

Statistics Canada's strategy for the dissemination and communication of climate change-related statistics and indicators

UNECE Expert forum for producers and users of climate change-related statistics

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August 28, 2023



Delivering insight through data for a better Canada



Statistics
Canada

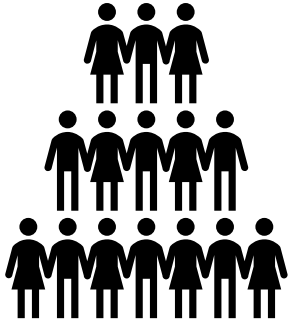
Statistique
Canada

Canada

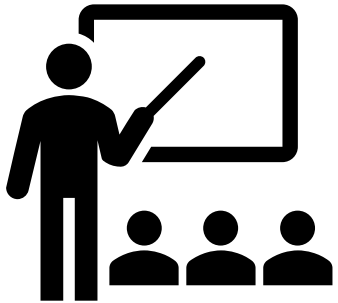
Outline

- Overview of our data users
- Core products
- New products
- Conclusions and best practices

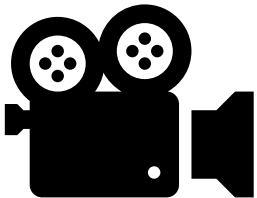
Data users



- General public

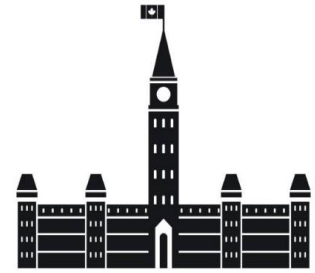


- Teachers, students

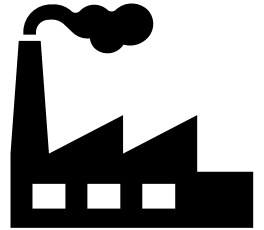


- Members of the press

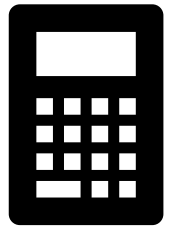
- Governments



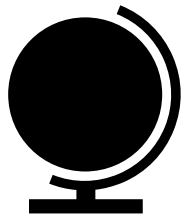
- Industry groups, not for profit groups



- Academics, think tanks, specialized data users



- International statistical organizations



Data Tables

- Customizable
- Downloadable
 - .CSV
 - SDMX
- Metadata
- Data available by country and/or province
- 115 industries + 2 household categories

Physical flow account for greenhouse gas emissions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

Frequency: Annual

 Help

Table: 38-10-0097-01 (formerly CANSIM 153-0114)


 Save my customizations

Release date: 2023-02-16

Geography: Canada, Province or territory

 Customize table (Add/Remove data)

Didn't find what you're looking for? [View related tables, including other calculations and frequencies](#)

 Download options

Showing 118 records

Filter

Reset

Geography	Sector	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
		Kilotonnes											
	Total, industries and households	742,597	756,849	768,470	768,717	778,221	779,287	783,999	757,922	772,903	788,071	781,509	700,790
	Total, industries	613,955	629,167	635,845	640,369	642,982	646,091	651,501	627,847	637,788	647,726	643,907	578,462
	Forestry and logging [BS11300]	6,018	7,216	7,113	7,244	7,420	6,810	8,240	7,682	7,327	7,009	5,650	5,251
	Fishing, hunting and trapping [BS11400]	648	814	868	672	613	640	841	827	940	1,008	1,062	972
	Support activities for agriculture and forestry [BS11500]	965	934	828	772	643	639	871	916	906	967	939	785
	Oil and gas extraction [BS21100]	148,428	154,865	160,393	166,604	172,587	178,087	179,724	167,615	173,922	180,133	177,227	156,946
	Coal mining [BS21210]	2,108	2,537	2,887	2,763	2,909	2,311	2,348	3,110	3,229	3,654	4,195	3,930
	Metal ore mining [BS21220]	3,417	3,905	4,044	4,728	4,860	4,614	4,807	4,342	4,709	4,790	4,863	4,397
	Non-metallic												

Analytical articles

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

Released at 8:30 a.m. Eastern time in The Daily, Thursday, February 16, 2023

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](#).

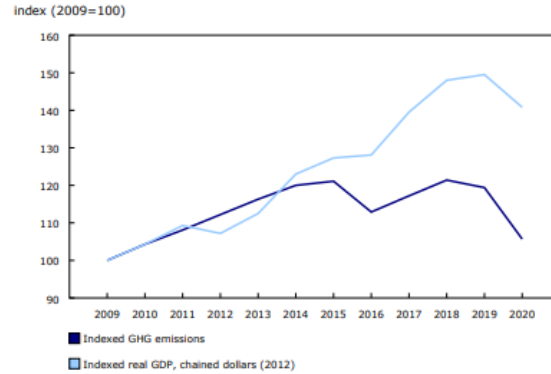
The coal phase-out for electricity generation continues to lower industrial GHG emissions

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 4.41 terajoules per million dollars of GDP. Direct emissions are produced by industries when they burn fuel or through their other industrial processes.

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



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

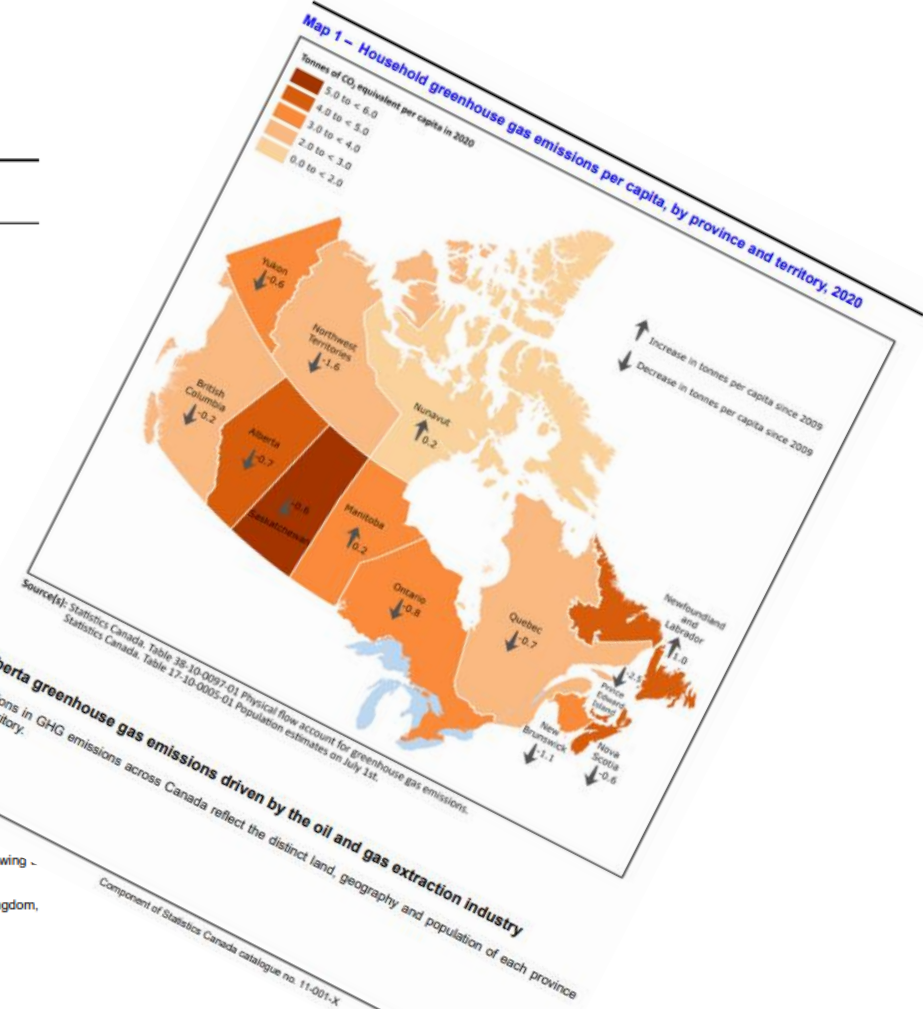
Households account for almost one-quarter of the total energy used in Canada

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 account for almost one-quarter of the energy used in 2020, they were responsible for less than one-fifth (17.5%) of GHG emissions in the year.

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



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.

Custom tabulations

Custom tabulation for Specialized Data user interested in GHG by emissions type	2020		
	Carbon dioxide (CO ₂)	Methane (CH ₄)	Nitrous Oxide (N ₂ O)
Total, industries and households	###	###	###
Total, industries	###	###	###
Crop and animal production [BS11A00]	###	###	###
Crop and animal production (except cannabis) [BS11B00]	###	###	###
Cannabis production (licensed) [BS111CL]	###	###	###
Cannabis production (unlicensed) [BS111CU]	###	###	###
Forestry and logging [BS11300]	###	###	###
Fishing, hunting and trapping [BS11400]	###	###	###
Support activities for agriculture and forestry [BS11500]	###	###	###
Oil and gas extraction [BS21100]	###	###	###
Coal mining [BS21210]	###	###	###
Metal ore mining [BS21220]	###	###	###
Non-metallic mineral mining and quarrying [BS21230]	###	###	###
Support activities for mining and oil and gas extraction [BS21300]	###	###	###
Electric power generation, transmission and distribution [BS22110]	###	###	###
Natural gas distribution, water, sewage and other systems [BS221A0]	###	###	###
Residential building construction [BS23A00]	###	###	###
Non-residential building construction [BS23B00]	###	###	###
Transportation engineering construction [BS23C10]	###	###	###

- Requests often come from federal/provincial policy departments or academics doing modelling
- Data validation, confidentiality, and cost must be assessed on a case-by-case basis
- Takes considerable time and effort

Linkage products - NEW

Energy use and greenhouse gas emissions associated with tourism, by product^{1, 2, 3, 4}

Frequency: Occasional

[Help](#)

Table: 38-10-0141-01

[Save my customizations](#)

Release date: 2023-02-24

Reference period	2019	
Geography	Canada (map)	
Physical flow	Direct plus indirect energy use ⁵	Direct plus indirect greenhouse gas emissions ^{6, 7, 8}
Products	Terajoules	Kilotonnes
Total tourism	711,740	50,274
Total tourism products	687,257	47,896
Total transportation	600,849	41,951
Passenger air transport	306,743	21,701
Passenger rail transport	1,702	121
Passenger water transport	4,090	280
Interurban, charter and tour bus transport	4,466	313
Taxis	3,314	209
Vehicle rental	4,165	255
Vehicle repairs and parts	7,944	478
Vehicle fuel	268,425	18,594
Total accommodation	33,016	2,041
Hotels	22,511	1,414
Motels	1,474	95
Camping	2,419	137

Energy use and greenhouse gas emissions associated with the production of environmental and clean technology products^{1, 2, 3, 4, 5}

Frequency: Annual

[Help](#)

Table: 38-10-0139-01

[Save my customizations](#)

Release date: 2022-12-19

Geography	Canada (map)	
Physical flow	Goods and services (products)	
	2019	
	Kilotonnes	
Direct greenhouse gas emissions ^{6, 7, 8}	Total, environmental and clean technology products	8,348
	Total, environmental products	3,721
	Total, environmental goods	1,989
	Clean electricity ²	30
	Electricity from nuclear ¹⁰	0
	Electricity from renewable sources	30
	Biofuels and primary goods ¹¹	1,558
	Waste and scrap goods	401
	Waste management and remediation services	1,733
	Total, clean technology products	4,626
	Total, clean technology goods	1,288
	Total, clean technology services	3,338
	Scientific and research and development services	513
	Support services	1,495
Construction services	1,331	

Infographics - NEW

- Aimed at the Canadian public, students and teachers, the press, industry groups

Canadian Greenhouse Gas Emissions Attributable to Households, 2018

Release date: March 28, 2022

[More information](#) [PDF version](#)

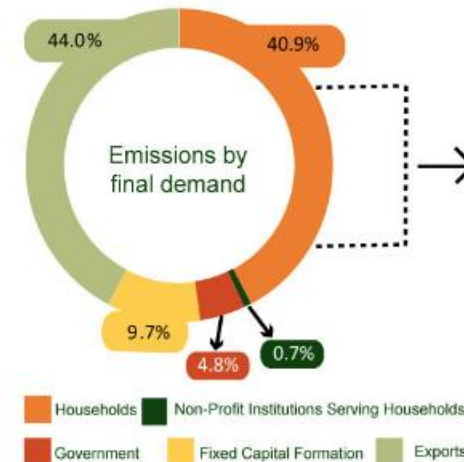
CANADIAN GREENHOUSE GAS EMISSIONS ATTRIBUTABLE TO HOUSEHOLDS, 2018



Data for Canadian greenhouse gas emissions (GHG) attributable to household consumption and use of select goods and services along with the associated emissions intensity figures and breakdowns by final demand categories.¹

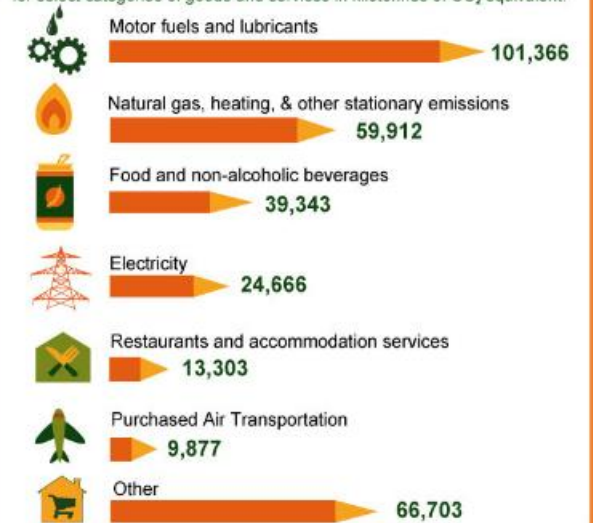
GHG Emissions by Final Demand

About 40.9% of Canadian emissions were the result of Canadian household consumption and use of goods and services in 2018. These values include the GHGs created by the Canadian economy during the production and transportation of the goods and services, as well as emissions from the use of fuels by households.²



GHG Emissions Attributable to Households³

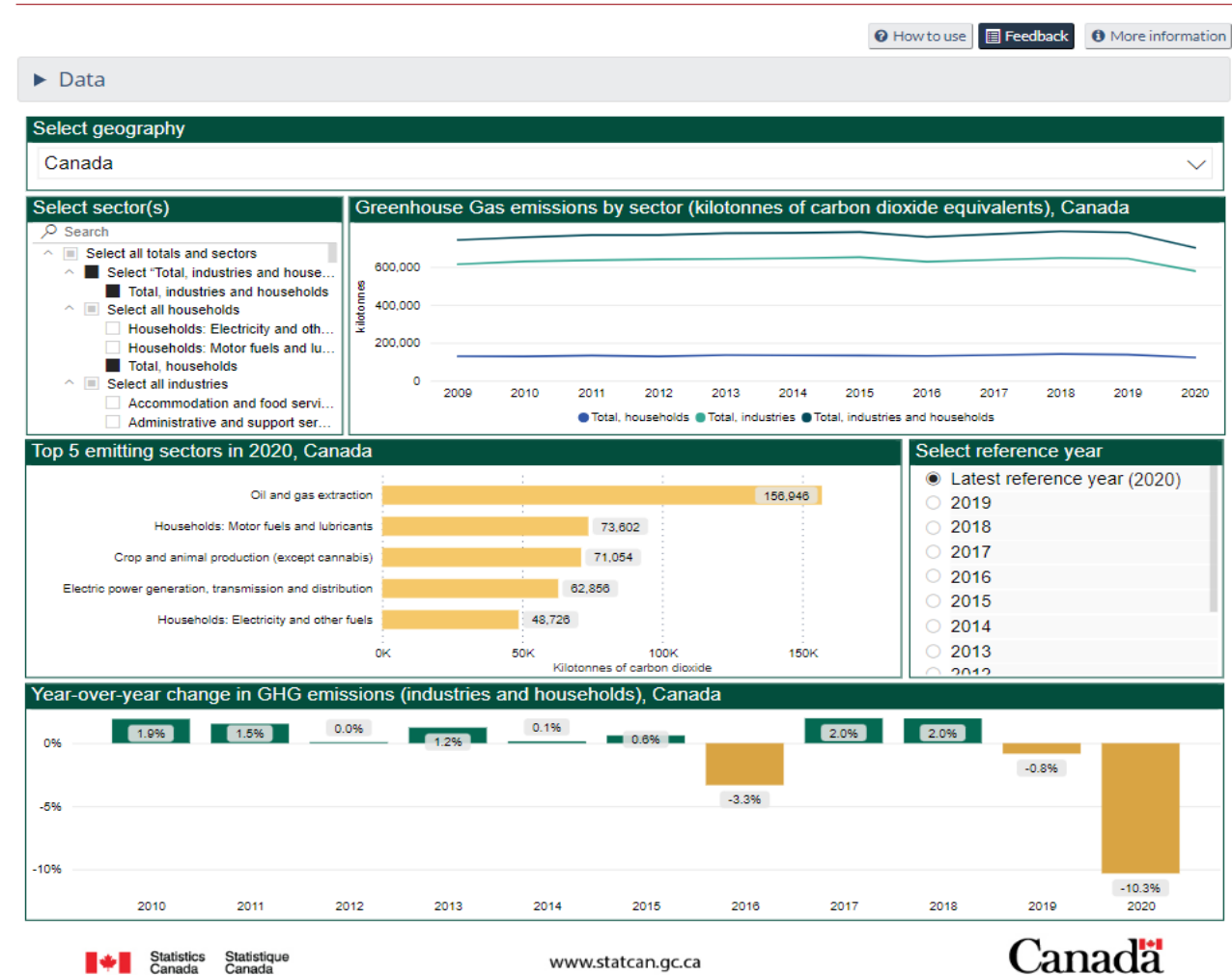
Direct and indirect emissions⁴ resulting from the production and use of goods and services consumed by households was 315 megatonnes. Emissions attributable to household demand and use are shown below for select categories of goods and services in kilotonnes of CO₂ equivalent.



Interactive data visualisations - NEW

- Platform allows data users to visually examine industries of interest across the time series of their choice
- Aimed at the Canadian public, students and teachers, the press, industry groups

Physical flow account for greenhouse gas emissions: Interactive tool



Social media and podcasts - NEW



- Statistics Canada has social media accounts on Facebook, Instagram, LinkedIn, Reddit, Twitter, and YouTube
- Climate Change was featured in an episode of Statistics Canada's podcast - "Green Houses, Not Gases"
- Aimed at the general public, but may also alert specialized data users about new data releases



Climate Change Statistics Website - NEW



Bringing together data, tools and reports to provide Canadians with relevant information on climate change.

Follow:

Sign up to [My StatCan](#) to get updates in real-time.

Find data on

- [Environment](#)
- [Economy](#)
- [Population and society](#)
- [Extreme events and natural disasters](#)
- [Financial impacts and risks](#)

[More related subjects: Climate change](#)

[More information on financial impacts and risks](#)

Features



Key indicators

Canada

[Average car commuting duration, in minutes](#)
(2021 Census of population) **22.8**

[Direct industrial energy intensity](#)
(2020) **4.47 terajoules per million dollars of real GDP**
-3.1% ↓
(annual change)

[Direct industrial greenhouse gas emissions intensity](#)
(2020) **0.31 kilotonnes per million dollars of real GDP**
-5.3% ↓
(annual change)

[More key indicators](#)

CLIMATE CHANGE STATISTICS

AT STATISTICS CANADA

Looking for data on climate change?
Statistics Canada has a wealth of information, including data on greenhouse gas emissions, the drivers and impacts of climate change, and the efforts to mitigate and to adapt to its consequences.¹
Here are some examples of the data we publish.

EMISSIONS
Data on greenhouse gas (GHG) emissions and their human cause
Oil and gas extraction accounted for 22.4% of Canada's total GHG emissions in 2020, while households were responsible for 17.5%.²

MAIN DRIVERS
Data on key contributors to GHG emissions
In 2021, 23.9 million registered vehicles in Canada were fuelled by gasoline, up 5.2% from 2017.

IMPACTS
Data on the impacts of climate change on human and natural systems
In 2021, the western provinces experienced a significant drought, affecting the amount of crops that could be harvested and their quality. This contributed to a \$1.1 billion increase in crop insurance payments in 2022.

MITIGATION
Data on efforts to avoid the consequences of climate change
In 2020, businesses in Canada spent \$140 million on research and development of renewable energy resource technologies, up \$53 million from 2019.

ADAPTATION
Data on climate change adaptation measures
Percentage of Canadian towns and cities classed as green,* by province

	2000 to 2004 (five-year average)	2018 to 2022 (five-year average)
Canada	82.4%	74.5%

Experimental Environment, Social and Governance Dashboard - NEW

Experimental ESG Dashboard

Environment, Social and Governance (ESG) refers to three non-financial factors that can be used to inform the long-term risk and return of an investment. ESG are emerging as a priority for governments, businesses and international organisations.

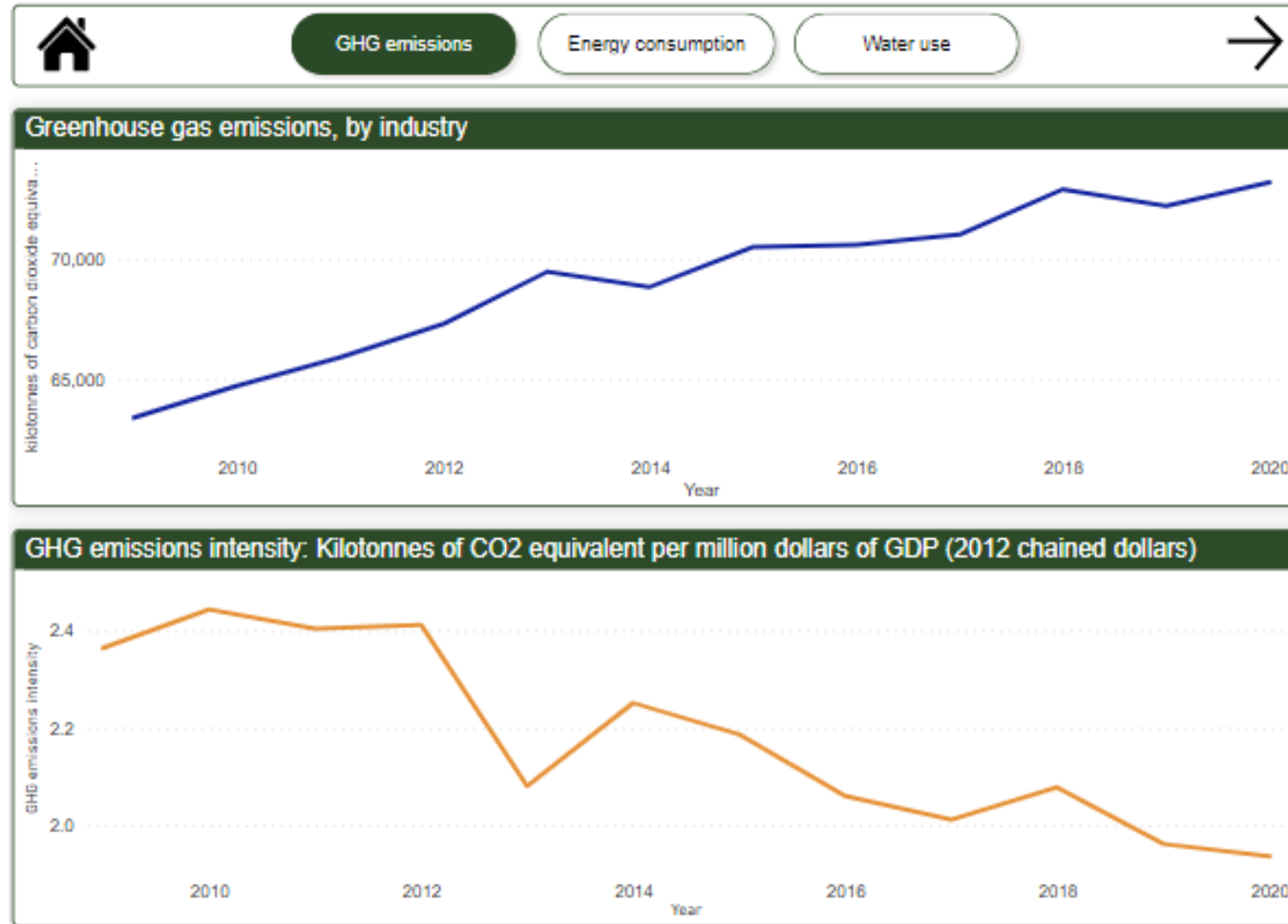
Environment



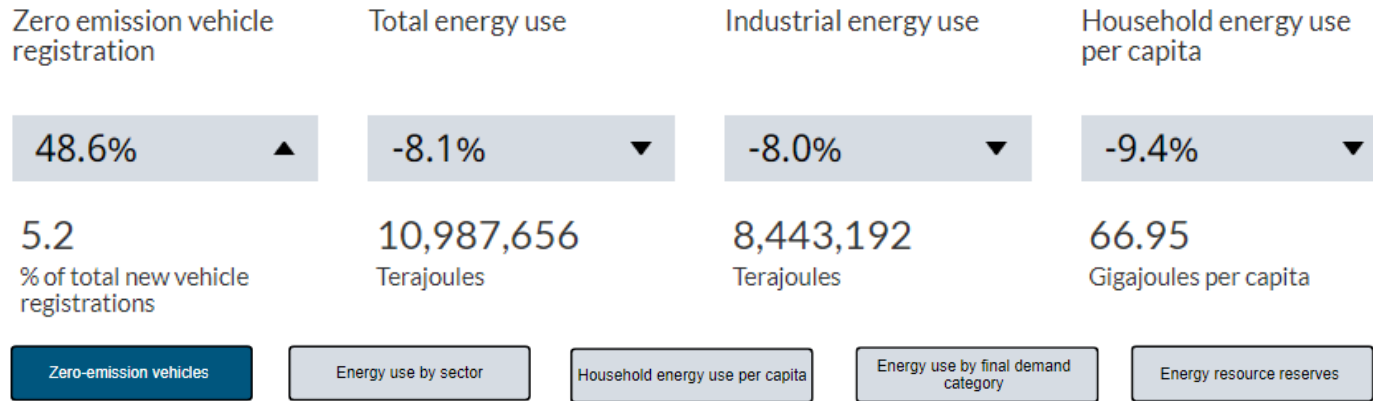
Social



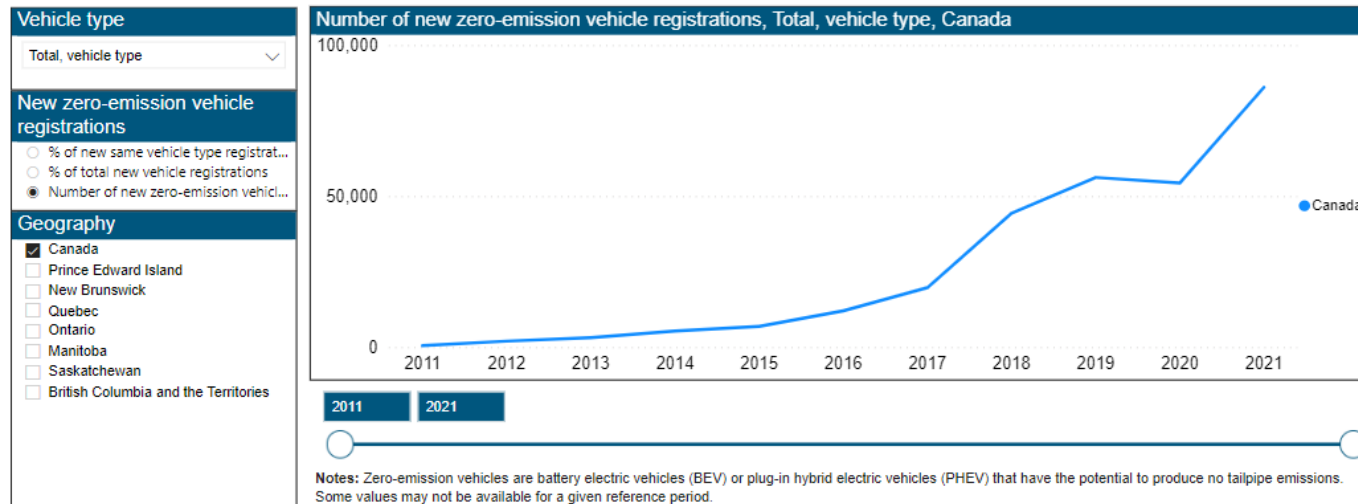
Governance



Canadian Centre for Energy Information, Energy and the Environment webpage - NEW



New zero-emission vehicle registrations



Notes: Zero-emission vehicles are battery electric vehicles (BEV) or plug-in hybrid electric vehicles (PHEV) that have the potential to produce no tailpipe emissions. Some values may not be available for a given reference period. Data for Newfoundland and Labrador, Nova Scotia and Alberta are currently not available due to contractual limitations of the existing data sharing agreement. For more information, please see data table 20-10-0021-01 from Statistics Canada.

- Indicators related to energy and the environment
- Interactive charts
- “What’s new?” section for newest releases related to energy and the environment
- Automatically updated data with new releases
- Aimed at all data users: overview, datasets, and publication tabs

Communicating differences between NIR and PFA



Greenhouse gas emissions — National Inventory Report (NIR)

Environment and Climate Change Canada is responsible for producing [Canada's official National Greenhouse Gas Inventory](#) and associated report ([National Inventory Report: Greenhouse Gas Sources and Sinks in Canada](#)). Canada's official greenhouse gas (GHG) inventory fulfills Canada's reporting obligations under the [United Nations Framework Convention on Climate Change \(UNFCCC\)](#), and is the official benchmark for greenhouse gas emissions in Canada.

The GHG inventory includes emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃) in the following five sectors: Energy; Industrial Processes and Product Use (IPPU); Agriculture; Waste; and Land Use, Land-Use Change and Forestry (LULUCF).

National Inventory Report (NIR)



Greenhouse gas emissions — Physical flow account (PFA)

Statistics Canada compiles the [physical flow account \(PFA\)](#) for greenhouse gas (GHG) emissions in accordance with the United Nations' [System of Environmental-Economic Accounting \(SEEA\)](#). The account records greenhouse gas emissions that originate from Canadian economic activity and flow to the environment. The account therefore provides an overview of the GHG emissions associated with Canada's economic output.

The PFA framework follows the classification system of industries and commodities used in Statistics Canada's [supply and use tables \(SUT\)](#) and aligns environmental data with economic activity, including activities associated with households. The account focuses on emissions of the three main greenhouse gases, namely carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

Physical flow account (PFA)



Communicating differences between NIR and PFA



National Inventory Report



Physical flow account

Mandate The National Inventory Report (NIR) is Canada's official greenhouse gas inventory and annual submission to the United Nations Framework Convention on Climate Change.

The physical flow account (PFA) integrates greenhouse gas emissions estimates with economic activity across industries and households.

Department responsible [Environment and Climate Change Canada \(ECCC\)](#)

[Statistics Canada](#)

Geographic scope Nationally and by province and territory

Nationally and by province and territory

First year in time series 1990

2009

Frequency of releases Annual

Annual

Reporting framework [United Nations Framework Convention on Climate Change \(UNFCCC\)](#) reporting requirements for annual inventories.

[United Nations System of Environmental-Economic Accounting \(SEEA\)](#)

The PFA aligns with the Canadian System of Macroeconomic Accounts.

Classification system(s) **Two breakdowns:**

- By UNFCCC Common Reporting Format (CRF) and Intergovernmental Panel on Climate Change (IPCC) categories.
- By economic sector.
The NIR's economic sector classifications do not conform to a standardized system such as the North American Industry Classification (NAICS) or the International Standard Industrial Classification (ISIC), although there are close similarities. Estimates for each economic sector include emissions from energy-related and non-energy-related processes.

One breakdown:

- By StatCan's Input-Output Industry Classification (IOIC).
The Input-Output Industry Classification is the classification used in the Supply and Use tables. It's a system used for classifying industries by codes similar to the North American Industry Classification System.



National Inventory Report



Physical flow account

List of pollutants (GHGs) 7 (includes synthetic fluorinated gases)

3 (excludes synthetic fluorinated gases)

Carbon dioxide (CO ₂)	✓
Methane (CH ₄)	✓
Nitrous oxide (N ₂ O)	✓
Perfluorocarbons (PFCs)	✓
Hydrofluorocarbons (HFCs)	✓
Sulphur hexafluoride (SF ₆)	✓
Nitrogen trifluoride (NF ₃)	✓

Carbon dioxide (CO ₂)	✓
Methane (CH ₄)	✓
Nitrous oxide (N ₂ O)	✓
Perfluorocarbons (PFCs)	✗
Hydrofluorocarbons (HFCs)	✗
Sulphur hexafluoride (SF ₆)	✗
Nitrogen trifluoride (NF ₃)	✗

Detailed inclusions and exclusions

Inclusion principle Includes estimates of seven human-caused GHG emissions and removals occurring within Canadian jurisdiction.

Includes estimates of the three main human-caused GHG emissions and removals related to the operations of Canadian economic residents.

Pollutants Includes GHG emissions and removals in the following five sectors:

- energy
- industrial processes and product use
- agriculture
- waste
- land use, land-use change, and forestry

Includes GHG emissions and removals from energy use and industrial processes, including fugitive emissions from agricultural and forestry activities.
Excludes emissions from waste, land use and land use change.



Removals Includes removals of CO₂ from the atmosphere through:

- its storage in woody vegetation on the landscape.
- its storage in soils of forest lands, croplands, grasslands, and wetlands.
- carbon capture, use, and storage technology.

Includes removals of CO₂ from the atmosphere through carbon capture, use, and storage technology only.



Communicating differences between NIR and PFA

	 National Inventory Report	 Physical flow account
Biomass fuel consumption	Excludes CO ₂ emissions from the combustion of biomass fuels (such as residential firewood, wood pellets, ethanol, and biodiesel). ¹	Includes CO ₂ emissions from the combustion of biomass fuels (such as residential firewood, wood pellets, ethanol, and biodiesel).
Aviation fuels	Includes emissions from foreign airlines flying over Canadian territory. Excludes emissions from Canadian airlines flying over foreign territory.	Excludes emissions from foreign airlines flying over Canadian territory. Includes emissions from Canadian airlines flying over foreign territory.
Marine fuels	Includes GHG emissions from ships that travel between two ports located in Canadian waters. Excludes international voyages departing from or arriving in Canada.	Includes GHG emissions from all Canadian ships for both domestic and international voyages. Excludes foreign ships.
Solid and liquid waste	Includes GHG emissions from solid and liquid waste.	Excludes GHG emissions from solid and liquid waste.
Synthetic fluorinated gases	Includes GHG emissions from synthetic fluorinated gases (HFCs, PFCs, SF ₆ , NF ₃).	Excludes GHG emissions from synthetic fluorinated gases (HFCs, PFCs, SF ₆ , NF ₃).
Non-energy products from fuels and solvent use	Includes GHG emissions from non-energy products from fuels and solvent use.	Includes GHG emissions from non-energy products from fuels only (excludes solvent use).



Communicating differences between NIR and PFA

Total, Reconciliation with Canada's submission to the United Nations Framework Convention on Climate Change (UNFCCC)

Select all

Balancing item: Waste

Balancing item: Biomass

Balancing item: Motor fuels

Balancing item: Aviation

Balancing item: Synthetic fluorinated gases

Balancing item: Non-energy Products from Fuels and Solvent Use

Balancing item: Other differences

Conclusions, best practices

- National Statistical Offices, as a best practice, should try to reach as many data groups as possible with their climate change-related information.
- Publishing a wider variety of product types will reach a wider variety of data user groups.
- Effort should be made to inform the public about the differences between SEEA-based and UNFCCC-based GHG estimates, so they can make informed decisions about which data to use for their purposes.



Thank you!

Michele McMillan, michele.mcmillan@statcan.gc.ca

Links to selected products

- Data tables (can be expanded using the “**Add/Remove data**” button at the top of the screen):
 - [Physical flow account for GHG emissions \(38-10-0097-01\)](#)
 - [Direct plus indirect energy and GHG emissions intensity, by industry \(Table 38-10-0098-01\)](#)
 - [Physical flows by final demand \(Table 38-10-0010-01\)](#)
 - [Metadata for the Physical Flow Accounts](#)
- Analytical articles
 - [Canadian System of Environmental–Economic Accounts: Energy use and greenhouse gas emissions, 2020](#)
- Infographics
 - [Canadian Greenhouse Gas Emissions Attributable to Households, 2018](#)
 - [Climate change statistics at Statistics Canada](#)
- Linkage products
 - [Energy use and greenhouse gas emissions associated with tourism, by product](#)
 - [Energy use and greenhouse gas emissions associated with the production of environmental and clean technology products](#)
- Dashboards and Websites
 - [Physical flow account for greenhouse gas emissions: Interactive tool](#)
 - [Climate Change Statistics](#)
 - [Experimental environmental, social and governance dashboard](#)
 - [Canadian Centre for Energy Information, Energy and the Environment page](#)
 - [GHG landing page \(highlighting differences between PFA and NIR estimates\)](#)
- Podcast: [Eh Sayers Season 3 Episode 3 - Green Houses, Not Gases](#)

