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EMISSIONS OF HARMFUL SUBSTANCES TO AIR

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

Canada

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

EMISSIONS OF HARMFUL SUBSTANCES TO AIR

August 2025

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Emissions of harmful substances to air

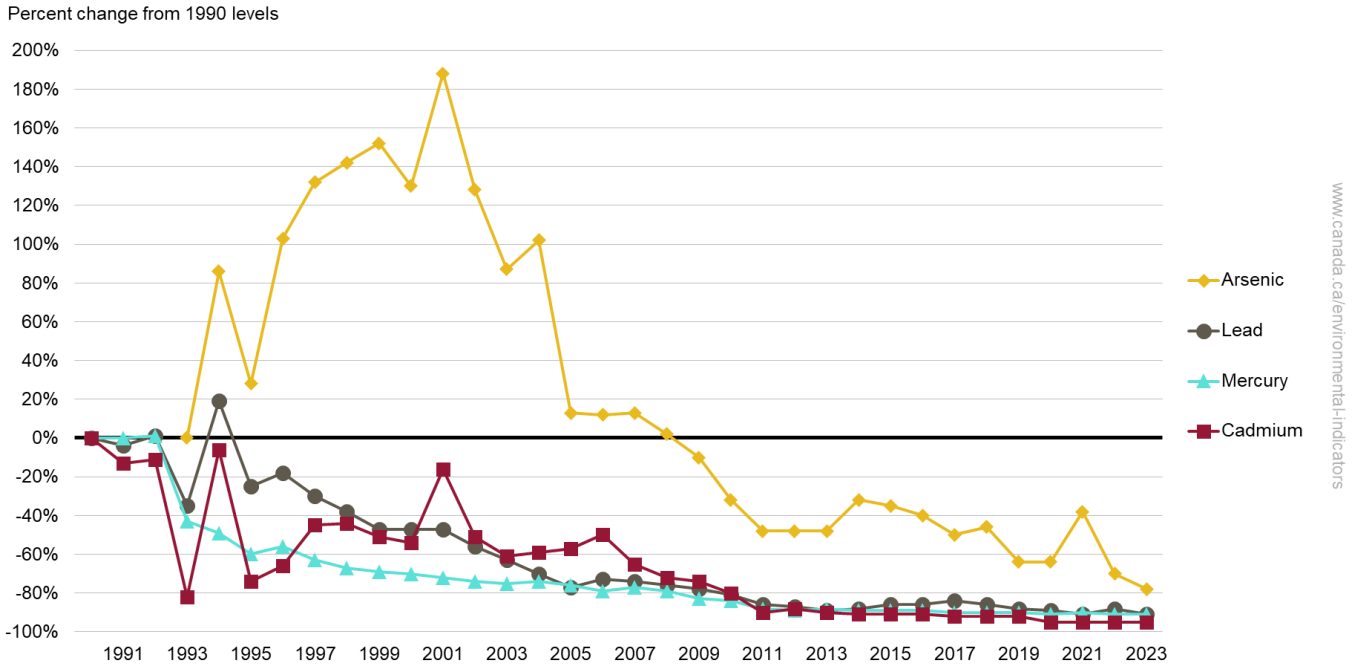
Mercury, lead, cadmium and arsenic are listed as toxic[1] substances under the *Canadian Environmental Protection Act, 1999* (CEPA, 1999). Small particles of toxic metals can travel long distances in the air, be inhaled, or settle on the ground and in water. From there, the particles can enter the food web and build up in the tissues of living organisms. Exposure to these substances, even in small amounts, can be hazardous to humans and ecosystems.

The emissions of harmful substances to air indicator reports on mercury, lead and cadmium emissions from human-related activities using data from the Air Pollutant Emissions Inventory (APEI). It also reports on arsenic[2] emissions based on facility reporting to the National Pollutant Release Inventory (NPRI).

Key results

- In 2023, mercury, lead and cadmium emissions had decreased by 91%, 91% and 95%, respectively from 1990 levels
- In 2023, arsenic facility-based emissions had decreased by 78% from 1993 levels[2]

Figure 1. Percentage change of mercury, lead and cadmium emissions from 1990 level and arsenic emissions from 1993 level, Canada



Data for Figure 1

Note: The indicator reports emissions from human-related activities only for mercury, lead and cadmium and facility-based emissions for arsenic. It does not include emissions from natural sources such as forest fires or volcanoes. Facility-based reporting for arsenic emissions did not begin until 1993.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory and National Pollutant Release Inventory.

[1] Section 64 of the *Canadian Environmental Protection Act, 1999*, defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

[2] Mercury, lead and cadmium use data from the Air Pollutant Emissions Inventory (APEI) starting in 1990. However, arsenic is not reported in the APEI and, therefore, arsenic emissions are from facility-based reporting only, using data from the National Pollutant Release Inventory (NPRI). Facility-based reporting did not begin until 1993.

The decreases in mercury, lead, cadmium and arsenic emissions are mostly attributed to large reductions in emissions from the non-ferrous smelting and refining industry. This decline was primarily due to the implementation of mandatory pollution prevention plans under CEPA 1999, closing of outdated smelters, compliance with federal and provincial legislation, and conformance with guidelines introduced over this period. The changes in facility processes and adoption of emission reduction technologies also contributed to the reduction of mercury emissions.

However, emissions of mercury have not changed substantially since 2011. This may be due to a range of competing factors such as increases in production levels offset by the ongoing implementation of cleaner technologies, facility closures and regulations coming into force in the earlier years.

While overall lead emissions declined between 1990 and 2023, they did increase slightly from 2014 to 2017 but continued to decline afterwards. These reductions are partly due to the closure of some non-ferrous metal smelting and refining facilities, the installation of more efficient emission control equipment, changes in lead concentrations in smelter feed and changes in production levels at some facilities.

Cadmium emissions fluctuated between 1990 and 2006 but decreased steadily starting in 2007, before declining sharply in 2010. Fluctuations in cadmium emissions prior to 2010 are mostly driven by emissions from a non-ferrous smelting and refining facility in Manitoba that is now closed.

Reporting to the National Pollutant Release Inventory (NPRI) of facility-based arsenic emissions did not begin until 1993. Arsenic emissions from facilities fluctuated between 1993 and 2004 but decreased drastically in 2005 and continued to steadily decline since. Fluctuations in facility-based arsenic emissions prior to 2005 are mostly driven by a foundry facility in Quebec that was required to lower its arsenic emissions. Fluctuations were also driven by changes to NPRI reporting in 2002.

For more detailed information on emissions from industrial, commercial and institutional facilities, visit the Canadian Environmental Sustainability Indicator's interactive maps.

Emissions of mercury to air

Mercury is a naturally occurring metal that can be emitted to the air by natural processes (like melting permafrost, volcanic activity, and soil and rock erosion), human activities (such as coal-fired electricity generation and waste incineration and treatment) and the improper disposal of mercury-containing products (such as batteries, thermometers and fluorescent lamps).

Mercury emissions are both a local and a global concern. Mercury can travel long distances in the atmosphere and may settle anywhere in Canada, including in ecologically sensitive areas such as the Canadian Arctic and the Great Lakes. Mercury that has accumulated in the environment can be re-emitted into the atmosphere through natural processes, such as temperature change and microbial activity, or human activities that disturb mercury-laden sites. Re-emission of mercury is a more significant source of atmospheric pollution than anthropogenic emissions from Canadian sources because it involves the release of mercury that has been accumulated over decades in the environment, which exceeds current direct emissions.[3]

Mercury can have significant negative impacts on human health and the environment as mercury persists in the environment and accumulates in food chains over time, up to several decades. In humans, exposure poses a particular risk to populations who rely heavily on the consumption of aquatic and marine species, such as northern and Indigenous communities, whose traditional diets typically include predatory fish (for example, freshwater trout and Arctic char) and marine mammals.

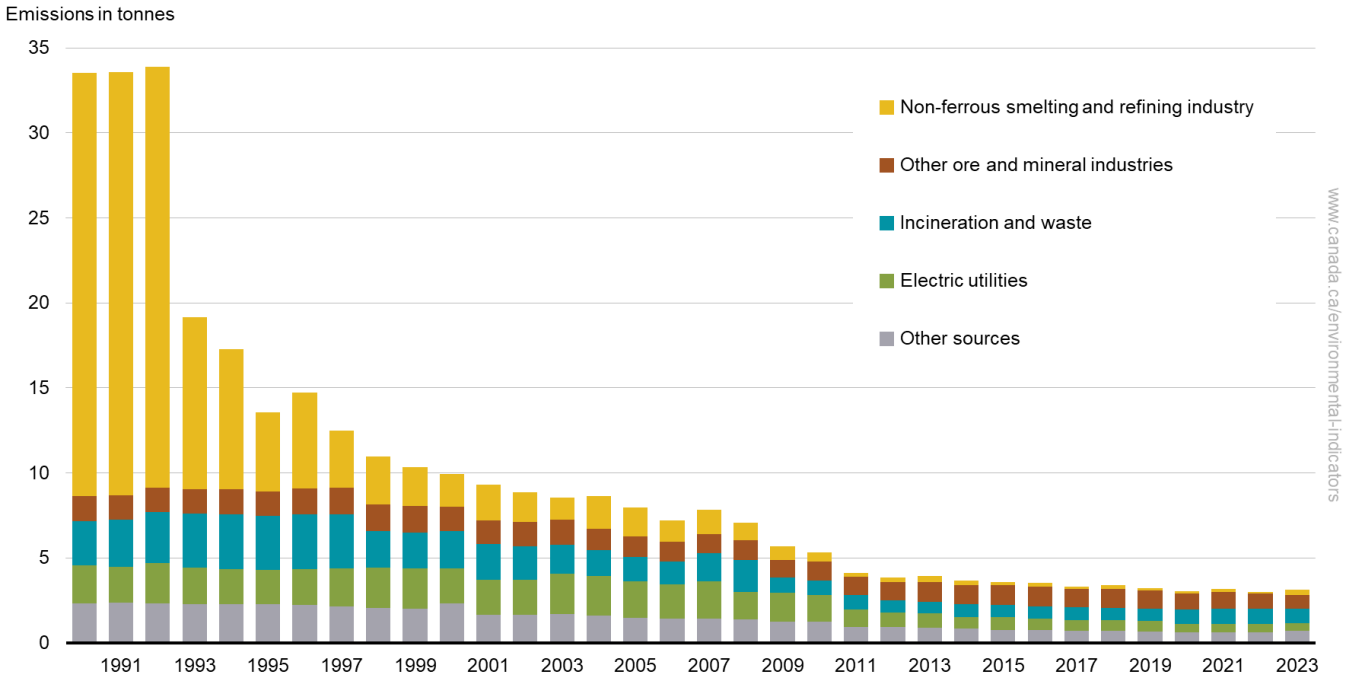
This indicator reports on mercury emissions from human-related activities using data from the Air Pollutant Emissions Inventory (APEI).

[3] Environment and Climate Change Canada (2016) Mercury Science Assessment Report. Retrieved on April 28, 2025.

Key results

- In 2023, 3.13 tonnes of mercury were emitted from anthropogenic sources in Canada
    - Combined emissions from the ore and mineral industries, including the non-ferrous smelting and refining industry (11% or 0.33 tonnes), the iron and steel industry (10% or 0.32 tonnes), other ore and mineral industries (8% or 0.26 tonnes) and the cement and concrete industry (6% or 0.19 tonnes), collectively emitted 35% (or 1.1 tonnes) of the annual total
    - Incineration and waste represented the highest emitting sector, emitting 28% (or 0.86 tonnes) of the annual total
- Between 1990 and 2023, mercury emissions decreased by 91% (or 30.4 tonnes)

Figure 2. Mercury emissions to air by source, Canada, 1990 to 2023



Data for Figure 2

Note: The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), building heating and energy generation, home firewood burning, manufacturing, the oil and gas industry, transportation (road, rail, air and marine) and other miscellaneous sources. Other ore and mineral industries include the aluminum industry, the asphalt paving industry, cement and concrete, iron and steel industries, iron ore industry and mining and rock quarrying. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

The largest reduction in mercury emissions from a single anthropogenic source between 1990 and 2023 was from the non-ferrous smelting and refining industry. This industry reduced its emissions by 98.7% (from 24.9 tonnes in 1990 to 0.33 tonnes in 2023), contributing to 81% of the overall emissions reduction of mercury. National emissions drastically decreased by 43% between 1992 and 1993 and have generally continued to steadily decrease since. The sharp decline in mercury emissions between 1992 and 1993 was largely due to a major process change at a smelter in Manitoba, which significantly reduced mercury emissions from what was, then, Canada's largest point source. Additional closures and modernizations of smelters across Canada and pollution prevention regulations and standards also helped reduce mercury emissions during this period.

The reductions between 1990 and 2023 were primarily due to changes in facility processes and adoption of emission reduction technologies, the closing of outdated smelters, compliance with federal and provincial legislation, and conformance with guidelines.

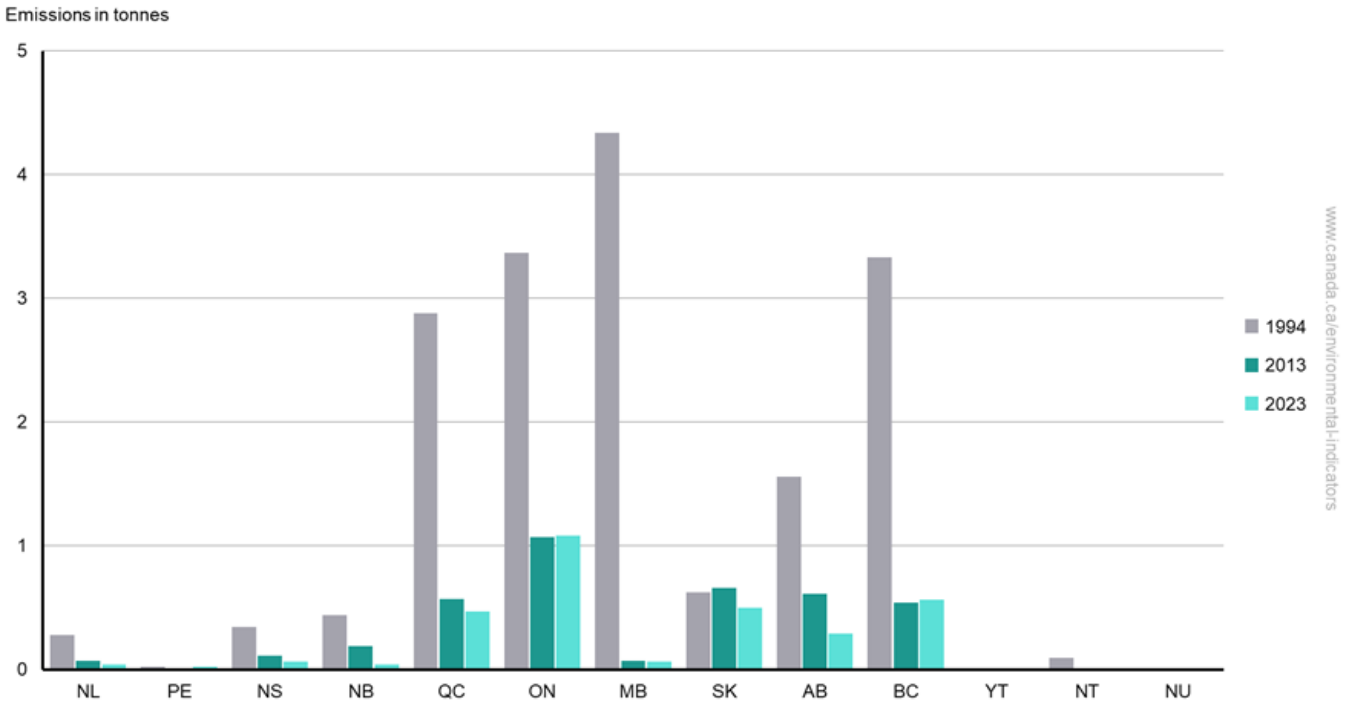
Between 1990 and 2023, emissions from electric utilities, and incineration and waste declined by 79% and 67% (1.8 and 1.7 tonnes), respectively. The decrease from electric utilities was largely due to the closure of coal-fired power plants.[4] Combined, these two sources contributed 11% to the total decrease in mercury emissions.

Mercury emissions to air by province and territory

Key results

- In 2023, Ontario (35%), British Columbia (18%) and Saskatchewan (16%) accounted for 68% of national mercury emissions
- Between 1994 and 2023[5], Manitoba had the largest reduction in annual emissions with a decrease of 4.3 tonnes

Figure 3. Mercury emissions to air by province and territory, Canada, 1994, 2013 and 2023



Data for Figure 3

Note: Emissions from the Northwest Territories for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. Some reported emissions from Newfoundland and Labrador, Prince Edward Island, New Brunswick, Yukon, the Northwest Territories and Nunavut are too small to see in the figure. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

In 2023, Ontario had the highest mercury emissions, accounting for 35% (1.1 tonnes) of the national total. These emissions came mostly from the incineration and waste sector, the iron and steel industry, and the mining and rock quarrying industry, which together accounted for 58% of the total provincial emissions.

[4] In October 2006, the Canadian Council of Ministers of the Environment endorsed the Canada-wide standards for mercury emissions from coal-fired electric power generation plants (PDF; 137 kB) to significantly reduce mercury emissions from the coal-fired electric power generation sector.

[5] Data from 1990 to 1993 were not considered in the provincial and territorial indicators, as a significant amount of emissions could not be assigned to any province or territory.

Table 1. The largest source of mercury emissions to air within each province and territory, 2023

Province and Territory	Largest source of mercury emissions
Newfoundland and Labrador	Other ore and mineral industries (specifically the iron ore industry)
Prince Edward Island	Incineration and waste industry
Nova Scotia	Electric utilities (mostly coal power plants)
New Brunswick	Incineration and waste industry
Quebec	Incineration and waste industry
Ontario	Incineration and waste industry
Manitoba	Incineration and waste industry
Saskatchewan	Electric utilities (mostly coal power plants)
Alberta	Incineration and waste industry
British Columbia	Non-ferrous smelting and refining industry
Yukon	Incineration and waste industry
Northwest Territories	Other ore and mineral industries (specifically the mining and rock quarrying industry)
Nunavut	Incineration and waste industry

All provinces and territories had lower emissions in 2023 compared to 1994, with the caveat that Nunavut, which separated from the Northwest Territories in 1999 and thus lacks data for comparison to 1994. Manitoba had the largest decline in emissions between 1994 and 2023. This decline was mostly due to changes in zinc processing technology and production levels, and the closure of an outdated copper smelter at a non-ferrous smelting and refining facility.

Mercury emissions from most of the provinces and territories have declined or remained stable since 1994, except for Saskatchewan. The province had an overall increase in emissions from 1994 to 2008, followed by a gradual decline until 2014.

Alberta had the largest decrease in emissions between 2013 and 2023 (0.3 tonnes). This decline was largely from electric utilities, likely due to the closure of coal-fired power plants.[6]

Mercury emissions to air from facilities

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

The Canadian Environmental Sustainability Indicators provide access to this information through an online interactive map. The map allows users to explore rates of mercury emissions to air from individual facilities.

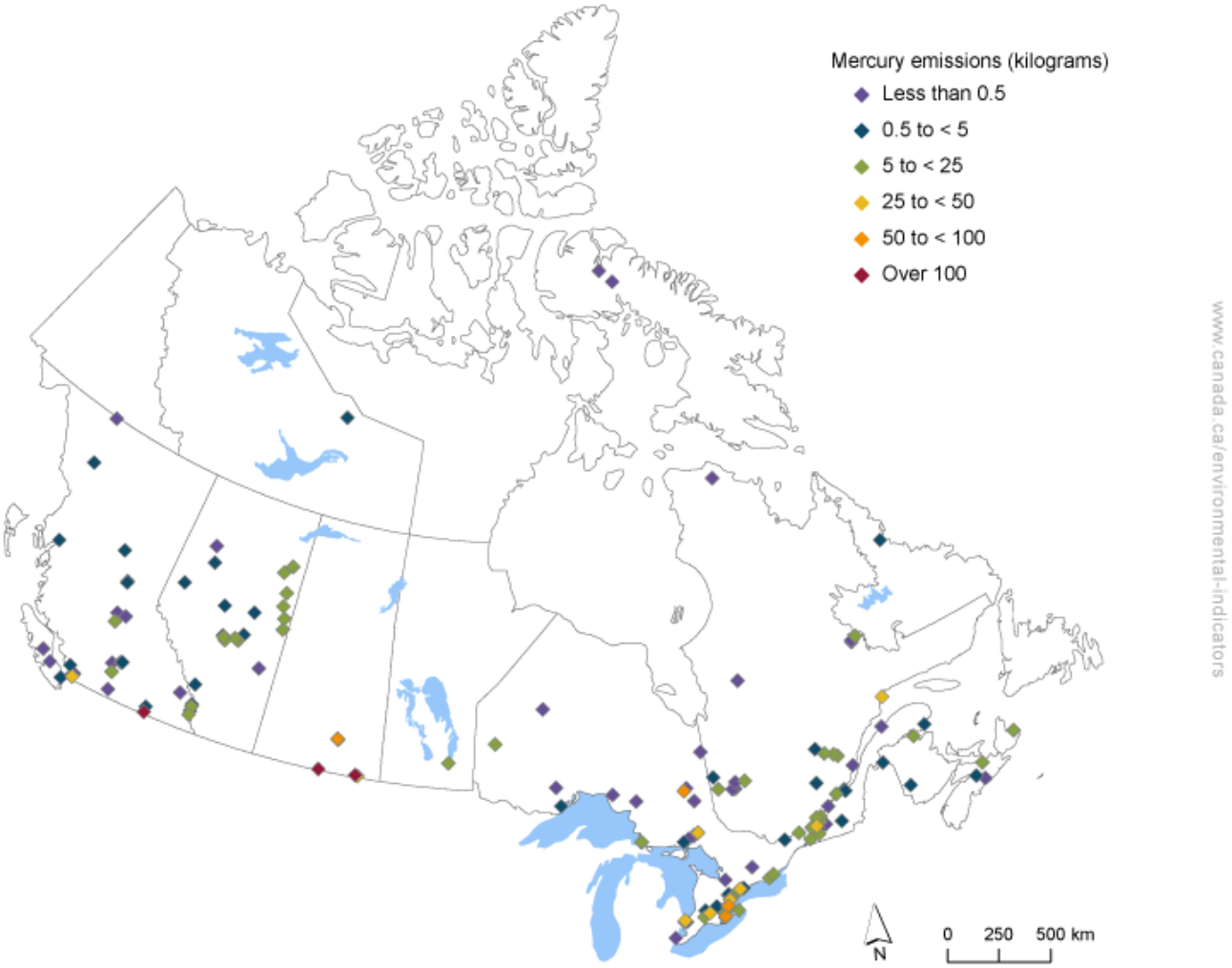
In 2023, facility-reported mercury emissions represent 62% of total national mercury emissions.[7] Of these facilities:

- 59 facilities reported emissions under 0.5 kilogram (kg)
- 106 facilities reported emissions between 0.5 to 100 kg
- 3 facilities reported emissions over 100 kg, located in Saskatchewan (2) and British Columbia (1)

[6] In October 2006, the Canadian Council of Ministers of the Environment endorsed the Canada-wide standards for mercury emissions from coal-fired electric power generation plants (PDF; 137 kB) to significantly reduce mercury emissions from the coal-fired electric power generation sector.

[7] The percentage of facility-reported emissions are calculated using the total facility-reported emissions from National Pollutant Release Inventory. As facilities are only mandated to report when the reporting criteria is met, the percentage may not align with the Air Pollutant Emissions Inventory.

Figure 4. Mercury emissions to air by facility, Canada, 2023



Navigate data using the interactive map

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

Global mercury emissions to air

Mercury in the air can travel hundreds to thousands of kilometres via air masses before being deposited to the environment.[8] Environment and Climate Change Canada estimates that over 95% of the human-related mercury deposited in Canada came from sources outside of the country [9].

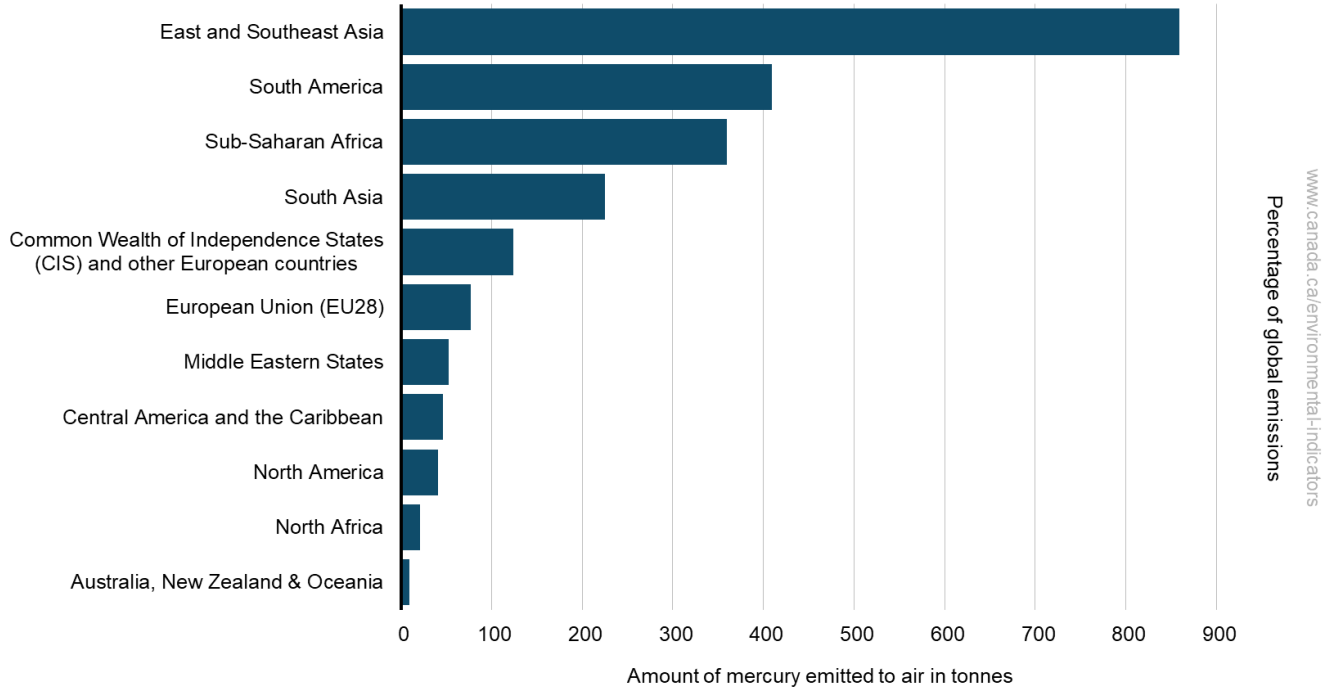
[8] Durnford D et al. (2010) Long range transport of mercury to the Arctic and across Canada. Atmospheric Chemistry and Physics 10(2):4673–4717. Retrieved on April 28, 2025.

[9] Environment and Climate Change Canada (2016) Canadian Mercury Science Assessment Report. Retrieved on April 28, 2025.

Key results

- In 2015, the latest year for which data are available, global mercury emissions[10] to air from human activity were estimated to be 2 220 tonnes
- The East and Southeast Asia, South America and Sub-Saharan Africa regions accounted for 73% of the global total
- The North America region (which includes only Canada and the United States) emitted 40 tonnes, or about 2% of the global total
- Canada emitted less than 5 tonnes or about 0.2% of the global total

Figure 5. Global mercury emissions to air, 2015



Data for Figure 5

Note: CIS = Commonwealth of Independent States. The CIS includes Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. The 28 member countries of the European Union includes Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. The North American region includes only Canada and the United States, Mexico is grouped into the Central America and the Caribbean region.
Source: United Nations Environmental Program (2019) Global Mercury Assessment 2018.

Emissions of lead to air

Lead is a naturally occurring metal found in the Earth's crust which can be released during natural processes, such as rock and soil erosion. However, in Canada, most lead emissions come from industrial activities, such as metal smelting and refining, and various combustion processes. Lead is also used in the manufacture of vehicle lead-acid batteries worldwide, as well as pipes, sheeting, and within glass to prevent radiation exposure from television and computer screens.

[10] United Nations Environment Programme (2019) Global Mercury Assessment 2018. The global emissions were compiled by the United Nations Environment Programme and are independent of Canada's mercury emission estimates. The use of different calculation estimates and different source classifications account for the differences in Canada's mercury emissions as reported in the global comparison indicator and in the Canadian mercury indicator for 2015.

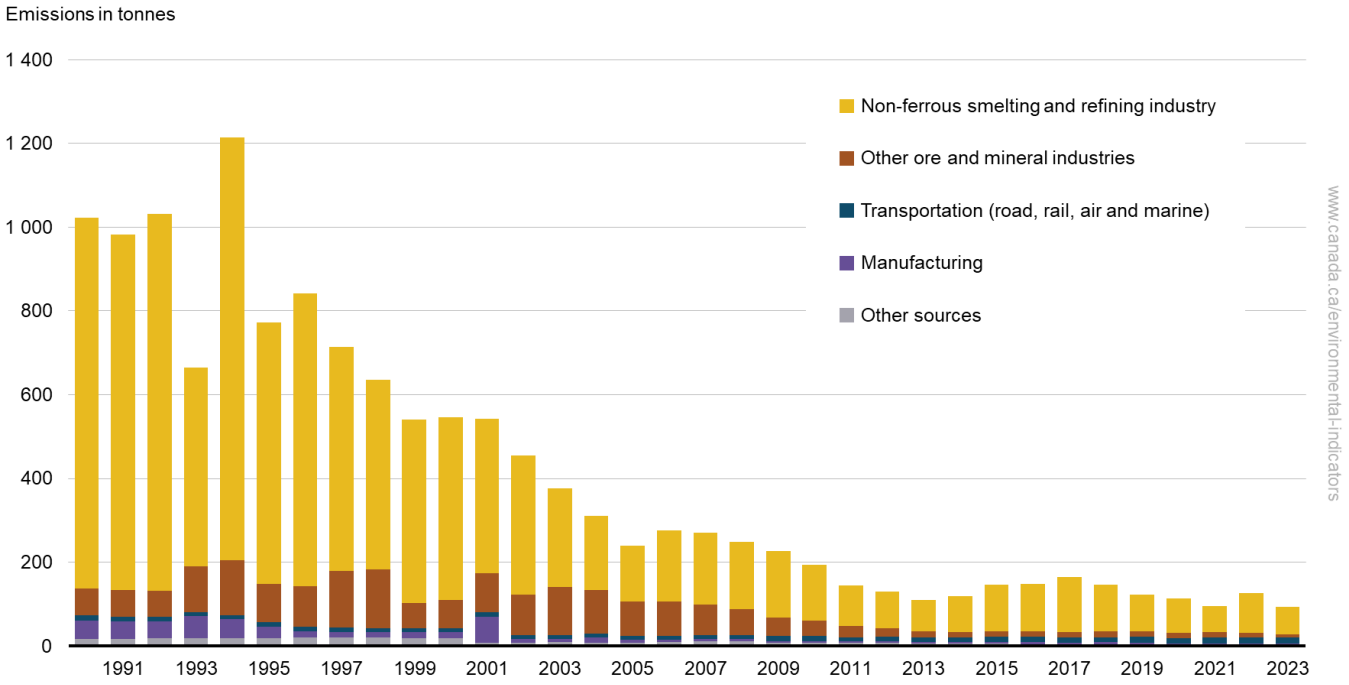
Lead emissions to air can be deposited on land or water surfaces and accumulate in soils, sediments, humans and wildlife. Exposure to lead, even in small amounts, can be hazardous to humans and wildlife. In humans, chronic exposure to relatively low levels may affect the central and peripheral nervous systems, blood pressure, and renal function, and may result in reproductive problems and developmental neurotoxicity.

This indicator reports on lead emissions from human-related activities using data from the Air Pollutant Emissions Inventory (APEI).

Key results

- In 2023, 93.3 tonnes of lead were emitted in Canada
- The largest source of lead emissions has been the non-ferrous smelting and refining industry since 1990. These emissions accounted for 70% (or 65.3 tonnes) of total emissions in 2023
- Between 1990 and 2023, national lead emissions decreased by 91% (or 930.1 tonnes)

Figure 6. Lead emissions to air by source, Canada, 1990 to 2023



Data for Figure 6

Note: The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), building heating and energy generation, electric utilities, home firewood burning, incineration and waste, off-road vehicles and mobile equipment, the oil and gas industry, paints and solvents and other miscellaneous sources. The other ore and mineral industries include the aluminum industry, the asphalt paving industry, the cement and concrete industry, foundries, iron and steel industry, iron pelletizing mining and rock quarrying and the mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

The largest reduction in lead emissions between 1990 and 2023 was from the non-ferrous smelting and refining industry (93% or 821 tonnes). The decline was due to the 2006 publication of a Pollution Prevention Planning Notice targeting base metal smelters and refineries and zinc plants (BMS P2 Notice)[11] and the installation of more efficient emission control equipment in operating smelters, along with the closure of outdated smelters in 2010, 2018 and 2019. The majority of emissions prior to 2010 are due to 2 non-ferrous smelting and refining facilities, one located in Quebec and the other located in Manitoba.

[11] The 2006 publication of a Pollution Prevention Planning Notice required the preparation and implementation of pollution prevention plans in respect to specified toxic substances released from base metal smelters and refineries and zinc plants.

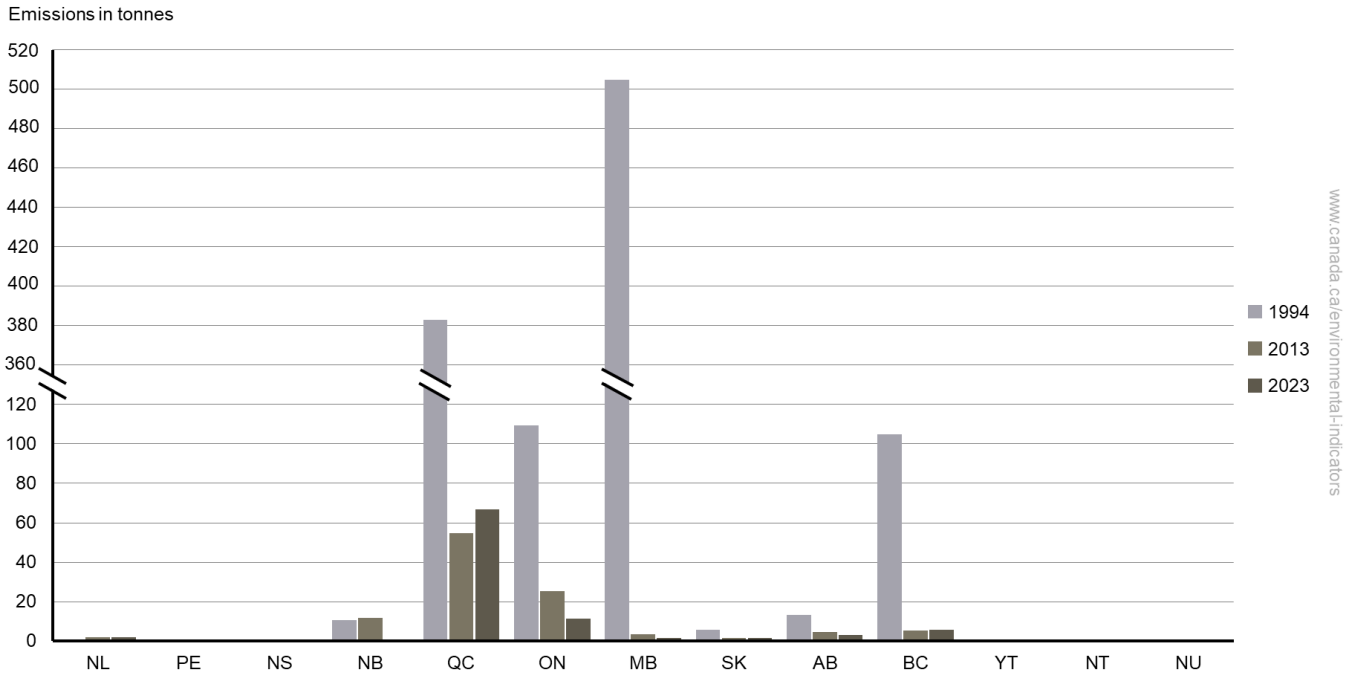
From 2014 to 2017, national lead emissions increased slightly; however, emissions began to decrease gradually from 2018 onwards. The decrease in lead emissions is mostly attributable to the implementation of pollution prevention plans under the BMS P2 Notice and the implementation of the base-level industrial emissions requirements (BLIERs), and the development for the non-ferrous smelting and refining industry through environmental performance agreements (EPAs).[12] Some fluctuations in national emissions may be due to changes in lead concentrations in smelter feed, changes in production levels at some facilities and the closure of smelters in Manitoba in 2018 and New Brunswick in 2019.

Lead emissions to air by province and territory

Key results

- In 2023, Quebec and Ontario accounted for 72% and 12% of national lead emissions, respectively
- Between 1994 and 2023[13], Manitoba had the largest decrease in annual emissions of 503.5 tonnes

Figure 7. Lead emissions to air by province and territory, Canada, 1994, 2013 and 2023



Data for Figure 7

Note: Emissions from the Northwest Territories for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. Some reported emissions from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, Saskatchewan, Yukon, the Northwest Territories and Nunavut are too small to see in the figure. Some legacy data for 1994 that cannot be attributed to any province or territory are excluded from the figure. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

In 2023, Quebec had the highest lead emissions in Canada, accounting for 72% (66.9 tonnes) of national emissions. These emissions came mostly from the non-ferrous smelting and refining industry and accounted for 90% of the total provincial emissions.

[12] The 2018 base metal smelter and refineries and zinc plants Environmental Performance Agreements (BMS EPAs) were developed with the objective of implementing the base-level industrial emissions requirements (BLIERS) for emissions of sulphur dioxide (SO_2) and particulate matter (PM), developed for the base metals smelting and refining sector. This agreement is in effect until December 2025.

[13] Data from 1990 to 1993 were not considered in the provincial and territorial indicators, as a significant amount of emissions could not be assigned to any province or territory.

Table 2. The largest source of lead emissions to air within each province and territory, 2023

Province and Territory	Largest source of lead emissions
Newfoundland and Labrador	Other ore and mineral industries (specifically the iron ore industry)
Prince Edward Island	Transportation (road, rail, air and marine)
Nova Scotia	Transportation (road, rail, air and marine)
New Brunswick	Transportation (road, rail, air and marine)
Quebec	Non-ferrous smelting and refining industry
Ontario	Non-ferrous smelting and refining industry
Manitoba	Transportation (road, rail, air and marine)
Saskatchewan	Transportation (road, rail, air and marine)
Alberta	Transportation (road, rail, air and marine)
British Columbia	Transportation (road, rail, air and marine)
Yukon	Transportation (road, rail, air and marine)
Northwest Territories	Transportation (road, rail, air and marine)
Nunavut	Transportation (road, rail, air and marine)

Between 1994 and 2023, Manitoba and Quebec experienced the largest emission reductions with 503.5 tonnes (99.7%) and 316.2 tonnes (82.5%), respectively. These declines were mostly due to the reduced emissions from the non-ferrous smelting and refining industry.

New Brunswick and Newfoundland and Labrador had slight increases in lead emissions between 1994 and 2013, although emissions in both provinces declined between 2013 and 2023.

In most provinces, emissions continued to decrease or remained stable from 2013 to 2023, except for Quebec. Ontario had the largest decrease in emissions (14.3 tonnes, 56%) between 2013 and 2023, largely from the non-ferrous smelting and refining industry. This decrease was mostly due to process changes and the implementation of pollutant prevention plans under the BMS P2 Notice combined with the implementation of the EPAs.

Lead emissions to air from facilities

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

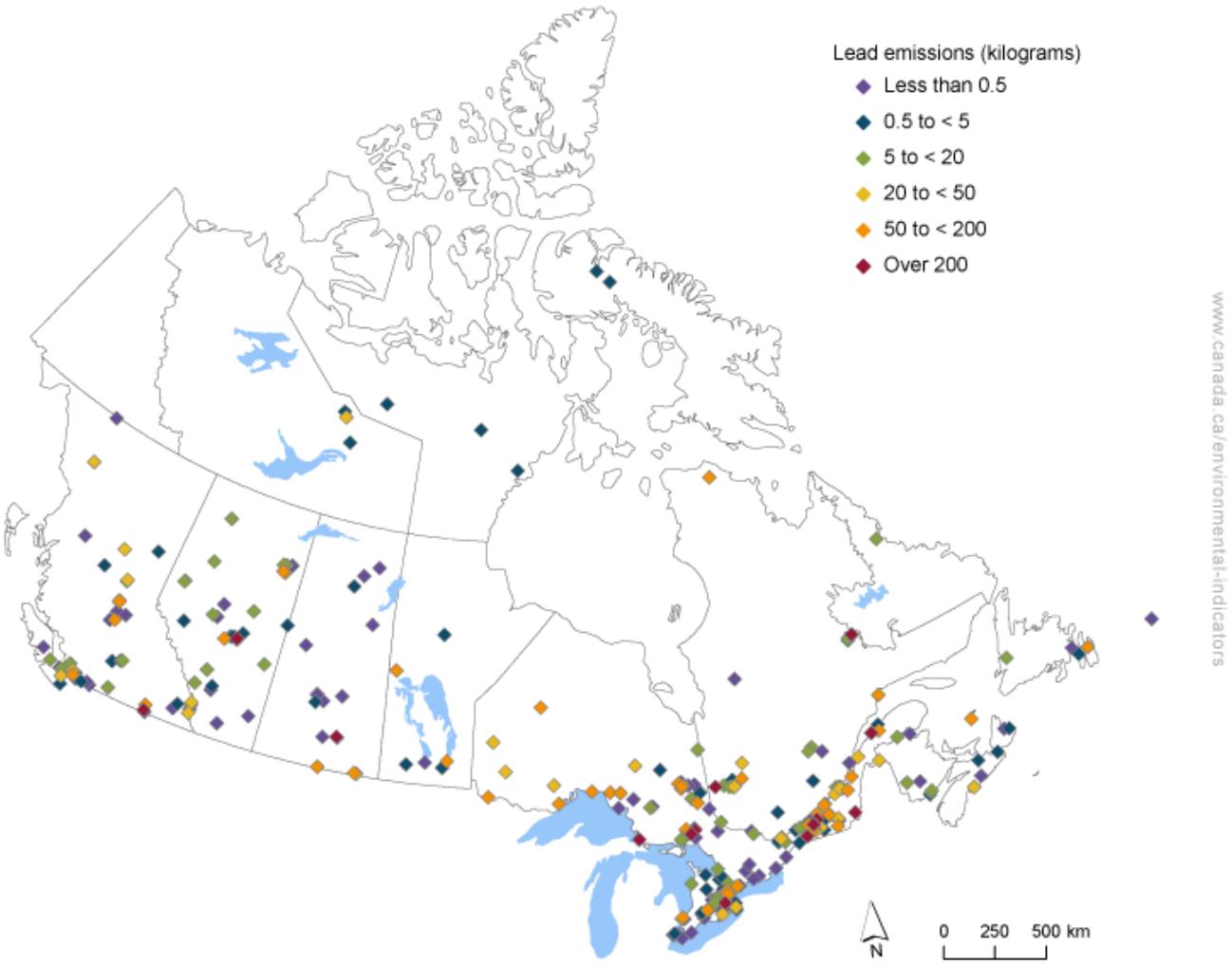
The Canadian Environmental Sustainability Indicators provide access to this information through an online interactive map. The map allows you to explore lead emissions to air from individual facilities.

In 2023, facility-reported lead emissions represent 82% of total national lead emissions.[14] Of these facilities:

- 122 facilities reported emissions under 0.5 kilogram (kg)
- 230 facilities reported emissions between 0.5 to 200 kg
- 17 facilities reported emissions over 200 kg, located in Quebec (8), Ontario (5), British Columbia (1), Alberta (1), Saskatchewan (1), and Newfoundland and Labrador (1)
    - One (1) non-ferrous smelting and refining facility in Quebec accounted for 56% (or 58,911 kg) of the total facility-reported emissions of lead in 2023

[14] The percentage of facility-reported emissions are calculated using the total facility-reported emissions from National Pollutant Release Inventory. As facilities are only mandated to report when the reporting criteria is met, the percentage may not align with the Air Pollutant Emissions Inventory.

Figure 8. Lead emissions to air by facility, Canada, 2023



Navigate data using the interactive map

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

Emissions of cadmium to air

Cadmium is a naturally occurring metal in the Earth's crust. This metal can be released during natural processes, such as weathering and erosion of cadmium-bearing rocks, forest fires, and volcanic activity. Human activity can also contribute to cadmium emissions, such as through the manufacture of batteries, electroplating, power generation and heating, transportation, solid waste disposal, and sewage sludge application.

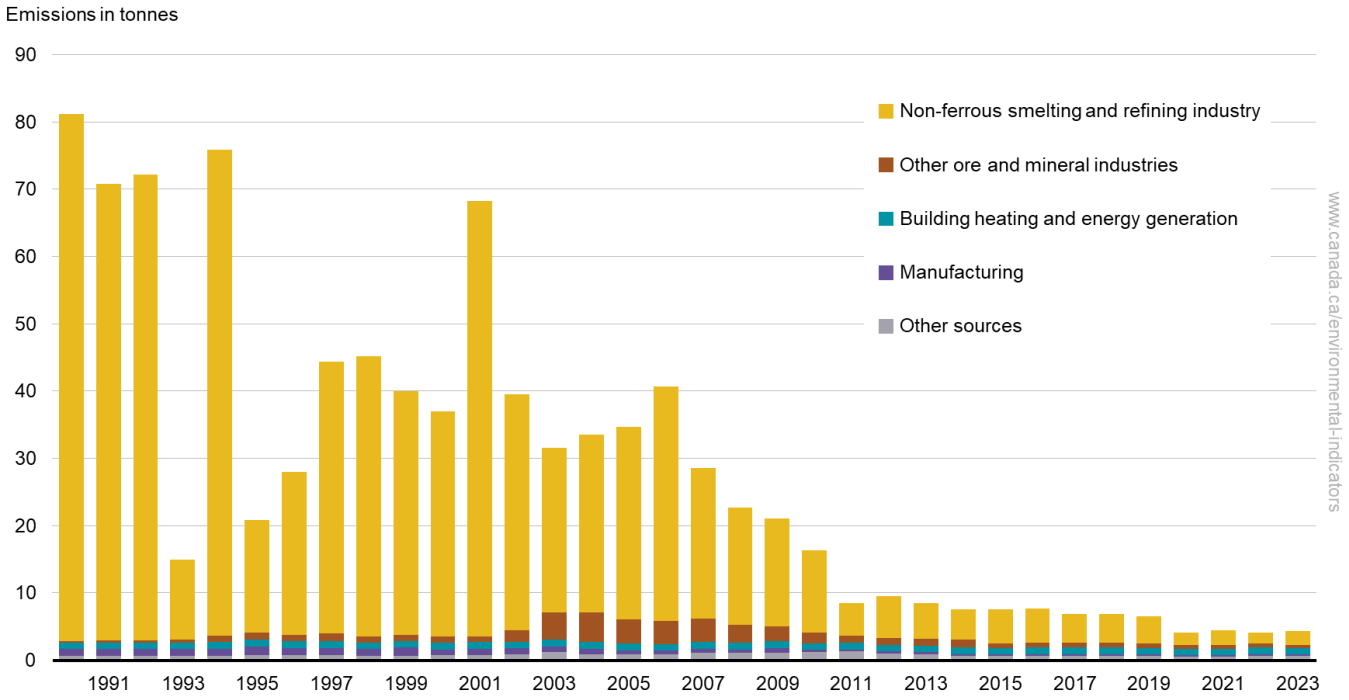
Exposure to cadmium can be hazardous to both humans and wildlife since cadmium accumulates in the food chain over time. The Government of Canada has concluded that cadmium compounds may be harmful to the environment and may constitute a danger based on their carcinogenic potential. Human exposure to cadmium has been associated with gastrointestinal irritation and harmful effects on the kidneys and bones.

This indicator reports on cadmium emissions from human-related activities using data from the Air Pollutant Emissions Inventory (APEI).

Key results

- In 2023, 4.3 tonnes of cadmium were emitted in Canada
- Since 1990, the largest source of cadmium emissions has been the non-ferrous smelting and refining industry. It accounted for 47% (or 2.0 tonnes) of the national total in 2023
- Between 1990 and 2023, cadmium emissions decreased by 95% (or 76.8 tonnes)

Figure 9. Cadmium emissions to air by source, Canada, 1990 to 2023



Data for Figure 9

Note: The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), electric utilities, home firewood burning, incineration and waste, oil and gas industry, transportation (road, rail, air and marine) and other miscellaneous sources. Other ore and mineral industries include the aluminum industry, the asphalt paving industry, the cement and concrete industry, foundries, the iron and steel industry, iron pelletizing, mining and rock quarrying and mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Between 1990 and 2023, cadmium emissions from the non-ferrous smelting and refining industry declined by 97% (76.2 tonnes). This decline was responsible for nearly all of the reduction in national cadmium emissions between 1990 and 2023. The decline was due to the closure of outdated smelters in 2010, 2018 and 2019 and the implementation of pollution prevention plans under the base metal smelter and refineries and zinc plants Pollution Prevention Notice (BMS P2 Notice)[15] combined with the implementation of the Environmental Performance Agreements (EPAs).[16]

The fluctuations in cadmium emissions prior to 2010 were mostly driven by changes in emissions from a single non-ferrous smelting and refining facility in Manitoba that is now closed.

[15] The 2006 publication of a Pollution Prevention Planning Notice required the preparation and implementation of pollution prevention plans in respect to specified toxic substances released from base metal smelters and refineries and zinc plants.

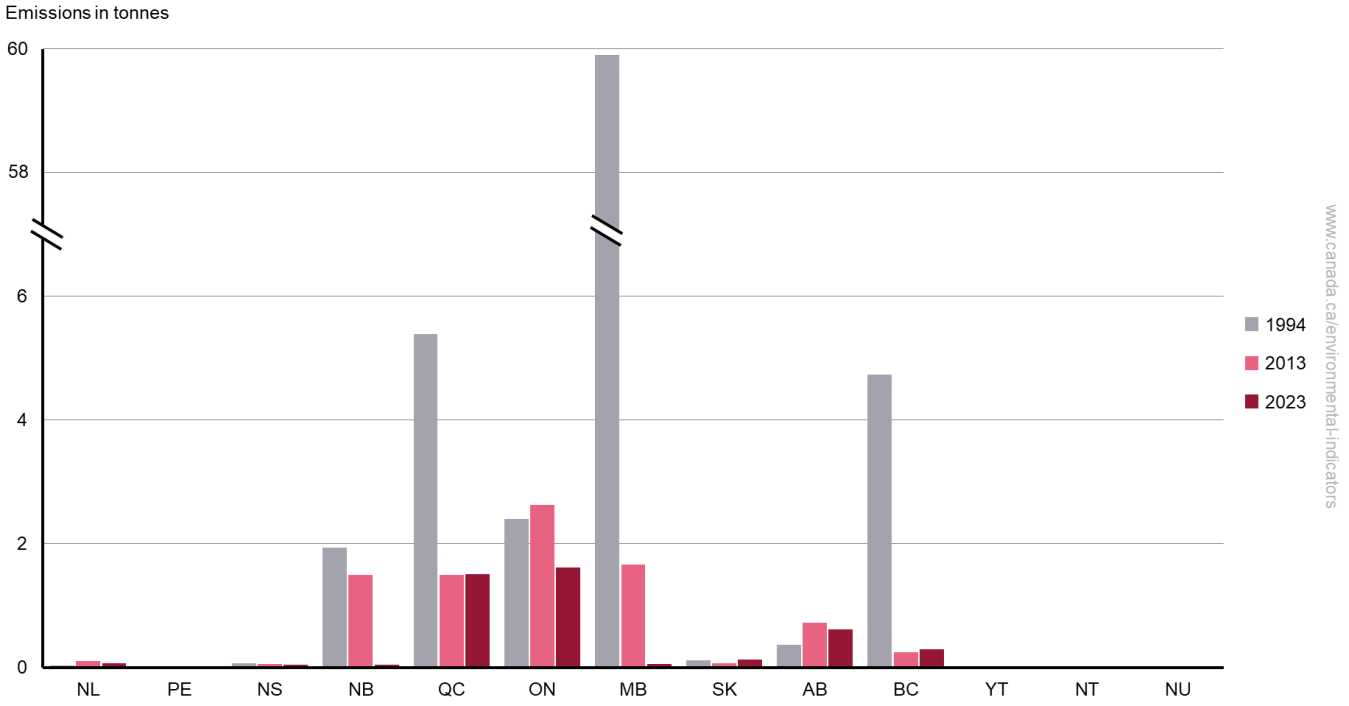
[16] The 2018 base metal smelter and refineries and zinc plants Environmental Performance Agreements (BMS EPAs) were developed with the objective of implementing the base-level industrial emissions requirements (BLIERS) for emissions of sulphur dioxide (SO_2) and particulate matter (PM), developed for the base metals smelting and refining sector. This agreement is in effect until December 2025.

Cadmium emissions to air by province and territory

Key results

- In 2023, Ontario and Quebec accounted for 72% (3.1 tonnes) of national cadmium emissions
- Between 1994 and 2023[17], Manitoba had the largest decline in emissions (59.7 tonnes)

Figure 10. Cadmium emissions to air by province and territory, Canada, 1994, 2013 and 2023



Data for Figure 10

Note: Emissions from the Northwest Territories for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. Some reported emissions from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, Manitoba, Saskatchewan, Yukon, the Northwest Territories and Nunavut are too small to see in the figure. Legacy data for 1994 that cannot be attributed to any province or territory are excluded from the figure. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

In 2023, Ontario and Quebec reported the highest cadmium emissions of all the provinces and territories, accounting for 37% (1.6 tonnes) and 35% (1.5 tonnes) of national emissions, respectively. These emissions came mostly from the non-ferrous smelting and refining industry, manufacturing industries, and building heating and energy generation.

Table 3. The largest source of cadmium emissions to air within each province and territory, 2023

Province and Territory	Largest source of cadmium emissions
Newfoundland and Labrador	Other ore and mineral industries (specifically the iron ore industry)
Prince Edward Island	Building heating and energy generation
Nova Scotia	Building heating and energy generation

[17] Data from 1990 to 1993 were not considered in the provincial and territorial indicators, as a significant amount of emissions could not be assigned to any province or territory.

Province and Territory	Largest source of cadmium emissions
New Brunswick	Manufacturing
Quebec	Non-ferrous smelting and refining industry
Ontario	Non-ferrous smelting and refining industry
Manitoba	Building heating and energy generation
Saskatchewan	Other ore and mineral industries (specifically the iron and steel industry)
Alberta	Oil and gas industry
British Columbia	Non-ferrous smelting and refining industry
Yukon	Building heating and energy generation
Northwest Territories	Building heating and energy generation
Nunavut	Incineration and waste industry

Between 1994 and 2023, emissions declined or remained stable for all provinces and territories, except Alberta and Newfoundland and Labrador. During this period, Manitoba experienced the largest decline in cadmium emissions (99.9% or 59.7 tonnes).

While Ontario, Alberta, and Newfoundland and Labrador had higher cadmium emissions in 2013 compared to 1994, emissions from all provinces and territories continued to decrease or remained stable from 2013 to 2023. Manitoba experienced the largest decline between 2013 and 2023 (1.6 tonnes), largely from the non-ferrous smelting and refining industry. This decrease was mostly due to the closure of a smelter in 2018.

Cadmium emissions to air from facilities

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

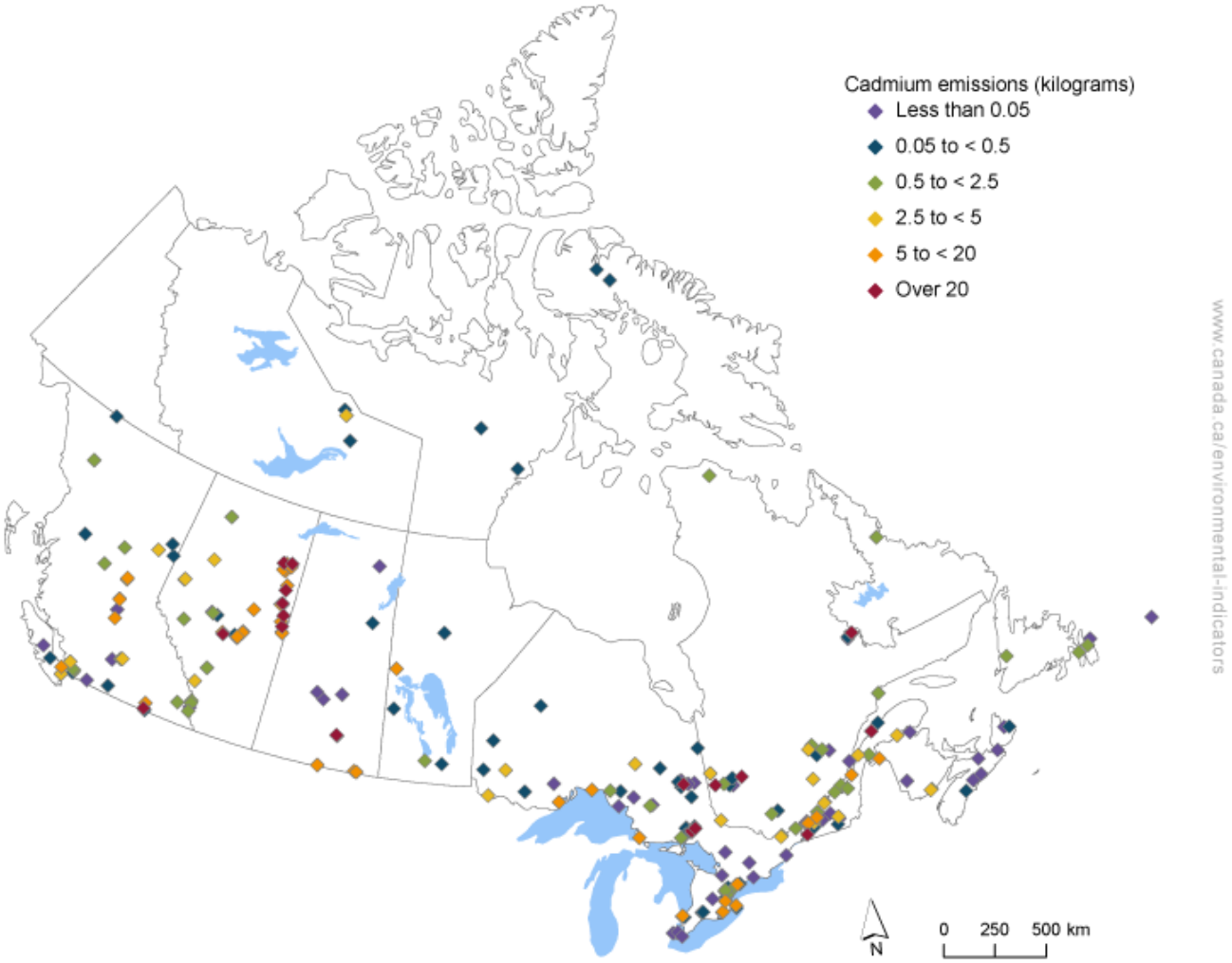
The Canadian Environmental Sustainability Indicators provide access to this information through an online interactive map. The map allows you to explore cadmium emissions to air from individual facilities.

In 2023, facility-reported cadmium emissions represent 74% of total national cadmium emissions.[18] Of these facilities:

- 130 facilities reported emissions under 0.5 kilogram (kg)
- 116 facilities reported emissions between 0.5 to 20 kg
- 17 facilities reported emissions over 20 kg, located in Alberta (7), Quebec (4), Ontario (3), British Columbia (1), Saskatchewan (1) and Newfoundland and Labrador (1)

[18] The percentage of facility-reported emissions are calculated using the total facility-reported emissions from National Pollutant Release Inventory. As facilities are only mandated to report when the reporting criteria is met, the percentage may not align with the Air Pollutant Emissions Inventory.

Figure 11. Cadmium emissions to air by facility, Canada, 2023



Navigate this data using the interactive map

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

Emissions of arsenic to air

Arsenic is a naturally occurring element released in aquatic and terrestrial environments from natural weathering and rock and soil erosion. Arsenic is also released to the environment from sources such as mining and rock quarrying, metal processing, wood preservation, coal-fired power generation and arsenical pesticides.

Exposure to arsenic can be hazardous to both humans and wildlife as it accumulates in the food chain over time. The Government of Canada concluded inorganic arsenic compounds may be harmful to the environment and may constitute a danger to human health based on their carcinogenic potential. In humans, exposure to arsenic has been associated with heart disease, decreased lung function and harmful effects to the skin.

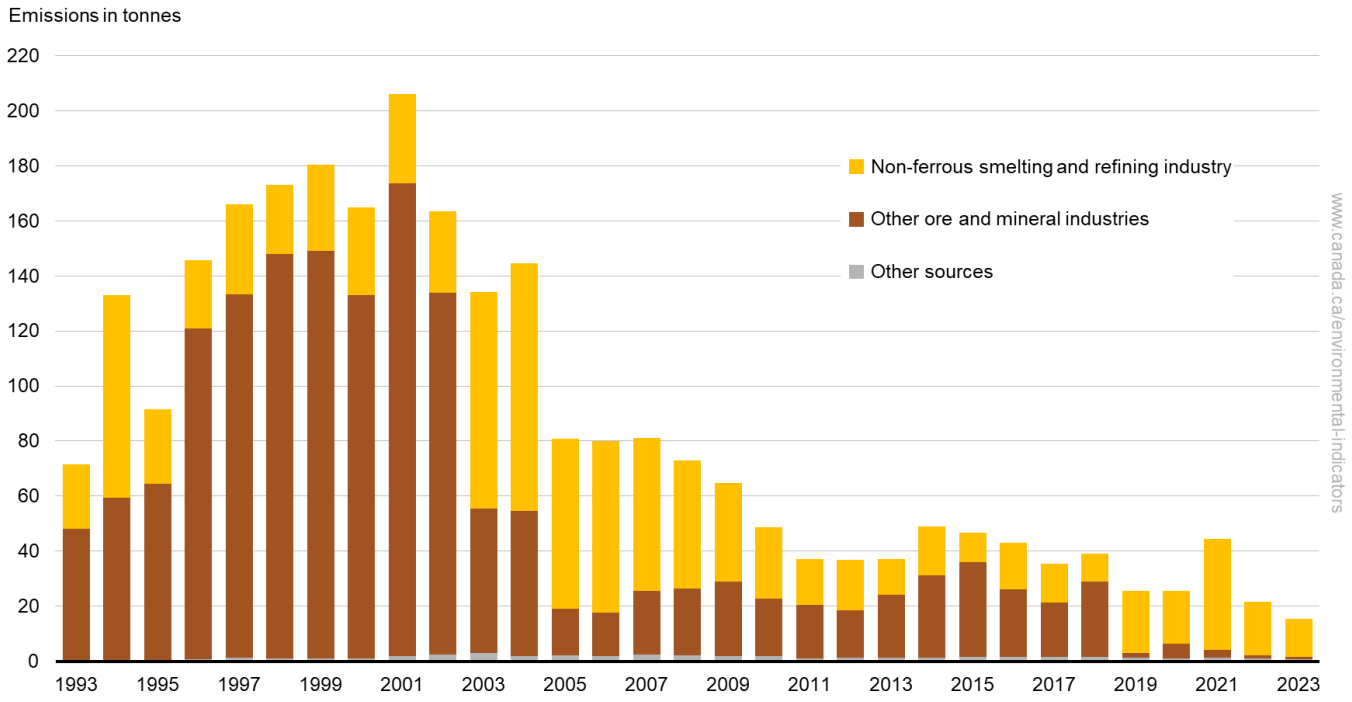
This indicator reports on arsenic[19] emissions from facility-based reporting to the National Pollutant Release Inventory (NPRI). The NPRI provides detailed information on emissions from industrial, commercial and institutional facilities that meet its reporting criteria.

[19] Arsenic is not reported in the APEI and, therefore, arsenic emissions are from facility-based reporting only, using data from the National Pollutant Release Inventory (NPRI). Facility-based reporting did not begin until 1993.

Key results

- In 2023, 15.4 tonnes of arsenic were emitted in Canada from facilities
- In 2023, the largest source of arsenic emissions from facilities was the non-ferrous smelting and refining industry, accounting for 89% (or 13.7 tonnes) of the national total
- Between 1993 and 2023, arsenic facility-based emissions decreased by 78% (or 56.2 tonnes)

Figure 12. Facility-based arsenic emissions to air by source, Canada, 1993 to 2023



Data for Figure 12

Note: The indicator reports emissions from facilities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes incineration and waste, manufacturing, the oil and gas industry and other miscellaneous sources. Other ore and mineral industries include foundries, the iron and steel industry, mining and rock quarrying and mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) National Pollutant Release Inventory.

Between 1993 and 2023, facility-based arsenic emissions from the non-ferrous smelting and refining industry declined by 42% (9.8 tonnes). This decline was responsible for 17% of the total reduction in national arsenic emissions between 1993 and 2023. The decline was due to the closure of outdated smelters in 2010, 2018 and 2019 and the implementation of pollution prevention plans under the base metal smelter and refineries and zinc plants Pollution Prevention Notice (BMS P2 Notice)[20] combined with the implementation of the Environmental Performance Agreements (EPAs).[21]

Before 2010, most of the changes in facility-based arsenic emissions were caused by a single non-ferrous metal smelting and refining facility located in Manitoba, which has since shut down. Similarly, fluctuations in arsenic emissions before 2005 were largely influenced by a smelter in Quebec. In addition, in 2002, the federal government implemented the Metal and Diamond Mining Effluent Regulations to limit arsenic pollution into waters

[20] The 2006 publication of a Pollution Prevention Planning Notice required the preparation and implementation of pollution prevention plans in respect to specified toxic substances released from base metal smelters and refineries and zinc plants.

[21] The 2018 base metal smelter and refineries and zinc plants Environmental Performance Agreements (BMS EPAs) were developed with the objective of implementing the base-level industrial emissions requirements (BLIERS) for emissions of sulphur dioxide (SO_2) and particulate matter (PM), developed for the base metals smelting and refining sector. This agreement is in effect until December 2025.

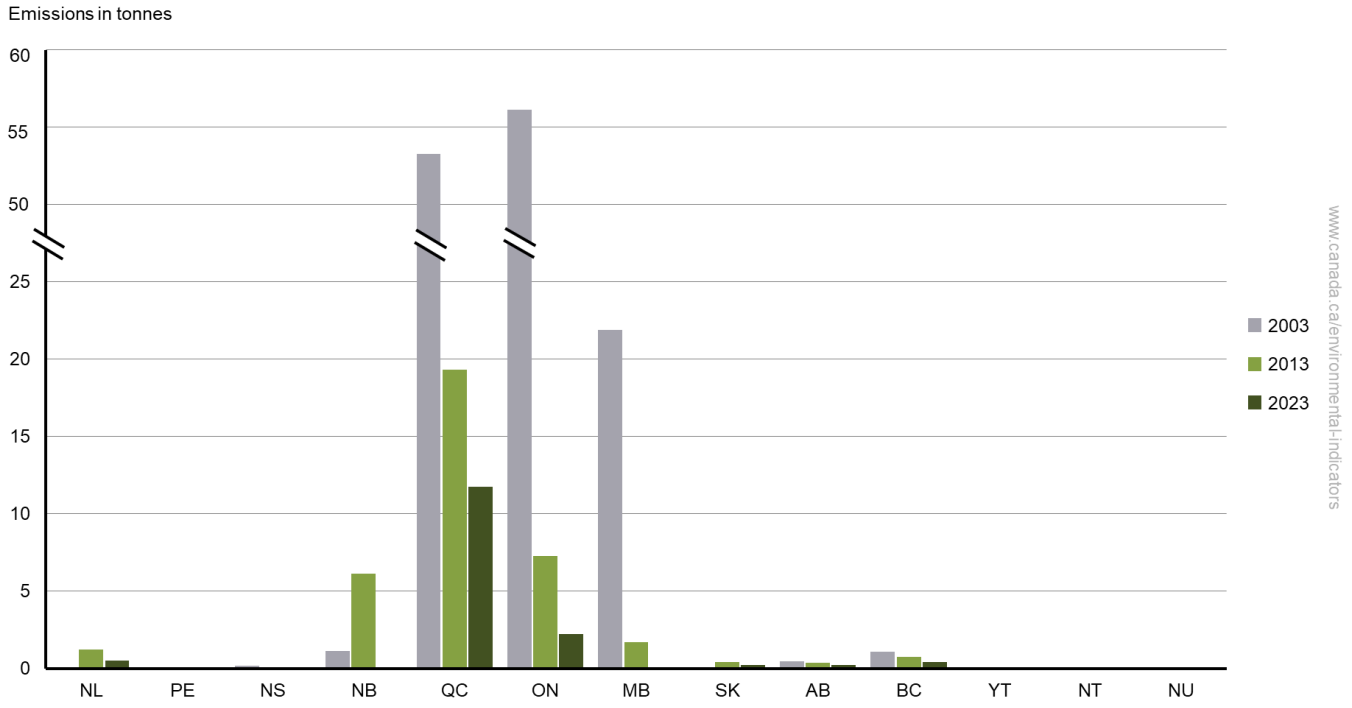
across Canada. As a result of these regulations, a mining and rock quarrying facility in Ontario significantly reduced its emissions. Fluctuations were also driven by changes to NPRI air emissions reporting in 2002.

Arsenic emissions to air by province and territory

Key results

- In 2023, Ontario and Quebec accounted for 91% (14 tonnes) of national arsenic facility-based emissions
- Between 2003 and 2023[22], Ontario had the largest decline in emissions (53.9 tonnes)

Figure 13. Facility-based arsenic emissions to air by province and territory, Canada, 2003, 2013 and 2023



Data for Figure 13

Note: The indicator reports emissions from facility-based activities only. It does not include emissions from natural sources such as forest fires or volcanoes. Some reported emissions from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Yukon, the Northwest Territories and Nunavut are too small to see in the figure. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the National Pollutant Release Inventory.
Source: Environment and Climate Change Canada (2025) National Pollutant Release Inventory.

In 2023, Quebec and Ontario reported the highest arsenic emissions from facilities of all the provinces and territories, accounting for 76% (11.8 tonnes) and 14% (2.2 tonnes) of national emissions, respectively. These emissions came mainly from the non-ferrous smelting and refining industry.

Table 4. The largest source of arsenic emissions to air within each province and territory, 2023

Province and Territory	Largest source of arsenic emissions
Newfoundland and Labrador	Other ore and mineral industries (specifically mining and rock quarrying)
Prince Edward Island [A]	n/a
Nova Scotia	Other ore and mineral industries (specifically mining and rock quarrying)

[22] Data from 1993 to 2002 were not considered in the provincial/territorial indicator for arsenic as, prior to 2002, the reporting threshold for arsenic was much higher, therefore, the year 2003 was selected because it was the year the NPRI updated its reporting criteria for arsenic.

Province and Territory	Largest source of arsenic emissions
New Brunswick	Pulp and paper
Quebec	Non-ferrous smelting and refining industry
Ontario	Non-ferrous smelting and refining industry
Manitoba	Other ore and mineral industries (specifically mining and rock quarrying)
Saskatchewan	Electric utilities
Alberta	Oil and gas industry
British Columbia	Non-ferrous smelting and refining industry
Yukon	Other ore and mineral industries (specifically mining and rock quarrying)
Northwest Territories	Other ore and mineral industries (specifically the mineral products industry)
Nunavut	Other ore and mineral industries (specifically mining and rock quarrying)

Note: [A] In 2023, no facility-based arsenic emissions were reported in Prince Edward Island.

Between 2003 and 2023, reported arsenic emissions decreased in all the province and territories, except for Newfoundland and Labrador and Saskatchewan. Ontario experienced the largest decrease between 2003 and 2023 (53.9 tonnes), largely from the non-ferrous smelting and refining industry. This decrease was mostly due to process changes and the implementation of pollution prevention plans under the BSM P2 Notice combined with the implementation of the EPAs.

While Newfoundland and Labrador, Prince Edward Island, New Brunswick and Saskatchewan had higher arsenic emissions in 2013 compared to 2003, emissions from all provinces and territories continued to decrease or remained stable from 2013 to 2023. Quebec experienced the largest decline between 2013 and 2023 (7.6 tonnes), largely from the non-ferrous smelting and refining sector.

Yukon, Northwest territories and Nunavut had no reported emissions in 2003. Yukon had no reported emissions in 2013. Prince Edward Island was the only province that had no reported facility-based arsenic emissions in 2023.

Arsenic emissions to air from facilities

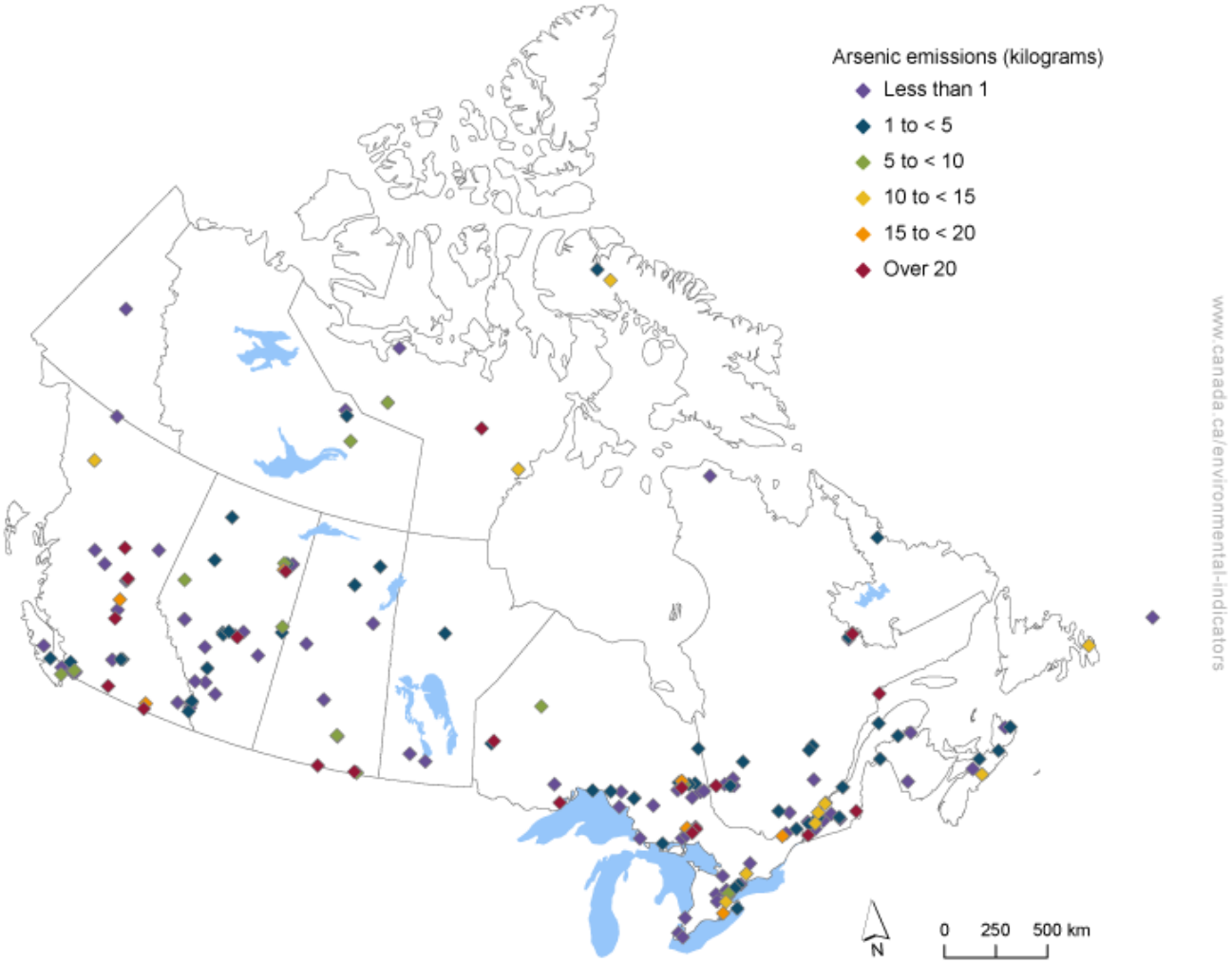
The National Pollutant Release Inventory provides detailed information on emissions from industrial, commercial and institutional facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an online interactive map. The map allows you to explore arsenic emissions to air from individual facilities.

In 2023, 199 facilities across Canada reported arsenic releases. Of these facilities:

- 89 facilities reported emissions under 1 kilogram (kg)
- 88 facilities reported emissions between 1 to 20 kg
- 22 facilities reported emissions over 20 kg, located in Ontario (6), British Columbia (5), Quebec (4), Alberta (2), Newfoundland and Labrador (2), Saskatchewan (2) and Nunavut (1)

Figure 14. Arsenic emissions to air by facility, Canada, 2023



Navigate this data using the interactive map

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

About the indicators

What the indicators measure

These indicators track human-related emissions to air of 3 substances (mercury, lead and cadmium) and facility-based emissions to air of 1 substance (arsenic). The 4 substances are defined as toxic under the *Canadian Environmental Protection Act, 1999*. For each substance, data are provided at the national, regional (provincial and territorial) and facility level, and by source. Global emissions data are also provided for mercury.

Why these indicators are important

Mercury and its compounds, lead, inorganic cadmium compounds and inorganic arsenic compounds are on the Toxic substances list under Schedule 1 of the *Canadian Environmental Protection Act, 1999*. This means that these substances are "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

The indicators inform Canadians about emissions of mercury, lead and cadmium to air from human activity and emissions of arsenic from facility-based reporting in Canada. These indicators also help the government to identify priorities and develop or revise strategies to inform further risk management and to track progress on policies put in place to reduce or control these 4 substances and air pollution in general.

Related Initiatives

These indicators support the measurement of progress towards the following 2022 to 2026 Federal Sustainable Development Strategy Goal 11: Improve access to affordable housing, clean air, transportation, parks, and green spaces, as well as cultural heritage in Canada.

In addition, the indicators contribute 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."

Related indicators

The Releases of harmful substances to water indicators track human-related releases to water of 4 toxic substances, namely mercury, lead, cadmium and arsenic, and their compounds. For each substance, data are provided at the national, provincial/territorial, facility level and by source.

The Human exposure to harmful substances indicators track the concentrations of 4 substances (mercury, lead, cadmium and bisphenol A) in Canadians.

The 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 (NH_3), carbon monoxide (CO) and fine particulate matter ($PM_{2.5}$). Black carbon, which is a component of $PM_{2.5}$, is also reported. Mercury, lead, cadmium and arsenic can also be components of particulate matter. Data are provided for each air pollutant at the national, provincial/territorial, facility level and by major source.

The Air quality indicators track ambient concentrations of fine particulate matter ($PM_{2.5}$), ozone (O_3), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), and volatile organic compounds (VOCs) at the national and regional levels and at local monitoring stations.

Data sources and methods

Data sources

Data for the indicators for mercury, lead and cadmium are based on emission estimates reported in the Air Pollutant Emissions Inventory. The inventory data are available online on the Open Data website. Facility data for the arsenic indicator and the interactive maps for the 4 substances come from the National Pollutant Release Inventory, which are also available on Open Data.

Global mercury emissions data were taken from the United Nations Environment Programme's Global Mercury Assessment 2018 report.

More information

Air Pollutant Emissions Inventory

Canada's Air Pollutant Emissions Inventory (APEI) is prepared and published by Environment and Climate Change Canada. The inventory provides data and estimates on releases of air pollutants from human activities. These pollutants contribute to the formation of smog and acid rain; reduced air quality and contribute to climate change. Improvements to the inventory are made periodically as new emission estimation methods are adopted and additional information is made available. Historical emissions are updated based on these improvements.

This inventory fulfills many of Canada's international reporting obligations on pollution. Specifically, under the 1979 Convention on Long-range Transboundary Air Pollution, Canada is committed to submitting an annual inventory of emissions of key air pollutants to the United Nations Economic Commission for

Europe. The APEI is a comprehensive inventory of 17 air pollutants[23] that combines facility emissions reported to the National Pollutant Release Inventory with non-facility emissions estimated by Environment and Climate Change Canada (the department). Estimates are developed using the latest estimation methods and are largely based on published statistics or other sources of information, such as surveys and reports. The Air Pollutant Emissions Inventory provides a comprehensive overview of pollutant emissions across Canada.

The national and provincial/territorial inventory data are current as of March 14, 2025. While the national indicators for mercury, lead and cadmium cover the period from 1990 to 2023, the provincial/territorial indicators only cover the period from 1994 to 2023. Data from 1990 to 1993 were not considered in the provincial/territorial indicators as a significant amount of legacy emissions could not be attributed to any province or territory. Emissions data are reported in the inventory approximately 1 year after data collection, validation, calculation and interpretation have been completed. The indicators are reported following the public release of the inventory data.

National Pollutant Release Inventory

The National Pollutant Release Inventory (NPRI) is a database of pollutant releases (to air, water and land), disposals and transfers for recycling from industrial, commercial and institutional facilities. The data for these facilities are provided by the facility operators as mandated by the *Canadian Environmental Protection Act, 1999*. 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 that meet substance-specific reporting thresholds and other requirements must report their pollutant releases, disposals and transfers annually to the department. Facilities with quantities below the reporting thresholds can voluntarily report their emissions. For mercury, lead, cadmium and arsenic the reporting thresholds are 5 kg, 50 kg, 5 kg and 50 kg, respectively.

While the national indicator for arsenic covers the period from 1993 to 2023, the provincial/territorial indicators only cover the period from 2003 to 2023. Data from 1993 to 2002 were not considered in the provincial/territorial indicator for arsenic as prior to 2002, the reporting threshold for arsenic was much higher, therefore, the year 2003 was selected because it was the year the NPRI updated its reporting criteria for arsenic. Emissions data reported to the NPRI are typically made publicly available about 6 months after the reporting deadline. This timeline allows for data collection, validation, calculation and interpretation. As a result, the data is generally published approximately 1.5 years after the end of the reporting year. The indicators are reported following the public release of the inventory data.

Because the arsenic indicators are derived solely from the NPRI database, they reflect only facility-reported releases (through mandatory or voluntary reporting). As a result, the indicators do not include all releases in Canada. They are limited to the main point sources for arsenic. Additionally, some facilities perform multiple activities but report their overall emissions under a single activity when submitting to the inventory. For example, some facilities engage in both mining activities and smelting and refining activities but report their overall emissions only under mining, which can misrepresent how arsenic is distributed across activities.

Global Mercury Assessment

The Global Mercury Assessment 2018 report is the third edition of the United Nations Environment Programme reporting on global mercury emissions. This edition was based on national emissions inventories for 2015. Data for global mercury emissions were taken directly from the Global Mercury Assessment 2018 report.

[23] 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, particulate matter less than or equal to 10 microns and total particulate matter.

Methods

The indicators are produced by grouping the calculated emissions data from Canada's national inventories to report on the key sources that contribute to the majority of mercury, lead, cadmium and arsenic emissions.

More information

Compilation of 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 and models to quantify total emissions. Together, these data sources provide a comprehensive overview of pollutant emissions across Canada.

A compilation framework has been developed that makes use of the best available data, while addressing 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. Environment and Climate Change Canada (the department) collects most facility-reported data through 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.

Within the Air Pollutant Emissions Inventory, 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 National Pollutant Release 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 are estimated by the department to ensure complete coverage.

In-house emission estimates

Emissions estimates are calculated by the department using 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. 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.[24] 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.[25]

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 type.

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 address 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 Chapter 3.4 of the Air Pollutant Emissions Inventory Report.

Temporal coverage

Historical data for mercury, lead and cadmium are provided at the national and source level for the period from 1990 to 2023. For the regional indicators (provincial/territorial), emissions are presented for 1994, 2013 and 2023. However, because Nunavut only officially separated from the Northwest Territories in 1999, emissions from the Northwest Territories for 1994 include emissions from the region that would eventually become Nunavut.

Historical data for arsenic are provided at the national and source level for the period from 1993 to 2023. The year 1993 was selected as the first year for arsenic emissions to air because facility-based reporting

[24] 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)."

[25] 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.

did not begin until 1993. For the provincial/territorial chart, emissions to air are provided for 2003, 2013 and 2023, with 2023 being the most recent year with available data and 2013 serving as a 10-year comparison. The year 2003 was selected because a significant amount of emissions could not be assigned to any province or territory from 1993 to 2002.

Air pollutant emissions by source classification

For the purposes of reporting the indicators, calculated emissions data from the Air Pollutant Emissions Inventory and National Pollutant Release Inventory are grouped into the following 14 sources:

- agriculture (livestock, crop production and fertilizer)
- building heating and energy generation
- dust and fires
- electric utilities
- home firewood burning
- incineration and waste
- manufacturing
- miscellaneous
- non-ferrous smelting and refining
- off-road vehicles and mobile equipment
- oil and gas industry
- other ore and mineral industries
- paints and solvents
- transportation (road, rail, air and marine)

Table 5 shows the allocation of sources of mercury, lead and cadmium reported in the indicators compared with the sources and sectors reported by the Air Pollutant Emissions Inventory.

Table 6 shows the allocation of sources of arsenic reported in the indicators compared with the sources reported in the National Pollutant Release Inventory.

Certain sectors from the Air Pollutant Emissions Inventory and the National Pollutant Release Inventory are sometimes shown as individual sources in the indicators when they have significant emissions.

Table 5. Alignment of sources reported in the indicators with the sources and sectors from the Air Pollutant Emissions Inventory

Sources in the Canadian Environmental Sustainability Indicators	Sources and sectors in the Air Pollutant 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: Agricultural fuel combustion
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

Sources in the Canadian Environmental Sustainability Indicators	Sources and sectors in the Air Pollutant Emissions Inventory
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
Incineration and waste	Incineration and waste sources: Human crematoriums
Incineration and waste	Incineration and waste sources: Pet crematoriums
Incineration and waste	Incineration and waste sources: Waste incineration
Incineration and waste	Incineration and waste sources: 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: Electronics
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: Service stations
Miscellaneous	Commercial/residential/institutional: Other (miscellaneous)
Non-ferrous smelting and refining industry	Non-ferrous smelting and refining industry

Sources in the Canadian Environmental Sustainability Indicators	Sources and sectors in the Air Pollutant Emissions Inventory
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
Other ore and mineral industries	Ore and mineral industries: Aluminum industry
Other ore and mineral industries	Ore and mineral industries: Asphalt paving industry
Other ore and mineral industries	Ore and mineral industries: Cement and concrete industry
Other ore and mineral industries	Ore and mineral industries: Foundries
Other ore and mineral industries	Ore and mineral industries: Iron and steel industry
Other ore and mineral industries	Ore and mineral industries: Iron ore pelletizing
Other ore and mineral industries	Ore and mineral industries: Mineral products industry
Other ore and mineral industries	Ore and mineral industries: Mining and rock quarrying
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 (landing and takeoff)
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

Sources in the Canadian Environmental Sustainability Indicators	Sources and sectors in the Air Pollutant Emissions Inventory
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. The sectors may vary from one substance to the next.

Table 6. Alignment of sources reported in the indicators with the sources from the National Pollutant Release Inventory

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Electric utilities	Electric power generation, transmission and distribution
Incineration and waste	Remediation and other waste management services
Incineration and waste	Waste collection
Incineration and waste	Waste treatment and disposal
Incineration and waste	Water, sewage and other systems
Manufacturing	Aerospace product and parts manufacturing
Manufacturing	Basic chemical manufacturing
Manufacturing	Cement and concrete product manufacturing
Manufacturing	Commercial and service industry machinery manufacturing
Manufacturing	Electrical equipment manufacturing
Manufacturing	Fruit and vegetable preserving and specialty food manufacturing
Manufacturing	Machine shops, turned product, and screw, nut and bolt manufacturing
Manufacturing	Motor vehicle manufacturing
Manufacturing	Motor vehicle parts manufacturing
Manufacturing	Other chemical product manufacturing
Manufacturing	Other fabricated metal product manufacturing
Manufacturing	Other miscellaneous manufacturing
Manufacturing	Pesticide, fertilizer and other agricultural chemical manufacturing
Manufacturing	Petroleum and coal product manufacturing
Manufacturing	Plastic product manufacturing
Manufacturing	Pulp and paper
Manufacturing	Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing
Manufacturing	Sawmills and wood preservation
Manufacturing	Spring and wire product manufacturing
Manufacturing	Veneer, plywood and engineered wood product manufacturing

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Miscellaneous	Architectural, engineering and related services
Miscellaneous	Highway, street and bridge construction
Miscellaneous	Lessors of real estate
Miscellaneous	Lumber, millwork, hardware and other building supplies merchant wholesalers
Miscellaneous	Petroleum, petroleum products, and other hydrocarbons merchant wholesalers
Miscellaneous	Recyclable material merchant wholesalers
Miscellaneous	Scientific research and development services
Miscellaneous	Support activities for water transportation
Miscellaneous	Universities
Miscellaneous	Warehousing and storage
Non-ferrous smelting and refining industry	Non-ferrous smelting and refining industry
Oil and gas industry	Oil and gas extraction
Other ore and mineral industries	Aluminum industry
Other ore and mineral industries	Foundries
Other ore and mineral industries	Iron and steel industry
Other ore and mineral industries	Mineral products industry
Other ore and mineral industries	Mining and rock quarrying
Transportation (road, rail, air and marine)	Support activities for air transportation

Note: This table is only applicable to the arsenic indicator.

For display purposes, smaller emitting sources are sometimes grouped together under the title "Other sources" in the figures and corresponding data tables of emissions by source. The grouped sources may differ by substance and are listed in the notes of each figure and data table.

Recent changes

The emission estimates reported in Canada's Air Pollutant Emissions Inventory used in the indicators undergo continuous improvements, leading to recalculations. For more information about these recent changes, consult Annex 3 of the Air Pollutant Emissions Inventory Report.

A new substance, arsenic, has been included in this indicator using data from the National Pollutant Release Inventory.

Caveats and limitations

Total emissions of mercury, lead, cadmium and arsenic to air reported in these indicators exclude natural sources such as forest fires or volcanoes. Arsenic reflects only facility-based emissions to air as reported to the National Pollutant Release Inventory (NPRI). They do not include estimates of emissions from other sources, such as emissions from cities, transboundary pollution or consumer products in Canada.

To provide a consistent global picture, Canadian mercury emissions data used for the international comparison came from the United Nations Environment Programme's Global Mercury Assessment 2018 report. However, it is important to note that the emissions data found in this report were estimated using different estimation techniques and different source classifications than the data used for the national indicators. In addition, some sources were not quantified in the international comparison due to a lack of data.

The methods used to estimate air pollutant emissions continue to evolve. In general, improvements are made every year to methodologies for estimating emissions. As a result of these improvements, emissions for a given year may differ from those previously published by the department. Caution is advised when comparing different reports and different sources.

Prior to the launch of the NPRI, emissions data were collected and compiled by provincial, territorial and regional environmental authorities. As such, in the provincial/territorial comparisons in the indicators, the base year used differs from that used in the national indicators. Furthermore, some legacy data for 1994 could not be attributed to any province or territory. The legacy data were captured under unspecified region in the data tables.

More information

Air Pollutant Emissions Inventory and National Pollutant Release Inventory

The Air Pollutant Emissions Inventory uses facility information from the National Pollutant Release Inventory and other sources. The National Pollutant Release Inventory started providing facility-reported data to the Air Pollutant Emissions Inventory for heavy metals (mercury, lead and cadmium) in 1994. 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 any given time because of updates or corrections to the facility-reported data from the National Pollutant Release Inventory.

The number and composition of facilities that report releases to air to the National Pollutant Release Inventory can vary each year. This variation is due to the fact that only facilities that meet or exceed the reporting threshold are required to report to the inventory. An analysis of how this might affect the apparent trends has not been undertaken. Events or changes at facilities can also alter facility emissions outputs from one year to the next. Some changes can include:

- changes in production levels
- upgrades to operating practices
- plant expansions
- change of ownership
- temporary or permanent closures
- pollution prevention measures
- accidental releases

Facilities reporting to the National Pollutant Release Inventory may use different methods to calculate releases. The methods vary depending on the substance and/or facility and may change from year to year. Since the launch of the National Pollutant Release Inventory in 1993, the substance list and reporting requirements have continuously evolved.

Global mercury emissions

Air emissions sources that were not quantified in the international mercury emissions comparison include:

- chemical manufacturing processes
- other mineral products (for example, lime manufacturing)
- secondary non-ferrous metal production
- oil and gas extraction
- pulp and paper industry
- food industry
- transport and processing other than refinery emissions
- industrial/hazardous waste incineration and sewage sludge incineration
- preparation of dental amalgam fillings and disposal of removed fillings containing mercury

The Canadian mercury emissions data follows the same reporting structure as the Global Mercury Assessment report and uses the best data, measurements and methods available. Nonetheless, users must be cautious when comparing the data, as emissions estimation methodologies differ among countries.

Resources

References

Environment and Climate Change Canada (2016) Canadian Mercury Science Assessment Report. Retrieved on April 7, 2025.

United Nations Environment Programme (2019) Global Mercury Assessment 2018. Retrieved on April 7, 2025.

Environment and Climate Change Canada (2025) Using and interpreting data from the National Pollutant Release Inventory. Retrieved on April 7, 2025.

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Related information

NPRI sector overview: Aluminium

NPRI sector overview: Electricity

NPRI sector overview: Metal ore mining

Annex

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

Table A.1. Data for Figure 1. Percentage change of mercury, lead and cadmium emissions from 1990 level and arsenic emissions from 1993 level, Canada

Year	Mercury (percentage change from 1990 level)	Lead (percentage change from 1990 level)	Cadmium (percentage change from 1990 level)	Arsenic (percentage change from 1993 level)
1990	0	0	0	n/a
1991	0	-4	-13	n/a
1992	1	1	-11	n/a
1993	-43	-35	-82	0
1994	-49	19	-6	86
1995	-60	-25	-74	28
1996	-56	-18	-66	103
1997	-63	-30	-45	132
1998	-67	-38	-44	142
1999	-69	-47	-51	152
2000	-70	-47	-54	130
2001	-72	-47	-16	188
2002	-74	-56	-51	128
2003	-75	-63	-61	87
2004	-74	-70	-59	102
2005	-76	-77	-57	13
2006	-79	-73	-50	12
2007	-77	-74	-65	13
2008	-79	-76	-72	2
2009	-83	-78	-74	-10
2010	-84	-81	-80	-32
2011	-88	-86	-90	-48
2012	-89	-87	-88	-48
2013	-88	-89	-90	-48
2014	-89	-88	-91	-32
2015	-89	-86	-91	-35
2016	-89	-86	-91	-40
2017	-90	-84	-92	-50
2018	-90	-86	-92	-46
2019	-90	-88	-92	-64
2020	-91	-89	-95	-64

Year	Mercury (percentage change from 1990 level)	Lead (percentage change from 1990 level)	Cadmium (percentage change from 1990 level)	Arsenic (percentage change from 1993 level)
2021	-90	-91	-95	-38
2022	-91	-88	-95	-70
2023	-91	-91	-95	-78

Note: n/a = not applicable. The indicator reports emissions from human-related activities only for mercury, lead and cadmium and facility-based emissions for arsenic. It does not include emissions from natural sources such as forest fires or volcanoes. Facility-based reporting for arsenic emissions did not begin until 1993.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory and National Pollutant Release Inventory.

Table A.2. Data for Figure 2. Mercury emissions to air by source, Canada, 1990 to 2023

Year	Incineration and waste (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes	Other sources (emissions in tonnes)	Electric utilities (emissions in tonnes)	Non-ferrous smelting and refining industry (emissions in tonnes)	Total (emissions in tonnes)
1990	2.58	1.51	2.31	2.25	24.89	33.54
1991	2.77	1.44	2.36	2.12	24.86	33.55
1992	3.01	1.43	2.33	2.35	24.77	33.88
1993	3.19	1.43	2.27	2.14	10.11	19.14
1994	3.20	1.47	2.29	2.06	8.25	17.27
1995	3.17	1.47	2.29	1.99	4.64	13.56
1996	3.22	1.50	2.25	2.09	5.67	14.73
1997	3.17	1.55	2.15	2.24	3.38	12.49
1998	2.16	1.56	2.05	2.37	2.83	10.97
1999	2.11	1.57	2.01	2.37	2.27	10.33
2000	2.20	1.43	2.33	2.05	1.94	9.95
2001	2.10	1.38	1.63	2.09	2.12	9.32
2002	1.94	1.43	1.66	2.06	1.75	8.84
2003	1.70	1.47	1.70	2.37	1.29	8.53
2004	1.55	1.25	1.61	2.31	1.90	8.62
2005	1.42	1.22	1.45	2.17	1.70	7.95
2006	1.34	1.16	1.44	2.00	1.25	7.19
2007	1.67	1.13	1.43	2.17	1.41	7.82
2008	1.85	1.19	1.38	1.63	1.01	7.06
2009	0.90	1.02	1.26	1.67	0.84	5.70
2010	0.83	1.12	1.24	1.58	0.55	5.32
2011	0.84	1.08	0.94	1.02	0.22	4.09
2012	0.71	1.07	0.93	0.86	0.26	3.83
2013	0.67	1.15	0.89	0.85	0.36	3.92
2014	0.75	1.11	0.82	0.71	0.29	3.68
2015	0.73	1.16	0.77	0.73	0.18	3.56

Year	Incineration and waste (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes	Other sources (emissions in tonnes)	Electric utilities (emissions in tonnes)	Non-ferrous smelting and refining industry (emissions in tonnes)	Total (emissions in tonnes)
2016	0.73	1.15	0.75	0.67	0.22	3.52
2017	0.74	1.07	0.71	0.63	0.14	3.29
2018	0.74	1.12	0.72	0.61	0.20	3.40
2019	0.75	1.06	0.67	0.60	0.12	3.20
2020	0.81	0.95	0.63	0.50	0.16	3.05
2021	0.86	1.01	0.63	0.50	0.19	3.19
2022	0.88	0.89	0.63	0.50	0.10	3.01
2023	0.86	0.77	0.69	0.47	0.33	3.13

Note: Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), building heating and energy generation, home firewood burning, manufacturing, the oil and gas industry, transportation (road, rail, air and marine) and other miscellaneous sources. Other ore and mineral industries include the aluminum industry, the asphalt paving industry, cement and concrete, iron and steel industries, iron ore industry and mining and rock quarrying. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.3. Data for Figure 3. Mercury emissions to air by province and territory, Canada, 1994, 2013 and 2023

Province or territory	1994 (emissions in tonnes)	2013 (emissions in tonnes)	2023 (emissions in tonnes)
Newfoundland and Labrador	0.28	0.07	0.04
Prince Edward Island	0.02	0.01	0.02
Nova Scotia	0.34	0.11	0.06
New Brunswick	0.44	0.19	0.04
Quebec	2.88	0.57	0.47
Ontario	3.37	1.07	1.08
Manitoba	4.34	0.07	0.06
Saskatchewan	0.62	0.66	0.50
Alberta	1.56	0.61	0.29
British Columbia	3.33	0.54	0.56
Yukon	< 0.01	< 0.01	< 0.01
Northwest Territories	0.09[A]	< 0.01	< 0.01
Nunavut	n/a	0.01	0.01
Canada	17.27	3.92	3.13

Note: n/a = not applicable. [A] Value for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.4. Data for Figure 5. Global mercury emissions to air, 2015

Region	Mercury emissions (tonnes)	Percentage of global emissions
East and Southeast Asia	859	38.6
South America	409	18.4
Sub-Saharan Africa	360	16.2
South Asia	225	10.1
Commonwealth of Independent States (CIS) and other European countries	124	5.6
European Union (EU28)	77	3.5
Middle Eastern States	53	2.4
Central America and the Caribbean	46	2.1
North America	40	1.8
North Africa	21	0.9
Australia, New Zealand and Oceania	9	0.4

Note: The Commonwealth of Independent States includes Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. The 28 member countries of the European Union includes Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. The North American region includes only Canada and the United States, Mexico is grouped into the Central America and the Caribbean region.
Source: United Nations Environmental Program (2019) Global Mercury Assessment 2018.

Table A.5. Data for Figure 6. Lead emissions to air by source, Canada, 1990 to 2023

Year	Non-ferrous smelting and refining industry (emissions in tonnes)	Transportation (road, rail, air and marine) (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes)	Other sources (emissions in tonnes)	Manufacturing (emissions in tonnes)	Total (emissions in tonnes)
1990	886.28	13.44	63.32	17.43	42.95	1,023.41
1991	847.51	10.60	63.98	17.65	42.04	981.77
1992	899.27	9.38	63.20	18.46	41.07	1,031.39
1993	473.81	9.20	110.95	17.89	52.93	664.77
1994	1,010.17	8.55	130.67	18.26	46.67	1,214.32
1995	624.47	10.16	91.88	18.27	27.80	772.57
1996	698.38	10.64	98.42	20.01	14.49	841.94
1997	534.65	10.04	135.49	20.03	14.07	714.28
1998	454.48	10.53	138.99	20.04	12.49	636.52
1999	438.70	9.95	58.65	19.08	14.10	540.48
2000	437.09	10.12	66.60	19.52	13.65	546.97
2001	368.36	10.03	94.66	8.58	61.23	542.85
2002	331.58	10.11	96.38	8.48	7.85	454.39
2003	235.69	9.56	114.81	8.82	7.72	376.60
2004	177.80	8.25	105.02	8.17	12.30	311.53
2005	133.73	9.53	81.55	7.32	7.42	239.56

Year	Non-ferrous smelting and refining industry (emissions in tonnes)	Transportation (road, rail, air and marine) (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes)	Other sources (emissions in tonnes)	Manufacturing (emissions in tonnes)	Total (emissions in tonnes)
2006	170.85	8.58	81.73	9.49	5.78	276.43
2007	171.40	9.30	74.05	10.99	5.24	270.98
2008	161.10	9.47	61.66	11.95	4.68	248.87
2009	158.60	11.53	45.20	7.27	4.74	227.33
2010	131.68	11.75	37.86	7.95	3.81	193.05
2011	96.91	9.54	27.60	7.76	2.90	144.72
2012	88.72	12.38	18.90	7.64	2.92	130.56
2013	74.94	11.96	13.40	5.89	3.21	109.40
2014	86.95	11.13	12.74	5.47	3.67	119.95
2015	111.81	12.76	12.40	5.18	4.64	146.80
2016	113.02	13.86	12.29	4.93	3.84	147.94
2017	130.75	13.40	12.95	4.86	2.46	164.42
2018	112.04	12.16	13.42	4.84	4.03	146.51
2019	86.90	14.83	13.66	4.25	3.03	122.66
2020	82.25	12.52	12.02	4.09	2.54	113.42
2021	61.86	14.16	12.24	3.77	2.59	94.63
2022	95.86	13.67	10.89	4.00	2.56	126.98
2023	65.31	13.89	8.38	3.52	2.19	93.29

Note: Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), building heating and energy generation, electric utilities, home firewood burning, incineration and waste, off-road vehicles and mobile equipment, the oil and gas industry, paints and solvents and other miscellaneous sources. The other ore and mineral industries include the aluminum industry, the asphalt paving industry, the cement and concrete industry, foundries, iron and steel industry, iron pelletizing mining and rock quarrying and the mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.6. Data for Figure 7. Lead emissions to air by province and territory, Canada, 1994, 2013 and 2023

Province or territory	1994 (emissions in tonnes)	2013 (emissions in tonnes)	2023 (emissions in tonnes)
Newfoundland and Labrador	0.37	1.95	1.88
Prince Edward Island	0.14	0.07	0.09
Nova Scotia	0.94	0.39	0.28
New Brunswick	10.47	11.61	0.76
Quebec	383.08	54.71	66.91
Ontario	109.36	25.45	11.15
Manitoba	504.94	3.34	1.45
Saskatchewan	5.64	1.41	1.47
Alberta	13.34	4.60	3.17
British Columbia	105.03	5.21	5.68
Yukon	0.22	0.13	0.12

Province or territory	1994 (emissions in tonnes)	2013 (emissions in tonnes)	2023 (emissions in tonnes)
Northwest Territories	0.54[A]	0.49	0.28
Nunavut	n/a	0.04	0.04
Unspecified region[B]	80.25	n/a	n/a
Canada	1,214.32	109.40	93.29

Note: n/a = not applicable. [A] Value for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. [B] Legacy data for 1994 cannot be attributed to any province or territory. Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.7. Data for Figure 9. Cadmium emissions to air by source, Canada, 1990 to 2023

Year	Non-ferrous smelting and refining industry (emissions in tonnes)	Building heating and energy generation (emissions in tonnes)	Other sources (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes)	Manufacturing (emissions in tonnes)	Total (emissions in tonnes)
1990	78.29	0.90	0.63	0.31	1.02	81.16
1991	67.85	0.90	0.65	0.35	1.01	70.76
1992	69.20	0.90	0.69	0.37	1.01	72.18
1993	11.95	0.92	0.69	0.41	1.02	15.00
1994	72.31	0.97	0.70	0.91	1.03	75.91
1995	16.73	1.02	0.71	1.04	1.29	20.79
1996	24.15	1.04	0.72	0.93	1.11	27.96
1997	40.34	1.03	0.73	1.17	1.05	44.33
1998	41.58	0.90	0.69	0.95	1.04	45.15
1999	36.16	0.94	0.70	0.91	1.25	39.95
2000	33.53	1.02	0.71	0.88	0.87	37.01
2001	64.69	0.98	0.71	0.85	1.00	68.24
2002	35.06	1.02	0.88	1.66	0.87	39.49
2003	24.43	1.05	1.17	3.97	0.89	31.50
2004	26.43	1.02	0.90	4.34	0.83	33.51
2005	28.59	0.99	0.85	3.59	0.61	34.63
2006	34.77	0.94	0.83	3.51	0.60	40.65
2007	22.37	1.02	1.15	3.50	0.55	28.59
2008	17.38	1.02	1.14	2.73	0.39	22.66
2009	16.02	0.97	1.14	2.25	0.68	21.04
2010	12.27	0.96	1.24	1.56	0.30	16.32
2011	4.84	1.02	1.32	0.98	0.30	8.46
2012	6.28	1.00	1.00	0.99	0.31	9.58
2013	5.30	0.96	0.90	0.99	0.33	8.48
2014	4.56	0.96	0.65	1.13	0.28	7.58

Year	Non-ferrous smelting and refining industry (emissions in tonnes)	Building heating and energy generation (emissions in tonnes)	Other sources (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes)	Manufacturing (emissions in tonnes)	Total (emissions in tonnes)
2015	5.02	0.92	0.61	0.72	0.27	7.55
2016	5.10	0.96	0.63	0.67	0.30	7.66
2017	4.28	0.99	0.61	0.69	0.28	6.86
2018	4.23	0.99	0.60	0.73	0.29	6.86
2019	3.96	1.02	0.59	0.68	0.24	6.49
2020	1.81	0.94	0.55	0.59	0.23	4.11
2021	2.21	0.91	0.54	0.55	0.24	4.45
2022	1.69	0.96	0.65	0.57	0.26	4.14
2023	2.05	0.88	0.68	0.50	0.23	4.34

Note: Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes agriculture (livestock, crop production and fertilizer), electric utilities, home firewood burning, incineration and waste, oil and gas industry, transportation (road, rail, air and marine) and other miscellaneous sources. Other ore and mineral industries include the aluminum industry, the asphalt paving industry, the cement and concrete industry, foundries, the iron and steel industry, iron pelletizing, mining and rock quarrying and mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.8. Data for Figure 10. Cadmium emissions to air by province and territory, Canada, 1994, 2013 and 2023

Province or territory	1994 (emissions in tonnes)	2013 (emissions in tonnes)	2023 (emissions in tonnes)
Newfoundland and Labrador	0.03	0.10	0.07
Prince Edward Island	0.01	0.01	0.01
Nova Scotia	0.06	0.05	0.04
New Brunswick	1.94	1.49	0.04
Quebec	5.39	1.49	1.51
Ontario	2.40	2.63	1.61
Manitoba	59.78	1.66	0.05
Saskatchewan	0.11	0.07	0.12
Alberta	0.36	0.72	0.61
British Columbia	4.74	0.24	0.29
Yukon	< 0.01	< 0.01	< 0.01
Northwest Territories	0.01[A]	0.01	0.01
Nunavut	n/a	< 0.01	< 0.01
Unspecified region[B]	1.08	n/a	n/a
Canada	75.91	8.48	4.34

Note: n/a = not applicable. [A] Value for 1994 includes emissions from Nunavut, which was officially separated from the Northwest Territories in 1999. [B] Legacy data for 1994 cannot be attributed to any province or territory. Totals may not add up due to rounding. The indicator reports emissions from human-related activities only. It does not include emissions from natural sources such as forest fires or volcanoes. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the Air Pollutant Emissions Inventory.
Source: Environment and Climate Change Canada (2025) Air Pollutant Emissions Inventory.

Table A.9. Data for Figure 12. Facility-based arsenic emissions to air by source, Canada, 1993 to 2023

Year	Non-ferrous smelting and refining (emissions in tonnes)	Other ore and mineral industries (emissions in tonnes)	Other sources (emissions in tonnes)	Total (emissions in tonnes)
1993	23.50	48.12	0.00	71.62
1994	73.74	59.19	0.09	133.02
1995	27.04	64.36	0.09	91.48
1996	24.86	120.02	0.79	145.67
1997	32.78	132.01	1.29	166.07
1998	25.09	146.80	1.09	172.98
1999	31.39	148.01	1.00	180.40
2000	31.79	132.05	0.96	164.80
2001	32.31	171.76	1.86	205.93
2002	29.74	131.41	2.43	163.58
2003	78.65	52.57	2.94	134.16
2004	89.95	52.64	1.92	144.50
2005	61.64	17.10	2.06	80.80
2006	62.29	15.76	1.91	79.95
2007	55.69	22.89	2.55	81.13
2008	46.41	24.29	2.19	72.88
2009	35.66	27.23	1.81	64.70
2010	26.00	20.88	1.73	48.61
2011	16.65	19.45	1.15	37.26
2012	18.34	17.16	1.42	36.92
2013	13.13	22.74	1.27	37.14
2014	17.76	29.67	1.40	48.83
2015	10.52	34.63	1.46	46.61
2016	16.99	24.41	1.60	43.00
2017	14.25	19.65	1.60	35.51
2018	9.99	27.43	1.55	38.97
2019	22.76	1.60	1.31	25.67
2020	19.15	5.28	1.14	25.58
2021	40.54	2.80	1.19	44.53
2022	19.47	1.13	0.96	21.56
2023	13.71	1.01	0.70	15.41

Note: n/a = not available. Totals may not add up due to rounding. The indicator reports emissions from facilities only. It does not include emissions from natural sources such as forest fires or volcanoes. The category "other sources" includes incineration and waste, manufacturing, the oil and gas industry and other miscellaneous sources. Other ore and mineral industries include foundries, the iron and steel industry, mining and rock quarrying and mineral products industry. For more details on the sources, consult the Data sources and methods.
Source: Environment and Climate Change Canada (2025) National Pollutant Release Inventory.

Table A.10. Data for Figure 13. Facility-based arsenic emissions to air by province and territory, Canada, 2003, 2013 and 2023

Province or territory	2003 (emissions in tonnes)	2013 (emissions in tonnes)	2023 (emissions in tonnes)
Newfoundland and Labrador	0.08	1.22	0.48
Prince Edward Island	< 0.01	<0.01	n/a
Nova Scotia	0.15	0.05	0.02
New Brunswick	1.10	6.12	0.01
Quebec	53.27	19.32	11.76
Ontario	56.14	7.26	2.23
Manitoba	21.89	1.69	<0.01
Saskatchewan	0.01	0.40	0.23
Alberta	0.45	0.36	0.21
British Columbia	1.06	0.72	0.41
Yukon	n/a	n/a	<0.01
Northwest Territories	n/a	<0.01	0.01
Nunavut	n/a	<0.01	0.07
Canada	134.16	37.14	15.41

Note: n/a = not available. The indicator reports emissions from facility-based activities only. It does not include emissions from natural sources such as forest fires or volcanoes. Some reported emissions from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Yukon, the Northwest Territories and Nunavut are too small to see in the figure. To access all available years data please refer to the indicator's interactive figures or, for the full dataset, to the National Pollutant Release Inventory.
Source: Environment and Climate Change Canada (2025) National Pollutant Release Inventory.

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