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Climate Change Canada

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INTERNATIONAL COMPARISON: AIR POLLUTANT EMISSIONS IN SELECTED COUNTRIES

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS



Canada 

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

INTERNATIONAL COMPARISON: AIR POLLUTANT EMISSIONS IN SELECTED COUNTRIES

March 2024

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International comparison: air pollutant emissions in selected countries

Air pollution problems, such as smog and acid rain, result from the release of pollutants into the atmosphere. The majority of these pollutants are released through human activities, such as transportation, the burning of fuels for electricity and heating, and a variety of industrial activities. Air pollution can affect human health, the environment, buildings, structures, and the economy. These indicators compare Canada's emissions of 5 key air pollutants with those of top emitting member countries of the Organisation for Economic Co-operation and Development (OECD), both in terms of total quantity and emissions intensity (the ratio of emissions to gross domestic product).

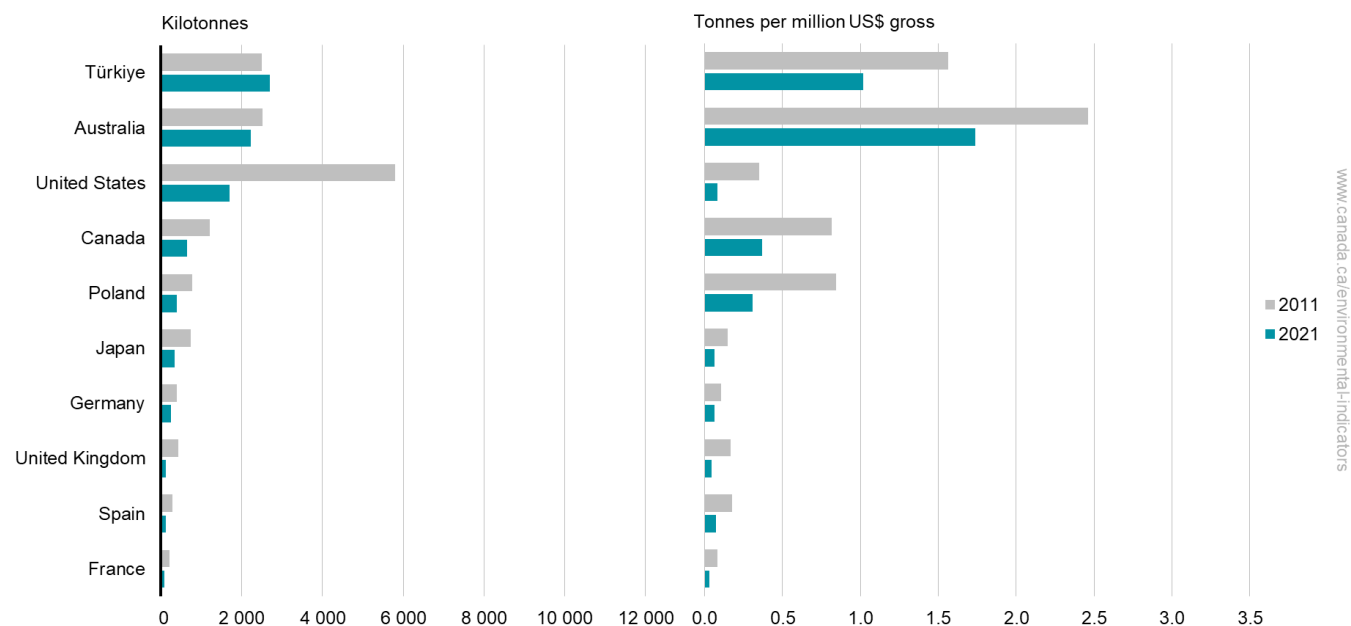
Sulphur oxides

Key results

In 2021, Canada:

- saw a decrease of 47% in sulphur oxides (SO_x) emissions from 2011 levels
- ranked 4th highest in SO_x emissions among OECD member countries
- had the 3rd highest ratio of SO_x emissions to gross domestic product among the top 10 emitting OECD member countries

Figure 1. Sulphur oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021



[Data for Figure 1](#)

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Although Canada's SO_x emissions declined by 563 kilotonnes from 2011 to 2021, Canada ranked as one of the highest emitters among OECD member countries, behind Türkiye, Australia, and the United States. Of the top 10 emitters, the United States experienced the largest decrease (4 088 kilotonnes, or 71%), driven by reduced emissions from the coal-fired electricity production industry. Except for Türkiye, all of the other top 10 emitting member countries experienced declines in emissions between 2011 and 2021.

In terms of the ratio of SO_x emissions to gross domestic product, all top 10 emitting member countries reported declines ranging between 30% and 76% from 2011 to 2021.

Note that, in 2011, South Korea and Colombia were the 7th and 9th highest in SO_x emissions among OECD member countries with 434 kilotonnes and 401 kilotonnes, respectively. Since no data was available for 2021, South Korea and Colombia are not represented in the comparison as the top 10 emitting countries are based on 2021 emissions.

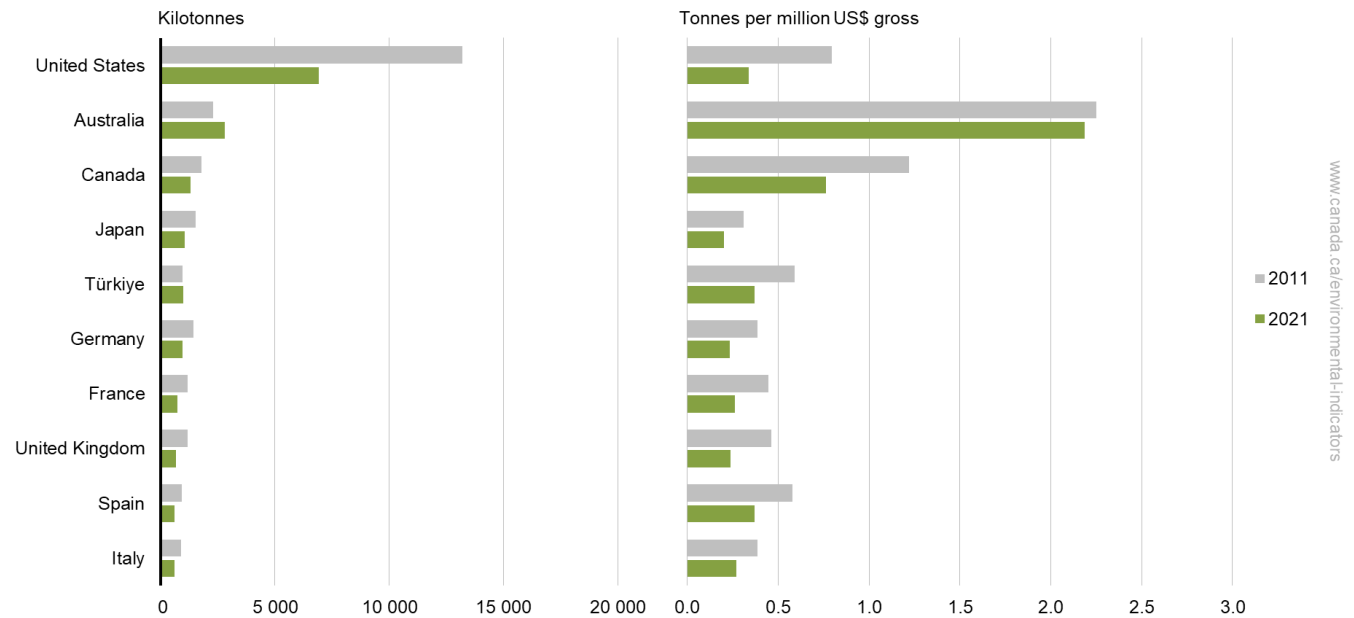
Nitrogen oxides

Key results

In 2021, Canada:

- saw a decrease of 27% in nitrogen oxides (NO_x) emissions from 2011 levels
- ranked 3rd highest in NO_x emissions among OECD member countries
- had the 2nd highest ratio of NO_x emissions to gross domestic product among the top 10 emitting OECD member countries

Figure 2. Nitrogen oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021



[Data for Figure 2](#)

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

In 2021, Canada ranked as one of the highest emitters among OECD member countries, behind the United States and Australia, despite a reduction of 483 kilotonnes in NO_x emissions between 2011 and 2021. Of the top 10 emitting members, the United States experienced the largest reduction over that period (6 268 kilotonnes, or 48%). In 2021, emissions from Australia and Türkiye were higher than in 2011 (+22% and +3%, respectively).

Emissions intensity, the ratio of NO_x emissions to gross domestic product, was lower in 2021 than it was in 2011 for all top 10 emitting member countries. The reductions in intensity were between 3% and 58%.

Note that, in 2011, South Korea was the eighth highest in NO_x emissions among OECD member countries with 1 040 kilotonnes. Since no data was available for 2021, South Korea is not represented in the comparison as the top 10 emitting countries are based on 2021 emissions.

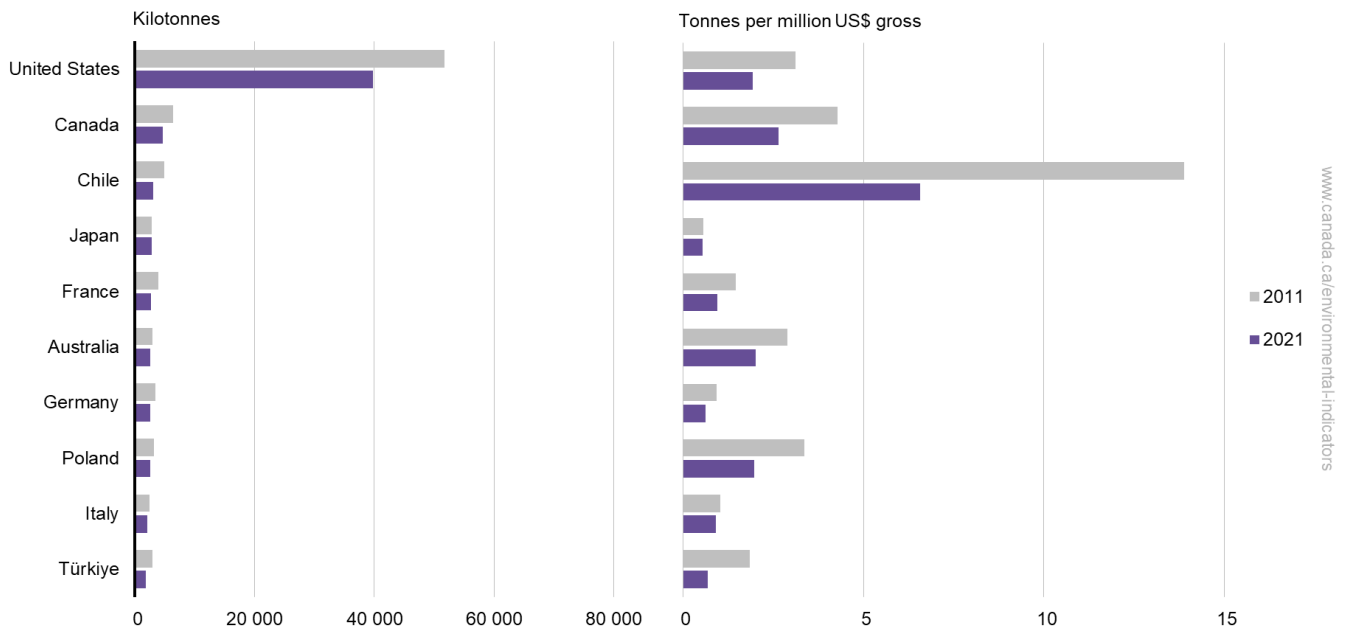
Carbon monoxide

Key results

In 2021, Canada:

- saw a decrease of 27% in carbon monoxide (CO) emissions from 2011 levels
- ranked 2nd highest in CO emissions among OECD member countries
- had the 2nd highest ratio of CO emissions to gross domestic product among the top 10 emitting OECD member countries

Figure 3. Carbon monoxide emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021



[Data for Figure 3](#)

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

In 2021, the United States was the highest CO emitting country, followed by Canada. Except for Japan, all the top 10 emitting member countries of the OECD experienced declines in emissions between 12% and 39% in 2021 from 2011 levels.

Declines were also observed in the ratio of CO emissions to gross domestic product between 2011 and 2021; they ranged from 4% to 63% for the top 10 emitting countries.

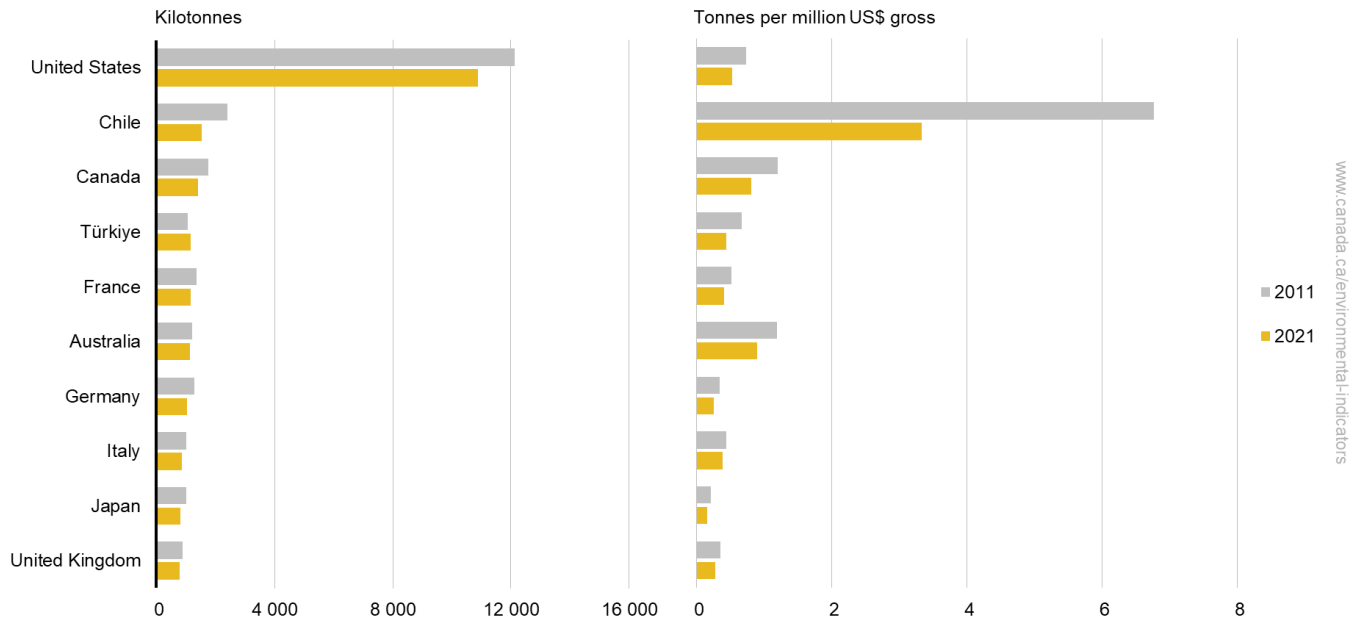
Volatile organic compounds

Key results

In 2021, Canada:

- saw a decrease of 21% in volatile organic compounds (VOC) emissions from 2011 levels
- ranked 3rd highest in VOC emissions among OECD member countries
- had the 3rd highest ratio of VOC emissions to gross domestic product among the top 10 emitting OECD member countries

Figure 4. Volatile organic compounds emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021



[Data for Figure 4](#)

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Although Canada's VOC emissions declined by 366 kilotonnes between 2011 and 2021, Canada ranked as one of the highest emitters among the member countries of the OECD, behind the United States and Chile. Most of the top 10 emitting member countries experienced declines in emissions between 2011 and 2021, with the exception of Türkiye whose emissions increased by 9%.

The reductions in emissions intensity range from 5% to 36% between 2011 and 2021 for the top 10 emitting member countries.

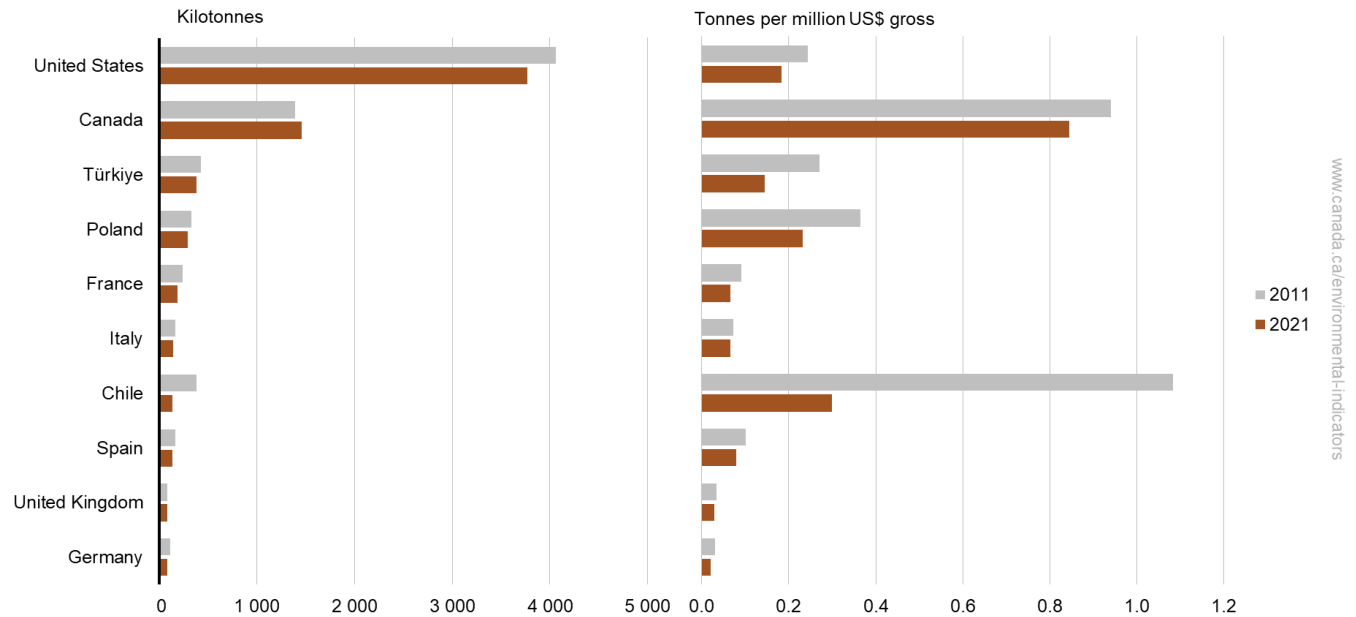
Fine particulate matter

Key results

In 2021, Canada:

- saw an increase of 5% in fine particulate matter (PM_{2.5}) emissions from 2011 levels
- ranked 2nd highest in PM_{2.5} emissions among OECD member countries
- had the highest ratio of PM_{2.5} emissions to gross domestic product among OECD member countries

Figure 5. Fine particulate matter emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021



[Data for Figure 5](#)

Note: Definitions of pollution sources and estimation methods may differ from country to country. Canada and the United States include open sources such as dust from roads, prescribed forest burning and agriculture in their PM_{2.5} emissions. These sources are not always reported by other OECD member countries. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Of the top 10 emitting member countries, Canada is the only country that experienced an increase in PM_{2.5} emissions from 2011 to 2021. Despite this increase in emissions, all the top 10 member countries experienced declines in their emissions intensity, which decreased between 8% and 46%, from 2011 to 2021.

Canada and the United States include open sources¹ such as dust from roads, prescribed forest burning and agriculture in their PM_{2.5} emissions. These sources are not always reported by other OECD member countries.

Note that, in 2011, Colombia was the 8th highest in PM_{2.5} emissions among OECD member countries, with 191 kilotonnes. Since no data was available for 2021, Colombia is not represented in the comparison as the top 10 emitting countries are based on 2021 emissions.

¹ Canada's Air Pollutant Emission Inventory reported that, in 2021, national emissions from dust, agriculture and controlled fires accounted for 1 280 kilotonnes (88%) of Canada's total of PM_{2.5}.

About the indicator

What the indicator measures

These indicators present total emissions and emissions intensity for member countries of the Organisation for Economic Co-operation and Development (OECD). The emissions of 5 pollutants are reported: sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and fine particulate matter (PM_{2.5}). The indicators focus on the top 10 emitting member countries of the OECD.

Why this indicator is important

These indicators help to inform Canadians about how Canada's emissions compare to those of other countries. The indicators report on key air pollutants that contribute to smog and acid rain and help the government to identify priorities, track progress, and develop strategies and policies for reducing or controlling air pollution.

Exposure to air pollutants on a daily basis can cause adverse health and environmental effects. Fine particulate matter is a key component of smog along with ground-level ozone (O₃) and has been associated with pulmonary and cardiovascular health issues. While causing effects of their own, NO_x (such as nitrogen dioxide [NO₂]) and VOCs are the main contributors to the formation of O₃. NO_x, SO_x (such as sulphur dioxide [SO₂]), and VOCs also lead to the formation of PM_{2.5} in the air. This is in addition to the PM_{2.5} that is emitted directly from sources such as road dust and prescribed forest burning. SO_x and NO_x can also lead to the formation of acid rain that can harm the environment, materials, living organisms and humans.

Irrespective of downward trends observed in emissions, localized air quality issues may still arise when emission sources are spatially concentrated.

Related indicators

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 (NH₃), carbon monoxide (CO) and fine particulate matter (PM_{2.5}). Black carbon, which is a component of PM_{2.5}, is also reported. For each air pollutant, data are provided at the national, provincial/territorial and facility level and by major source.

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

The [International comparison of urban air quality](#) indicators present and compare the air quality in selected Canadian urban areas with a population greater than 1 million to the air quality in selected international urban areas having comparable data.

Data sources and methods

Data sources

Air pollutant emissions data for the indicators come from the Organisation for Economic Co-operation and Development [OECD.Stat](#) database, specifically the Air emissions by source table under the Environment (Air and Climate) grouping.

The gross domestic product data were obtained from the Main aggregate tables of the National accounts (Annual national accounts) in the same database.

More information

At the time of this update the OECD.Stat database contained emissions data up to the end of 2021, reflecting delays in the collection and aggregation of international data. Data are collected for each member country from the following sources:

- the [Centre on Emission Inventories and Projections database](#) (as of August 2023) of the Convention on Long-Range Transboundary Air Pollution

- the [National Inventory Submissions 2023](#) (as of August 2023) of the United Nations Framework Convention on Climate Change
- the replies to the OECD Questionnaire on the State of the Environment and comments from member countries received before September 2023

The OECD.Stat database indicates the source used to report emissions for each country, pollutant, and year.

Methods

Two (2) years of data are used to compare the emissions from 38 member countries of the Organisation for Economic Co-operation and Development (OECD): 2021, which is the latest year with available information, and 2011, 10 years prior.

For each air pollutant, 2011 and 2021 emissions are compiled and ranked in relation to total emissions in 2021. While the focus is on the top 10 emitting OECD member countries, emissions for all 38 member countries are provided, when available.

The emission intensity indicators are calculated by dividing a country's emissions by its gross domestic product value for that year.

More information

Air pollutant emissions indicators

Emissions for each member country are estimated or measured using one or several of the following methods:

- continuous emission monitoring systems
- predictive emission monitoring
- source testing
- mass balance
- site-specific emission factors
- published emission factors
- engineering estimates
- special studies

Generally, each country compiles and estimates its air pollutant emissions combining facility-level emissions (aka point sources) with sector-level emissions (or area sources).

Canada's data are derived from the annual Convention on Long-Range Transboundary Air Pollution submission to the Centre on Emission Inventories and Projections database. The submitted air pollutant emission data are based on Canada's [Air Pollutant Emission Inventory](#). This includes information reported by facilities to the National Pollutant Release Inventory as well as emission estimates compiled for non-reporting facilities, non-reporting sources such as motor vehicles or non-reported pollutants (in-house emissions estimates).

Air pollution emissions per unit of gross domestic product

The emissions intensity indicators are expressed in tonnes of pollutants emitted per million United States dollars using constant gross domestic product at purchasing power parity for the base year 2015.

Purchasing power parity is a weighted average of the relative prices, quoted in national currency, of comparable items between countries. Using purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Countries included in the comparison

The indicators include all member countries of the OECD as of February 2024. The data presented in the indicator reflect data completeness in the OECD.Stat database at the time of reporting.

Caveats and limitations

Air pollutant emission inventories from different countries are estimated with the best data, measurements, and methodologies available. While national emission inventories follow a common reporting structure, emissions estimation methodologies and coverage among countries may differ. Users should be cautious when comparing the data.

The indicators exclude non-anthropogenic (natural sources) emissions and emissions from international aviation and maritime transport.

Emissions from sources such as dust from roads, prescribed forest fires and agriculture are also included in Canada's values. These sources are not always reported by other countries.

Emissions reported for Canada in this indicator may be slightly different from the emissions reported in the Canadian Environmental Sustainability Indicators' [Air pollutant emissions](#). Those indicators are based on data from Canada's Air Pollutant Emission Inventory.

Adjustments may be made to Canada's national totals after the final submission to the database OECD.Stat, which may result in slight differences in the values reported.

Resources

References

Centre on Emission Inventories and Projections, European Monitoring and Evaluation Programme (2023) [Submissions 2023](#). Retrieved on February 1, 2024.

Environment and Climate Change Canada (2023) [Canada's Air Pollutant Emissions Inventory Report](#). Retrieved on February 1, 2024.

Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#). Retrieved on February 1, 2024.

Annex

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

Table A.1A. Data for Figure 1. Sulphur oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 sulphur oxides emissions (kilotonnes)	2021 sulphur oxides emissions (kilotonnes)	2011 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
Türkiye	2 502	2 697	1.57	1.02
Australia	2 507	2 222	2.46	1.74
United States	5 791	1 703	0.35	0.08
Canada	1 204	641	0.81	0.37
Poland	776	392	0.85	0.31
Japan	732	337	0.15	0.07
Germany	387	254	0.10	0.06
United Kingdom	430	125	0.17	0.04
Spain	282	123	0.18	0.07
France	219	89	0.08	0.03

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.2B. Data for Figure 1. Sulphur oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 sulphur oxides emissions (kilotonnes)	2021 sulphur oxides emissions (kilotonnes)	2011 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
Italy	202	78	0.09	0.04
New Zealand	69	72	0.45	0.35
Chile	321	70	0.90	0.15
Czech Republic	167	69	0.50	0.17
Iceland	82	61	5.66	3.21
Greece	160	47	0.50	0.16
Portugal	56	41	0.18	0.12

Country	2011 sulphur oxides emissions (kilotonnes)	2021 sulphur oxides emissions (kilotonnes)	2011 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 sulphur oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
Finland	60	24	0.25	0.09
Belgium	52	23	0.11	0.04
Netherlands	34	21	0.04	0.02
Sweden	25	15	0.06	0.03
Norway	18	15	0.06	0.04
Slovak Republic	67	14	0.45	0.08
Hungary	34	14	0.14	0.04
Estonia	73	12	2.08	0.25
Ireland	25	12	0.10	0.02
Lithuania	19	11	0.26	0.11
Austria	15	11	0.04	0.02
Denmark	14	9	0.05	0.03
Slovenia	11	4	0.18	0.05
Switzerland	8	4	0.02	0.01
Latvia	4	4	0.10	0.06
Luxembourg	1	1	0.02	0.01
South Korea	434	n/a	0.25	n/a
Colombia	401	n/a	0.76	n/a
Israel	153	n/a	0.58	n/a
Mexico	n/a	n/a	n/a	n/a
Costa Rica	n/a	n/a	n/a	n/a

Note: n/a = not available. Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.3A. Data for Figure 2. Nitrogen oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 nitrogen oxides emissions (kilotonnes)	2021 nitrogen oxides emissions (kilotonnes)	2011 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
United States	13 190	6 922	0.79	0.34
Australia	2 292	2 800	2.25	2.19
Canada	1 802	1 320	1.22	0.76
Japan	1 526	1 044	0.31	0.20
Türkiye	946	977	0.59	0.37
Germany	1 429	963	0.38	0.23
France	1 172	751	0.44	0.26
United Kingdom	1 170	678	0.46	0.24
Spain	931	618	0.58	0.37
Italy	900	608	0.39	0.27

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](https://data.oecd.org).

Table A.4B. Data for Figure 2. Nitrogen oxides emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 nitrogen oxides emissions (kilotonnes)	2021 nitrogen oxides emissions (kilotonnes)	2011 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
Poland	823	589	0.90	0.46
Chile	242	259	0.68	0.56
Greece	325	221	1.02	0.74
Netherlands	329	194	0.39	0.21
New Zealand	153	164	1.00	0.80
Czech Republic	241	159	0.72	0.40
Norway	197	140	0.68	0.41
Belgium	227	139	0.46	0.25
Portugal	185	135	0.59	0.41
Austria	196	121	0.47	0.27
Sweden	163	115	0.37	0.21

Country	2011 nitrogen oxides emissions (kilotonnes)	2021 nitrogen oxides emissions (kilotonnes)	2011 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 nitrogen oxides emissions intensity (tonnes per million United States dollars of gross domestic product)
Hungary	138	110	0.57	0.35
Ireland	107	99	0.45	0.20
Finland	164	97	0.69	0.38
Denmark	136	89	0.51	0.28
Slovak Republic	81	58	0.54	0.32
Lithuania	56	52	0.76	0.50
Switzerland	79	51	0.16	0.09
Latvia	39	34	0.91	0.59
Slovenia	47	26	0.73	0.33
Estonia	40	22	1.16	0.46
Iceland	22	19	1.51	1.03
Luxembourg	40	13	0.71	0.19
South Korea	1 040	n/a	0.60	n/a
Colombia	353	n/a	0.66	n/a
Israel	158	n/a	0.60	n/a
Costa Rica	55	n/a	0.74	n/a
Mexico	n/a	n/a	n/a	n/a

Note: n/a = not available. Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.5A. Data for Figure 3. Carbon monoxide emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 carbon monoxide emissions (kilotonnes)	2021 carbon monoxide emissions (kilotonnes)	2011 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)
United States	51 653	39 728	3.11	1.94
Canada	6 314	4 594	4.27	2.65
Chile	4 936	3 020	13.88	6.56
Japan	2 726	2 760	0.55	0.53
France	3 855	2 704	1.46	0.94
Australia	2 941	2 584	2.89	2.02
Germany	3 443	2 583	0.93	0.63
Poland	3 089	2 520	3.37	1.97
Italy	2 412	2 042	1.03	0.90
Türkiye	2 942	1 784	1.84	0.67

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.6B. Data for Figure 3. Carbon monoxide emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 carbon monoxide emissions (kilotonnes)	2021 carbon monoxide emissions (kilotonnes)	2011 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)
Spain	1 844	1 635	1.15	0.97
United Kingdom	1 791	1 271	0.71	0.44
Czech Republic	890	790	2.66	1.97
New Zealand	705	670	4.62	3.25
Austria	563	522	1.34	1.14
Netherlands	663	433	0.80	0.46
Norway	443	427	1.53	1.25
Greece	592	424	1.86	1.42
Hungary	562	345	2.32	1.09
Slovak Republic	414	334	2.80	1.84
Finland	393	329	1.65	1.29

Country	2011 carbon monoxide emissions (kilotonnes)	2021 carbon monoxide emissions (kilotonnes)	2011 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 carbon monoxide emissions intensity (tonnes per million United States dollars of gross domestic product)
Belgium	398	288	0.80	0.52
Sweden	387	276	0.87	0.51
Portugal	328	259	1.04	0.78
Denmark	307	192	1.16	0.61
Switzerland	228	151	0.45	0.26
Ireland	197	123	0.83	0.25
Iceland	114	112	7.84	5.94
Lithuania	152	112	2.07	1.08
Estonia	123	109	3.53	2.26
Latvia	155	102	3.63	1.80
Slovenia	139	87	2.16	1.10
Luxembourg	27	19	0.49	0.27
Colombia	1 797	n/a	3.38	n/a
South Korea	710	n/a	0.41	n/a
Costa Rica	355	n/a	4.81	n/a
Israel	168	n/a	0.64	n/a
Mexico	n/a	n/a	n/a	n/a

Note: n/a = not available. Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.7A. Data for Figure 4. Volatile organic compounds emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 volatile organic compounds emissions (kilotonnes)	2021 volatile organic compounds emissions (kilotonnes)	2011 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)
United States	12 128	10 890	0.73	0.53
Chile	2 404	1 532	6.76	3.33
Canada	1 766	1 400	1.19	0.81
Türkiye	1 068	1 166	0.67	0.44
France	1 351	1 164	0.51	0.41
Australia	1 206	1 143	1.18	0.89
Germany	1 273	1 044	0.34	0.25
Italy	1 021	868	0.44	0.38
Japan	1 018	823	0.21	0.16
United Kingdom	886	781	0.35	0.27

Note: Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.8A. Data for Figure 4. Volatile organic compounds emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 volatile organic compounds emissions (kilotonnes)	2021 volatile organic compounds emissions (kilotonnes)	2011 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)
Poland	768	715	0.84	0.56
Spain	581	549	0.36	0.33
Netherlands	271	276	0.33	0.29
Czech Republic	243	187	0.73	0.47
New Zealand	180	179	1.18	0.87
Portugal	141	149	0.45	0.45
Greece	204	146	0.64	0.49
Norway	158	145	0.54	0.43

Country	2011 volatile organic compounds emissions (kilotonnes)	2021 volatile organic compounds emissions (kilotonnes)	2011 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 volatile organic compounds emissions intensity (tonnes per million United States dollars of gross domestic product)
Sweden	175	138	0.39	0.26
Belgium	133	122	0.27	0.22
Ireland	110	115	0.46	0.23
Hungary	134	114	0.55	0.36
Austria	132	111	0.32	0.24
Denmark	125	107	0.47	0.34
Slovak Republic	115	92	0.77	0.51
Finland	105	82	0.44	0.32
Switzerland	95	75	0.19	0.13
Lithuania	50	48	0.68	0.46
Latvia	40	37	0.95	0.65
Slovenia	37	30	0.58	0.38
Estonia	23	27	0.65	0.55
Luxembourg	12	11	0.21	0.16
Iceland	6	5	0.38	0.29
South Korea	847	n/a	0.49	n/a
Colombia	579	n/a	1.09	n/a
Israel	272	n/a	1.03	n/a
Costa Rica	84	n/a	1.14	n/a
Mexico	n/a	n/a	n/a	n/a

Note: n/a = not available. Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.9A. Data for Figure 5. Fine particulate matter emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 fine particulate matter emissions (kilotonnes)	2021 fine particulate matter emissions (kilotonnes)	2011 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)
United States	4 060	3 767	0.24	0.18
Canada	1 390	1 463	0.94	0.84
Türkiye	432	383	0.27	0.15
Poland	335	297	0.37	0.23
France	243	189	0.09	0.07
Italy	168	149	0.07	0.07
Chile	385	138	1.08	0.30
Spain	164	135	0.10	0.08
United Kingdom	88	83	0.04	0.03
Germany	115	83	0.03	0.02

Note: Definitions of pollution sources and estimation methods may differ from country to country. Canada and the United States include open sources such as dust from roads, prescribed forest burning and agriculture in their PM_{2.5} emissions. These sources are not always reported by other OECD member countries. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

Table A.10A. Data for Figure 5. Fine particulate matter emissions and emissions intensity of the top 10 emitting member countries of the Organisation for Economic Co-operation and Development, 2011 and 2021

Country	2011 fine particulate matter emissions (kilotonnes)	2021 fine particulate matter emissions (kilotonnes)	2011 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)
Portugal	50	45	0.16	0.14
Hungary	56	38	0.23	0.12
Greece	47	36	0.15	0.12
Norway	32	25	0.11	0.07
Czech Republic	43	24	0.13	0.06
Slovak Republic	24	19	0.16	0.10
Belgium	25	18	0.05	0.03

Country	2011 fine particulate matter emissions (kilotonnes)	2021 fine particulate matter emissions (kilotonnes)	2011 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)	2021 fine particulate matter emissions intensity (tonnes per million United States dollars of gross domestic product)
Latvia	21	18	0.50	0.31
Sweden	26	16	0.06	0.03
Finland	20	14	0.09	0.06
Austria	19	14	0.04	0.03
Netherlands	21	14	0.03	0.02
Ireland	14	13	0.06	0.03
Denmark	19	12	0.07	0.04
Slovenia	15	10	0.23	0.13
Lithuania	9	7	0.12	0.07
Switzerland	8	6	0.02	0.01
Estonia	16	5	0.46	0.10
Luxembourg	2	1	0.03	0.02
Iceland	1	1	0.10	0.06
Colombia	191	n/a	0.36	n/a
South Korea	81	n/a	0.05	n/a
Mexico	n/a	n/a	n/a	n/a
Australia	n/a	n/a	n/a	n/a
Costa Rica	n/a	n/a	n/a	n/a
Israel	n/a	n/a	n/a	n/a
Japan	n/a	n/a	n/a	n/a
New Zealand	n/a	n/a	n/a	n/a

Note: n/a = not available. Definitions of pollution sources and estimation methods may differ from country to country. Comparisons should be made with caution. Gross domestic product values are in millions of constant United States dollars, constant purchasing power parity, for the base year 2015. The use of purchasing power parity facilitates international comparison of gross domestic product by creating an equivalent purchasing power basis for each country compared.

Source: Organisation for Economic Co-operation and Development (2024) [OECD.Stat](#).

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