



Energy Efficiency Trends in Canada

1990 to 2008

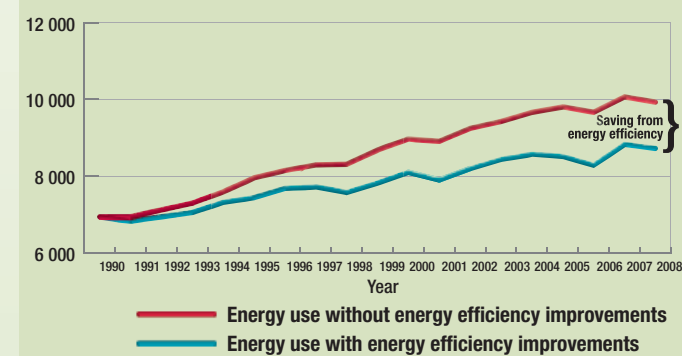
November 2010

Every year, Natural Resources Canada conducts an analysis of the factors behind the observed changes in total energy use in Canada. The latest version of this analysis – *Energy Efficiency Trends in Canada – 1990 to 2008* – is due for publication shortly. This brochure summarises the key elements and findings in that analysis.

Overview

Energy efficiency has improved by 18 percent since 1990. These improvements reduced energy use by approximately 1206 petajoules (PJ), decreased greenhouse gas (GHG) emissions by 66.7 megatonnes (Mt) and saved Canadians \$26.9 billion in 2008.

Secondary energy use, with and without energy efficiency improvements, 1990–2008 (petajoules)



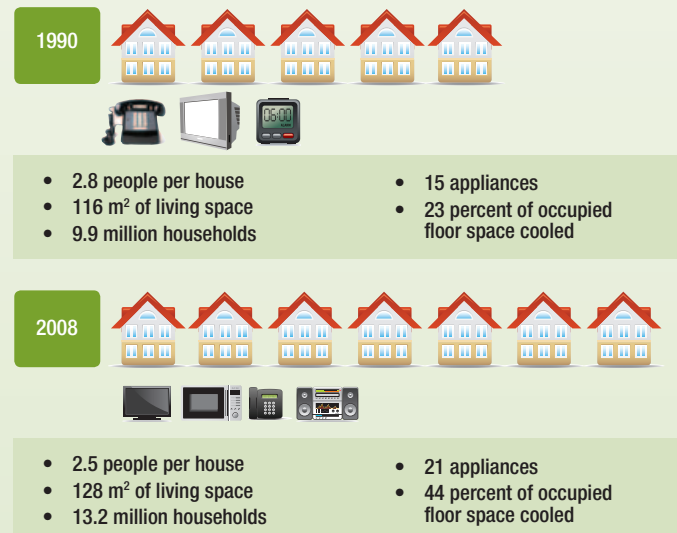
Energy intensity – which measures the efficiency of energy use per unit of economic activity (gigajoules per gross domestic product [GJ/GDP]) – improved by 22 percent across the period. Overall energy use per capita, however, showed a 5 percent increase, reflecting in part, lifestyle changes in the home and transport.



Residential

Between 1990 and 2008, residential energy use increased by 14 percent while GHG emissions grew by 8 percent.

Residential energy indicators, 1990 and 2008



Despite the increases in key energy use drivers, energy use per household decreased by 14 percent, and energy use per square metre decreased by 21 percent, primarily due to changes to the building envelope.

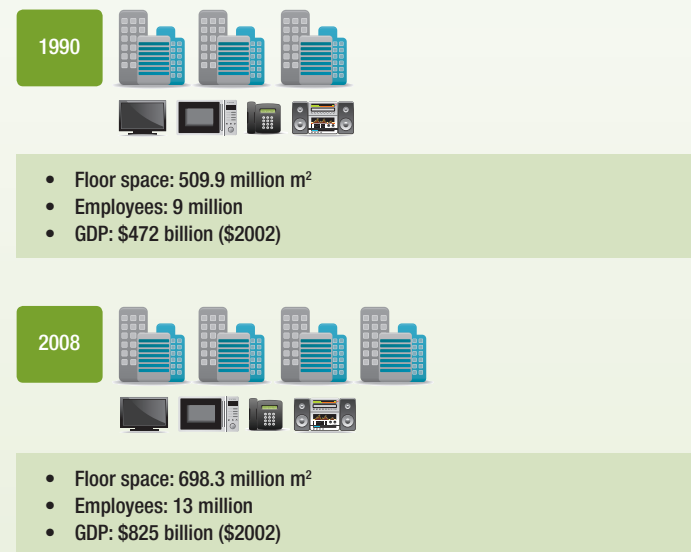
The net result was energy efficiency savings of 392 PJ – the largest of any sector in the economy.



Commercial/Institutional

Since 1990, commercial sector GDP increased by 73 percent while energy use increased by 39 percent and GHG emissions increased by 38 percent.¹

Commercial/Institutional energy indicators, 1990 and 2008



Energy consumed per unit of floor space increased by 2 percent, while energy per unit of economic activity decreased by 20 percent. These results reflect the energy demands of some sector activities, service requirements (e.g. opening hours) and plug load,² as well as the positive effects of improvements to the building envelope.

The largest energy end-use increases were in space conditioning and auxiliary equipment (e.g. office equipment).

¹ Data for this sector include petroleum products that are sold to the secondary distribution market.

² Plug load is a generic term for all major and minor appliances in a home or office environment.

Overall, sector energy efficiency improved by 104 PJ, saving 5.6 Mt of GHG emissions.

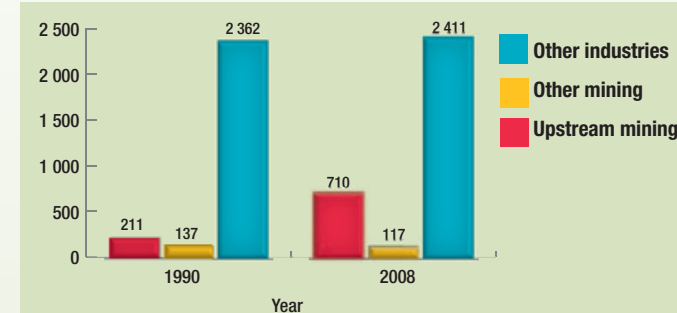


Industrial

From 1990 to 2008, industrial energy use increased by 19 percent and associated GHG emissions increased by 13 percent.

Most energy-use growth was in mining, with the oil price spike and process technology advances leading to significant increases in upstream oil and gas activity (notably oil sands development).

Industrial energy use by selected industry, 1990–2008 (petajoules)



This year's report isolates the components of upstream mining and uses production to better measure efficiency and account for technological advances. Even so, increased difficulty in resource extraction has resulted in a more energy-intensive industry.

The only major subsector to reduce energy use was pulp and paper, in part from on-going declines in the newsprint industry. Pulp and paper GHG emissions decreased as pulping liquors continued to displace heavy fuel oils.

Industrial sector energy intensity decreased by 15 percent, due to more efficient capital, tighter management of energy use and increased capacity utilisation (i.e. plants producing closer to maximum levels). Energy intensity was reduced in all but the mining, petroleum refining and forestry subsectors.

Overall, sector energy efficiency improved by 333 PJ, saving 18 Mt of GHG emissions.



Transport

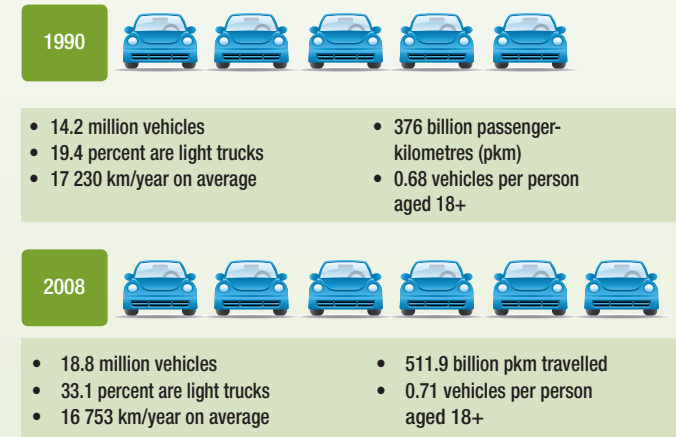
Transport sector energy use increased by 38 percent, and GHG emissions increased by 36 percent. Nearly two thirds of this increase was in freight transport.

However, energy efficiency improved by 378 PJ, mainly within heavy trucking and light-duty vehicles, reflecting improvements in each end use and the dominance of those modes within the sector.

Passenger transport

The main trends within passenger transport are shown below:

Passenger transportation energy indicators, 1990 and 2008

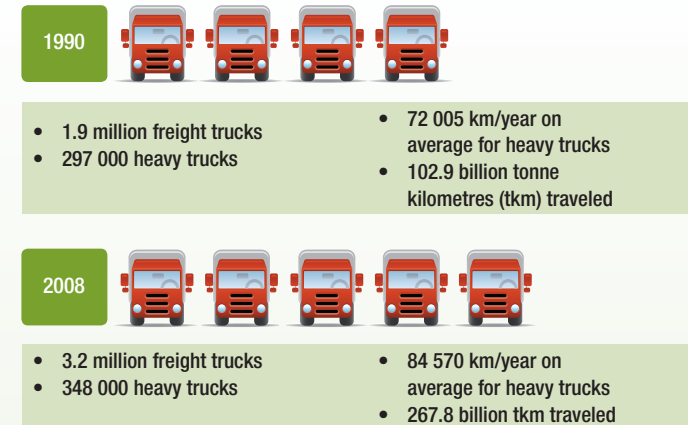


Overall passenger transport energy efficiency improved by 262 PJ, avoiding 17.8 Mt of GHG emissions.

Freight transport

Energy use increased by 71 percent and was mirrored almost exactly by a 70 percent increase in GHG emissions, equal to 31.8 Mt of emissions.

Freight transportation energy indicators, 1990 and 2008



While rail and shipping remain the dominant modes, there was a 185 percent increase in tonne-kilometres travelled by heavy trucks over the period.

Energy efficiency improved for all modes (i.e. maritime, rail, air and road) over the analysis period, for a combined subsector energy efficiency effect of 116 PJ (equivalent to 18 percent of 1990 consumption), which avoided GHG emissions of 8.2 Mt.

Natural Resources Canada's Office of Energy Efficiency
Leading Canadians to Energy Efficiency at Home, at Work and on the Road

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