



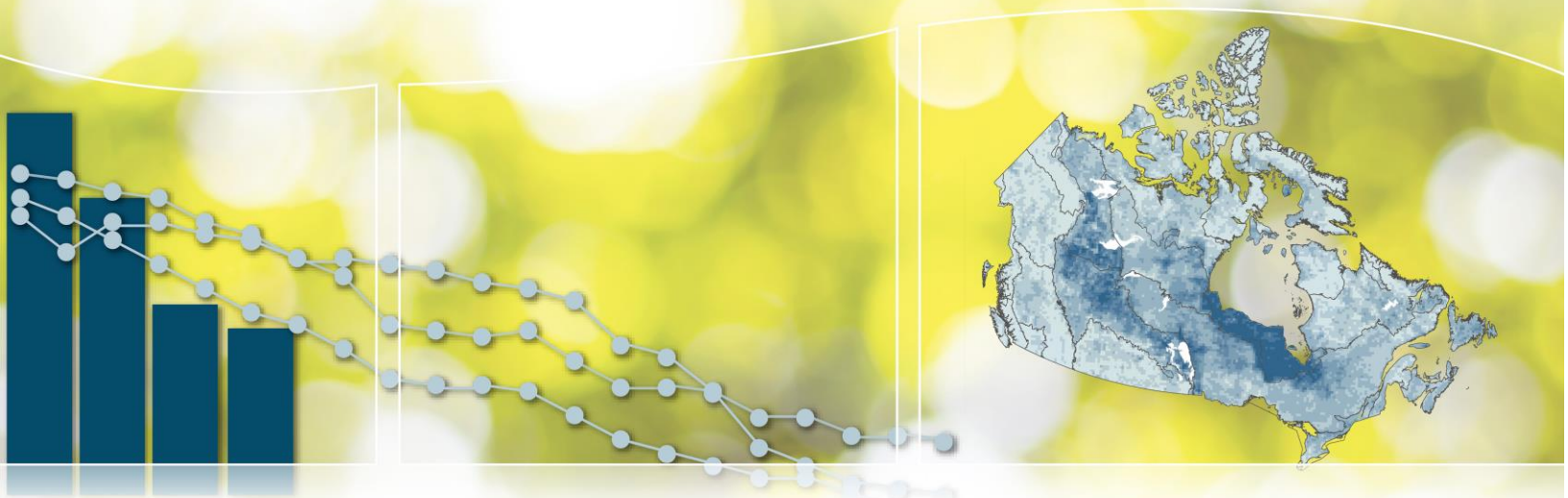
Environment and  
Climate Change Canada

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# Canadian Environmental Sustainability Indicators

## Global greenhouse gas emissions



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## Global greenhouse gas emissions

April 2019

### Table of Contents

<b>Global greenhouse gas emissions</b> .....	<b>5</b>
Key results .....	5
About the indicator .....	6
What the indicator measures .....	6
Why this indicator is important .....	6
Related indicators .....	6
Data sources and methods .....	7
Data sources .....	7
Methods .....	7
Recent changes .....	7
Caveats and limitations .....	8
Resources .....	8
References .....	8
Related information .....	8
<b>Annex</b> .....	<b>9</b>
Annex A. Data tables for the figures presented in this document .....	9

**List of Figures**

Figure 1. Greenhouse gas emissions for the world and top 10 emitting countries and regions, 2005 and 2014..... 5

**List of Tables**

Table A.1. Data for Figure 1. Greenhouse gas emissions for the world and top 10 emitting countries and regions, 2005 and 2014 ..... 9

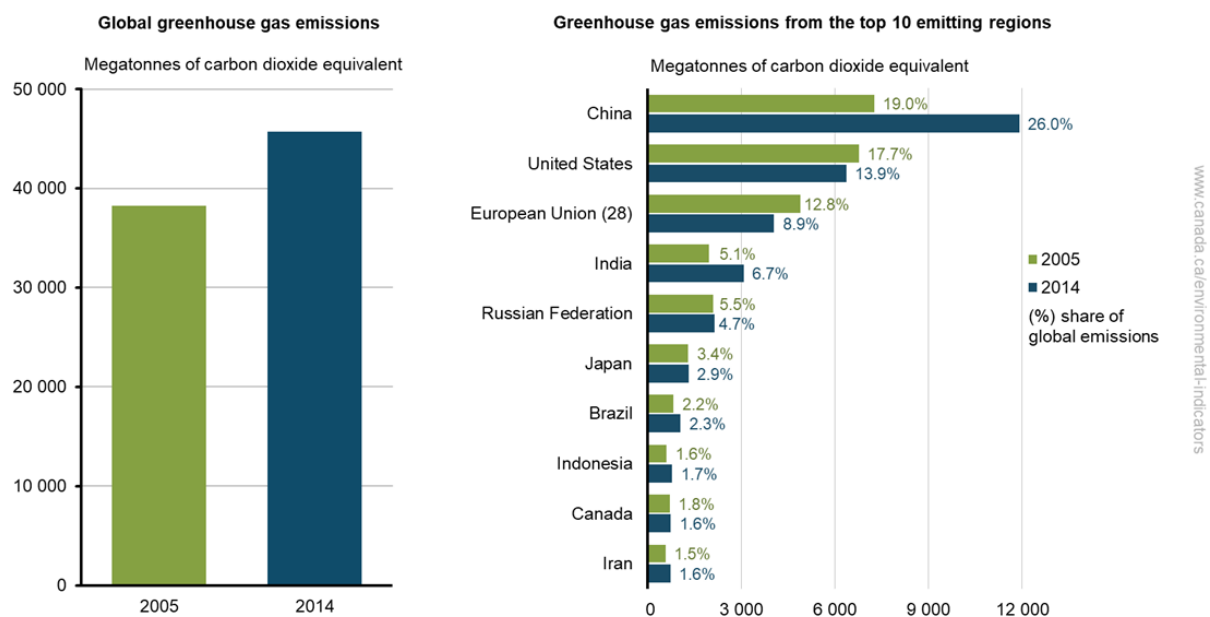
# Global greenhouse gas emissions

The release of greenhouse gases (GHGs) and their increasing concentration in the atmosphere is leading to a changing climate. This change has an impact on the environment, human health and the economy. Greenhouse gases remain in the atmosphere for periods ranging from a few years to thousands of years. As such, they have a worldwide impact, no matter where they were first emitted. This indicator highlights GHG emissions caused by human activity around the world.

## Key results

- Between 2005 and 2014, global GHG emissions increased by 19.5%, from 38 273 to 45 741 megatonnes of carbon dioxide equivalent (Mt CO<sub>2</sub> eq.)
- In 2014, the highest emitting country was China with 11 912 Mt CO<sub>2</sub> eq., or 26.0% of global GHG emissions. Since 2005, emissions from China increased by 63.9%
- Canada's emissions in 2014 reached 745 Mt CO<sub>2</sub> eq., which made up 1.6% of global GHG emissions

**Figure 1. Greenhouse gas emissions for the world and top 10 emitting countries and regions,<sup>1</sup> 2005 and 2014**



[Data for Figure 1](#)

**Note:** Greenhouse gas emissions for each country and region presented in this comparison were calculated by the World Resources Institute. For certain countries, including Canada, these values differ from the latest official estimate of greenhouse gas emissions submitted to the United Nations Framework Convention on Climate Change. Canada's emissions under this indicator also differ from the [Greenhouse gas emissions](#) indicators which are based on Canada's submission to the United Nations Framework Convention on Climate Change. European Union (28) includes: Austria, Belgium, Bulgaria, Croatia, 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 United Kingdom.

**Source:** World Resources Institute (2017) [CAIT – Historical Emissions Data](#).

<sup>1</sup> Countries/regions shown are the top 10 emitters of greenhouse gases globally.

Canada's share of global emissions decreased from 1.8% in 2005 to 1.6% in 2014. Like that of other developed countries, it is anticipated to continue to decline with the expected rapid increase in emissions from developing and emerging countries, particularly China, India, Brazil and Indonesia.

On December 12, 2015, Canada and 194 other countries reached the [Paris Agreement](#), an ambitious and balanced agreement to fight climate change. This new agreement will strengthen the effort to limit the global average temperature rise to well below 2°C and pursue efforts to limit the increase to 1.5°C.

According to the Intergovernmental Panel on Climate Change, reaching this goal implies large-scale changes in energy systems and potentially land use across the world. In addition, the efforts and associated costs needed to reach this goal will vary between countries, with the distribution of costs across countries potentially being different from the distribution of the actions themselves.<sup>2</sup>

## About the indicator

### What the indicator measures

The Global greenhouse gas emissions indicator reports global human emissions of greenhouse gases (GHGs) for 2005 and 2014. Emissions from energy and non-energy related sources are included in this indicator, while emissions from land use, land use change and forestry are excluded. The emissions of GHGs include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

### Why this indicator is important

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

### Related indicators

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

The [Carbon dioxide emissions from a consumption perspective](#) indicator provides a view of the impact of Canada's consumption of goods and services, regardless of where they are produced, on the levels of carbon dioxide released into the atmosphere.

The [Greenhouse gas emissions](#) indicators report trends in total anthropogenic (human-made) GHG emissions at the national level.

The [Progress towards Canada's greenhouse gas emissions reduction target](#) indicator provides an overview of Canada's projected GHG emissions up to 2030.

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<sup>2</sup> Intergovernmental Panel on Climate Change (2014) [Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change - Summary for Policy Makers](#) (PDF; 2.0 MB). Retrieved on December 12, 2018.

## Data sources and methods

### Data sources

The data used to compile the Global greenhouse gas emissions indicator were retrieved from the World Resources Institute's [Climate Analysis Indicator Tool](#). The data are based on the February 2017 version of the tool which was accessed in February 2019.

#### More information

The World Resources Institute's [Climate Analysis Indicator Tool](#) uses information and emissions from different sources:

- Carbon Dioxide Information Analysis Center for [Global, Regional, and National Fossil-Fuel Carbon Dioxide \(CO<sub>2</sub>\) emissions](#).
- Food and Agriculture Organization of the United Nations for [Land Use Change and Forestry Data](#).
- International Energy Agency for their [CO<sub>2</sub> Emissions from Fuel Combustion \(2016 edition\)](#).
- United States Energy Information Administration for their [International Energy Statistics](#).
- United States Environmental Protection Agency for their [Global Anthropogenic Non-CO<sub>2</sub> GHG Emissions: 1990–2030](#).

It covers anthropogenic GHG emissions across the world, excluding emissions attributed to land use, land use change and forestry. The data are reported by the World Resources Institute's 2 to 3 years after data collection. The latest year available at the time of the update was 2014.

### Methods

The indicator is composed of the world and selected countries/regions GHG emission totals for 2005 and 2014 as retrieved from the World Resources Institute's [Climate Analysis Indicator Tool](#).

#### More information

The national GHG emission totals from the World Resources Institute's Climate Analysis Indicators Tool are compiled by using as many as 5 different GHG emissions data sources. The selection of these data sources is done by the use of different completeness criteria like geographic coverage, temporal coverage and accuracy. For more information on the data sources selection and the national and global emissions compilation consult the [CAIT Country Greenhouse Gas Emissions: Sources & Methods](#) (PDF; 681 kB) document from the World Resources Institute.

Greenhouse gas emissions are reported in carbon dioxide equivalent (CO<sub>2</sub> eq.), determined by multiplying the amount of emissions of a particular gas by its global warming potential. The indicator uses the Intergovernmental Panel on Climate Change's 1995 100-year [global warming potentials](#).

### Recent changes

The time coverage of the indicator has been modified and now presents data for 2005 and 2014. It previously presented data for 2005 and 2013.

## Caveats and limitations

The emissions in the World Resources Institute's [Climate Analysis Indicator Tool](#) as of February 2019 may reflect revisions of data previously published by that organization. The emissions reported by the World Resource Institute are also slightly different from the emissions reported by member countries in their National Inventory Report to the United Nations Framework Convention on Climate Change.

### More information

A leading cause of the difference between the data reported by the World Resources Institute and by individual countries in their National Inventory Report is that many member countries, including Canada, now report emissions using revised methodology and global warming potential guidelines that have yet to be used in the World Resource Institute's calculations. Caution is advised when comparing data released in different years and reports.

Emissions from international bunker fuels (which are estimated based on the location of marine and aviation refueling) are not reflected in reported countries and regions emissions totals. However, they are included in the total world emissions and the "Rest of the world" emissions.

Greenhouse gas data in the Climate Analysis Indicators Tool have uncertainties due to the fact that they are using many different data sources. Despite the uncertainties, the World Resources Institute has chosen to err on the side of inclusiveness, by capturing the widest possible range of GHG sources and sinks that contribute to global climate change. For more information on uncertainties please consult section 7 of the document [CAIT Country Greenhouse Gas Emissions: Sources & Methods](#) (PDF; 681 kB).

## Resources

### References

Carbon Dioxide Information Analysis Center (2019) [Global, Regional, and National Fossil-Fuel Carbon Dioxide \(CO<sub>2</sub>\) emissions](#). Retrieved in January 2019.

Food and Agriculture Organization of the United Nations (2019) [Land Use Change and Forestry Data](#). Retrieved in January 2019.

International Energy Agency (2016) [CO<sub>2</sub> Emissions from Fuel Combustion \(2016 edition\)](#). Retrieved in January 2019.

United States Energy Information Administration (2019) [International Energy Statistics](#). Retrieved in January 2019.

United States Environmental Protection Agency (2012) [Global Anthropogenic Non-CO<sub>2</sub> Greenhouse Gas Emissions: 1990–2030](#). Retrieved in January 2019.

World Resources Institute (2017) [CAIT – Historical Emissions Data](#). Retrieved in February 2019.

### Related information

[Canada's action on climate change](#)

[Climate change](#)

[Greenhouse gas emissions: drivers and impacts](#)

[Greenhouse gas emissions](#)



## Annex

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

**Table A.1. Data for Figure 1. Greenhouse gas emissions for the world and top 10 emitting countries and regions, 2005 and 2014**

Country or region	2005 Greenhouse gas emissions (megatonnes of carbon dioxide equivalent)	Share of global greenhouse gas emissions in 2005 (percent)	2014 Greenhouse gas emissions (megatonnes of carbon dioxide equivalent)	Share of global greenhouse gas emissions in 2014 (percent)	2005 to 2014 percent change in national emissions
China	7 267	19.0	11 912	26.0	63.9
United States	6 765	17.7	6 371	13.9	-5.8
European Union (28) <sup>[A]</sup>	4 883	12.8	4 054	8.9	-17.0
India	1 970	5.1	3 080	6.7	56.3
Russian Federation	2 110	5.5	2 138	4.7	1.3
Japan	1 303	3.4	1 315	2.9	0.9
Brazil	828	2.2	1 051	2.3	27.0
Indonesia	610	1.6	789	1.7	29.5
Canada	708	1.8	745	1.6	5.2
Iran	569	1.5	734	1.6	28.8
Rest of the world <sup>[B]</sup>	11 259	29.4	13 553	29.6	20.4
World	38 273	100.0	45 741	100.0	19.5

**Note:** Greenhouse gas emissions for each country and region presented in this comparison were calculated by the World Resources Institute. For certain countries, including Canada, these values differ from the latest official estimate of greenhouse gas emissions submitted to the United Nations Framework Convention on Climate Change. Canada's emissions under this indicator also differ from the [Greenhouse gas emissions](#) indicators which are based on Canada's submission to the United Nations Framework Convention on Climate Change.

<sup>[A]</sup> European Union (28) includes: Austria, Belgium, Bulgaria, Croatia, 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 United Kingdom.

<sup>[B]</sup> "Rest of the world" includes international bunkers.

**Source:** World Resources Institute (2017) [CAIT – Historical Emissions Data](#).

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