Environment Canada Environnement Canada

www.ec.gc.ca

Data Sources and Methods for the International Air Pollutant Emissions Indicators

May 2013

Canada

ISBN : En4-144/23-2013E-PDF
Cat. No.: 978-1-100-22037-6

Aussi disponible en français

1 Introduction

The international air pollutant emissions indicators are part of the Canadian Environmental Sustainability Indicators (CESI) program (http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1), which provides data and information to track Canada's performance on key environmental sustainability issues.

The international air pollutant emissions indicators track air pollutant emissions from Canada and nine other countries. These indicators help to inform Canadians about how Canada's emissions compare to those from 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. The emissions data used for these indicators are also used to fulfill Canada's international and domestic commitments and reporting obligations.

2 Description and rationale of the international air pollutant emissions indicators

2.1 Description

The international air pollutant emissions indicators track air pollutant emissions for Canada and for nine other leading economies (G8 countries plus Australia and Sweden). Four pollutants were selected for these indicators. They are sulphur oxides (SO_X), nitrogen oxides (NO_X), volatile organic compounds (VOC) and ammonia (NH_3). Emissions are reported in kilotonnes (kt).

A country's air pollutant emissions intensity for the same four pollutants are also provided in terms of total tonnes (t) of emissions per unit of gross domestic product (GDP in US$ millions). The GDP used is in American dollars (US$), at constant prices, and constant purchasing power parity (PPP), and for the base year of 2005.

3 Data

3.1 Data sources

The air pollutant emissions data used to calculate the international air pollutant emissions indicators are directly retrieved from the Centre on Emission Inventories and Projections database (http://www.ceip.at/overview-of-submissions-under-clrtap/2012-submissions/) of the Convention on Long-Range Transboundary Air Pollution (CLRTAP). For Japan and Australia, the emissions were taken from the National Inventory Submission 2012 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php) of the United Nations Framework Convention on Climate Change (UNFCCC). Ammonia emissions for the year 2010 were retrieved from the National Emission Inventory (NEI) (http://www.epa.gov/ttnchie1/trends/) of air pollutant emissions trends data of the United States Environmental Protection Agency (U.S. EPA).

Gross domestic product (GDP) statistics were obtained through the National Accounts of the Organisation for Economic Co-operation and Development (OECD) StatExtracts (http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1), accessed September 2012.

3.2 Spatial coverage
The following countries are included in the international air emissions indicators: Canada, United States, Germany, United Kingdom, France, Italy, Sweden, Russia, Australia and Japan.

3.3 Temporal coverage
Two years are used to compare these countries: 2010, which is the latest available year at the release time of these indicators and 2000 (10 years in the past).

3.4 Data completeness
NH_3 emissions were not available for Japan and Australia. These two countries were excluded from the comparison provided for NH_3.

3.5 Data timeliness
The data is current up to the end of 2010. The international air pollutant emissions indicators are reported two years after data collection, because of the time needed to validate, calculate and interpret the data.

4 Methods

International air pollutant emissions indicators

Emissions data used to calculate the international air emissions indicators are directly taken from the Centre on Emission Inventories and Projections (CEIP) database (http://www.ceip.at/webdab-emission-database/). This database contains all the information on emissions for the countries that have signed the Convention on Long-Range Transboundary Air Pollution (CLRTAP). It provides time-series emissions by pollutant and by source (sector). Each country is required to report its emissions by February 15 of each year.

Canada's annual CLRTAP submission for air pollutant emission data is based on Canada's National Pollutant Release Inventory (NPRI) Air Pollutant Emission Summaries and Trends (http://www.ec.gc.ca/pdb/websol/emissions/ap/ap_query_e.cfm). This includes information reported by facilities to the NPRI as well as emission estimates that are compiled for other sources such as motor vehicles. For Japan and Australia, the emissions used were directly taken from the National Inventory Submission 2012 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php) of the United Nations Framework Convention on Climate Change (UNFCCC).

Each country compiles and estimates its emissions, generally using a combination of top-down and bottom-up approaches. Top-down approaches involve the multiplication of sector activity levels by emissions factors. Bottom-up approaches are based on facility emissions. The emissions are collated, verified, validated and grouped into the format required by the international organizations (CEIP and UNFCCC) and reported.
The emissions are estimated or measured using one of the following methods:

- Continuous emission monitoring systems (CEMS)
- Predictive emission monitoring (PEM)
- Source testing
- Mass balance
- Site-specific emission factors
- Published emission factors
- Engineering estimates

- Special studies

The total emissions for each country were retrieved from the CEIP database, the UNFCCC submissions and the U.S. EPA NEI and used for the comparisons.

International air pollutant emissions per unit gross domestic product (GDP)

This indicator is obtained by dividing the emissions from the international air pollutant emissions indicator by the gross domestic product (GDP) data from the Organisation of Economic Co-operation and Development (OECD) StatExtracts (emissions per GDP in tonnes/US$ million (GDP) using constant purchasing power parities (PPPs) and the 2005 OECD Base Year). PPPs are weighted averages of the relative prices, quoted in national currency, of comparable items between countries. The use of PPPs facilitates international comparison of GDP by creating an equivalent purchasing power basis for each country compared.

5 Caveats and limitations

Air pollutant emissions inventories from different countries are being estimated with the best data, measurements and methodologies available. Even though the national emissions inventories used for these comparisons follow the same Centre on Emission Inventories and Projections database (CEIP) (http://www.ceip.at/overview-of-submissions-under-clrtap/2012-submissions/) structure, the user needs to be cautious when comparing the data. Emissions estimation methodologies among countries may differ so comparisons should be made with caution.

Comparison with past international air emissions reporting

The emissions in CEIP or in the National inventory submissions of the United Nations Framework Convention on Climate Change (UNFCCC) for a given year may be different from those previously published by those organizations. Caution is advised when comparing data released in different years.

6 References and further reading

6.1 References

CEIP European Monitoring and Evaluation Programme (2012) Centre on Emission Inventories and Projections 2012 submission. Retrieved in December, 2012. Available from: http://www.ceip.at/overview-of-submissions-under-clrtap/2012-submissions/

OECD (2012) OECD Statistical Library – GDP. Retrieved in September, 2012. Available from: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1

UNFCCC (2012) GHG Emissions Inventory - National Inventory Submissions 2012. Retrieved in December, 2012. Available from: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php

U.S. EPA (2012) National Emissions Inventory (NEI) of Air Pollutant Emissions Trends Data. Retrieved in January, 2013. Available from: http://www.epa.gov/ttnchie1/trends/

www.ec.gc.ca

Additional information can be obtained at:
Environment Canada
Inquiry Centre
10 Wellington Street, 23rd Floor
Gatineau, QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
Email: Enviroinfo@ec.gc.ca