Releases Inventory (NPRI) reported data.

sunlight, and accelerating melting. Climate modelling shows that reducing emissions of black carbon is one of the most powerful actions available to countries to slow the pace of near-term warming in the Arctic¹⁹, a region that is already warming at a rate 3 times the global average.

The Air pollutant emissions indicators are intended to help track Canada's progress in reducing air pollutant emissions from human-related sources and how effective these emission reduction measures are at improving ambient air quality in Canada.

Related initiatives

The indicators are relevant to the [Sustainable Development Goals of the 2030 Agenda for Sustainable Development](#). They are linked to the 2030 Agenda's Goal 11: Sustainable Cities and Communities and Target 11.6: "By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management."

The indicators also help Canada report against its international compliance commitments under the Convention on Long-range Transboundary Air Pollution's amended [Gothenburg Protocol](#). Under the amended protocol, Canada has committed to emission reductions by 2020 and beyond for 4 air pollutants:

- sulphur dioxide (SO_x) (55% reduction from 2005 levels by 2020 and beyond)
- nitrogen oxides (NO_x) (35% reduction from 2005 levels by 2020 and beyond)
- volatile organic compounds (VOCs) (20% reduction from 2005 levels by 2020 and beyond)
- fine particulate matter (PM_{2.5}) (25% reduction from 2005 levels by 2020 and beyond)

Canada has been able to meet and maintain its emissions reduction commitments. In 2023, emissions were:

- 71% below 2005 levels for SO_x
- 46% below 2005 levels for NO_x
- 39% below 2005 levels for VOCs
- 41% below 2005 levels for PM_{2.5} (the commitment excludes open source emissions from road dust, construction operations, and crop production)

The indicators also demonstrate Canada's contribution to the Arctic Council's collective goal for black carbon emissions. Canada and other Arctic States agreed to collectively reduce emissions of black carbon by 25% to 33% of 2013 levels by 2025. Canada is on track to exceed its share of the goal, having reduced emissions by 40% below 2013 levels in 2023.

Related indicators

The [Air health trends](#) indicator provides an overview of the public health impacts attributable to outdoor air pollution in Canada.

The [Air quality](#) indicators track ambient concentrations of fine particulate matter (PM_{2.5}), ozone (O₃), sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and volatile organic compounds (VOCs) at the national and regional levels and at local monitoring stations.

The [Emissions of harmful substances to air](#) indicators track human-related emissions to air of 3 toxic substances, namely mercury, lead and cadmium, and their compounds. For each substance, data are provided at the national, provincial/territorial and facility level and by source. Global emissions to air are also provided for mercury.

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 [Greenhouse gas emissions from large facilities](#) indicator reports GHG emissions from the largest GHG emitters in Canada (industrial and other types of facilities).

¹⁹ von Salzen, K., Whaley, C.H., Anenberg, S.C. et al. [Clean air policies are key for successfully mitigating Arctic warming](#). Nature Commun Earth Environ 3, 222 (2022). Retrieved on March 18, 2025.

The [International comparison: air pollutant emissions in selected countries](#) indicators compare Canada's emissions of 5 key air pollutants with those of top emitting member countries of the Organisation for Economic Co-operation and Development (OECD).

The [Population exposure to outdoor air pollutants](#) indicator tracks the proportion of the Canadian population living in areas where outdoor concentrations of air pollutants are less than or equal to the 2020 Canadian Ambient Air Quality Standards.

Data sources and methods

Data sources

The Air pollutant emissions indicators track emissions of 6 key air pollutants: sulphur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), ammonia (NH₃), carbon monoxide (CO) and fine particulate matter (PM_{2.5}). The emissions data used are from [Canada's Air Pollutant Emissions Inventory](#) for the years 1990 to 2023.

Data for the black carbon indicator come from Canada's [Black Carbon Emissions Inventory](#) and are reported for the years 2013 to 2023 by source at the national level and by province and territory.

Data on reported air pollutant emissions by facility, shown in [interactive maps](#), come from the [National Pollutant Release Inventory](#) and are available for the years 1993 to 2023.

More information

The Air Pollutant Emissions Inventory and the Black Carbon Emissions Inventory provide data and estimates on releases of air pollutants from human activities. These pollutants contribute to smog, acid rain, reduced air quality and climate change. Improvements to data and the methods for trend analysis are made periodically as new emission estimation methodologies are adopted and additional information is made available. Historical emissions are updated on the basis of these improvements.

Air Pollutant Emissions Inventory

The Air Pollutant Emissions Inventory fulfills many of Canada's international pollution levels reporting obligations. Specifically, under the 1979 Convention on Long-range Transboundary Air Pollution, Canada has committed to submitting an annual inventory of emissions of key air pollutants to the United Nations Economic Commission for Europe. The inventory is a comprehensive assessment of 17 air pollutants,²⁰ combining emissions reported by facilities to the National Pollutant Release Inventory with emissions of all other sources estimated by Environment and Climate Change Canada. Estimates are developed using the latest estimation methods and are based on published statistics or other sources of information such as surveys and reports. The Air Pollutant Emission Inventory provides a comprehensive overview of pollutant emissions across Canada.

The national and provincial/territorial inventory data are current as of March 14, 2025 and cover the period from 1990 to 2023. Emissions data are compiled into a database for reporting approximately one year after data collection, validation and calculation have been completed. After this process is the interpretation of results and public reporting of the inventory. The Air pollutant emissions indicators are reported following the public release of the inventory data.

Black carbon emissions inventory

As a member of the Arctic Council, Canada committed under the [Framework for Action on Enhanced Black Carbon and Methane Emissions Reductions](#) (2015) to submit periodic inventories of its black carbon emissions to the Arctic Council Secretariat. Canada already voluntarily reports black carbon emissions to the United Nations Economic Commission for Europe as a Party to the Gothenburg Protocol, which was amended in 2012 to add fine particulate matter (including black carbon). The Black Carbon

²⁰ Includes the 6 key air pollutants (sulphur oxides, nitrogen oxides, volatile organic compounds, ammonia, carbon monoxide and fine particulate matter) along with cadmium, lead, mercury, dioxins and furans, 4 types of polycyclic aromatic hydrocarbons, hexachlorobenzene, coarse particulate matter and total particulate matter.

Emissions Inventory is compiled using PM_{2.5} emissions data from combustion-related sources from the Air Pollutant Emissions Inventory. Black carbon estimates are published separately from the Air Pollutant Emissions Inventory. The data are current as of March 14, 2025.

Black carbon is a short-lived climate pollutant (SLCP), meaning it contributes to warming but has a relatively short lifespan in the atmosphere (from a few days to a few weeks) compared to carbon dioxide (CO₂) (which can persist in the atmosphere for hundreds to thousands of years) and other longer-lived greenhouse gases (GHGs). Although their life spans are short, SLCPs are potent contributors to warming of the Earth's surface.²¹ When black carbon deposits on snow and ice, it darkens the surface, accelerating heating and melting, creating a warming impact that is particularly strong in the Arctic and other snow covered areas (including glaciers).²² Reducing emissions of SLCPs, including black carbon, can help slow near-term warming – the impacts of reductions are seen quickly because SLCPs have such short lifespans in the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) special report on Global Warming states that reductions in short-lived climate pollutants are required to limit warming to a maximum of 1.5°C, and [Canada's Changing Climate Report](#) flags short-lived climate pollutants as an important part of climate policy discussions because mitigation can slow global temperature warming and improve air quality.

National Pollutant Release Inventory

The National Pollutant Release Inventory is a database of pollutant releases (to air, water and land), disposals and transfers for recycling from industrial, commercial and institutional facilities. The data from these facilities is provided by the operators of the facilities as mandated by the *Canadian Environmental Protection Act* (the Act). Under the Act, owners or operators of facilities that manufacture, process or otherwise use or release one or more of the substances tracked by the inventory, and meet substance-specific reporting thresholds and other requirements, must report their pollutant releases, disposals and transfers annually to the department. The inventory data from 1993 to 2023 are current as of March 27, 2025.

Methods

Emissions data from Canada's national inventories are used to produce the indicators for the 6 key air pollutants. Data are grouped to report on the sources that contribute the majority of emissions for each pollutant. Canada's national inventories use the latest advancements in scientific knowledge to estimate or measure emissions for the various air pollutant sources.

More information

Compilation of air pollutant emissions

The Air Pollutant Emissions Inventory is developed using 2 types of information:

- facility-reported data, consisting of emissions from relatively large industrial, commercial and institutional facilities
- in-house estimates, including diffuse sources and other sources that are too numerous to be accounted for individually, such as road and non-road vehicles, agricultural activities, construction and solvent use

The Air Pollutant Emissions Inventory is developed using many sources of information, procedures and emission estimation models. Emissions data reported by individual facilities to the department's National Pollutant Release Inventory are supplemented with documented, science-based estimation tools to quantify total emissions. Together, these data sources provide a comprehensive overview of pollutant emissions across Canada.

²¹ Environment and Climate Change Canada (2019) [Short-lived climate pollutants](#). Retrieved on March 18, 2025.

²² Climate and Clean Air Coalition (2022) [Science: Black carbon](#). Retrieved on March 18, 2025.

A compilation framework has been developed that makes use of the best available data, while ensuring that there is no double-counting or omissions. Additional information on the inventory compilation process is provided in [Chapter 3](#) of the Air Pollutant Emissions Inventory Report.

Facility-reported emissions data

Facility-reported emissions data generally refers to any stationary sources that emit pollutants through stacks or other equipment at specific locations. The major source of facility-reported data is the [National Pollutant Release Inventory](#).

Facility-reported data from the National Pollutant Release Inventory are used in the Air Pollutant Emissions Inventory without modifications, except when data quality issues are detected and not addressed during the quality control exercise. The National Pollutant Release Inventory reporting requirements and thresholds vary by pollutant and, in some cases, by industry. Details on these reporting requirements and thresholds are available on the National Pollutant Release Inventory website.

A distinction has been made between reporting facilities and non-reporting facilities. Reporting facilities meet the threshold required to report to the National Pollutant Release Inventory; while non-reporting facilities do not meet these thresholds due to their size or emission levels, and therefore are not required to report to the inventory. Some facilities may be required to report emissions on only certain pollutants. Therefore, emissions from the non-reporting facilities or of non-reported pollutants must be estimated in-house to ensure complete coverage.

In-house emission estimates

In-house emission estimates are calculated with information such as production data and activity data, using various estimation methodologies and emission models. These emission estimates are at the national provincial and territorial levels, rather than at any specific geographic locations. These include emissions from non-industrial, residential, commercial, transportation, and other sources, such as open burning, agricultural activities and construction operations. The Air Pollutant Emissions Inventory uses in-house estimates for the following emission sources:

- any residential, governmental, institutional, or commercial operation that does not report to the National Pollutant Release Inventory
- on-site solid waste disposal facilities
- motor vehicles, aircraft, vessels or other transportation equipment or devices
- other sources, such as open burning, agricultural activities and construction operations

In general, in-house emission estimates are calculated from activity data and emission factors.²³ Activity data usually comprise statistical production or process data at the provincial, territorial or national level. This information is typically provided by provincial/territorial agencies, federal government departments, industry associations, etc. For each source category, activity data are combined with emission factors to produce provincial/territorial-level emission estimates.

The in-house emission estimate methodologies and emission models used in Canada are often based on those developed by the United States Environmental Protection Agency (U.S. EPA) and are adapted to reflect the Canadian climate, fuels, technologies and practices. Methods used in Canada's Air Pollutant Emissions Inventory are therefore generally consistent with those used in the United States or those recommended in the emission inventory guidebook.²⁴

²³ The United States Environmental Protection Agency defines an emission factor as "...a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (for example, kilograms of particulate emitted per megagram of coal burned)."

²⁴ European Monitoring and Evaluation Programme / European Environment Agency (2023). EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023 [Technical Guidance to Prepare National Emission Inventories](#). Luxembourg: Publications Office of the European Union. Technical Report No. 06/2023.

The Air Pollutant Emissions Inventory reports air pollutant emissions from mobile sources such as on-road vehicles, off-road vehicles and engines. For the current edition of the Air Pollutant Emissions Inventory, an emissions estimation model developed by the U.S. EPA (MOVES) was used. The emissions for off-road vehicles and engines (such as graders, heavy trucks, outboard motors and lawnmowers) were estimated using the U.S. EPA's NONROAD emission estimation model (see "off-road vehicles and equipment" in [Table A2-1 of Annex 2](#) of the Air Pollutant Emissions Inventory Report). The parameters in both models were modified to take into account variations in the Canadian vehicle fleet, emission control technologies, types of fuels, vehicle standards, and types of equipment engines and their application in various industries. The emission estimates for civil and international aviation, railways and navigation are estimated using detailed vehicle movement statistics coupled with fuel consumption, engine information, and emission rates by vehicle types.

Calculation of black carbon emissions

Emissions of black carbon are calculated by applying factors to estimate the fraction of black carbon in PM_{2.5} emissions from combustion-related sources, with some exceptions, for example, the mobile sources, where models are used. The factors primarily come from the United States Environmental Protection Agency's [SPECIATE database](#). SPECIATE is a repository of particulate matter speciation profiles²⁵ of air pollution sources. The ratios used for each source are available on the Government of Canada's [Open Data Portal](#). More information on black carbon emission estimation methods can be found in [Chapter 3](#) of Canada's Black Carbon Inventory Report.

Recalculations

Emission recalculation is an essential practice in the maintenance of an up-to-date air pollutant emissions inventory. The Air Pollutant Emissions Inventory is continuously updated with improved estimation methodologies, statistics and more recent and appropriate emission factors. As new information and data become available, previous estimates are updated and recalculated to ensure a consistent and comparable trend in emissions. Recalculations of previously reported emission estimates are common for both in-house estimates and facility-reported emission data. More information on recalculations is provided in [Annex 3](#) of the Air Pollutant Emissions Inventory Report.

Emissions reconciliation

In several sectors, estimation of total emissions involves combining estimates provided by facilities with estimates developed in-house by the department. To prevent double counting of emissions and to confirm that the Air Pollutant Emissions Inventory includes all emissions, a comparison and reconciliation of emission estimates from various sources is performed for each pollutant, industry sector and geographical region, as appropriate. More information on the reconciliation process is provided in [section 3.4](#) of the Air Pollutant Emissions Inventory Report.

Temporal coverage

Historical data are provided at the national level for the period from 1990 to 2023, except for black carbon, which covers the period from 2013 to 2023. For the regional indicators (provincial/territorial), emissions are presented for 1990 (2013 for black carbon) and 2023. Facility level emissions information are available from 2011 to 2023.

Air pollutant emissions by source classification

For the purpose of reporting the indicators, calculated emissions data from the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory are grouped into the following 13 sources:

1. agriculture (livestock, crop production and fertilizer)
2. building heating and energy generation

²⁵ A speciation profile is the dataset that breaks down PM_{2.5} emitted from a particular source into its different components (black carbon and organic carbon). Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory 2025](#). Retrieved on March 18, 2025.

3. dust and fires
4. electric utilities
5. home firewood burning
6. incineration and waste
7. manufacturing
8. miscellaneous
9. off-road vehicles and mobile equipment
10. oil and gas industry
11. ore and mineral industries
12. paints and solvents
13. transportation (road, rail, air and marine)

Table 1 shows the allocation of air pollutant emission sources reported in the indicators compared with the sources and sectors reported by the Air Pollutant Emissions Inventory.

Table 1. Alignment of sources reported in the indicators with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory

Sources in the indicators	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Agriculture (livestock, crop production and fertilizer)	Agriculture: Animal production
Agriculture (livestock, crop production and fertilizer)	Agriculture: Crop production
Agriculture (livestock, crop production and fertilizer)	Agriculture: Fuel use
Building heating and energy generation	Commercial/Residential/Institutional: Commercial and institutional fuel combustion
Building heating and energy generation	Commercial/Residential/Institutional: Residential fuel combustion
Dust and fires	Dust: Coal transportation
Dust and fires	Dust: Construction operations
Dust and fires	Dust: Mine tailings
Dust and fires	Dust: Paved roads
Dust and fires	Dust: Unpaved roads
Dust and fires	Fires: Prescribed burning
Dust and fires	Fires: Structural fires
Electric utilities	Electric power generation (utilities): Coal
Electric utilities	Electric power generation (utilities): Diesel
Electric utilities	Electric power generation (utilities): Natural gas
Electric utilities	Electric power generation (utilities): Landfill gas ^[A]
Electric utilities	Electric power generation (utilities): Other (electric power generation)
Home firewood burning	Commercial/Residential/Institutional: Home firewood burning

Sources in the indicators	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Incineration and waste	Incineration and waste: Crematoriums
Incineration and waste	Incineration and waste: Waste incineration
Incineration and waste	Incineration and waste: Waste treatment and disposal
Manufacturing	Manufacturing: Abrasives manufacturing
Manufacturing	Manufacturing: Bakeries
Manufacturing	Manufacturing: Biofuel production
Manufacturing	Manufacturing: Chemicals industry
Manufacturing	Manufacturing: Construction fuel combustion
Manufacturing	Manufacturing: Food preparation
Manufacturing	Manufacturing: Glass manufacturing
Manufacturing	Manufacturing: Grain industry
Manufacturing	Manufacturing: Metal fabrication
Manufacturing	Manufacturing: Plastics manufacturing
Manufacturing	Manufacturing: Pulp and paper industry
Manufacturing	Manufacturing: Textiles
Manufacturing	Manufacturing: Vehicle manufacturing (engines, parts, assembly, painting)
Manufacturing	Manufacturing: Wood products
Manufacturing	Manufacturing: Other (manufacturing)
Miscellaneous	Commercial/Residential/Institutional: Commercial cooking
Miscellaneous	Commercial/Residential/Institutional: Human ^[B]
Miscellaneous	Commercial/Residential/Institutional: Marine cargo handling
Miscellaneous	Commercial/Residential/Institutional: Other (miscellaneous)
Miscellaneous	Commercial/Residential/Institutional: Service stations
Off-road vehicles and mobile equipment	Transportation and mobile equipment: Off-road diesel vehicles and equipment
Off-road vehicles and mobile equipment	Transportation and mobile equipment: Off-road gasoline / liquefied petroleum gas / natural gas vehicles and equipment
Oil and gas industry	Oil and gas industry: Downstream oil and gas industry
Oil and gas industry	Oil and gas industry: Upstream oil and gas industry
Ore and mineral industries	Ore and mineral industries: Aluminum industry
Ore and mineral industries	Ore and mineral industries: Asphalt paving industry
Ore and mineral industries	Ore and mineral industries: Cement and concrete industry
Ore and mineral industries	Ore and mineral industries: Foundries
Ore and mineral industries	Ore and mineral industries: Iron and steel industry
Ore and mineral industries	Ore and mineral industries: Iron ore pelletizing

Sources in the indicators	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Ore and mineral industries	Ore and mineral industries: Mineral products industry
Ore and mineral industries	Ore and mineral industries: Mining and rock quarrying
Ore and mineral industries	Ore and mineral industries: Non-ferrous refining and smelting industry
Paints and solvents	Paints and solvents: Dry cleaning
Paints and solvents	Paints and solvents: General solvent use
Paints and solvents	Paints and solvents: Printing
Paints and solvents	Paints and solvents: Surface coatings
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Air transportation
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Heavy-duty diesel vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Heavy-duty gasoline vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Heavy-duty liquefied petroleum gas / natural gas vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty diesel trucks
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty diesel vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty gasoline trucks
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty gasoline vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty liquefied petroleum gas / natural gas trucks
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Light-duty liquefied petroleum gas / natural gas vehicles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Domestic marine navigation, fishing and military
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Motorcycles
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Rail transportation
Transportation (road, rail, air and marine)	Transportation and mobile equipment: Tire wear and brake lining

Note: ^[A] Includes electric power generation from combustion of waste materials by utilities and by industry for commercial sale and/or private use. ^[B] Includes human respiration, perspiration and dental amalgams.

For display purposes, smaller emitting sources are sometimes grouped together under the title Other sources in the charts of air pollutant emissions by source. The names of the sources grouped as such are listed in the notes of each chart.

Sectoral indicators

Sectoral indicators on air pollutant emissions from transportation, off-road vehicles and mobile equipment, electric utilities and the oil and gas industry provide additional analysis on the largest sources of Canada's air pollutant emissions. These indicators also rely on calculated emissions data from the Air Pollutant Emissions Inventory.

These indicators are provided at the national level. They identify the contribution of each sector to the national emissions of air pollutants for the year 2023. They also provide information about emissions of selected pollutants, by sector, for the period from 1990 to 2023.

Tables 2 through 4 below show the alignment of air pollutant emission sources reported in the Air pollutant emissions indicators compared with those reported by the sectoral indicators.

Table 2. Alignment of sources reported in the transportation, off-road vehicles and mobile equipment indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory

Air pollutant emissions from transportation, off-road vehicles and mobile equipment	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Air, marine and rail travel	Transportation and mobile equipment: Air transportation
Air, marine and rail travel	Transportation and mobile equipment: Domestic marine navigation, fishing and military
Air, marine and rail travel	Transportation and mobile equipment: Rail transportation
Large trucks and buses	Transportation and mobile equipment: Heavy-duty diesel vehicles
Large trucks and buses	Transportation and mobile equipment: Heavy-duty gasoline vehicles
Large trucks and buses	Transportation and mobile equipment: Heavy-duty liquefied petroleum gas / natural gas vehicles
Off-road vehicles and equipment, tire wear and brake lining	Transportation and mobile equipment: Off-road diesel vehicles and equipment
Off-road vehicles and equipment, tire wear and brake lining	Transportation and mobile equipment: Off-road gasoline / liquefied petroleum gas / natural gas vehicles and equipment
Off-road vehicles and equipment, tire wear and brake lining	Transportation and mobile equipment: Tire wear and brake lining
Passenger cars and motorcycles	Transportation and mobile equipment: Light-duty diesel vehicles
Passenger cars and motorcycles	Transportation and mobile equipment: Light-duty gasoline vehicles
Passenger cars and motorcycles	Transportation and mobile equipment: Light-duty liquefied petroleum gas / natural gas vehicles
Passenger cars and motorcycles	Transportation and mobile equipment: Motorcycles
Passenger light trucks	Transportation and mobile equipment: Light-duty diesel trucks
Passenger light trucks	Transportation and mobile equipment: Light-duty gasoline trucks
Passenger light trucks	Transportation and mobile equipment: Light-duty liquefied petroleum gas / natural gas trucks

Table 3. Alignment of sources reported in the electric utilities indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory

Air pollutant emissions from electric utilities	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Coal	Electric power generation (utilities): Coal
Diesel	Electric power generation (utilities): Diesel
Natural gas	Electric power generation (utilities): Natural gas
Other	Electric power generation (utilities): Waste materials ^[A]
Other	Electric power generation (utilities): Other (electric power generation)

Note: ^[A] Includes electric power generation from combustion of waste materials by utilities and by industry for commercial sale and/or private use.

Table 4. Alignment of sources reported in the oil and gas industry indicator of Air pollutant emissions with the sources and sectors from the Air Pollutant Emissions Inventory/Black Carbon Emissions Inventory

Air pollutant emissions from the oil and gas industry	Sources and sectors in the Air Pollutant Emissions Inventory and Black Carbon Emissions Inventory
Downstream oil and gas	Oil and gas industry: Downstream oil and gas industry
Upstream oil and gas	Oil and gas industry: Upstream oil and gas industry

Recent changes

The emission estimates reported in Canada's Air Pollutant Emissions Inventory and Canada's Black Carbon Emissions Inventory used in the indicators undergo continuous improvements, leading to recalculations. [Annex 3](#) of the Air Pollutant Emissions Inventory Report and [section 3.2](#) of Canada's Black Carbon Emissions Inventory Report contain more information about the recent changes made.

Caveats and limitations

The methodologies for compiling air pollutant emissions generally improve over time, and revisions are made to the Air Pollution Emissions Inventory. As a result of this, the emissions and trends reported for the indicators may be different from those previously published.

Some area source emissions were not updated for 2023 due to the unavailability of activity-level statistics at the time of compilation. In these cases, the emission estimates from the most recent year available were used.

The Air Pollutant Emissions Inventory (APEI) uses facility information from the National Pollutant Release Inventory and other sources. The version of the data published by the National Pollutant Release Inventory may not be identical to that used in the Air Pollutant Emissions Inventory at a given time because of updates to point source data from National Pollutant Release Inventory reporting. The inventory also uses different rounding protocols in its final report and total emissions reported in the indicators may be slightly different.

The Black Carbon Emissions Inventory generally uses the same sources as the APEI, however, work will continue to improve the completeness and accuracy of the inventory, quantifying the emissions that are not yet captured.

Resources

References

Environment and Climate Change Canada (2015) [Climate and Clean Air Coalition](#). Retrieved on March 18, 2025.

Environment and Climate Change Canada (2017) [Using and interpreting data from the National Pollutant Release Inventory](#). Retrieved on March 18, 2025.

Environment and Climate Change Canada (2025) [National Pollutant Release Inventory](#). Retrieved on March 18, 2025.

Environment and Climate Change Canada (2024) [National Pollutant Release Inventory: tools and resources](#). Retrieved on March 18, 2025.

Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory Report](#). Retrieved on March 18, 2025.

Environment and Climate Change Canada (2025) [Canada's Black Carbon Inventory Report](#). Retrieved on March 18, 2025.

Related information

[Air Pollutant Emissions Inventory: overview](#)

[Black Carbon Emissions Inventory: overview](#)

Annex

Annex A. Data tables for the figures presented in this document

Table A. 1. Data for Figure 1. Air pollutant emissions, Canada, 1990 to 2023

Year	Sulphur oxides (percentage change from 1990 level)	Nitrogen oxides (percentage change from 1990 level)	Volatile organic compounds (percentage change from 1990 level)	Ammonia (percentage change from 1990 level)	Carbon monoxide (percentage change from 1990 level)	Fine particulate matter (percentage change from 1990 level)
1990	0	0	0	0	0	0
1991	-7	-3	-1	-1	-3	-3
1992	-11	0	0	2	-3	-5
1993	-14	4	5	3	-2	-5
1994	-21	10	7	7	-1	-4
1995	-17	14	10	14	0	-4
1996	-16	17	13	18	-2	-6
1997	-18	22	13	19	-5	-5
1998	-19	23	13	19	-7	-7
1999	-23	23	12	18	-9	-8
2000	-23	20	11	20	-11	-9
2001	-23	15	8	20	-14	-10
2002	-25	13	8	22	-16	-14
2003	-27	12	5	21	-20	-14
2004	-27	5	2	25	-26	-16
2005	-30	1	3	24	-31	-15
2006	-37	-6	-3	21	-37	-19
2007	-39	-7	-6	22	-43	-18
2008	-45	-10	-10	20	-46	-16
2009	-53	-16	-17	16	-48	-19
2010	-57	-16	-18	14	-48	-17
2011	-60	-20	-21	13	-51	-17
2012	-61	-25	-20	17	-53	-14
2013	-61	-27	-19	21	-54	-12
2014	-63	-29	-19	19	-56	-11
2015	-65	-31	-23	19	-58	-14
2016	-65	-35	-28	19	-58	-18
2017	-69	-35	-28	17	-59	-17
2018	-73	-36	-27	21	-60	-14
2019	-76	-38	-30	21	-61	-13
2020	-78	-44	-38	25	-65	-21
2021	-79	-44	-38	26	-65	-18
2022	-78	-45	-38	22	-65	-17
2023	-80	-45	-38	25	-65	-15

Note: The indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 2. Data for Figure 2. Distribution of air pollutant emissions by source, Canada,

Source	Sulphur oxides (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Ammonia (percentage of national emissions)	Carbon monoxide (percentage of national emissions)	Fine particulate matter (percentage of national emissions)
Oil and gas industry	43.5	36.8	39.5	0.5	11.9	1.0
Manufacturing	5.6	5.7	8.0	2.3	2.7	1.1
Ore and mineral industries	27.6	6.9	0.6	0.3	11.4	2.3
Transportation (road, rail, air and marine)	0.5	24.6	4.8	1.3	22.2	0.6
Off-road vehicles and mobile equipment	<0.1	13.4	9.3	<0.1	37.9	1.1
Building heating and energy generation	0.3	4.7	0.2	<0.1	0.7	0.3
Electric utilities	22.2	7.3	0.1	<0.1	0.9	0.1
Home firewood burning	<0.1	0.3	4.6	0.1	11.7	3.7
Incineration and waste	0.3	0.3	0.9	1.4	0.2	<0.1
Paints and solvents	n/a	<0.1	19.8	n/a	<0.1	<0.1
Agriculture (livestock, crop production and fertilizer)	<0.1	0.2	8.3	93.5	<0.1	25.4
Dust and fires	<0.1	<0.1	<0.1	<0.1	0.3	63.2
Miscellaneous	<0.1	<0.1	3.7	0.1	0.1	1.2

Note: n/a = not available. The indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. The percentages have been rounded off and their sum may not add up to 100.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 3. Data for Figure 3. Distribution of air pollutant emissions by province and territory, Canada,

Province or territory	Sulphur oxides (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Ammonia (percentage of national emissions)	Carbon monoxide (percentage of national emissions)	Fine particulate matter (percentage of national emissions)
Newfoundland and Labrador	1.3	2.7	1.0	0.2	1.3	1.3
Prince Edward Island	<0.1	0.2	0.3	0.6	0.4	0.3
Nova Scotia	6.2	2.2	1.6	0.7	2.1	1.4
New Brunswick	2.2	1.8	1.4	0.8	1.9	1.1
Quebec	15.4	9.7	14.0	13.2	26.1	11.5
Ontario	15.8	14.3	20.4	19.8	21.1	16.6
Manitoba	0.3	2.2	4.1	11.3	4.5	6.8
Saskatchewan	19.3	8.9	14.1	22.0	7.2	26.2
Alberta	27.0	42.3	34.6	27.2	23.0	24.5

Province or territory	Sulphur oxides (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Ammonia (percentage of national emissions)	Carbon monoxide (percentage of national emissions)	Fine particulate matter (percentage of national emissions)
British Columbia	12.3	13.8	8.3	4.1	12.0	9.4
Yukon	<0.1	0.2	<0.1	<0.1	0.2	0.3
Northwest Territories	<0.1	0.9	0.1	<0.1	0.2	0.3
Nunavut	<0.1	0.9	<0.1	<0.1	0.1	0.3

Note: The indicator reports emissions of 6 key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. The percentages have been rounded off and their sum may not add up to 100.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 4. Data for Figure 4. Total sulphur oxide emissions by source, Canada, 1990 to

Year	Oil and gas industry (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Electric utilities (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	535.6	1 483.3	618.4	372.6	3 009.9
1991	541.6	1 336.3	592.1	325.1	2 795.2
1992	580.9	1 171.5	610.7	311.6	2 674.7
1993	608.5	1 114.9	547.2	316.5	2 587.2
1994	604.6	894.5	559.8	317.1	2 376.1
1995	598.4	1 108.3	532.6	269.2	2 508.5
1996	597.3	1 091.3	542.2	282.5	2 513.3
1997	552.8	1 034.1	591.3	281.4	2 459.7
1998	523.4	1 021.7	603.6	274.5	2 423.1
1999	516.1	927.7	601.1	279.2	2 324.1
2000	513.3	916.8	619.2	279.3	2 328.6
2001	497.9	914.2	623.9	274.4	2 310.4
2002	468.1	905.7	624.3	269.4	2 267.5
2003	475.6	814.1	630.4	276.8	2 196.9
2004	468.1	876.3	581.5	283.3	2 209.2
2005	462.2	859.1	521.9	252.2	2 095.4
2006	424.3	827.6	458.9	183.4	1 894.3
2007	402.4	779.8	491.9	170.8	1 844.8
2008	378.3	716.1	427.5	143.7	1 665.5
2009	371.8	523.1	384.0	122.4	1 401.3
2010	339.3	502.1	333.9	115.5	1 290.9
2011	328.5	467.8	293.2	109.6	1 199.1
2012	330.5	477.5	284.2	94.3	1 186.6
2013	315.5	492.9	278.2	82.8	1 169.3
2014	286.8	487.8	269.2	77.4	1 121.1
2015	260.5	483.5	251.5	64.8	1 060.3
2016	246.2	481.5	253.1	57.7	1 038.5

Year	Oil and gas industry (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Electric utilities (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
2017	254.7	389.1	245.4	54.4	943.6
2018	265.7	258.2	220.2	56.0	800.1
2019	266.9	183.2	205.4	51.8	707.3
2020	243.6	195.3	168.2	42.9	649.9
2021	262.6	162.2	169.0	45.5	639.3
2022	277.5	175.0	154.2	45.9	652.6
2023	264.3	167.8	134.8	41.3	608.1

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from transportation (road, rail, air and marine), off-road vehicles and mobile equipment, home firewood burning, incineration and waste, agriculture (livestock, crop production and fertilizer), dust and fires, paints and solvents, building heating and energy generation, manufacturing, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 5. Data for Figure 5. Sulphur oxide emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	70.0	51.2	8.1
Prince Edward Island	3.7	2.8	0.2
Nova Scotia	203.1	149.7	37.7
New Brunswick	109.0	93.4	13.2
Quebec	251.0	226.3	93.6
Ontario	1 124.1	500.1	96.1
Manitoba	508.7	397.0	2.0
Saskatchewan	102.3	146.9	117.4
Alberta	510.3	459.3	164.4
British Columbia	109.1	65.0	75.1
Yukon	0.6	1.3	<0.1
Northwest Territories	18.0 ^[A]	0.8	0.4
Nunavut ^[A]	n/a	1.7	0.2

Note: ^[A] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. n/a = not applicable. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 6. Data for Figure 7. Total nitrogen oxide emissions by source, Canada, 1990 to

Year	Oil and gas industry (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Electric utilities (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	343.5	894.8	373.8	366.7	257.0	2 235.8
1991	337.1	890.0	360.3	337.9	250.9	2 176.2

Year	Oil and gas industry (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Electric utilities (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1992	353.0	931.5	354.4	332.7	262.9	2 234.5
1993	378.4	998.9	361.6	337.0	243.0	2 318.9
1994	410.3	1 103.3	367.3	348.2	240.0	2 469.1
1995	426.3	1 140.6	367.1	359.9	248.1	2 542.0
1996	438.2	1 176.1	364.6	367.5	269.0	2 615.4
1997	482.1	1 207.4	364.1	386.0	287.7	2 727.3
1998	493.7	1 208.8	348.0	380.7	310.1	2 741.3
1999	511.1	1 190.7	351.4	384.0	306.4	2 743.5
2000	456.4	1 159.9	354.8	394.8	326.8	2 692.6
2001	450.9	1 095.8	334.8	373.7	313.0	2 568.2
2002	451.8	1 054.8	362.6	352.4	314.9	2 536.5
2003	492.9	1 004.8	360.1	352.2	293.0	2 503.0
2004	427.2	962.6	355.1	342.1	267.5	2 354.5
2005	427.5	917.0	326.2	334.2	253.7	2 258.7
2006	427.3	865.5	276.8	307.4	224.3	2 101.3
2007	450.1	847.0	267.4	284.3	238.8	2 087.6
2008	460.0	802.2	246.3	267.8	225.1	2 001.4
2009	455.0	745.6	219.5	234.0	218.0	1 872.1
2010	445.1	719.3	227.4	259.5	233.7	1 885.0
2011	457.0	628.8	232.0	267.1	199.8	1 784.7
2012	449.8	579.2	228.5	250.7	166.3	1 674.5
2013	454.0	547.6	226.4	245.3	162.0	1 635.3
2014	462.5	512.9	227.8	226.6	167.2	1 597.0
2015	463.9	455.1	224.2	236.5	152.3	1 532.0
2016	456.1	402.5	219.9	224.6	152.4	1 455.5
2017	463.8	384.1	232.0	237.6	145.0	1 462.4
2018	470.0	378.5	228.0	232.4	129.0	1 437.8
2019	468.4	357.4	225.7	220.6	124.8	1 396.8
2020	444.3	302.1	213.9	188.7	101.9	1 250.9
2021	438.8	298.6	219.9	184.5	100.1	1 241.9
2022	443.3	301.2	219.5	173.9	93.8	1 231.8
2023	451.5	302.4	219.2	164.6	90.1	1 227.8

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from ore and mineral industries, manufacturing, building heating and energy generation, home firewood burning, incineration and waste, agriculture (livestock, crop production and fertilizer), dust and fires, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 7. Data for Figure 8. Nitrogen oxide emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	50.8	57.4	33.5

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Prince Edward Island	6.3	6.8	2.8
Nova Scotia	81.1	88.4	26.7
New Brunswick	77.6	69.9	21.6
Quebec	304.9	288.1	118.9
Ontario	590.2	537.7	175.1
Manitoba	69.6	66.3	27.0
Saskatchewan	146.3	170.9	109.7
Alberta	605.4	663.0	519.7
British Columbia	287.0	285.7	169.0
Yukon	3.3	2.5	2.3
Northwest Territories	13.4 ^[A]	14.3	10.5
Nunavut ^[A]	n/a	7.8	11.0

Note: ^[A] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. n/a = not applicable. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 8. Data for Figure 10. Total volatile organic compound emissions by source, Canada, 1990 to

Year	Oil and gas industry (emissions in kilotonnes)	Paints and solvents (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	606.6	343.3	287.0	103.6	257.1	147.7	346.8	108.0	2 200.2
1991	601.8	336.0	286.9	103.6	253.8	148.9	335.4	109.6	2 176.0
1992	615.8	338.3	296.4	105.3	254.7	133.7	345.5	116.4	2 206.2
1993	644.0	337.1	305.1	105.1	271.1	156.9	362.4	117.6	2 299.4
1994	661.7	348.1	322.2	107.5	273.0	153.3	384.2	115.1	2 365.0
1995	673.0	361.3	382.4	111.5	262.8	148.1	376.9	113.1	2 429.0
1996	701.2	358.7	409.6	114.5	262.3	137.6	380.2	116.0	2 480.1
1997	688.4	359.8	440.0	115.2	257.5	125.9	373.4	115.8	2 475.9
1998	700.8	361.6	467.2	115.6	261.5	127.0	366.4	93.2	2 493.3
1999	653.6	373.1	490.7	116.0	259.3	120.3	351.6	90.7	2 455.3
2000	667.9	379.7	489.5	116.9	254.5	117.2	330.3	92.5	2 448.4
2001	672.3	357.5	495.4	119.9	229.6	112.7	309.9	80.1	2 377.3
2002	683.6	361.2	497.7	121.0	232.8	108.1	290.1	77.8	2 372.2
2003	676.6	364.1	482.9	120.6	216.0	120.1	263.5	73.8	2 317.7
2004	656.0	362.2	471.5	124.5	200.9	108.1	243.8	79.1	2 246.1
2005	652.4	438.9	448.6	125.6	187.1	105.6	215.9	82.0	2 256.1
2006	630.4	417.1	417.8	123.0	165.3	96.3	198.2	80.9	2 129.1
2007	627.4	409.4	375.3	120.9	149.8	92.9	188.3	95.3	2 059.2
2008	634.0	392.3	338.1	118.9	133.8	91.9	172.9	95.2	1 977.1
2009	586.9	353.3	314.8	116.2	113.0	91.0	160.2	96.4	1 831.7
2010	569.2	361.4	319.8	115.2	118.2	90.8	148.7	85.4	1 808.7
2011	557.2	349.7	301.2	114.1	115.8	92.5	115.1	90.9	1 736.6
2012	607.6	354.6	274.8	114.8	117.7	89.7	107.6	86.3	1 753.1
2013	658.0	357.0	254.9	116.1	115.9	84.1	103.3	96.1	1 785.4
2014	693.7	363.6	220.1	115.3	110.0	89.9	95.9	98.7	1 787.1

Year	Oil and gas industry (emissions in kilotonnes)	Paints and solvents (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
2015	666.1	326.9	205.2	114.0	105.6	86.6	89.0	97.7	1 691.1
2016	599.3	310.4	199.6	114.6	104.5	83.4	83.8	93.5	1 589.2
2017	616.2	307.2	187.2	114.9	100.7	81.8	79.4	94.7	1 582.1
2018	637.6	313.1	175.2	115.7	108.6	82.4	78.6	91.0	1 602.2
2019	613.6	305.2	165.0	115.4	103.5	82.9	75.8	81.7	1 543.1
2020	526.5	262.1	144.3	115.2	97.7	75.4	63.4	70.6	1 355.3
2021	525.0	272.6	139.9	115.7	112.0	77.7	64.7	64.4	1 371.9
2022	533.3	271.5	129.9	114.9	107.3	76.0	65.6	68.3	1 366.8
2023	540.5	271.5	127.6	113.6	109.6	75.5	66.3	63.3	1 367.8

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from incineration and waste, ore and mineral industries, dust and fires, building heating and energy generation, electric utilities and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 9. Data for Figure 11. Volatile organic compound emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	32.2	31.2	13.3
Prince Edward Island	8.4	8.1	3.8
Nova Scotia	50.2	47.8	21.5
New Brunswick	39.9	48.5	18.7
Quebec	345.9	343.6	192.1
Ontario	589.7	571.1	278.6
Manitoba	71.4	83.2	55.8
Saskatchewan	177.5	256.4	193.3
Alberta	590.5	613.4	473.6
British Columbia	282.6	240.9	113.3
Yukon	1.5	2.1	1.0
Northwest Territories	10.3 ^[A]	8.5	1.9
Nunavut ^[A]	n/a	1.3	0.9

Note: ^[A] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. n/a = not applicable. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 10. Data for Figure 13. Total ammonia emissions by source, Canada, 1990 to

Year	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	356.6	13.0	20.0	5.6	395.2
1991	353.5	13.3	19.1	6.2	392.1
1992	364.8	13.6	19.1	7.2	404.7
1993	367.6	14.4	18.5	8.3	408.8
1994	379.6	14.6	19.9	9.4	423.5
1995	396.8	16.5	26.6	9.9	449.8
1996	413.1	16.2	26.2	10.7	466.2
1997	418.7	16.3	25.2	11.1	471.3
1998	417.9	16.4	26.0	11.5	471.9
1999	415.6	14.6	24.8	11.6	466.7
2000	424.7	14.3	25.0	11.8	475.7
2001	427.9	13.9	21.8	11.9	475.5
2002	431.0	19.5	21.6	11.7	483.8
2003	437.5	12.0	18.9	11.5	479.9
2004	452.4	11.6	18.6	11.3	493.9
2005	448.7	13.2	17.2	10.7	489.8

Year	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
2006	440.4	12.0	16.2	10.2	478.8
2007	446.2	11.4	16.1	10.1	483.8
2008	440.1	12.6	13.6	9.5	475.8
2009	425.9	12.3	12.7	9.1	460.0
2010	418.3	12.9	11.6	8.7	451.6
2011	416.2	12.7	11.9	7.7	448.5
2012	433.2	11.7	12.0	7.4	464.3
2013	446.3	12.9	11.3	7.3	477.8
2014	437.1	13.2	11.3	7.0	468.6
2015	440.0	11.9	11.8	6.9	470.6
2016	440.0	12.2	12.1	6.9	471.2
2017	431.2	11.7	11.3	6.8	461.1
2018	447.4	12.1	12.1	6.9	478.4
2019	448.8	12.5	11.2	6.9	479.3
2020	462.6	11.9	12.2	5.8	492.5
2021	467.2	13.1	11.5	6.1	497.9
2022	451.7	13.9	10.5	6.4	482.4
2023	462.7	14.1	11.4	6.5	494.7

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from incineration and waste, the oil and gas industry, home firewood burning, ore and mineral industries, electric utilities, building heating and energy generation, off-road vehicles and mobile equipment, dust and fires, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 11. Data for Figure 14. Ammonia emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	1.0	1.1	0.9
Prince Edward Island	3.4	3.8	3.0
Nova Scotia	4.9	4.6	3.3
New Brunswick	4.6	5.7	4.1
Quebec	65.3	67.7	65.3
Ontario	111.0	101.9	98.1
Manitoba	38.1	55.4	56.1
Saskatchewan	48.6	84.0	108.8
Alberta	95.3	140.4	134.6
British Columbia	23.0	25.3	20.5

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Yukon	<0.1	<0.1	<0.1
Northwest Territories	<0.1 ^[A]	<0.1	<0.1
Nunavut ^[A]	<0.1	<0.1	<0.1

Note: ^[A] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 12. Data for Figure 16. Total carbon monoxide emissions by source, Canada, 1990 to

Year	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Oil and gas industry (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	3 476.5	6 104.8	333.7	915.7	389.8	1 861.1	13 081.6
1991	3 305.1	5 831.3	323.8	927.9	453.5	1 898.0	12 739.6
1992	3 236.4	5 911.6	338.4	983.1	482.8	1 697.1	12 649.4
1993	3 128.9	5 955.2	360.7	992.5	478.3	1 896.3	12 811.9
1994	3 154.6	6 043.2	397.8	970.6	461.9	1 861.3	12 889.4
1995	3 714.9	5 696.7	405.3	952.5	457.7	1 903.5	13 130.6
1996	3 779.4	5 520.2	417.5	977.5	447.3	1 660.0	12 801.7
1997	3 974.0	5 212.7	466.6	971.8	413.7	1 427.8	12 466.7
1998	4 160.3	4 935.3	484.7	781.0	397.9	1 357.3	12 116.4
1999	4 340.5	4 569.6	497.0	759.2	374.0	1 312.4	11 852.8
2000	4 315.4	4 441.4	441.9	772.0	396.1	1 217.2	11 584.1
2001	4 414.4	4 144.6	466.1	667.4	421.9	1 081.5	11 195.9
2002	4 559.9	3 839.8	499.6	646.7	491.6	945.6	10 983.3
2003	4 242.2	3 569.3	528.8	612.2	521.5	990.9	10 464.9
2004	4 054.0	3 258.2	501.0	653.5	499.9	717.0	9 683.6
2005	3 850.4	2 796.3	492.6	675.8	505.7	685.6	9 006.4
2006	3 592.2	2 546.3	502.2	665.1	509.7	486.5	8 302.0
2007	2 920.1	2 331.9	521.7	783.8	532.0	409.0	7 498.6
2008	2 642.6	2 156.9	538.8	785.3	546.6	402.1	7 072.4
2009	2 534.2	2 037.0	523.2	795.8	512.5	388.5	6 791.2
2010	2 861.3	1 892.4	518.0	706.8	537.0	345.9	6 861.4
2011	2 814.0	1 459.5	527.0	753.6	560.5	330.6	6 445.2
2012	2 611.0	1 369.1	528.5	717.1	552.0	352.0	6 129.7
2013	2 486.8	1 357.1	560.6	794.6	546.2	293.5	6 038.9
2014	2 148.3	1 319.7	544.3	812.5	515.0	380.8	5 720.6
2015	2 008.7	1 263.4	551.8	799.8	513.3	357.7	5 494.7
2016	2 055.0	1 248.4	533.0	764.4	557.7	342.1	5 500.6
2017	2 001.6	1 196.5	546.7	773.9	588.8	281.9	5 389.5
2018	1 943.8	1 185.5	563.7	754.2	526.6	254.0	5 227.8

Year	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Oil and gas industry (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
2019	1 903.4	1 161.8	537.4	686.2	507.9	263.6	5 060.3
2020	1 706.5	998.0	509.7	592.0	512.3	228.6	4 547.1
2021	1 755.3	1 025.2	535.6	536.8	512.0	237.6	4 602.6
2022	1 694.8	986.5	521.8	569.4	501.2	279.3	4 553.1
2023	1 712.7	1 001.2	538.6	527.0	515.6	222.8	4 517.8

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from dust and fires, electric utilities, building heating and energy generation, incineration and waste, agriculture (livestock, crop production and fertilizer), paints and solvents, manufacturing and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 13. Data for Figure 17. Carbon monoxide emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	215.9	126.2	56.5
Prince Edward Island	76.4	45.2	17.8
Nova Scotia	372.8	226.5	96.4
New Brunswick	313.6	243.5	85.3
Quebec	2 518.5	1 895.3	1 179.7
Ontario	3 589.2	2 470.8	951.7
Manitoba	500.1	403.6	201.2
Saskatchewan	829.3	682.4	326.6
Alberta	2 291.7	1 655.9	1 040.1
British Columbia	2 328.5	1 215.4	540.3
Yukon	17.2	17.6	7.6
Northwest Territories	28.4 ^[A]	17.7	8.5
Nunavut ^[A]	n/a	6.3	6.1

Note: ^[A] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. n/a = not applicable. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 14. Data for Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to

Year	Dust and fires (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1990	513.6	675.2	318.6	101.6	1 609.0
1991	502.8	667.8	293.4	102.4	1 566.5
1992	480.1	653.0	285.1	107.9	1 526.2

Year	Dust and fires (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
1993	502.1	638.7	279.7	108.5	1 529.1
1994	533.8	624.3	278.0	105.6	1 541.8
1995	547.2	610.1	276.3	103.3	1 536.8
1996	547.1	596.3	269.5	105.7	1 518.7
1997	575.8	582.5	265.3	104.0	1 527.7
1998	586.5	568.9	257.4	83.2	1 496.0
1999	588.5	555.3	258.2	80.3	1 482.4
2000	591.3	541.9	256.5	81.0	1 470.7
2001	622.1	528.7	234.5	69.5	1 454.9
2002	603.4	508.9	210.2	66.9	1 389.4
2003	627.6	489.2	204.1	62.7	1 383.5
2004	620.7	469.0	198.0	66.2	1 353.9
2005	650.8	449.5	196.1	67.9	1 364.3
2006	640.8	429.9	170.1	66.2	1 307.1
2007	667.6	416.6	164.6	77.5	1 326.5
2008	712.7	403.1	155.9	77.4	1 349.2
2009	696.6	389.8	139.8	78.1	1 304.2
2010	739.4	376.8	142.9	69.1	1 328.1
2011	766.7	363.5	137.3	73.3	1 340.9
2012	812.1	366.6	133.9	69.3	1 381.9
2013	840.2	369.4	129.1	75.4	1 414.2
2014	857.9	372.3	125.6	75.6	1 431.4
2015	816.5	375.3	119.9	72.8	1 384.5
2016	763.9	378.3	114.5	68.8	1 325.5
2017	776.6	374.1	119.7	69.0	1 339.4
2018	818.9	369.9	117.9	71.2	1 378.0
2019	842.4	365.8	116.4	68.3	1 392.9
2020	743.9	361.8	112.7	58.2	1 276.5
2021	783.5	357.5	118.7	52.2	1 311.9
2022	810.2	353.0	111.3	55.4	1 329.9
2023	865.3	348.3	105.0	51.3	1 369.8

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. The category "other sources" includes emissions from ore and mineral industries, transportation (road, rail, air and marine), manufacturing, off-road vehicles and mobile equipment, the oil and gas industry, building heating and energy generation, electric utilities, incineration and wastes, paints and solvents, and other miscellaneous sources. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 15. Additional information for Figure 19. Total fine particulate matter emissions by source, Canada, 1990 to

Year	Dust and fires (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Miscellaneous (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Oil and gas industry (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Building heating and energy generation (emissions in kilotonnes)
1990	513.6	675.2	101.6	54.3	13.9	114.1	36.0	11.8	33.4	4.6
1991	502.8	667.8	102.4	51.5	12.0	103.2	32.6	12.4	31.8	4.6
1992	480.1	653.0	107.9	49.3	12.0	99.9	31.6	12.6	32.2	4.7
1993	502.1	638.7	108.5	49.2	12.3	100.6	32.9	12.8	32.3	4.9
1994	533.8	624.3	105.6	51.0	12.7	100.5	34.1	13.7	33.9	4.9
1995	547.2	610.1	103.3	50.7	13.2	101.5	34.4	14.0	34.6	4.9
1996	547.1	596.3	105.7	52.6	13.2	93.2	35.5	14.1	34.5	5.2
1997	575.8	582.5	104.0	53.0	13.6	85.3	37.4	14.4	34.2	5.0
1998	586.5	568.9	83.2	50.6	14.4	80.2	37.1	16.1	32.5	4.6
1999	588.5	555.3	80.3	50.1	15.0	79.8	37.8	13.7	33.2	4.8
2000	591.3	541.9	81.0	51.2	15.5	74.8	39.0	13.5	32.0	5.3
2001	622.1	528.7	69.5	47.4	15.8	64.0	37.3	13.4	30.1	5.0
2002	603.4	508.9	66.9	37.3	16.0	55.3	35.7	13.9	29.5	5.2
2003	627.6	489.2	62.7	37.5	16.3	53.1	34.8	12.5	31.1	5.6
2004	620.7	469.0	66.2	35.9	16.8	50.6	33.8	11.8	31.5	5.3
2005	650.8	449.5	67.9	41.1	17.1	44.9	32.7	12.2	32.0	5.2
2006	640.8	429.9	66.2	39.3	17.3	29.0	30.1	11.6	30.6	4.9
2007	667.6	416.6	77.5	37.7	17.4	27.1	27.8	11.3	29.8	5.2
2008	712.7	403.1	77.4	35.9	17.8	24.3	26.1	9.8	28.7	5.1
2009	696.6	389.8	78.1	30.1	17.9	20.2	23.3	9.0	27.1	5.0
2010	739.4	376.8	69.1	33.9	17.6	19.6	25.3	8.9	26.1	4.8
2011	766.7	363.5	73.3	32.9	16.8	20.0	25.7	9.3	22.3	5.0
2012	812.1	366.6	69.3	35.1	16.9	19.4	24.2	9.8	19.8	4.6
2013	840.2	369.4	75.4	31.9	16.7	19.6	23.4	10.5	18.3	4.8

Year	Dust and fires (emissions in kilotonnes)	Agriculture (livestock, crop production and fertilizer) (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Ore and mineral industries (emissions in kilotonnes)	Miscellaneous (emissions in kilotonnes)	Manufacturing (emissions in kilotonnes)	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Oil and gas industry (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Building heating and energy generation (emissions in kilotonnes)
2014	857.9	372.3	75.6	31.6	16.1	18.7	21.3	12.4	16.4	4.9
2015	816.5	375.3	72.8	30.2	15.2	18.7	21.9	11.3	13.6	4.8
2016	763.9	378.3	68.8	30.0	15.2	17.2	21.1	10.4	11.6	4.9
2017	776.6	374.1	69.0	33.8	15.3	17.4	21.7	11.7	10.7	5.1
2018	818.9	369.9	71.2	32.7	15.3	17.3	21.0	11.8	10.7	5.3
2019	842.4	365.8	68.3	34.5	15.4	16.5	19.6	11.7	9.9	5.4
2020	743.9	361.8	58.2	35.1	15.5	16.6	16.6	12.2	8.4	5.0
2021	783.5	357.5	52.2	36.5	15.6	19.9	16.3	14.4	8.5	4.8
2022	810.2	353.0	55.4	34.7	15.7	15.1	15.2	14.4	8.3	5.1
2023	865.3	348.3	51.3	31.2	15.8	14.8	14.4	13.0	8.3	4.7

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Consult [Table 1](#) in the Data sources and methods for a complete list of the air pollutant emissions sources included under each category. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 16. Data for Figure 20. Fine particulate matter emissions by province and territory, Canada, 1990, 2005 and

Province or territory	1990 (emissions in kilotonnes)	2005 (emissions in kilotonnes)	2023 (emissions in kilotonnes)	1990, excluding open sources ^[A] (emissions in kilotonnes)	2005, excluding open sources ^[A] (emissions in kilotonnes)	2023, excluding open sources ^[A] (emissions in kilotonnes)
Newfoundland and Labrador	19.9	19.5	17.2	11.3	8.1	3.1
Prince Edward Island	4.8	4.3	4.3	1.9	1.6	0.9
Nova Scotia	27.3	23.7	18.8	16.2	11.7	4.4
New Brunswick	24.7	21.1	14.8	15.6	12.0	4.3
Quebec	151.1	140.0	157.3	82.1	64.4	47.7
Ontario	236.3	209.8	227.8	97.8	66.0	37.8
Manitoba	103.2	93.7	92.7	12.5	9.1	4.3
Saskatchewan	505.9	384.4	359.2	21.2	17.1	10.1
Alberta	361.7	357.3	335.9	66.0	32.7	23.6
British Columbia	166.8	99.7	129.2	93.7	39.6	18.8
Yukon	2.6	3.2	3.9	0.4	0.3	0.2
Northwest Territories	4.7 ^[B]	5.4	4.2	1.6 ^[B]	0.8	0.6
Nunavut ^[B]	n/a	2.3	4.3	n/a	0.6	0.3

Note: ^[A] Open sources include emissions associated with dust and fires and agriculture (livestock, crop production and fertilizer). ^[B] 1990 emissions data for the Northwest Territories include emissions for Nunavut, which was part of the Northwest Territories until 1999. n/a = not applicable. The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 17. Data for Figure 22. Total black carbon emissions by source, Canada, 2013 to

Year	Off-road vehicles and mobile equipment (emissions in kilotonnes)	Transportation (road, rail, air and marine) (emissions in kilotonnes)	Home firewood burning (emissions in kilotonnes)	Oil and gas industry (emissions in kilotonnes)	Other sources (emissions in kilotonnes)	Building heating and energy generation (emissions in kilotonnes)	Total emissions (emissions in kilotonnes)
2013	13.6	10.1	6.8	2.6	1.9	1.0	36.0
2014	12.5	9.1	6.8	2.9	1.7	1.0	34.1
2015	13.1	7.6	6.6	2.7	1.6	1.0	32.6
2016	12.3	6.2	6.3	2.4	1.5	1.1	29.7
2017	12.9	5.7	6.4	2.5	1.5	1.2	30.2
2018	12.5	5.7	6.5	2.5	1.4	1.2	29.9
2019	11.5	5.3	6.1	2.5	1.5	1.2	28.0
2020	9.5	4.6	5.0	2.5	1.5	1.2	24.2
2021	9.1	4.6	4.3	2.7	1.5	1.1	23.3
2022	8.3	4.4	4.6	2.6	1.8	1.1	22.9
2023	7.7	4.4	4.3	2.5	1.7	1.1	21.6

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires. "Other sources" includes emissions from ore and mineral industries, incineration and waste, manufacturing, electric utilities and agriculture (livestock, crop production and fertilizer). Consult [Table 1](#) in the Data sources and methods for more details. The numbers have been rounded off and their sum may not correspond to the total.

Source: Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory](#).

Table A. 18. Data for Figure 23. Black carbon emissions by province and territory, Canada, 2013 and

Province or territory	2013 (emissions in kilotonnes)	2023 (emissions in kilotonnes)
Newfoundland and Labrador	0.8	0.5
Prince Edward Island	0.2	0.1
Nova Scotia	1.2	0.5
New Brunswick	1.3	0.4
Quebec	7.2	4.4
Ontario	6.9	4.1
Manitoba	1.5	0.8
Saskatchewan	4.3	2.9
Alberta	7.8	5.0
British Columbia	3.9	2.5
Yukon	0.1	0.1
Northwest Territories	0.5	0.2
Nunavut	0.2	0.1

Note: The indicator reports air pollutant emissions from human activities only. It does not include emissions from natural sources such as forest fires.

Source: Environment and Climate Change Canada (2025) [Canada's Black Carbon Emissions Inventory](#).

Table A.19. Data for Figure 24. Contribution of the oil and gas industry to total air pollutant emissions by activity type, Canada,

Activity type	Sulphur oxides (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Carbon monoxide (percentage of national emissions)	Fine particulate matter (percentage of national emissions)	Ammonia (percentage of national emissions)
Upstream oil and gas	37.3	37.8	35.2	11.2	0.8	0.5
Downstream oil and gas	6.2	1.7	1.6	0.7	0.1	<0.1

Note: In the oil and gas industry, upstream activities include exploration, drilling, production and field processing and downstream activities include refining, storage and distribution.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 24. Contribution of the oil and gas industry to total air pollutant emissions by activity type, Canada,

Activity type	Sulphur oxides (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)	Carbon monoxide (emissions in kilotonnes)	Fine particulate matter (emissions in kilotonnes)	Ammonia (emissions in kilotonnes)
Upstream oil and gas	226.6	517.0	431.8	505.6	11.5	2.6
Downstream oil and gas	37.7	23.6	19.8	32.9	1.5	<0.1

Note: In the oil and gas industry, upstream activities include exploration, drilling, production and field processing and downstream activities include refining, storage and distribution.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 20. Data for Figure 25. Changes in emissions of key air pollutants from the oil and gas industry, Canada, 1990 to

Year	Carbon monoxide (percentage change from 1990 level)	Nitrogen oxides (percentage change from 1990 level)	Volatile organic compounds (percentage change from 1990 level)	Sulphur oxides (percentage change from 1990 level)
1990	0	0	0	0
1991	-3	-2	-1	1
1992	1	3	2	8
1993	8	10	6	14
1994	19	19	9	13
1995	21	24	11	12
1996	25	28	16	12
1997	40	40	13	3
1998	45	44	16	-2
1999	49	49	8	-4
2000	32	33	10	-4
2001	40	31	11	-7
2002	50	32	13	-13
2003	58	43	12	-11
2004	50	24	8	-13

Year	Carbon monoxide (percentage change from 1990 level)	Nitrogen oxides (percentage change from 1990 level)	Volatile organic compounds (percentage change from 1990 level)	Sulphur oxides (percentage change from 1990 level)
2005	48	24	8	-14
2006	50	24	4	-21
2007	56	31	3	-25
2008	61	34	5	-29
2009	57	32	-3	-31
2010	55	30	-6	-37
2011	58	33	-8	-39
2012	58	31	0	-38
2013	68	32	8	-41
2014	63	35	14	-46
2015	65	35	10	-51
2016	60	33	-1	-54
2017	64	35	2	-52
2018	69	37	5	-50
2019	61	36	1	-50
2020	53	29	-13	-55
2021	61	28	-13	-51
2022	56	29	-12	-48
2023	61	31	-11	-51

Note: Fine particulate matter and ammonia are not shown in the table due to their low share ($\leq 1\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 25. Changes in emissions of key air pollutants from the oil and gas industry, Canada, 1990 to

Year	Carbon monoxide (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)	Sulphur oxides (emissions in kilotonnes)
1990	334	344	607	536
1991	324	337	602	542
1992	338	353	616	581
1993	361	378	644	608
1994	398	410	662	605
1995	405	426	673	598
1996	417	438	701	597
1997	467	482	688	553
1998	485	494	701	523
1999	497	511	654	516
2000	442	456	668	513
2001	466	451	672	498
2002	500	452	684	468
2003	529	493	677	476

Year	Carbon monoxide (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)	Sulphur oxides (emissions in kilotonnes)
2004	501	427	656	468
2005	493	428	652	462
2006	502	427	630	424
2007	522	450	627	402
2008	539	460	634	378
2009	523	455	587	372
2010	518	445	569	339
2011	527	457	557	328
2012	529	450	608	331
2013	561	454	658	315
2014	544	462	694	287
2015	552	464	666	261
2016	533	456	599	246
2017	547	464	616	255
2018	564	470	638	266
2019	537	468	614	267
2020	510	444	526	244
2021	536	439	525	263
2022	522	443	533	277
2023	539	452	541	264

Note: Fine particulate matter and ammonia are not shown in the table due to their low share ($\leq 1\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 21. Data for Figure 26. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada,

Transportation mode	Carbon monoxide (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Fine particulate matter (percentage of national emissions)	Sulphur oxides (percentage of national emissions)	Ammonia (percentage of national emissions)
Passenger cars and motorcycles	7.7	1.0	1.6	<0.1	<0.1	0.4
Passenger light trucks	10.8	1.8	1.9	0.1	0.1	0.7
Large trucks and buses	2.7	10.1	0.8	0.3	<0.1	0.2
Air, marine and rail travel	1.0	11.7	0.6	0.2	0.3	<0.1
Off-road vehicles and equipment, tire wear and brake lining	37.9	13.4	9.3	1.1	<0.1	0.1

Note: "Passenger cars and motorcycles" include light-duty vehicles powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines as well as all types of motorcycles. "Passenger light trucks" include light-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines. "Large trucks and buses" include heavy-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 26. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada,

Transportation mode	Carbon monoxide (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)	Fine particulate matter (emissions in kilotonnes)	Sulphur oxides (emissions in kilotonnes)	Ammonia (emissions in kilotonnes)
Passenger cars and motorcycles	348.2	12.0	22.4	0.4	0.2	2.0
Passenger light trucks	485.8	22.2	25.6	0.8	0.4	3.3
Large trucks and buses	123.3	123.9	10.3	3.5	0.2	1.2
Air, marine and rail travel	43.8	144.2	7.9	2.3	2.1	<0.1
Off-road vehicles and equipment, tire wear and brake lining	1 712.7	164.6	127.6	15.7	0.2	0.4

Note: "Passenger cars and motorcycles" include light-duty vehicles powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines as well as all types of motorcycles. "Passenger light trucks" include light-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines. "Large trucks and buses" include heavy-duty trucks powered by motor gasoline, diesel, liquefied petroleum gas and compressed natural gas engines.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 22. Data for Figure 27. Changes in emissions of key air pollutants from transportation, off-road vehicles and mobile equipment, Canada, 1990 to

Year	Nitrogen oxides (percentage change from 1990 level)	Carbon monoxide (percentage change from 1990 level)	Volatile organic compounds (percentage change from 1990 level)
1990	0	0	0
1991	-3	-5	-2
1992	0	-5	1
1993	6	-5	5
1994	15	-4	11
1995	19	-2	20
1996	22	-3	25
1997	26	-4	28
1998	26	-5	32
1999	25	-7	33
2000	23	-9	29
2001	16	-11	27
2002	12	-12	24
2003	8	-18	18
2004	3	-24	13
2005	-1	-31	5
2006	-7	-36	-3
2007	-10	-45	-11
2008	-15	-50	-19
2009	-22	-52	-25

Year	Nitrogen oxides (percentage change from 1990 level)	Carbon monoxide (percentage change from 1990 level)	Volatile organic compounds (percentage change from 1990 level)
2010	-22	-50	-26
2011	-29	-55	-34
2012	-34	-58	-40
2013	-37	-60	-44
2014	-41	-64	-50
2015	-45	-66	-54
2016	-50	-66	-55
2017	-51	-67	-58
2018	-52	-67	-60
2019	-54	-68	-62
2020	-61	-72	-67
2021	-62	-71	-68
2022	-62	-72	-69
2023	-63	-72	-69

Note: Fine particulate matter, sulphur oxides and ammonia are not shown in the table due to their low share ($\leq 5\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 27. Changes in emissions of key air pollutants from transportation, off-road vehicles and mobile equipment, Canada, 1990 to

Year	Nitrogen oxides (emissions in kilotonnes)	Carbon monoxide (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)
1990	1 261.5	9 581.4	633.9
1991	1 227.9	9 136.4	622.3
1992	1 264.2	9 148.0	642.0
1993	1 335.9	9 084.1	667.5
1994	1 451.5	9 197.8	706.4
1995	1 500.5	9 411.6	759.3
1996	1 543.6	9 299.5	789.7
1997	1 593.4	9 186.7	813.4
1998	1 589.5	9 095.5	833.5
1999	1 574.7	8 910.2	842.2
2000	1 554.7	8 756.8	819.8
2001	1 469.4	8 559.0	805.2
2002	1 407.2	8 399.7	787.7
2003	1 357.0	7 811.5	746.4
2004	1 304.8	7 312.2	715.3
2005	1 251.3	6 646.7	664.5
2006	1 172.8	6 138.5	616.0
2007	1 131.3	5 252.0	563.6
2008	1 070.0	4 799.5	511.0

Year	Nitrogen oxides (emissions in kilotonnes)	Carbon monoxide (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)
2009	979.6	4 571.2	475.0
2010	978.8	4 753.6	468.5
2011	895.9	4 273.6	416.3
2012	829.9	3 980.1	382.4
2013	792.9	3 844.0	358.1
2014	739.5	3 468.0	316.0
2015	691.6	3 272.1	294.2
2016	627.1	3 303.4	283.4
2017	621.7	3 198.1	266.6
2018	610.8	3 129.3	253.8
2019	578.0	3 065.2	240.8
2020	490.8	2 704.5	207.8
2021	483.2	2 780.5	204.5
2022	475.2	2 681.3	195.4
2023	467.0	2 713.9	193.8

Note: Fine particulate matter, sulphur oxides and ammonia are not shown in the table due to their low share ($\leq 5\%$) of total emissions in 2023.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A.23. Data for Figure 28. Contribution of electric utilities to total air pollutant emissions by fuel source, Canada,

Fuel source	Sulphur oxides (percentage of national emissions)	Nitrogen oxides (percentage of national emissions)	Carbon monoxide (percentage of national emissions)	Fine particulate matter (percentage of national emissions)	Volatile organic compounds (percentage of national emissions)	Ammonia (percentage of national emissions)
Coal	20.5	3.8	0.3	<0.1	<0.1	n/a
Natural gas	0.2	2.0	0.4	<0.1	<0.1	<0.1
Diesel	<0.1	0.9	<0.1	<0.1	<0.1	<0.1
Other sources	1.5	0.6	<0.1	<0.1	<0.1	<0.1

Note: n/a = not available. Excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose. "Other" fuel sources include waste material and other uncategorized sources of electricity generation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 28. Contribution of electric utilities to total air pollutant emissions by fuel source, Canada,

Fuel source	Sulphur oxides (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)	Carbon monoxide (emissions in kilotonnes)	Fine particulate matter (emissions in kilotonnes)	Volatile organic compounds (emissions in kilotonnes)	Ammonia (emissions in kilotonnes)
Coal	124.5	46.4	14.1	0.8	0.2	n/a
Natural gas	1.3	25.1	16.0	0.3	1.2	0.3
Diesel	<0.1	11.3	2.8	0.2	0.1	n/a
Other sources	9.0	7.2	5.7	0.5	0.2	0.1

Note: n/a = not available. Excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose. "Other" fuel sources include waste material and other uncategorized sources of electricity generation.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Table A. 24. Data for Figure 29. Changes in emissions of key air pollutants from electric utilities, Canada, 1990 to

Year	Sulphur oxides (percentage change from 1990 level)	Nitrogen oxides (percentage change from 1990 level)
1990	0	0
1991	-4	-2
1992	-1	2
1993	-12	-5
1994	-9	-7
1995	-14	-3
1996	-12	5
1997	-4	12
1998	-2	21
1999	-3	19
2000	0	27
2001	1	22
2002	1	23
2003	2	14
2004	-6	4
2005	-16	-1
2006	-26	-13
2007	-20	-7
2008	-31	-12
2009	-38	-15
2010	-46	-9
2011	-53	-22
2012	-54	-35
2013	-55	-37

Year	Sulphur oxides (percentage change from 1990 level)	Nitrogen oxides (percentage change from 1990 level)
2014	-56	-35
2015	-59	-41
2016	-59	-41
2017	-60	-44
2018	-64	-50
2019	-67	-51
2020	-73	-60
2021	-73	-61
2022	-75	-64
2023	-78	-65

Note: Carbon monoxide, fine particulate matter, volatile organic compounds and ammonia are not shown in the table due to their low share ($\leq 1\%$) of total emissions in 2023. The indicator excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information for Figure 29. Changes in emissions of key air pollutants from electric utilities, Canada, 1990 to

Year	Sulphur oxides (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)
1990	618	257
1991	592	251
1992	611	263
1993	547	243
1994	560	240
1995	533	248
1996	542	269
1997	591	288
1998	604	310
1999	601	306
2000	619	327
2001	624	313
2002	624	315
2003	630	293
2004	582	267
2005	522	254
2006	459	224
2007	492	239
2008	427	225
2009	384	218
2010	334	234
2011	293	200

Year	Sulphur oxides (emissions in kilotonnes)	Nitrogen oxides (emissions in kilotonnes)
2012	284	166
2013	278	162
2014	269	167
2015	251	152
2016	253	152
2017	245	145
2018	220	129
2019	205	125
2020	168	102
2021	169	100
2022	154	94
2023	135	90

Note: Carbon monoxide, fine particulate matter, volatile organic compounds and ammonia are not shown in the table due to their low share ($\leq 1\%$) of total emissions in 2023. The indicator excludes emissions from industries that generate electricity and heat as a supporting activity rather than as their primary purpose.

Source: Environment and Climate Change Canada (2025) [Air Pollutant Emissions Inventory](#).

Additional information can be obtained at:

Environment and Climate Change Canada
Public Inquiries Centre
Place Vincent Massey Building
351 Saint-Joseph Boulevard
Gatineau QC K1A 0H3
Toll Free: 1-800-668-6767
Email: enviroinfo@ec.gc.ca