



INDICATOR: CHANGES IN GREENHOUSE GAS EMISSIONS

STRATEGIC DIRECTION: Reduce Threats

TARGET: 6. By 2015, plans for climate change mitigation are developed and implemented and contribute to Ontario's target to reduce greenhouse gas emissions by 6 per cent below 1990 levels.

THEME: Pressures on Ontario's Biodiversity – Climate Change

Background Information:

Greenhouse gases (GHG) from human activities trap heat in the atmosphere and are the most significant driver of observed climate change (IPCC 2014). The link between climate change and biodiversity has long been established, with climate change affecting ecosystems and species ability to adapt, thereby increasing the loss of biodiversity. In particular, climate change can alter the timing of species' life cycle events, change species distributions, impair trophic networks and ecosystem functioning, and, in the worst cases, result in species extinctions (Bellard et al. 2012; IPCC 2014).

In 2007, the Ontario government released a Climate Change Action Plan that established GHG emission reduction targets of 6, 15 and 80 percent below 1990 levels by the years 2014, 2020 and 2050, respectively (OMOE 2007). These targets are comparable to those set by the governments of Quebec, New Brunswick and British Columbia, as well as with the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Given the actual and projected impacts of climate change on biodiversity, the Ontario Biodiversity Strategy 2011 supports Ontario's Climate Change Action Plan, and has established a 2015 target for the development and implementation of plans for climate change mitigation that contribute to Ontario's target to reduce GHG emissions by 6% below 1990 levels by 2014 (OBS 2011).

This indicator reports on the development and implementation of some key plans for climate change mitigation, as well as progress in achieving Ontario's Climate Change Action Plan target to reduce GHG emissions by 6% below 1990 levels by 2014.

Data Analysis:

Information about Ontario's Climate Change Action Plan, Ontario's 2014 Climate Change Update and other provincial climate change initiatives were obtained from the Ontario Ministry of the Environment and Climate Change.

Information about GHG emission in Ontario is based on Environment Canada's National Inventory Report 1990–2012: Greenhouse Gases Sources and Sinks (2014). Canada's National Inventory Report is prepared and submitted annually to the United Nations Framework Convention on Climate Change. The inventory estimates include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs) in the following six sectors: energy; industrial processes; solvent and other product use; agriculture; waste; and land use, land-use change and forestry.



Environment Canada is responsible for the preparation and submission of the National Inventory Report using data provided by the provinces. Data for GHG emissions have been calculated annually and 1990 data is internationally recognized as the baseline level for all reduction targets. Emissions data for Ontario are also categorized by the following sectors: transportation, industry, buildings, electricity, agriculture and waste (Table 1). Emission data for Ontario from 1990 to 2012 were plotted against the 2014 target (Figure 1). The proportions of GHG emissions by sector for 2012, (Figure 2) as well as the percent change in GHG emissions by sector are presented in Figures 2 and 3.

Table 1. Sector descriptions for sources of greenhouse gas emissions (Source: OMOECC 2014).

Sector	Sources of Greenhouse Gas Emissions
Transportation	The combustion of fossil fuels such as diesel, gasoline and propane by passenger and commercial vehicles on and off roads, as well as rail and Ontario’s share of domestic marine and air travel.
Industry	Some industrial processes and stationary combustion of fossil fuels such as coke, natural gas and coal used in mining; pipelines; construction; greenhouses; production of cement, iron and steel, chemicals, paper and wood products; and other manufacturing.
Buildings	The combustion of fossil fuels such as natural gas in residential, commercial and institutional buildings for space and water heating.
Electricity	Generating electricity and heat by electric utilities using fossil fuels such as natural gas.
Agriculture	Enteric fermentation, manure management and fertilizer application.
Waste	Solid waste disposal on land, wastewater handling and waste incineration.

Results:

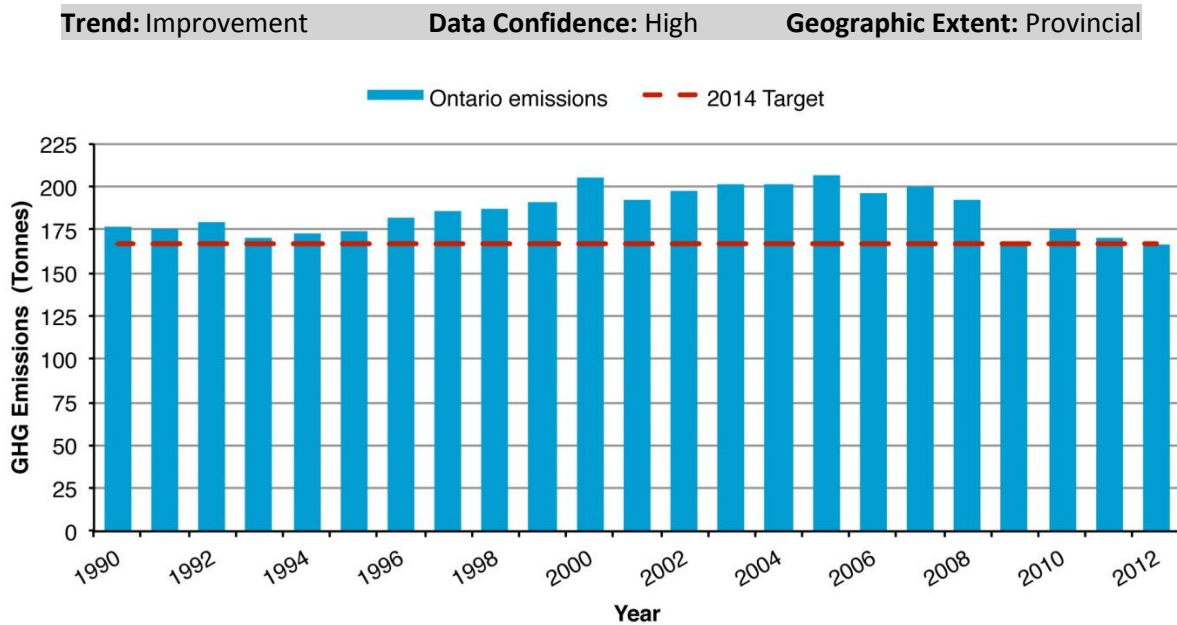


Figure 1. Greenhouse gas emission summary for Ontario 1990-2012 (Source: Environment Canada 2014).

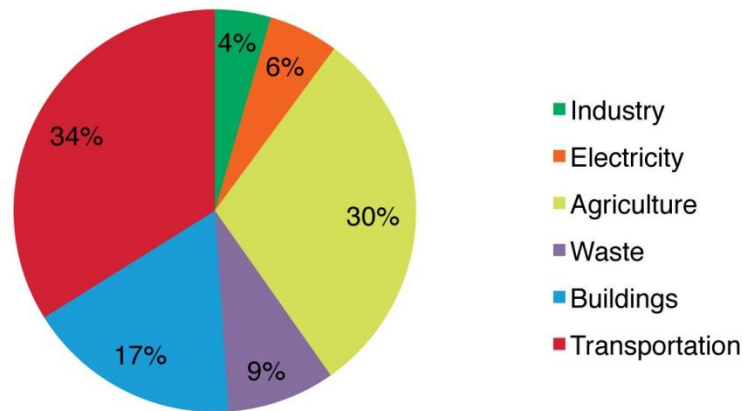


Figure 2. Greenhouse gas emissions in Ontario by sector 2012 (Source: OMOECC 2014).

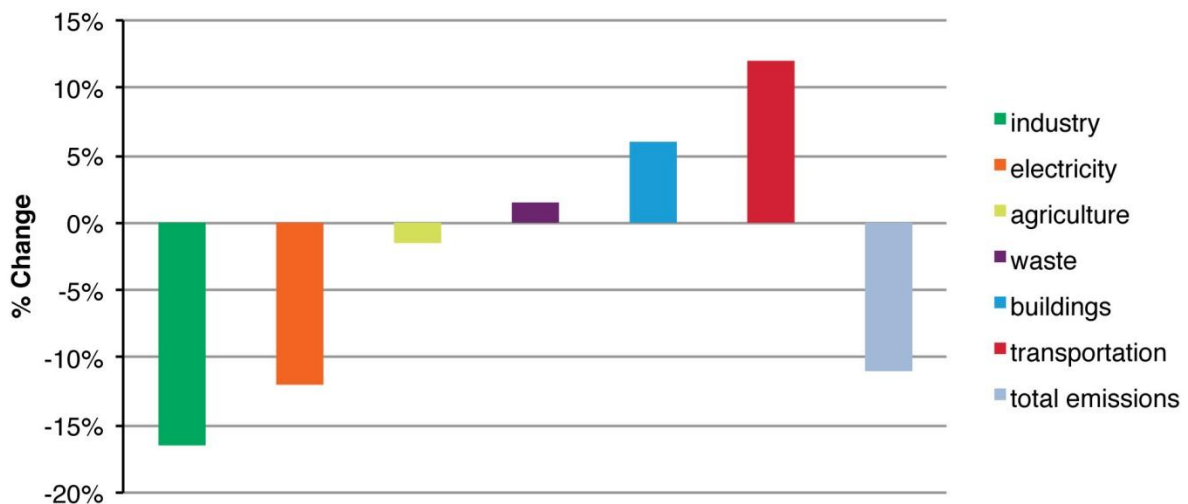


Figure 3. Changes in Ontario's greenhouse gas emissions by Sector 1990–2012 (Source: OMOECC 2014)

Status:

- Plans for climate change mitigation in Ontario have been developed and implemented. These include Go Green: Ontario's Climate Change Action Plan (2007), The Big Move Transportation Plan (2008), Green Energy Act (2009), Building Code Amendments (2012), as well as a number of supporting plans at the provincial, regional and municipal level.
- GHG emissions in Ontario grew from 1990 to the early 2000s, then stabilized and declined in recent years. Since 1990, total emissions in Ontario have declined by approximately 11%, with the greatest reductions in the electricity and industrial sectors. The reduction in electricity is attributable to the phasing out of coal-fired electricity generation, while the reduction in the industry sector is attributable to reduced production, including plant closures and improved emissions intensity.



- Based on current data¹, in 2012 total GHG emissions in Ontario were 167 Mt, achieving Ontario's target to reduce GHG emissions by 6% below 1990 levels.

Links:

Related Targets: N/A

Related Themes: N/A

Web Links:

Ontario Ministry of the Environment and Climate Change <http://www.ontario.ca/ministry-environment>

Ontario Ministry of Natural Resources and Forestry <http://www.ontario.ca/ministry-natural-resources-forestry>

United Nations Framework Convention on Climate Change http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php

References:

Bellard, C., C. Bertelsmeier, P. Leadley, W. Thuiller, and F. Courchamp. 2012. Impacts of climate change on future biodiversity. *Ecology Letters* 15:365-367.

Environment Canada. (2014). National inventory report 1990-2012: greenhouse gases and sinks in Canada. [Available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php]

IPCC. 2014. Summary for policymakers. pp. 1-32 *In* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)] *Climate change 2014: impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge University Press, Cambridge, U.K.

Ontario Biodiversity Council. 2011. Ontario's biodiversity strategy, 2011: renewing our commitment to protecting what sustains us. Ontario Biodiversity Council, Peterborough, ON.

Ontario Ministry of the Environment (OMOE). 2007. Go green: Ontario's action plan on climate change. Queen's Printer for Ontario, Toronto, ON.

Ontario Ministry of the Environment and Climate Change (OMOECC). 2014. Ontario's climate change update 2014. Queen's Printer for Ontario, Toronto, ON.

¹ The latest Ontario Climate Change Update (OMOECC 2014) provides data to 2012. Data for 2014 emissions will not be available until 2017.

Citation

Ontario Biodiversity Council. 2015. State of Ontario's Biodiversity [web application]. Ontario Biodiversity Council, Peterborough, Ontario. [Available at: <http://ontariobiodiversitycouncil.ca/sobr> (Date Accessed: May 19, 2015)].