



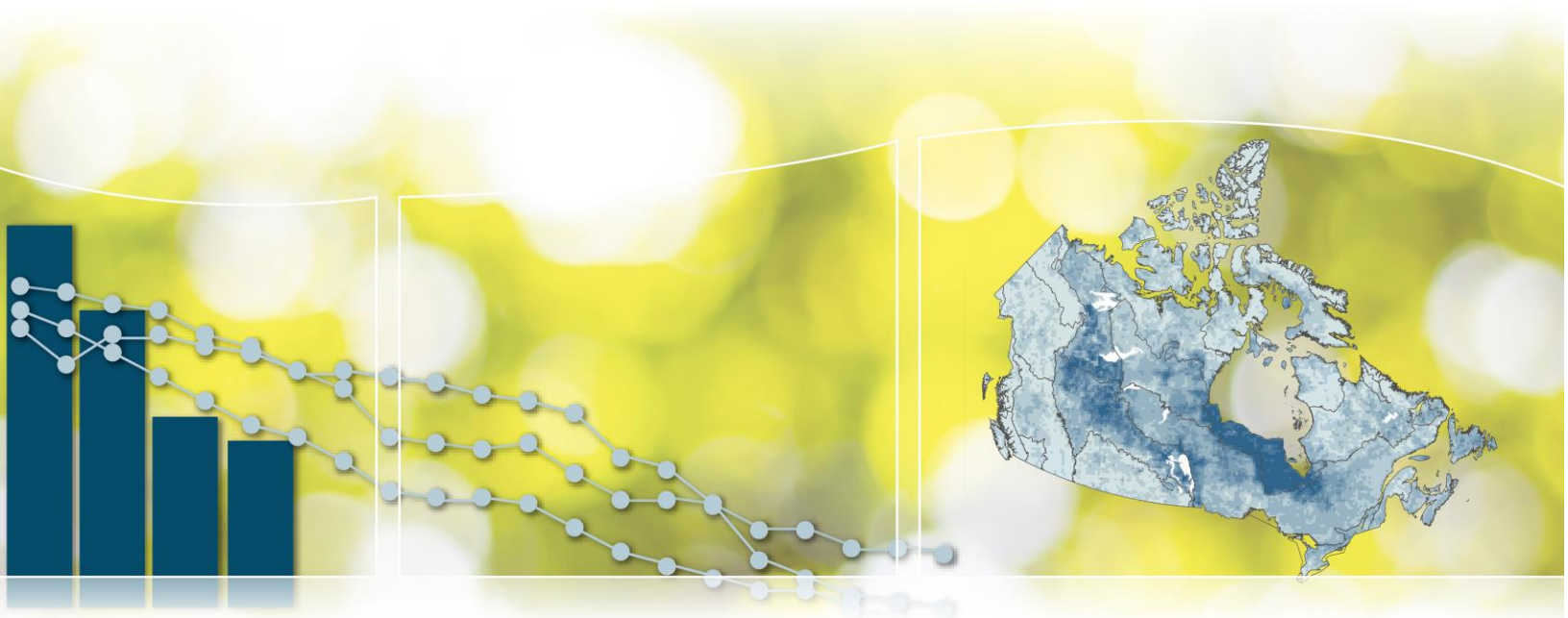
Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada



# Canadian Environmental Sustainability Indicators

## Global greenhouse gas emissions



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# Canadian Environmental Sustainability Indicators

## Global greenhouse gas emissions

May 2017

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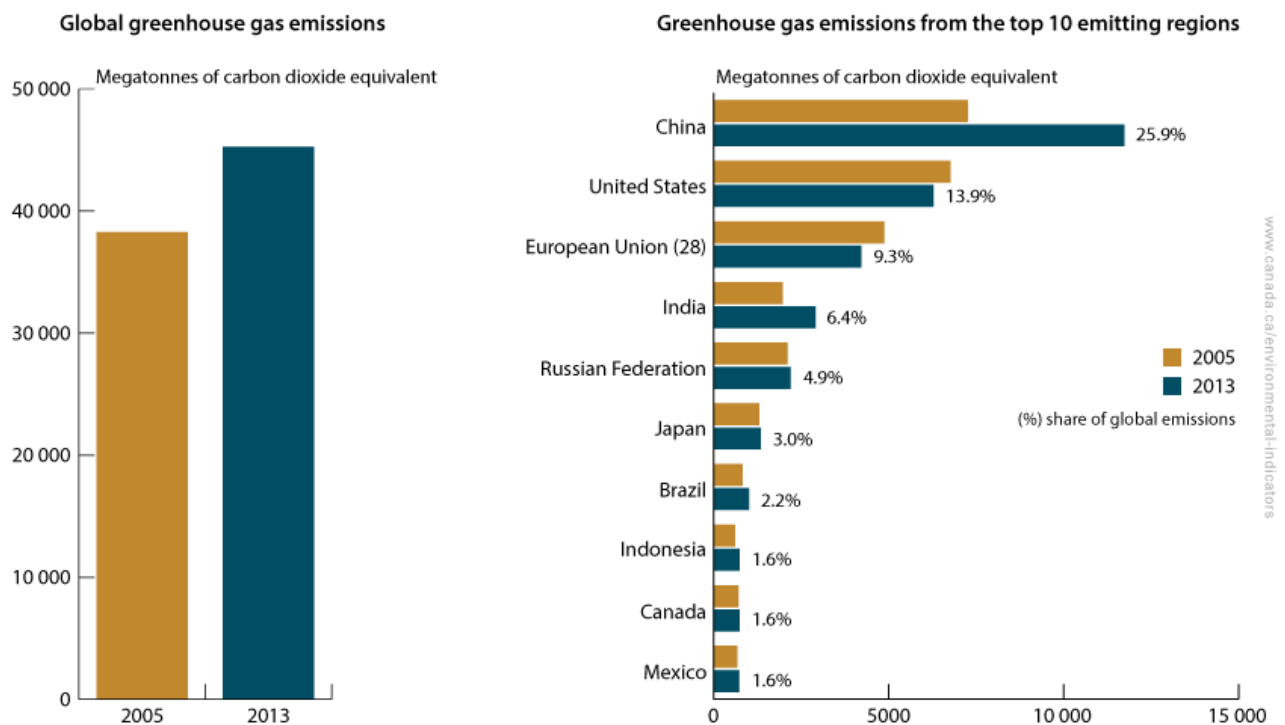
# Global greenhouse gas emissions indicator

This indicator highlights greenhouse gas (GHG) emissions caused by human activity around the world. 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.

## Key results

- Between 2005 and 2013, global GHG emissions increased by 18.3%. During that time, emissions from China increased by 61.5%.
- Canada's emissions in 2013 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 2013**



[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](#) indicator which is 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 Climate Data Explorer](#).

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

Canada's share of global emissions decreased since 2005. 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 does the indicator measure

The Global greenhouse gas emissions indicator reports global human emissions of greenhouse gases (GHGs) for 2005 and 2013. 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 is this indicator important

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

### What are the related indicators

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. Emissions are also presented [per person and per unit gross domestic product](#), by [province and territory](#), by [economic sector](#) and from [large facilities](#).

## Data sources and methods

### What are the data sources

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

#### More information

The World Resources Institute's [Climate Analysis Indicators 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](#).

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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](#). Retrieved on April 10, 2017.

- 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 two to three years after data collection. The latest year available at the time of the update was 2013.

## How is this indicator calculated

The indicator is composed of the world and selected countries/regions GHG emission totals for 2005 and 2013 as retrieved from the World Resources Institute's [Climate Analysis Indicators 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 five 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](#).

## What has recently changed

The time coverage of the indicator has been modified and now presents data for 2005 and 2013. It previously presented data for 1990, 2005 and 2012. The year 1990 was removed from the current version of the indicator because of data gaps in the World Resources Institute's Climate Analysis Indicators Tool. This would have made it impossible to present a comprehensive picture of global GHG emissions for that year.

## What are the caveats and limitations

The emissions in the World Resources Institute's [Climate Analysis Indicators Tool](#) as of February 2017 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 (2016) [Global, Regional, and National Fossil-Fuel Carbon Dioxide \(CO<sub>2</sub>\) emissions](#). Retrieved in March 2017.

Environment and Climate Change Canada (2017) [National Inventory Report 1990–2015: Greenhouse Gas Sources and Sinks in Canada](#). Retrieved in April 2017.

Food and Agriculture Organization of the United Nations (2016) [Land Use Change and Forestry Data](#). Retrieved in March 2017.

International Energy Agency (2016) [CO<sub>2</sub> Emissions from Fuel Combustion \(2016 edition\)](#). Retrieved in March 2017.

United States Energy Information Administration (2016) [International Energy Statistics](#). Retrieved in March 2017.

United States Environmental Protection Agency (2012) [Global Anthropogenic Non-CO<sub>2</sub> Greenhouse Gas Emissions: 1990–2030](#). Retrieved in March 2017.

World Resources Institute (2017) [CAIT Climate Data Explorer](#). Retrieved in March 2017.

### Related information

[Canada's Action on Climate Change](#)

[Climate Change](#)

[Drivers and Impacts of 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 2013**

Country or region	2005 Greenhouse gas emissions (megatonnes of carbon dioxide equivalent)	Share of global greenhouse gas emissions in 2005 (percent)	2013 Greenhouse gas emissions (megatonnes of carbon dioxide equivalent)	Share of global greenhouse gas emissions in 2013 (percent)	2005 to 2013 percent change in national emissions
China	7267	19.0	11 735	25.9	61.5
United States	6765	17.7	6280	13.9	-7.2
European Union (28) <sup>[A]</sup>	4883	12.8	4225	9.3	-13.5
India	1970	5.1	2909	6.4	47.6
Russian Federation	2110	5.5	2199	4.9	4.2
Japan	1303	3.4	1353	3.0	3.8
Brazil	828	2.2	1018	2.2	23.0
Indonesia	610	1.6	744	1.6	22.1
Canada	708	1.9	738	1.6	4.2
Mexico	682	1.8	733	1.6	7.5
World	38 273	100.0	45 261	100.0	18.3
Rest of the world <sup>[B]</sup>	11 147	29.1	13 327	29.4	19.6

**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](#) indicator which is 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 Climate Data Explorer](#).

**[www.ec.gc.ca](http://www.ec.gc.ca)**

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