



ENERGY EFFICIENCY TRENDS IN CANADA 1990 to 2016

Annually, Natural Resources Canada analyzes the factors influencing changes in total energy use and tracks energy efficiency trends in Canada from 1990 to the present. This summary presents key findings of the *Efficiency Trends in Canada Report – 1990 to 2016*.

The *Trends Report 1990 to 2016*, based on information from Natural Resources Canada's comprehensive energy use database, provides a comprehensive overview of energy use, related greenhouse gas (GHG) emissions and energy efficiency trends in Canada from 1990 to 2016. Additional details are provided annually in the [National Energy Use Database](#) (NEUD) tables. Analysis and results in the *Trends Report 1990 to 2016* focus on four principal sectors: residential, commercial/institutional, industrial and transportation.

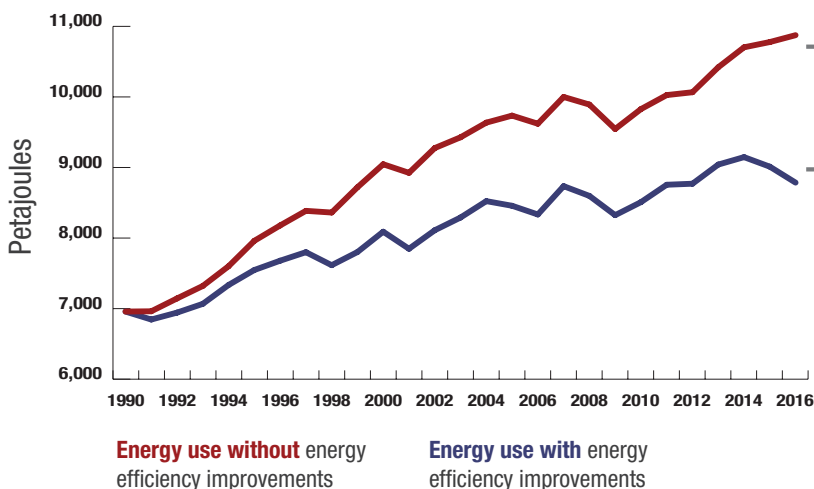
Overview

Canadians used energy 31% more efficiently in 2016 as compared to 1990, saving Canadians about \$45 billion in energy costs and avoiding 112 Mt GHG emissions in 2016, equivalent to the emissions from 34 million passenger cars.

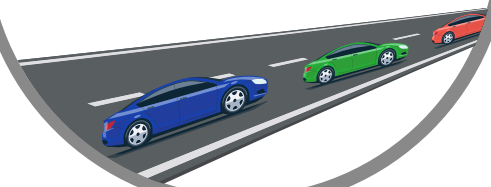
Total energy use in Canada grew by 26% from 1990 to 2016. In the absence of energy efficiency improvements, the rate of growth would have been more than double (56%).

The following figure illustrates the impact energy efficiency policies and programs have had on energy use and GHG emissions in Canada, including vehicle and equipment regulations; enhanced building codes; EnerGuide; ENERGY STAR; SmartWay; and retrofits.

Energy use, with and without energy efficiency improvements, 1990 to 2016



Savings from energy efficiency in 2015,
2,090 PJ or **\$45 billion**,
equivalent to the energy used by over
43 million passenger vehicles.



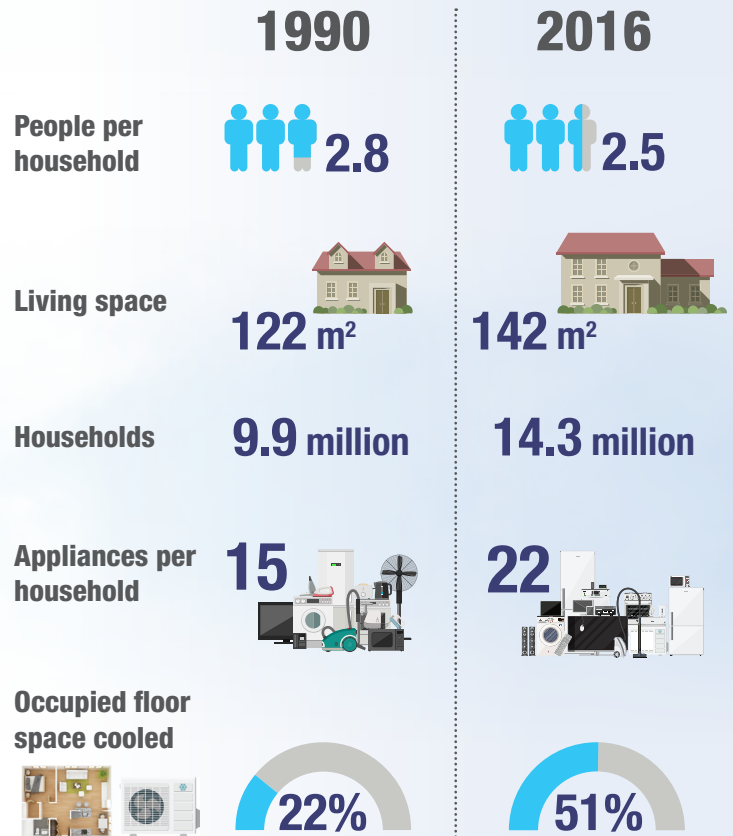
Residential



From 1990 to 2016, energy efficiency improved 51% in Canada's residential sector. As a result, Canadian households saved \$15 billion in energy costs and reduced GHG emissions by 30.2 Mt in 2016.

Energy efficiency was critical in offsetting several trends in the residential sector that increased overall and per household energy use from 1990 to 2016. The trends included more households (9.9 to 14.3 million), average living space (122 to 142 m²), household appliances including electronics (15 to 22), and cooled space (22 to 51% of occupied floor space). **Without energy efficiency improvements, total energy use in the residential sector would have increased by 53% rather than 2.4% from 1990 to 2016**, costing Canadians an additional \$1,048 per household.

Key drivers for residential energy consumption



Commercial/institutional

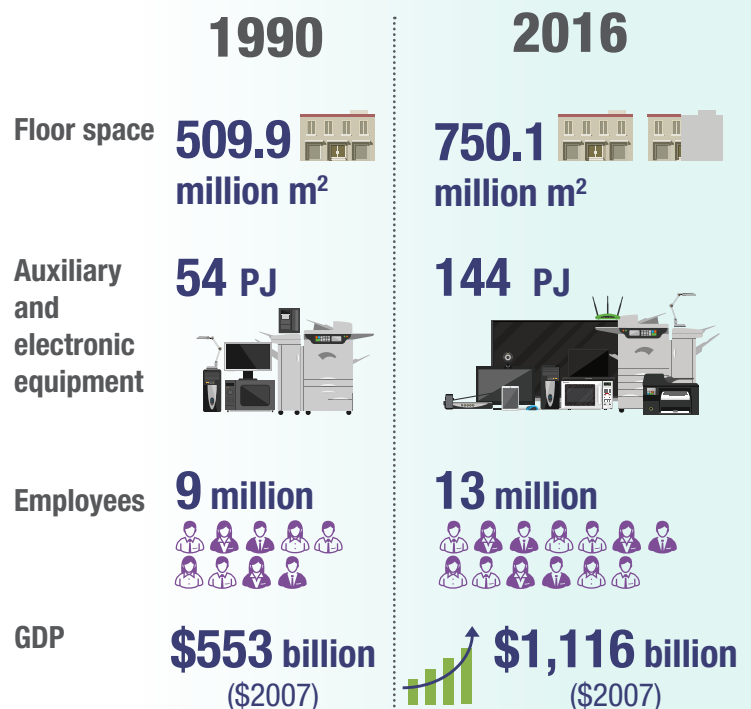


The commercial/institutional sector includes buildings used for activities such as finance, real estate, public administration, education and commercial services.

Energy efficiency in the commercial/institutional sector improved 24% from 1990 to 2016. As a result, businesses and institutions saved \$4.3 billion in energy costs and reduced their GHG emissions by 8.0 Mt in 2016.

Since 1990, the commercial/institutional sector experienced rapid economic growth. From 1990 to 2016, its contribution to the GDP more than doubled (102%), floor space increased 47%, and the plug load of auxiliary equipment increased 267%. In that time frame, total commercial/institutional energy use increased 34%. **Without energy efficiency improvements**, such as more energy-efficient equipment standards, and lighting and building envelope improvements, **the sector's energy use would have increased 58%.**

Key drivers for commercial/institutional energy consumption



Industrial

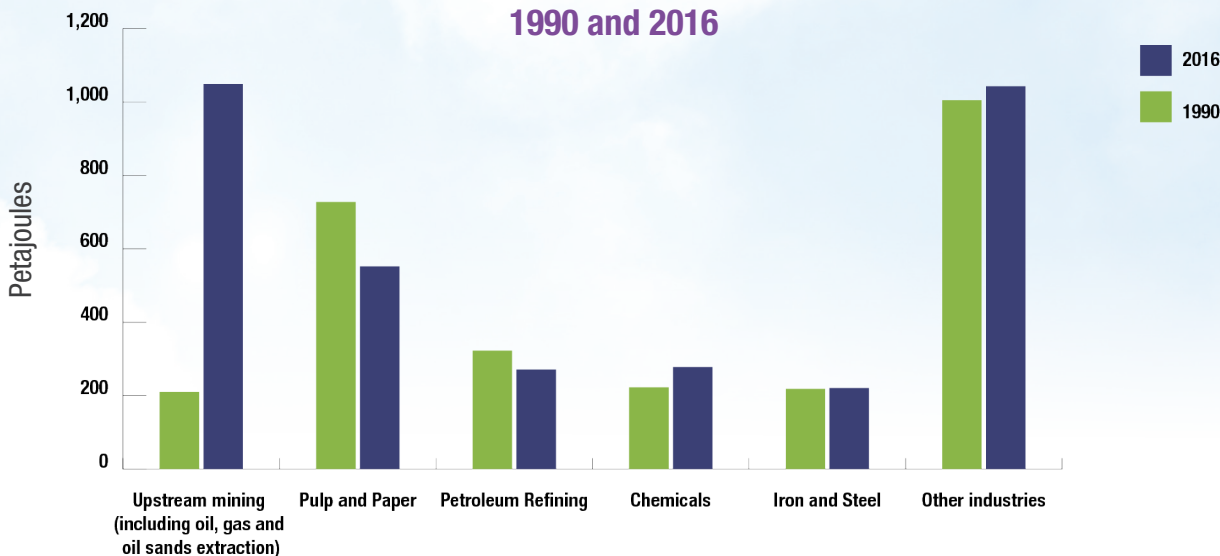


Energy efficiency in the industrial sector improved **16%** from 1990 to 2016. As a result, industry in Canada **saved \$4.9 billion** in energy costs and avoided emitting **29.6 Mt of GHG emissions** in 2016.

Most industrial energy use growth was in upstream mining, in large part due to significant growth in upstream oil and gas activity.

In the same time frame, industrial energy use **increased 26%** and associated **GHG emissions increased just 20%**, reflecting a shift by industry toward using slightly less carbon-intensive fuels.

Industrial energy use by selected industry, 1990 and 2016



Transportation



The transportation sector is diverse and covers several modes of transit including road, air, rail and marine. The transportation sector is the second-largest energy consumer and largest emitter of GHGs in Canada.

Between 1990 and 2016, the transportation sector's energy use **increased by 39%**, and **GHG emissions increased by 36%**. About two thirds of this increase

was in freight transportation, primarily because of the significant increase of freight shipping between cities and providing to the door delivery services.

Overall, **energy efficiency improved by 43%** (763 PJ), resulting in **\$21 billion savings** and more than 52 Mt of avoided GHG emissions in 2016.

Passenger transportation

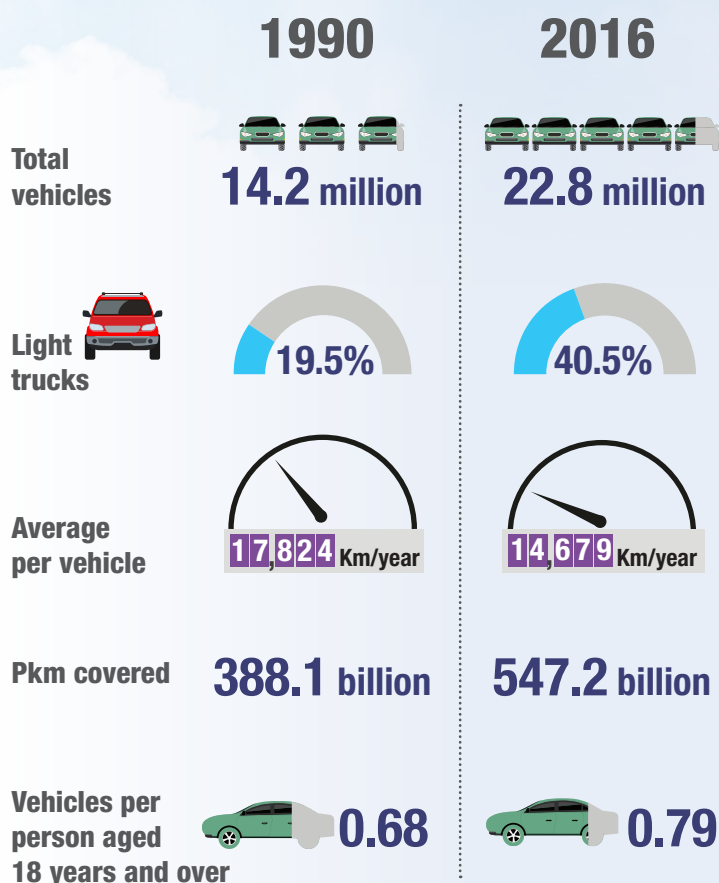
The energy efficiency of passenger vehicles improved 32% (359 PJ) from 1990 to 2016. As a result, 24.3 Mt of GHG emissions were avoided in 2016. **Improved vehicle energy performance, operating habits and fewer kilometres driven per vehicle more than offset the increased number of total vehicles, vehicle per person and the propensity for consumers to purchase larger vehicles.**

Freight transportation

From 1990 to 2016, energy use in the freight transportation sector **increased by 63%** and GHG emissions **increased by 61%**. Rail remained the dominant mode of transportation. Heavy trucks surpassed marine as the second most dominant mode due to a significant 166% increase in the tonne-kilometers travelled by heavy trucks during this timeframe.

Compared to 1990, freight transportation **energy efficiency improved 60%** for all modes (i.e. marine, rail, air and road) in 2016, accounting for 404 PJ saved and avoiding the release of 28.6 Mt of GHG emissions.

Key drivers for passenger energy consumption



Key drivers for freight energy consumption

