

Canadian System of Environmental–Economic Accounts: Energy use and greenhouse gas emissions, 2020

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Canada's economy has been growing at a faster pace than its industrial greenhouse gas (GHG) emissions over the past decade. For example, from 2009 to 2019, the economy grew 2.4% a year on average, while industrial GHG emissions experienced a slight increase of 0.5%. However, in 2020, the unprecedented impact of the COVID-19 pandemic resulted in reduced industrial activity. Gross domestic product (GDP) decreased 5.1%, while industrial GHG emissions saw an even greater decrease (-10.2%).

The energy use and GHG emissions data presented in this release reflect the economic activities of industries, households and governments that contributed to Canada's GDP in 2020. The data reveal trends that occurred because of the pandemic, where distancing measures and various restrictions on economic activity altered the usual trends.

These GHG emission estimates are based on the United Nations System of Environmental–Economic Accounting (SEEA) guidelines and are closely linked to economic statistics. They differ from the GHG emissions estimates released by Environment and Climate Change Canada (ECCC), which is responsible for producing Canada's National Inventory Report on Greenhouse Gas Sources and Sinks. ECCC's inventory is the official benchmark for GHG emissions in Canada and is based on the guidelines from the United Nations Framework Convention on Climate Change.

For more information on the methodological differences between these two data products, see the [greenhouse gas webpage](#) of the [Canadian Centre for Energy Information](#).

The coal phase-out for electricity generation continues to lower industrial GHG emissions

From 2009 to 2019, the Canadian economy as measured by real GDP (+26.8%), the total energy used by industries (+10.2%) and industrial GHG emissions (+4.9%) all increased. However, emissions rose about one-fifth of the pace of economic growth and about half that of industrial energy use. The significant decrease in energy used by industries (-8.0%) and in industrial GHG emissions (-10.2%) in 2020 can largely be attributed to the pandemic. Chart 1 displays the slower growth of GHG emissions when compared with total GDP over the time series.

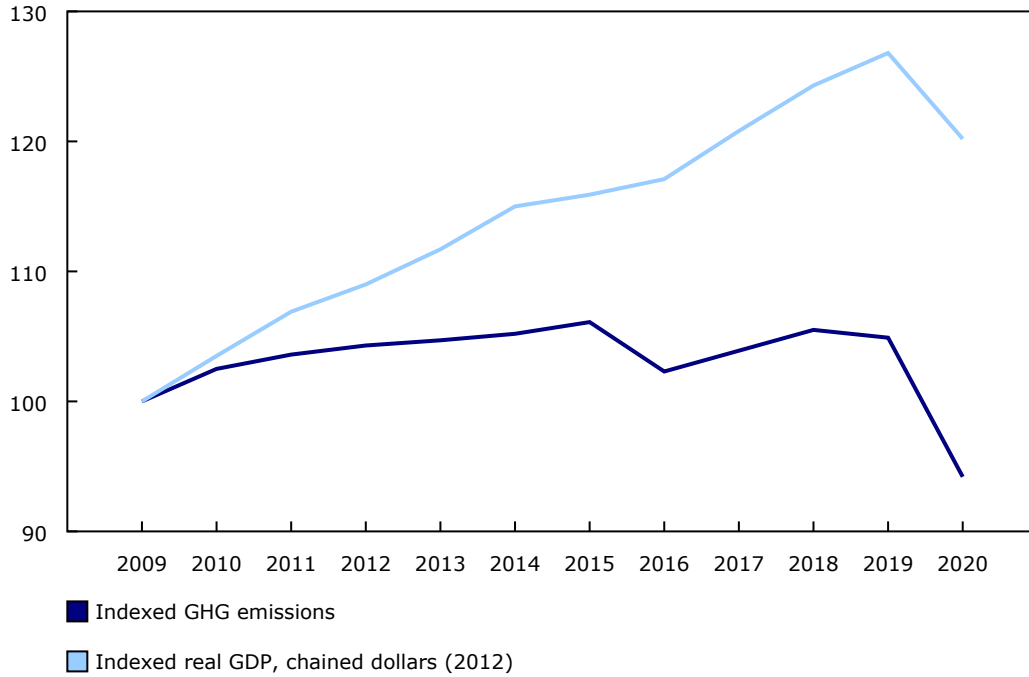
One reason why economic growth and industrial energy use are growing while GHG emissions are decreasing is that the electric power generation, transmission and distribution industry has been shifting away from coal toward less GHG intensive energy sources for generating electricity. From 2009 to 2020, GHG emissions from this industry fell by 39.9%, while GDP for the industry rose 14.4% nationally. This pattern of divergence between GDP and GHG emissions for the electric power generation industry can be seen in Chart 2.

Overall, direct industrial GHG emissions intensity decreased 5.3% to 0.31 kilotonnes per million dollars of GDP from 2019 to 2020, while direct industrial energy intensity decreased 3.1% to 4.47 terajoules per million dollars of GDP. Direct emissions are produced by industries when they burn fuel or through their other industrial processes.



Chart 1
Indexed greenhouse gas (GHG) emissions and indexed real gross domestic product (GDP),
chained dollars (2012), all industries

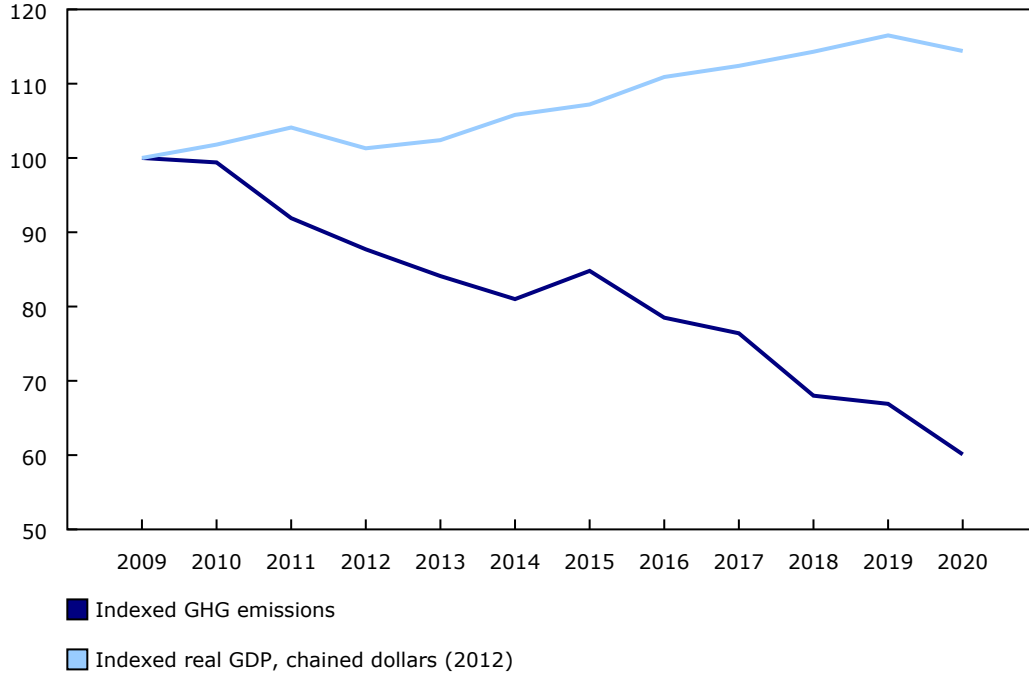
index (2009=100)



Source(s): Tables [38-10-0097-01](#) and [36-10-0434-03](#).

Chart 2
Indexed greenhouse gas (GHG) emissions and indexed real gross domestic product (GDP),
chained dollars (2012), for the electric power generation transmission, and distribution industry

index (2009=100)



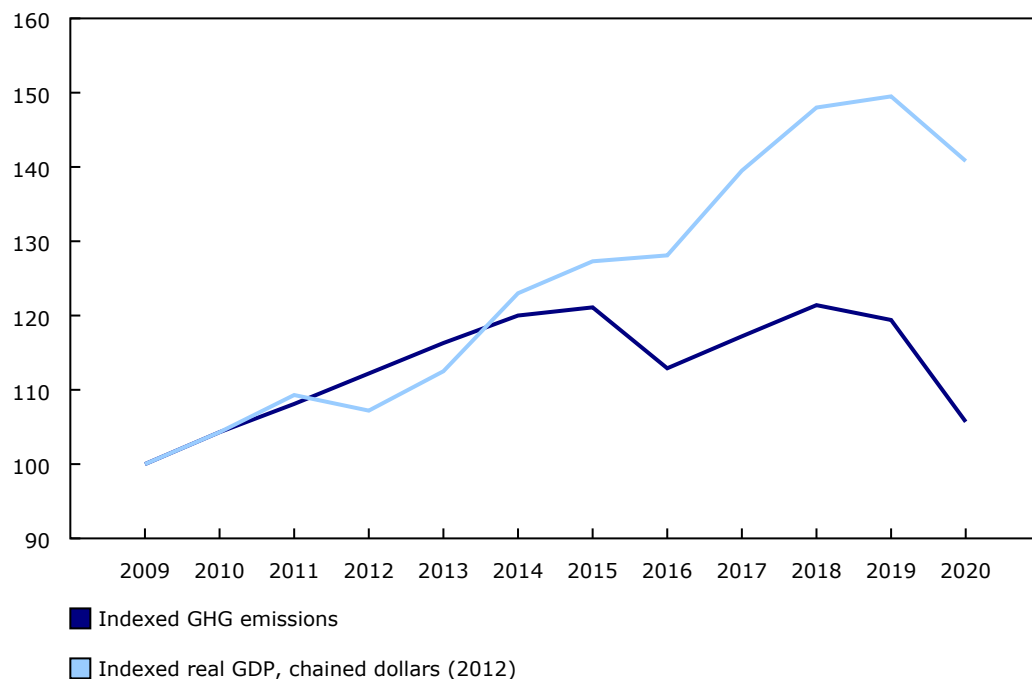
Source(s): Tables [38-10-0097-01](#) and [36-10-0434-03](#).

The oil and gas extraction industry remains Canada's top industrial energy user

Despite the pandemic, the oil and gas extraction industry continued as Canada's top industrial user of energy in 2020, representing 18.1% of Canada's total energy used. The oil and gas extraction industry has also been the highest GHG-emitting industry from 2009 to 2020, responsible for 22.4% of Canada's total GHG emissions in 2020. As shown in Chart 3, the oil and gas extraction industry has shown generalized growth in both GHG emissions and GDP from 2009 to 2020, except in 2016, 2019, and 2020. The most notable decrease occurred in 2020 due to the pandemic.

Chart 3
Indexed greenhouse gas (GHG) emissions and indexed real gross domestic product (GDP),
chained dollars (2012), for the oil and gas extraction industry

index (2009=100)



Source(s): Tables [38-10-0097-01](#) and [36-10-0434-03](#).

Households account for almost one-quarter of the total energy used in Canada

Households consumed almost one-quarter (23.2%) of Canada's total energy used in 2020, unchanged from 2019. The downward trends observed in the amount of energy used by households in 2020 can be attributed to the pandemic, where non-essential travel restrictions were in place. Although households accounted for almost one-quarter of the energy used in 2020, they were responsible for less than one-fifth (17.5%) of Canada's total GHG emissions in the year.

Household emissions per capita represent the average amount of household GHG emissions generated by a single Canadian and exclude all industrial emissions. Examples of household final consumption include buying gasoline for a vehicle or natural gas to heat a home. A region's available fuel mix, climate, average household size, and average household income all influence per capita emissions.

In 2020, Canada's per capita household GHG emissions decreased by 12.0% to 3.2 tonnes per person following a small decrease of 3.4% in 2019.

For international context, other countries with SEEA-based air emissions accounts such as the United Kingdom, France, and Germany reported per capita household emissions ranging from 1.5 to 2.2 tonnes for 2020.

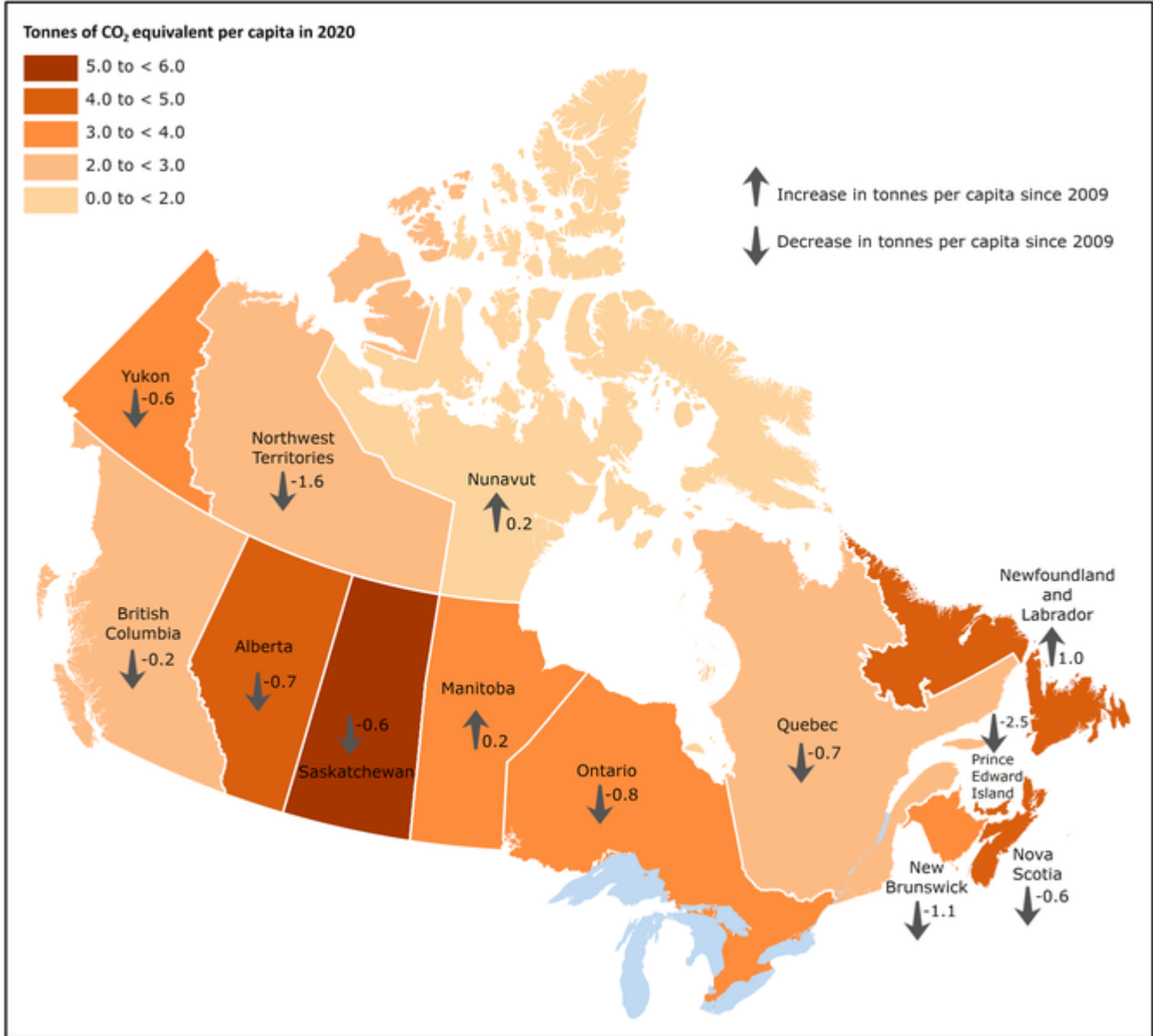
Quebec and British Columbia have the lowest per capita household GHG emissions among the provinces, while Atlantic Canada has among the highest

At 2.7 tonnes per capita, Quebec and British Columbia produced the lowest per capita household GHG emissions in 2020 among the provinces. Nunavut (0.9 tonnes), the Northwest Territories (2.9 tonnes), and Ontario (3.0 tonnes) were also below the national per capita level, while Manitoba (3.2 tonnes) matched it.

Per capita household GHG emissions were highest in Saskatchewan (5.1 tonnes), Newfoundland and Labrador (5.0 tonnes), Prince Edward Island (4.9 tonnes), Nova Scotia (4.4 tonnes), and Alberta (4.4 tonnes). New Brunswick (3.7 tonnes) and Yukon (3.5 tonnes) were also above the national average.

Among the provinces, Newfoundland and Labrador (+1.0 tonnes) had the largest increase in per capita household GHG emissions from 2009 to 2020, while Prince Edward Island (-2.5 tonnes) had the largest decline.

Map 1 – Household greenhouse gas emissions per capita, by province and territory, 2020



Source(s): Statistics Canada. Table 38-10-0097-01 Physical flow account for greenhouse gas emissions.
 Statistics Canada. Table 17-10-0005-01 Population estimates on July 1st.

Alberta greenhouse gas emissions driven by the oil and gas extraction industry

Variations in GHG emissions across Canada reflect the distinct land, geography and population of each province and territory.

Canada is a resource-rich country, and many resources are extracted and used here in Canada or exported abroad. The extraction of many of these resources—whether they are renewable, such as those obtained from logging, or non-renewable, such as those from mining or the oil and gas industry—contributes to Canada's annual GHG emissions and to its economic growth.

The oil and gas extraction industry was the largest GHG-emitting industry in Alberta in 2020, accounting for 48.7% of the province's total emissions. Emissions from this industry grew 29.2% from 2009 to 2019 in Alberta, in tandem with resource development. In 2020, there was a slowdown in activity in the oil and gas extraction industry in the second quarter, largely due to the pandemic, resulting in a decrease in their GHG emissions (-7.8%). In addition, there was considerable volatility in crude oil prices in the first half of 2020.

Households are the largest emitters in Central Canada

Both Ontario (29.6%) and Quebec (28.4%) counted households as their greatest source of direct GHG emissions in 2020.

Pulp, paper and paperboard mills account for one-fifth of emissions in British Columbia

Pulp, paper and paperboard mills (20.5%) and households (18.7%) were the largest sources of GHG emissions in British Columbia in 2020.

Crop and animal production are important contributors to GHG emissions in several provinces

In 2020, the crop and animal production industry accounted for the largest share of total GHG emissions in Manitoba (37.2%) and Saskatchewan (24.4%), and the second largest in Prince Edward Island (22.8%), after households (46.2%).

In Saskatchewan, in addition to the crop and animal production industry, the oil and gas extraction industry (22.9%) and the electric power generation, transmission and distribution industry (21.0%) also had a larger share of total emissions. These three industries accounted for more than two-thirds (68.3%) of the total emissions in the province.

The electric power generation, transmission and distribution and oil and gas extraction industries are among the top emitters in Atlantic Canada

The electric power generation, transmission and distribution industry was the most significant source of GHG emissions in Nova Scotia (42.6%) in 2020. In New Brunswick, the highest contributors were the electric power generation, transmission and distribution industry (21.1%), pulp, paper and paperboard mills (20.4%), and households (18.1%).

In Newfoundland and Labrador, households (28.8%) were the primary GHG emitters in 2020, followed by the oil and gas extraction industry (18.7%).

Mining industry is the largest GHG emitter in Nunavut and Northwest Territories

The metal-ore mining industry accounted for almost two-thirds of the GHG emissions in Nunavut (63.3%), and the non-metallic mineral mining and quarrying industry accounted for one-third (32.9%) of the GHG emissions in the Northwest Territories in 2020.

In Yukon, households (26.9%) were responsible for over one-quarter of total GHG emissions, followed by support activities for mining and oil and gas extraction (17.7%).

Note to readers

The basis for these greenhouse gas (GHG) estimates are Statistics Canada's physical flow accounts (PFA), which record the annual flows of selected natural resources, products and residuals between the Canadian economy and the environment. Data are presented to reflect the activities of industries, households and governments, and follow the classification system of industries and commodities used in [Statistics Canada's supply and use tables](#). Following the United Nations System of Environmental-Economic Accounting (SEEA), the use of this classification system enables the environmental accounts to be integrated with Canada's economic statistics, such as the gross domestic product.

Environment and Climate Change Canada is responsible for producing the official [National Inventory Report on Greenhouse Gas Sources and Sinks](#) in Canada. This inventory, which fulfills Canada's reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC), is consistent with guidelines published by the Intergovernmental Panel on Climate Change and is the official benchmark for GHG emissions in Canada. National inventories under the UNFCCC and the GHG accounts under the United Nations SEEA are based on different methodological frameworks that result in different GHG estimates. The sector definitions of the two products differ and should therefore not be directly compared. For more information on the methodological differences, see the [Canadian System of Environmental-Economic Accounts - Physical Flow Accounts metadata page](#) and the [greenhouse gas webpage of the Canadian Centre for Energy Information](#).

Preliminary data for 2020 from the PFA are now available for national energy use ([38-10-0096-01](#)) and national, provincial and territorial GHG emissions ([38-10-0097-01](#)). Estimates for 2009 to 2019 for both tables were also updated with revised source data.

The products "[Physical flow account for energy use: Interactive tool](#)" and "[Physical flow account for greenhouse gas emissions: Interactive tool](#)," both part of Statistics Canada - Data Visualization Products ([71-607-X](#)), are also available. For the latest in energy information in Canada, visit the [Canadian Centre for Energy Information](#) website.

Available tables: [38-10-0096-01](#) and [38-10-0097-01](#).

Definitions, data sources and methods: survey number [5115](#).

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; infostats@statcan.gc.ca) or Media Relations (statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca).