

Office of Energy Efficiency



The State of Energy Efficiency in Canada

Report 2005



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Leading Canadians to Energy Efficiency at Home, at Work and on the Road

The Office of Energy Efficiency of Natural Resources Canada strengthens and expands Canada's commitment to energy efficiency in order to help address the challenges of climate change.

The State of Energy Efficiency in Canada, Report 2005

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Message From the Minister



I am pleased to present the seventh edition of *The State of Energy Efficiency in Canada*. This report outlines the progress made in 2004 to improve energy efficiency in Canada and the various programs led by Natural Resources Canada's Office of Energy Efficiency (OEE) to attain this.

The Government of Canada is committed to achieving real progress on climate change, and the OEE has been instrumental in providing practical information, training and incentives to raise awareness about energy efficiency and help reduce consumption.

Take, for example, the commitment we have seen from ordinary Canadians through the EnerGuide for Houses Retrofit Incentive. Launched in October 2003, this \$73-million, three-year program encourages Canadians to make their homes more energy-efficient. Since its launch, there have been over 100,000 EnerGuide evaluations and over 15,000 grants awarded to homeowners. In Budget 2005, \$225-million was committed over five years to quadruple the number of homes retrofitted under this program.

The One-Tonne Challenge, another climate change initiative, encourages Canadians to reduce their individual greenhouse gas emissions by 20 percent. By engaging individuals in new, creative approaches to energy efficiency — such as changing the way we undertake everyday activities like heating and cooling homes, using computers and driving cars — we can contribute to a higher quality of life for all Canadians.

The Government of Canada's approach to climate change is focused on making the right choices for Canada. By promoting the responsible use of our energy resources, NRCan is ensuring that the actions taken today produce long-term results while maintaining a strong and growing economy.

A handwritten signature in green ink that reads "R. John Efford". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

The Honourable R. John Efford
Minister of Natural Resources Canada



Executive Summary

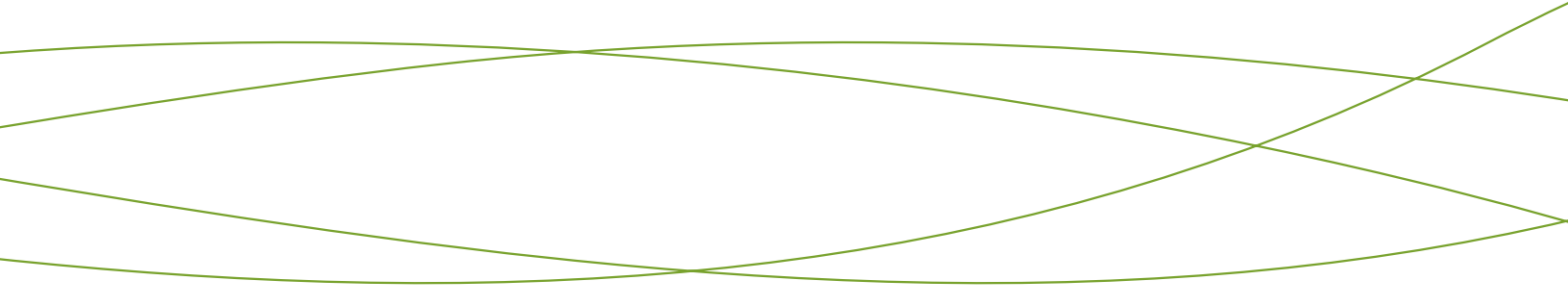
The Office of Energy Efficiency (OEE) of Natural Resources Canada is the country's foremost centre for energy efficiency. It administers key programs that promote energy efficiency in the major energy-using sectors of the economy and collects and analyses energy efficiency data and trends. Clients range from individual consumers to industry and large corporations.

At the core of the OEE's analytical capacity is its annual assessment of trends in energy use and related greenhouse gas (GHG) emissions in Canada since 1990. These results are published in the technical report *Energy Efficiency Trends in Canada*. A key component of this report is the OEE Energy Efficiency Index, which shows changes in the efficiency of how Canadians use energy to heat and cool their homes and workplaces and to operate appliances, vehicles

and factories. The OEE Index shows a sizable 13 percent improvement in energy efficiency over 1990–2002. As a result of this improvement, Canadians saved about \$11.6 billion in energy costs in 2002 alone.

Moreover, energy use in Canada increased by only 13 percent between 1990 and 2002 rather than the 31 percent that would have taken place without increases in energy efficiency. In addition, energy-related GHG emissions are more than 50 megatonnes lower than they would have been otherwise. The OEE Index shows that even with the many barriers to improvement in energy efficiency, strong and measurable progress has been made, due in part to the programs of the OEE.

Guided by the OEE's vision statement of "Leading Canadians to Energy Efficiency at Home, at Work and on the Road," OEE programs target all energy consumers and emphasize partnerships and economic investments. They aim



to provide information, improve knowledge and overcome market barriers, such as institutional deterrents in energy end-use markets and financial and economic constraints on energy users.

The Government of Canada committed to “getting its own house in order” by reducing GHG emissions from its operations by 31 percent from 1990 levels by the year 2010. Since 1990, through building retrofits, better fleet management, strategic “green power” purchases and the downsizing of operations, the Government of Canada has already achieved a 24 percent emissions reduction. The OEE has played and will continue to play an important role in helping to achieve this reduction.

As Canada works toward fulfilling its commitment for reducing GHG emissions under the Kyoto Protocol, the OEE continues to expand and improve the programs that

support Canadians in the key area of energy efficiency. Improving energy efficiency reduces GHG emissions that contribute to climate change. A dynamic, flexible and proactive organization, the OEE will continue to evolve in response to the climate change challenge and new energy efficiency opportunities throughout society.

The most recent market trends data available are for 2002. This edition of *The State of Energy Efficiency in Canada* is available in CD-ROM format. To order the CD-ROM, visit the OEE’s Web site at oee.nrcan.gc.ca or call 1 800 387-2000 (toll-free).



The Office of Energy Efficiency

The Office of Energy Efficiency (OEE) was established in April 1998 as part of Natural Resources Canada (NRCan). Its mandate is to strengthen and expand Canada's commitment to energy efficiency in order to help address the challenges of climate change, with specific emphasis on the Kyoto Protocol. The OEE builds on efforts by NRCan over the past three decades to promote energy conservation, continuous increases in energy efficiency and greater use of alternative sources of energy as ways to help protect the environment and strengthen Canada's economic competitiveness.

The OEE manages energy efficiency and alternative transportation fuels measures aimed at the residential, commercial/institutional, industrial and transportation sectors.¹ Guided by the OEE's vision statement of "Leading Canadians to Energy Efficiency at Home, at Work and on the Road," programs related to these sectors target all energy consumers and

emphasize partnerships and economic investments. They aim to overcome the market barriers of inadequate information and knowledge, institutional deterrents in energy end-use markets and financial and economic constraints on energy users.

The OEE is also responsible for

- collecting and analysing data on energy end-use;
- developing new measures to increase the impact and reach of NRCan's support for energy efficiency improvement;
- modifying its existing programs to increase their effectiveness and efficiency;
- reporting annually on the state of energy efficiency in Canada and communicating up-to-date information on energy efficiency and alternative transportation fuels through its publications and Web site at oee.nrcan.gc.ca; and
- managing Canada's Energy Efficiency Awards.

¹ The OEE's efforts in the area of alternative transportation fuels encourage the transition to less carbon-intensive energy sources in the transportation sector.

The OEE plays a key role in Outreach and the One-Tonne Challenge, designed to increase Canadians' awareness and understanding of climate change and the link to energy use. Outreach projects provide information and activities to integrate energy efficiency into Canadians' energy-use decisions. The One-Tonne Challenge asks Canadians to reduce annual GHG emissions by 20 percent, or one tonne. Canadians are challenged to use less energy, reduce waste and conserve water and other resources. The One-Tonne Challenge is co-managed with Environment Canada, with input from and coordination with other departments.

The OEE is assisted by the National Advisory Council on Energy Efficiency, which is composed of energy efficiency experts and leaders from all sectors of the economy and all regions of the country.

National Energy Use Database

The National Energy Use Database (NEUD) supports the development of Canadian energy end-use data, knowledge and analytical capabilities. Through the NEUD, data are collected on energy consumption at the end-use level. Information is also collected on the characteristics of energy-using equipment and buildings, the behaviour of Canadian consumers toward energy use and the adoption of energy-efficient technologies. For more information, visit the Web site at oe.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/database_e.cfm.

Reporting

Informing key decision-makers in government, industry and the environmental and international communities about Canada's energy efficiency efforts and successes is another of the OEE's major tasks. Reporting on the state of energy efficiency in Canada is one element of this work. The OEE also publishes the annual technical report *Energy Efficiency Trends in Canada* and the statistical reference *Energy Use Data Handbook*, and coordinates the drafting and publication of two NRCan reports: *Improving Energy Performance in Canada – Report to Parliament Under the Energy Efficiency Act* and *Federal House in Order – Annual Report on Emissions Reductions From Federal Operations*.

The OEE makes its publications and other documents on energy efficiency available to Canadians and others through a comprehensive Web site. The site provides details on OEE programs and offers practical, up-to-date information and tips for all energy users. It also provides access to the OEE's comprehensive, electronic Directory of Energy Efficiency and Alternative Energy Programs in Canada. For more information, visit the Web site at oe.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm.

Canada's Energy Efficiency Awards

Canada's Energy Efficiency Awards are managed by the OEE to encourage and honour Canadian innovation and achievements in energy efficiency by businesses, institutions, communities, governments and individuals. Now in their fifth year, the awards send a positive message that Canada is taking action on climate change.

Awards are presented annually in several categories – equipment and technology, housing, buildings, industry, outreach, media and a student competition. For more information, visit the Web site at oee.nrcan.gc.ca/awards.

Green Municipal Funds

The Government of Canada established the Green Municipal Funds (GMF) in 2000 to support municipal investments in innovative environmental infrastructure projects and practices to achieve cleaner air, water and soil and to reduce GHG emissions.

The funds are operated by the Federation of Canadian Municipalities (FCM) at arm's length from the Government of Canada. The OEE participates in the GMF through representation on the Peer Review Committee and governing Council that recommend projects for approval by the FCM National Board of Directors.

As of August 2004, the GMF had provided \$166 million to support 347 feasibility studies and projects. An additional investment of \$1 billion had been provided by municipal governments and their partners.

Budget 2005 builds on earlier investments by contributing an additional \$300 million in 2004-05 to the Green Municipal Funds.



Taking Action on Climate Change

One of the most pressing environmental challenges is that of global climate change. The international scientific community has concluded that the rapid increase in the concentration of greenhouse gas (GHG) emissions in the atmosphere can be expected to increase the earth's surface temperature, change our climate, alter our environment and endanger our health. For more information, visit the Government of Canada Web site at www.climatechange.gc.ca.

Most human-generated GHG emissions are produced through the combustion of fossil fuels. Although Canada accounts for only about 2 percent of the world's GHG emissions, it needs to be part of the solution. Substantially reducing GHG emissions is a challenge, particularly given Canada's highly industrialized and resource based economy. Solutions require a multifaceted, coordinated domestic response and a high level of cooperation among all nations.

In 1997, Canada and more than 160 other countries met in Kyoto, Japan, and agreed to targets to reduce GHG

emissions. Canada's target is to reduce its GHG emissions to 6 percent below 1990 levels by the first commitment period (2008 to 2012). The Government of Canada ratified the Kyoto Protocol and notified the United Nations of its decision on December 17, 2002.

The federal budget of February 2003 provided new funding of \$2 billion over five years to support climate change initiatives. This is in addition to the \$1.7 billion in climate change investments announced by the Government of Canada since 1997. This edition of *The State of Energy Efficiency in Canada* reflects the Office of Energy Efficiency measures implemented with this new funding.



Energy Use and Greenhouse Gas Emissions

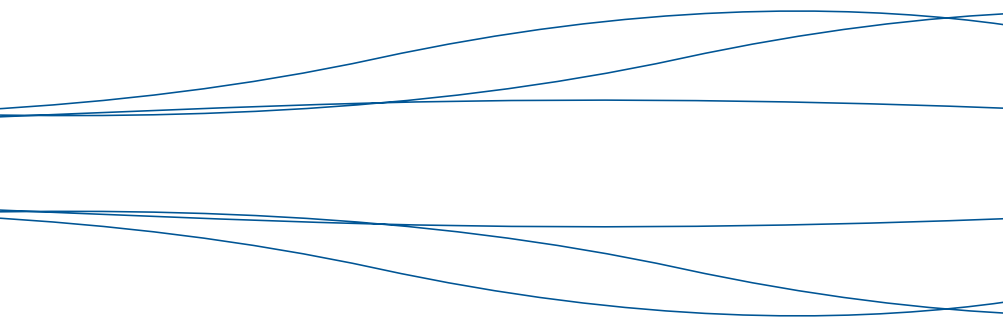
Canada, like other industrialized countries around the world, depends heavily on fossil fuels to meet its energy needs. These fuels, when burned, release carbon dioxide (CO₂) and, to a lesser extent, nitrous oxide and methane, all of which are greenhouse gases (GHGs). In general, the more energy Canadians use, the more GHG emissions produced and the greater the impact on global climate change.

Between 1990 and 2002, the amount of energy that Canadians used to heat and cool their homes and workplaces and to operate their appliances, vehicles and facilities – known as secondary energy use – increased by about 18 percent. GHG emissions associated with this energy use increased by approximately 18 percent, accounting for 66 percent of all GHG emissions in Canada in 2002.

Factors That Affect Energy Use

Several factors affect how much energy the Canadian economy uses. These include the level of economic activity in a sector (e.g. production by industry, floor space in the residential or commercial/institutional sector); the weather; structure (the mix of activities that consume energy in a sector); a higher service level (increased penetration of auxiliary equipment and space cooling in commercial/institutional buildings); and how efficiently each sector uses energy. By promoting improved energy efficiency, the Office of Energy Efficiency's (OEE's) programs are helping Canada reduce its GHG emissions.

Canada's increased energy use between 1990 and 2002 was primarily due to growth in economic activity in each end-use sector. For example, activity in the industrial sector increased by 44 percent during this period. In the residential sector, there was a 23 percent increase in activity (which is represented by a mix of households and floor space).



Likewise, the amount of commercial floor space in Canada grew by 26 percent over 1990–2002. In the transportation sector, there was a 16 percent increase in passenger-kilometres travelled and a 36 percent increase in tonne-kilometres moved.

Changes in structure – the mix of activities that consume energy – contributed to decreased energy use between 1990 and 2002. The decrease was mainly due to changes in the industrial sector.

The industrial sector accounted for approximately 39 percent of total secondary energy use in Canada in 2002 (see Figure 1) and 34 percent of secondary energy-related GHG emissions (see Figure 2).² The second largest energy-using sector – transportation – accounted for almost 28 percent of energy use and about 34 percent of GHG emissions in 2002. The energy used in transportation, primarily gasoline and diesel fuel, produces more GHG emissions than other energy sources when combusted.

Of the factors that affect energy use and GHG emissions in Canada’s end-use energy markets, the primary focus of the OEE is energy efficiency. The following chapter takes an in-depth look at the state of energy efficiency in Canada.

Figure 1

Secondary Energy Use by Sector, 2002 (petajoules)

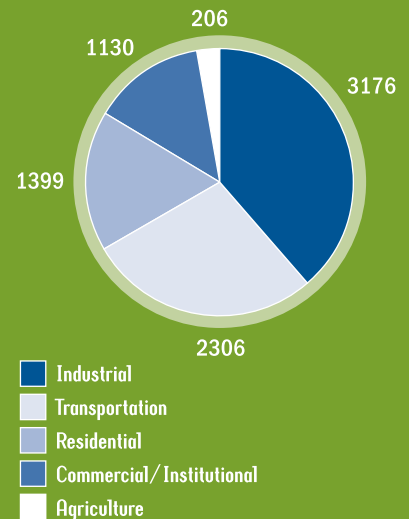
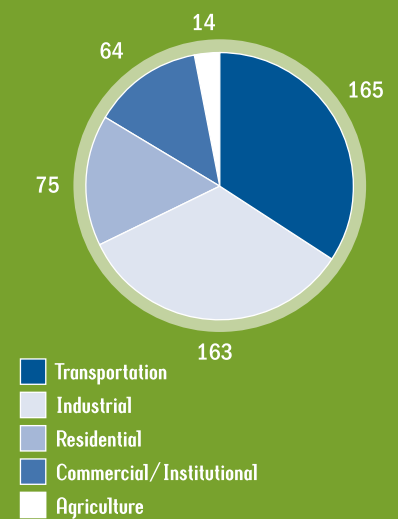


Figure 2

Secondary Energy-Related Greenhouse Gas Emissions by Sector, 2002 (megatonnes of CO₂ equivalent)



² There are other sources of GHG emissions (e.g. fugitive emissions and non-energy industrial process emissions). For further information, refer to Environment Canada’s *Canada’s Greenhouse Gas Inventory: 1990–2002*. A copy is available at www.ec.gc.ca/pdb/ghg/1990_02_report/toc_e.cfm.



The State of Energy Efficiency in Canada

The Office of Energy Efficiency (OEE) has become Canada's foremost centre for collecting and analysing energy efficiency data, analysing trends in energy use and developing and delivering key programs that promote energy efficiency in the major energy-using sectors of the economy. One of its goals is to improve Canada's ability to track the influence of its energy efficiency programs on market trends and identify opportunities to further improve energy efficiency.

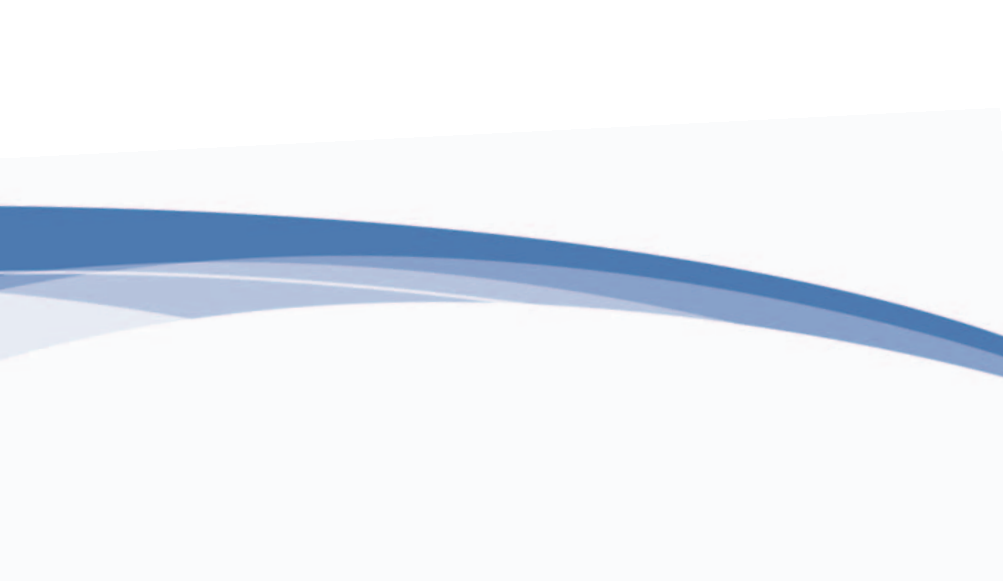
At the core of the OEE's analytical capacity is its annual assessment of trends in energy use and related greenhouse gas (GHG) emissions in Canada since 1990. The results are published in the technical report *Energy Efficiency Trends in Canada*. Changes in energy efficiency cannot be measured directly at the sectoral or economy-wide level. Thus, to track changes in energy efficiency, the OEE uses a factorization methodology to develop the OEE Energy Efficiency Index,³ the only one of its kind in Canada.

The OEE Index depicts annual changes in energy efficiency in the Canadian economy. Note that the OEE Index is only an estimate of changes in energy efficiency in the economy. Even after accounting for the other principal factors that influence energy intensity, namely activity, weather, structure and service level, the resulting estimate of energy efficiency includes some factors not related to efficiency. For example, the estimate of industry energy efficiency will include the effect of changes in sub-sector mixes of products or in the products themselves.

The OEE Index shows that, even with the many barriers to improvement in energy efficiency, strong and measurable progress has been made, due in part to the programs of the OEE. For 1990–2002, the OEE Index shows an increase in value, indicating that energy efficiency improved by 13 percent (see Figure 3 on page 11). As a result of this improvement, Canadians saved approximately \$11.6 billion in energy costs in 2002 alone.

Energy use increased between 1990 and 2002. Without improvements in energy efficiency, increases attributable to activity, weather, structure and service level would have

³ For more information on the OEE Energy Efficiency Index, see *Energy Efficiency Trends in Canada, 1990 to 2002 – June 2004*. The document can be viewed on the OEE Web site at oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/Trends04/ToFC.cfm.



led to an increase of 31 percent. However, as a result of a 13 percent improvement in energy efficiency, actual energy use increased by 18 percent (see Figure 4).

Each of the four principal end-use sectors in the Canadian economy (residential, commercial/institutional, industrial and transportation) contributed to this improvement in energy efficiency. The following are a few highlights from the analysis:

- In the **residential sector**, the combined effects of a 23 percent increase in activity (which is represented by a mix of households and floor space), an increase in energy demand due to weather (a colder winter and a warmer summer in 2002 relative to 1990) and an increase in the average number of major appliances per household were partially offset by a 20 percent improvement in energy efficiency. This kept the increase in residential energy use over the period to about 9 percent over 1990 levels.
- A 7 percent improvement in energy efficiency in the **commercial/institutional sector** over 1990–2002 reduced GHG emissions by almost four megatonnes.
- Although there was a 44 percent increase in **industrial** activity, much of it occurred in less energy-intensive industries, such as electrical and electronic products. That, along with a 14 percent improvement in energy efficiency between 1990 and 2002, restrained the increase in energy use in the industrial sector to 17 percent, which reflects changes in activity, structure and efficiency.

Figure 3

The OEE Energy Efficiency Index, 1990 to 2002

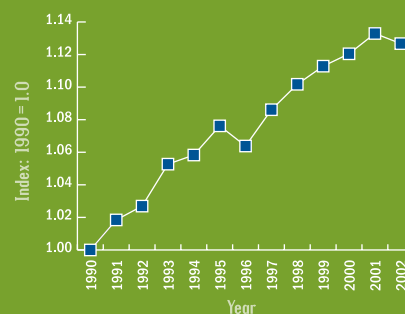


Figure 4

Impact of Energy Efficiency Improvements on Energy Use, 1990 to 2002

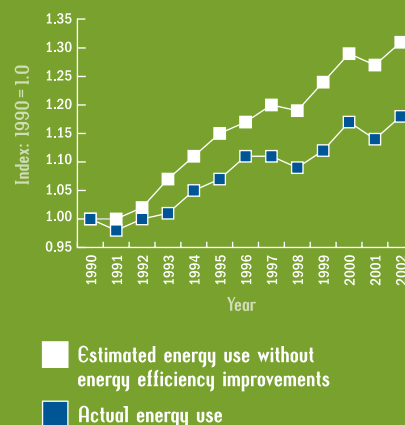
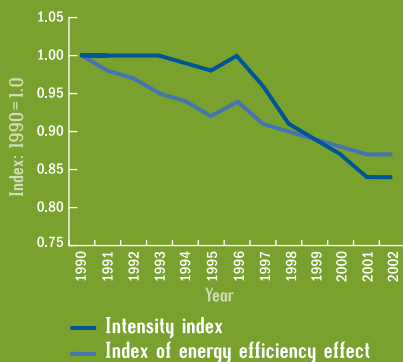


Figure 5

Changes in Energy Intensity and the Energy Efficiency Effect, 1990–2002



- Passenger **transportation** energy use increased by 13 percent, and freight transportation energy use increased by 36 percent. Thus energy use increased an average of approximately 23 percent in the transportation sector. A 10 percent improvement in energy efficiency helped offset increases in energy use.

Energy Intensity / Energy Efficiency

Although aggregate energy intensity is often used as a proxy for energy efficiency, there is a distinction between these two terms. Aggregate energy intensity is either the ratio of energy use per unit of gross domestic product (GDP) or energy use per capita. However, this measure is misleading because, in addition to pure energy efficiency, energy intensity captures (among other things) the impacts of weather variations and changes in the structure of the economy.

To properly gauge changes in energy efficiency over time, differences in economic structure and weather need to be normalized or factored out of the intensity calculation. The OEE applies an internationally recognized factorization analysis technique to isolate the impact of energy efficiency on changes in Canadian energy use.

Figure 5 compares, for Canada, an index of annual variation in energy intensity with the OEE’s index of changes in energy efficiency over 1990–2002. For comparison purposes, the indexes present improvements in energy intensity/energy efficiency as a downward trend (as opposed to an upward trend, as depicted in Figure 3).

Figure 6

Energy Intensities for Selected IEA Countries

GJ* per capita	GJ per \$1,000 of GDP
Luxembourg 355.7	Czech Republic 18.8
Canada 249.2	Hungary 13.2
United States 225.6	Turkey 11.4
Finland 203.6	Canada 10.8
Norway 196.4	Korea 8.5
Belgium 175.4	New Zealand 8.1
Sweden 164.0	United States 7.2
Netherlands 157.3	Australia 6.5
Australia 157.0	Finland 6.3
New Zealand 149.3	Portugal 6.3

* Gigajoules

International Comparisons

Canada has a higher aggregate intensity – absolute energy use per capita or per unit of GDP – than most International Energy Agency (IEA) countries, ranking second and fourth, respectively (as shown in Figure 6 on page 12).

Meaningful comparisons of energy efficiency between countries can be difficult because detailed energy, equipment stock, production and/or weather data for each target country are required. However, according to a 2004 IEA report entitled *Oil Crises and Climate Challenges: 30 Years of Energy Use in IEA Countries*, Canada's energy efficiency improved at an average annual rate of 1 percent between 1990 and 1998, similar to the rate recorded by the United States and the fourth fastest rate of improvement among the 13 countries included in the report (surpassed by Finland, Italy and Norway).



Improving Energy Efficiency

The Office of Energy Efficiency Approach

Guided by the vision statement “Leading Canadians to Energy Efficiency at Home, at Work and on the Road,” the Office of Energy Efficiency’s (OEE’s) programs target all energy consumers and emphasize partnerships and economic investments. Improving energy efficiency reduces greenhouse gas (GHG) emissions that contribute to climate change. The OEE uses five basic policy instruments to overcome market barriers to improving energy efficiency in the energy end-use market:

- leadership by the Government of Canada in reducing emissions from its own use of energy;
- information programs to advise energy users of the benefits of energy efficiency and to increase awareness, acceptance and adoption of energy-efficient technologies and practices;
- voluntary programs that support actions by energy users to improve their energy efficiency;

- direct financial incentives to encourage investment in energy-efficient buildings and building retrofits in order to stimulate more rapid deployment of energy-efficient technologies and practices; and
- regulations that set minimum performance standards to eliminate less energy-efficient products from the market.

The OEE maintains strong links with Natural Resources Canada’s (NRCan’s) research and development programs for advanced energy-efficient technologies. It works closely with NRCan’s CANMET Energy Technology Centre to ensure that Canadians are kept abreast of technology developments that can either reduce the consumption of fossil fuels or enable the transition to less GHG-intensive energy sources, including renewable energy.

The OEE manages energy efficiency and alternative transportation fuels measures aimed at all sectors of the Canadian end-use energy market. The following sections identify market trends and outline the efforts made and progress achieved by the OEE’s programs.

Equipment

Market Trends

Energy-using equipment plays a critical role in energy consumption in the residential, commercial/institutional and industrial sectors. Although individually such items consume relatively modest amounts of energy, the total energy requirement for an average building's energy-using equipment or to produce an industrial output can be significant.

In 2002, 13 percent of energy use in the residential sector was attributable to appliances. Major appliances (refrigerators, freezers, dishwashers, ranges, clothes washers and clothes dryers) accounted for 63 percent of this amount, or 8 percent of the total. Lighting fixtures (including lamps and ballasts) accounted for a significant amount of energy use in the commercial/institutional sector – 13 percent in 2002. Space heating and cooling equipment accounted for almost 60 percent of energy use in the residential and commercial/institutional sectors.

Although the stock of the major appliances increased by 31 percent between 1990 and 2002, the energy used by these appliances actually decreased by 14 percent (see Figure 7). The increasing popularity of minor appliances (e.g. televisions, digital videodiscs, satellite dishes, digital cable receivers, computers and audio equipment), for which energy use during the same period increased by 51 percent, resulted in an overall increase in energy use of 2 percent in the residential sector.

Promoting Energy Efficiency

Energy-using equipment offers the potential for significant energy efficiency improvements in the residential sector. Residential energy-using equipment is an important area for program support because equipment has a shorter life span than residential buildings. Because lighting fixtures comprise a significant proportion of equipment energy use in the commercial/institutional sector, they are periodically evaluated for opportunities in efficiency gains. In the industrial sector, energy efficiency improvements are most readily achieved in equipment and processes that are common to many industries, such as motors and auxiliary systems.

Figure 7

Average Energy Consumption of New Appliances, 1990 and 2002 Models

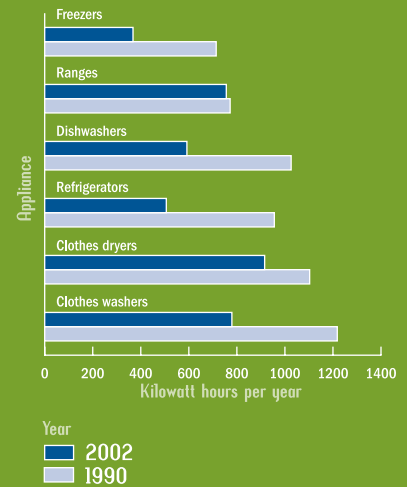


Figure 8

Eighth Amendment:
Estimated Reduction in CO₂ Emissions,
2005 to 2020

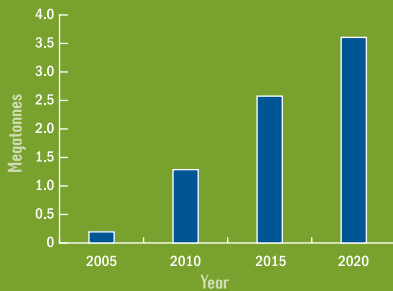
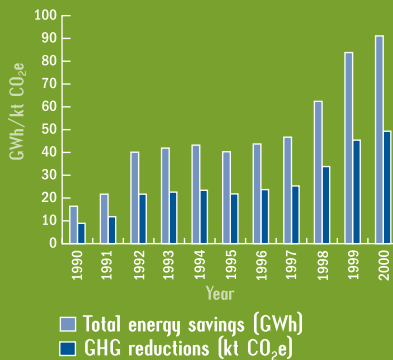


Figure 9

Impact of EnerGuide Labelling:
Total Energy Savings and GHG Emissions
Reductions Attributable to EnerGuide for Equipment,
1990 to 2000



The Office of Energy Efficiency's (OEE's) approach to improving the energy performance of equipment in the marketplace is to

- use regulations that set minimum performance standards to gradually exclude the least efficient equipment from the market; and
- influence consumers to select – and manufacturers to produce – energy-efficient products that outperform the minimum standards, through mandatory and voluntary labelling, information and promotion activities.

Selected Progress Indicators for Equipment

- The first *Energy Efficiency Regulations* under the *Energy Efficiency Act* came into force in 1995. Regulations have been established for more than 30 products. It is estimated that the Regulations implemented to date will, by 2020, result in a reduction of over 29 megatonnes of carbon dioxide (CO₂) emissions per year.
- The Regulations also require that eight specified types of new household appliances for sale display an EnerGuide label. This label shows the yearly energy consumption rating of an appliance and positions it on a scale between the most and least efficient comparable models. The label is used voluntarily by heating, ventilating and air-conditioning (HVAC) manufacturers and suppliers.
- Amendments to the *Energy Efficiency Regulations* have raised the efficiency standard in the residential and commercial/institutional sectors. Most recently, the eighth amendment has been pre-published to increase the minimum energy-performance standards in the residential sector for clothes washers and gas-fired and electric-storage water heaters and in the commercial/institutional sector for water chillers and exit signs. Cumulatively, the eighth amendment is expected to reduce CO₂ emissions by almost four megatonnes by 2020 (see Figure 8).

The 1992 *Energy Efficiency Act* provides the authority for the Government of Canada to make and enforce regulations concerning performance and labelling requirements for energy-using products (and doors and windows) that are imported or shipped between provinces or territories. The Act also gives the Government of Canada the authority to collect statistics on energy use and alternative energy.

The OEE's Equipment Program

The objective of the OEE's standards setting and conformity assessment under its Equipment Program is to eliminate the less energy-efficient models of energy-using equipment from the market through minimum performance regulations under the *Energy Efficiency Act*.

The Regulations incorporate national consensus performance standards that include testing procedures to determine the energy performance of equipment. They prohibit imports of, or interprovincial trade in, prescribed products that fail to meet minimum energy performance levels and labelling requirements.

For more information, visit the Web site at oee.nrcan.gc.ca/regulations.

The OEE's equipment labelling activities aim to promote the production, purchase and use of more energy-efficient major electrical household appliances in addition to HVAC and industrial equipment.

Labelling activities consist of rating, labelling and promotion to encourage manufacturers to produce and consumers to purchase and use energy-using equipment that is more energy efficient. EnerGuide provides comparative information on the energy performance of major household appliances. The voluntary EnerGuide HVAC Energy Efficiency Rating System provides information on home HVAC products. Introduced in 2001, the ENERGY STAR® Initiative in Canada allows the consumer to identify the most energy-efficient products available in their class, based on a standard set of criteria. The impact of EnerGuide labelling is illustrated in Figure 9 on page 16.

EnerGuide for Industry promotes and encourages the manufacture, purchase and use of industrial equipment that is more energy efficient. Implemented in 2001, this labelling/rating program follows principles similar to those for EnerGuide. The initiative targets commonly used "off-the-shelf" industrial equipment, such as motors, pumps, transformers, compressors, boilers and lights. The initiative aims ultimately to reduce GHGs related to energy use by improving the efficiency of the stock of energy-using equipment available for industrial applications.

For more information, visit the following Web sites:

- oee.nrcan.gc.ca/Publications/infosource/Pub/appliances
- oee.nrcan.gc.ca/equipment
- energystar.gc.ca
- oee.nrcan.gc.ca/egi



Housing

Market Trends

The residential sector accounted for 17 percent of secondary energy use in Canada and 16 percent of related greenhouse gas (GHG) emissions in 2002.

Between 1990 and 2002, residential energy use increased by 9 percent. The increase in energy use was largely driven by an increase in activity and a colder winter and warmer summer in 2002 relative to 1990. Without improvements in energy efficiency, residential energy use would have been almost 20 percent higher in 2002.

GHG emissions from the residential sector increased by over 8 percent between 1990 and 2002. This was principally due to the increase in the carbon-intensive generation of electricity.

Promoting Energy Efficiency

It is usually more economical to make energy efficiency improvements during home construction than after a home is built. However, by 2010, energy-efficient houses built before 1995 will represent about 65 percent of Canadian housing; therefore, energy use in the existing stock of houses also needs to be improved.

Over 80 percent of residential energy is used for space and water heating, and significant potential exists for continued energy efficiency gains in this area. Residential energy-using equipment is an important area for program support because equipment has a shorter life span than residential buildings.

With these opportunities in mind, the Office of Energy Efficiency's (OEE's) approach to the residential sector is to

- use regulations and information programs to gradually exclude the least efficient equipment from the market and to influence consumers to select – and manufacturers to produce – energy-efficient products that outperform the minimum standards (discussed previously in the section on equipment in this report);
- improve the energy performance of new and existing housing by supporting energy codes and the construction of benchmark energy-efficient housing, showing home buyers and owners the economic and environmental benefits of energy-efficient housing and renovation, and increasing builders' knowledge of energy-efficient housing technologies and practices; and
- use financial incentives to encourage homeowners to retrofit their homes to make them more energy efficient.

Selected Progress Indicators in Housing

- EnerGuide for Houses encourages Canadians to improve the energy efficiency of their homes, especially when undertaking home renovation and maintenance projects. In October 2003, the EnerGuide for Houses Retrofit Incentive was launched to encourage Canadian homeowners to make their homes more energy efficient. Homeowners can now qualify for a nontaxable grant, which represents approximately 10 to 20 percent of expenditures for retrofitting a home. Figure 10 on page 19 depicts audit-identified energy savings after retrofits.
- The R-2000* Standard affects the new housing market by encouraging Canadians to build homes that require less energy to heat than conventional new houses. R-2000 practices and technologies are increasingly being adopted in mainstream construction (see Figure 11 on page 19). Examples include greater use of heat recovery ventilators, high-performance windows and high-efficiency gas furnaces.

*R-2000 is an official mark of Natural Resources Canada.

The OEE's Housing Program



The R-2000 Standard is an industry-endorsed, voluntary certification for new houses. It features a technical performance standard for energy efficiency, indoor air quality and

environmental responsiveness and a quality assurance process for industry training and house evaluations and inspections.

For more information, visit the Web site at oee.nrcan.gc.ca/r-2000.



EnerGuide for Houses is an energy performance evaluation and rating initiative. It provides homeowners with the facts they need to make informed decisions about energy efficiency when they are buying a house or improving their home.

In January 2005, it was announced that Ontario will be the site of a pilot program to expand the ENERGY STAR program in Canada to include new houses. In March, it was announced that a new development in the western section of Ottawa, will be Canada's first community of ENERGY STAR®-qualified homes.

The EnerGuide for Houses Retrofit Incentive was launched in October 2003 to encourage homeowners to retrofit their houses to make them more energy efficient. Figure 12 shows significant growth in 2003–2004 evaluations under EnerGuide for Houses, largely due to the retrofit incentive.

For more information, visit the Web site at oee.nrcan.gc.ca/houses-maisons/.

Figure 10

Residential Energy Use and Energy Savings per Household, pre-1945 to 2000–2004

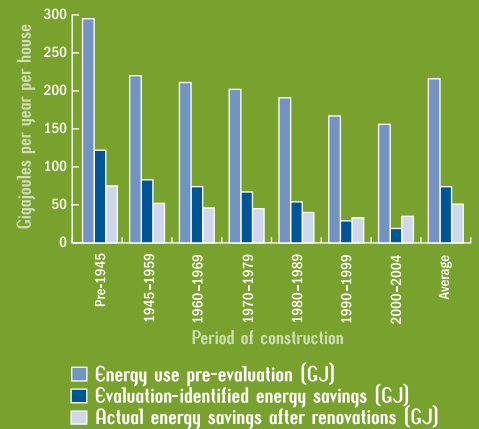


Figure 11

National Trends in Air Leakage in Houses (R-2000 and EnerGuide for Houses), pre-1945 to 2000–2004

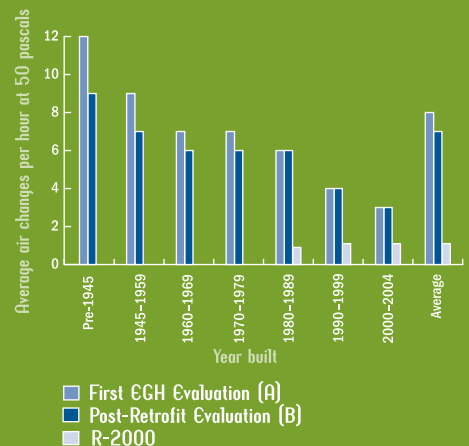


Figure 12

Evaluations Under EnerGuide for Houses, 1998–1999 to 2003–2004



Figure 13

Estimated Average GHG Reductions by Institution Under CBIP, 2003–2004

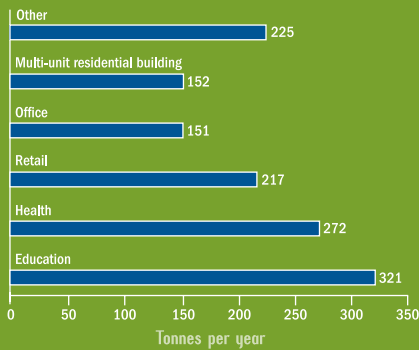
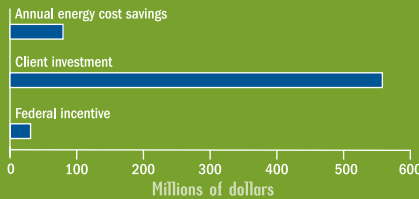


Figure 14

Energy Innovators Initiative – Incentive Projects From 1998 to 2004



Buildings

Market Trends

The commercial/institutional sector of the economy accounted for 14 percent of Canada’s secondary energy use and 13 percent of the related greenhouse gas (GHG) emissions in 2002.

Improved energy efficiency somewhat offset the effect of increased commercial activity between 1990 and 2002. This limited the growth in the sector’s energy use to about 30 percent. The energy efficiency of commercial/institutional buildings, heating and cooling equipment, lighting technology, electric motors and control systems improved. Without these advances, energy use in the sector would have increased by 38 percent.

GHG emissions from the commercial/institutional sector increased by 35 percent during 1990–2002. Part of the increase was due to a shift toward heavy fuel oil in the fuel mix and the use of more GHG-intensive fuels to generate electricity.

Promoting Energy Efficiency

Space heating accounts for more than half of the energy used in this sector and offers significant opportunities for gains in energy efficiency. Auxiliary motors, auxiliary equipment and lighting account for about 33 percent of commercial energy use. Energy efficiency improvements are also possible in these areas.

As is the case in the residential sector, it is generally more economical to make energy efficiency improvements during the construction of a building rather than afterward. However, given the slow turnover of the building stock in this sector and the opportunities for energy-efficient retrofits, the energy performance of existing buildings must also be improved.

The Office of Energy Efficiency’s (OEE’s) approach to the commercial/institutional sector is to

- use regulations and information to gradually exclude the least efficient equipment from the market and to influence consumers to select – and manufacturers to produce – energy-efficient products that outperform the minimum standards (discussed previously in the section on equipment in this report); and

- accelerate changes in building design, construction and operation by
 - marketing the benefits of more energy-efficient construction,
 - increasing the awareness and knowledge of building owners, designers and builders,
 - supporting energy codes,
 - providing incentives for designing more energy-efficient buildings, and
 - encouraging investments in energy-efficient building retrofits to lower costs and reduce GHG emissions by forming partnerships with key associations, emphasizing corporate energy management planning and providing incentives for implementing energy-efficient retrofits.

Selected Progress Indicators for Buildings

- Since the inception of the Commercial Building Incentive Program (CBIP), 372 projects aimed at improving the energy efficiency of new commercial, institutional and multi-unit residential buildings have been supported. Results indicate that, on average, CBIP buildings are almost 35 percent more energy efficient than similar buildings constructed to the *Model National Energy Code for Buildings*. Figure 13 on page 20 shows the estimated average GHG reductions by institution under CBIP.
- The Energy Innovators Initiative (EII) encourages commercial businesses and public institutions to become more energy efficient and reduce their GHG emissions. Since 1992, the EII has recruited more than 1600 commercial, institutional and multi-unit residential organizations across Canada. In 2003–2004, the program was expanded to allow more organizations to apply for funding.
- In the 2003–2004 fiscal year, approximately 70 energy retrofit projects, commercial businesses, public institutions and multi-unit residential buildings received financial incentives for energy retrofit projects from the EII. Since its inception, the EII has contributed \$30.5 million to energy retrofit projects. The total investment of these

projects is more than \$590 million, representing a significant contribution to energy efficiency retrofits by the commercial/institutional sector (see Figure 14 on page 20).

The OEE's Buildings Program

The Commercial Building Incentive Program, part of the OEE's Buildings Program, provides financial incentives to eligible building owners who construct new commercial, institutional and multi-unit residential buildings that are at least 25 percent more energy efficient than similar buildings constructed to meet the *Model National Energy Code for Buildings*. Up to \$60,000 may be given to owners of eligible buildings.

For more information, visit the Web site at oee.nrcan.gc.ca/newbuildings.

The Energy Innovators Initiative encourages owners and operators of existing commercial businesses and public institutions to reduce operating costs and become more energy efficient through a variety of tools and services, including information, training, advice and financial incentives. Organizations can receive up to 50 percent of approved costs to a maximum of \$25,000 for activities related to planning and developing an energy retrofit. Eligible measures include audits, feasibility studies, energy management plans and other facilitation services. Financial incentives are also available for qualifying energy retrofit projects. Organizations may qualify for up to 25 percent of eligible costs – up to \$250,000 (based on projected energy savings) – for the implementation of energy-saving measures.

For more information, visit the Web site at oee.nrcan.gc.ca/eii.

Industry

Market Trends

For the purposes of this report, the industrial sector includes all manufacturing activities, all mining activities, forestry and construction. However, it excludes electricity generation. In 2002, the industrial sector accounted for approximately 39 percent of secondary energy use in Canada and 34 percent of related greenhouse gas (GHG) emissions. Pulp and paper, an important sector in Canada's economy, accounted for almost 27 percent of total industrial energy demand in 2002.

Actual industrial energy use increased by approximately 17 percent between 1990 and 2002. This is the result of an increase in industrial activity, which grew by about 44 percent. Some of this increase was offset by improvements in energy efficiency and structural change – the shift to less energy-intensive industries (such as electrical and electronics).

GHG emissions from the industrial sector increased by 15 percent between 1990 and 2002. However, a significant shift toward the use of less GHG-intensive fuels in the industrial sector has meant that the level of GHG emissions is lower than it would have been otherwise.

Promoting Energy Efficiency

In the industrial sector, energy is used primarily to produce heat, to generate steam or as a source of drive power. Energy efficiency

improvements are most readily achieved in equipment and processes that are common to many industries, such as motors and auxiliary systems. Continued switching from fossil fuels to GHG-neutral energy sources (such as wood and pulp waste) represents another opportunity to reduce emissions from this sector.

The Office of Energy Efficiency's (OEE's) approach in the industrial sector is to

- implement more stringent minimum efficiency standards for electric motors, fluorescent and incandescent lamps, exit signs, dry-type distribution transformers and medium duty electric motors; and
- encourage and make voluntary action easier, both industry-wide and at the company level, to improve energy efficiency.

OEE initiatives at the sector and company levels address barriers to planning, implementing, tracking and reporting energy efficiency projects in industry.

Selected Progress Indicators for Industry

- During fiscal year 2003–2004, 147 new Industrial Energy Innovators were recruited (see Figure 15 on page 23).
- The Canadian Industry Program for Energy Conservation (CIPEC) has a network of more than 45 trade associations that targets all of industry, including industrial mining, manufacturing, construction, upstream oil and gas and electricity generation. Effective energy management by CIPEC companies resulted in \$3.4 billion in savings in 2002. As Figure 16 on page 23 demonstrates, significant energy intensity improvements occurred in the latter part of the decade. Between 1996 and 2002, energy intensity decreased by 11 percent.

- According to a recent study, there is a statistically significant difference between energy consumed by CIPEC participants and non-participants. The growth of energy consumption for CIPEC participants was about half that of non-participants. Three times more participants reported reduced energy use than non-participants. And 15 percent fewer participants reported an increase in energy use than non-participants.
- In fiscal year 2003–2004, the Industrial Building Incentive Program (IBIP) trained 17 architects and engineers in energy-efficient industrial building design. Modelling guidelines for industrial buildings were also completed.

The OEE's Industry Program

The Canadian Industry Program for Energy Conservation and Energy Innovators are sectoral- and company-level initiatives, respectively. They address barriers to planning, implementing, tracking and reporting energy efficiency projects in Canadian industry. Key elements include the establishment and tracking of energy efficiency improvement targets and plans, and the development of products and services that overcome barriers to continued energy efficiency improvement. The OEE provides support via employee awareness kits and events, best-practices guides, technical information, energy audits, benchmarking and workshops on energy management.

For more information, visit the Web site at oee.nrcan.gc.ca/cipec.

The Industrial Building Incentive Program (IBIP), also part of the OEE's Industry Program, aims to increase the energy efficiency of newly constructed industrial buildings. IBIP, a five-year program scheduled to run until March 2006, consists of an evaluation and selection of 6–10 projects annually from proposals. IBIP offers an incentive of up to \$80,000 to companies that are building new industrial facilities to offset additional design costs inherent in the initial attempts at energy-efficient design.

For more information, visit the Web site at oee.nrcan.gc.ca/newbuildings.

Figure 15

Industrial Energy Innovators, 1995–1996 to 2003–2004



Figure 16

CIPEC Energy Intensity Index, 1990–2002

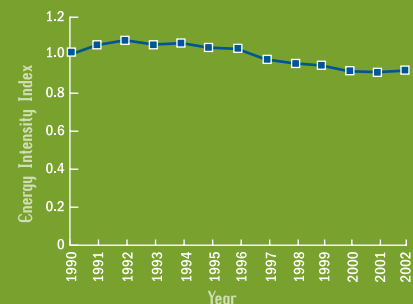


Figure 17

Changes in Trucking Energy Intensity and Average Activity per Truck, 1990–2002

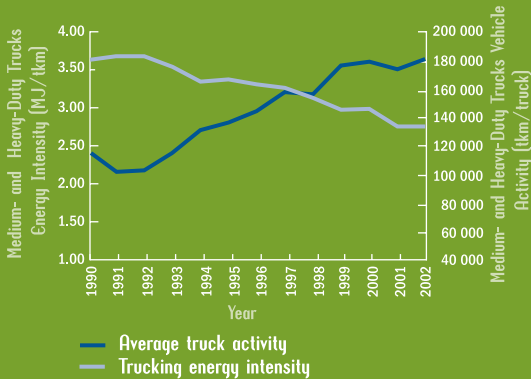


Figure 18

Company Average Fuel Consumption (CAFC) vs. Canadian Voluntary Standards, 1990 to 2003

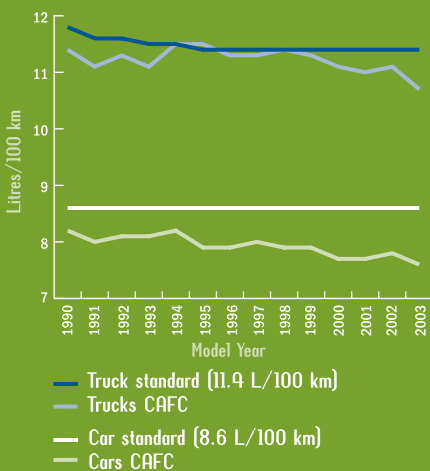
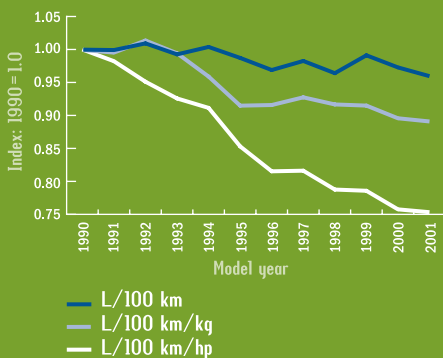


Figure 19

New-Car Fuel Efficiency, Normalized for Weight and Power, 1990 to 2001



Transportation

Market Trends

In 2002, the transportation sector accounted for approximately 28 percent of secondary energy use in Canada and about 34 percent of related greenhouse gas (GHG) emissions.

Energy efficiency improvements in freight and passenger transportation limited the growth in transportation energy use to 23 percent between 1990 and 2002. Without these improvements, transportation energy use would have increased by 32 percent over the period. The increase in energy use is due to many factors. Two of the most important factors are the growth in vehicle activity and the use of more intensive transportation modes to move people and goods (e.g. the increased use of minivans and sport utility vehicles [SUVs] and the increased amount of freight shipped by truck).

GHG emissions from the transportation sector increased by 22 percent from 1990 to 2002, consistent with the increase in energy use. The change in GHG intensity of transportation energy use was negligible because the fuel mix continues to be based almost entirely on fossil fuels.

The transportation sector consists of three sub-sectors: passenger, freight and off-road. The passenger sub-sector comprises three modes (road, rail and air), and the freight sub-sector comprises four modes (road, rail, air and marine). Road transport uses the most energy, accounting for more than 78 percent of total transportation energy use. Of this, over 60 percent is for passenger transportation and the remainder is for freight transportation.

Figure 17 illustrates an improvement in trucking energy intensity despite an increase in average activity over 1990 to 2002. Improved fleet practices, caused by an increase in transportation sector competitiveness and the introduction of electronic engines, have significantly improved engine fuel efficiency in medium- and heavy-duty trucks.

Promoting Energy Efficiency

Opportunities to improve the energy efficiency of road transport include manufacturing vehicles that are more fuel efficient, encouraging private and commercial owners to purchase such vehicles and promoting driving and maintenance practices that save fuel. In addition, there are opportunities for passenger and freight users to employ more energy-efficient modes of transportation.

The Office of Energy Efficiency (OEE) works to improve the efficiency of fuel use in road transport. Its approach is to

- improve the energy efficiency of the vehicle stock offered to and purchased by consumers and fleet owners; and
- influence driver behaviour, vehicle maintenance practices and fleet management.

The OEE also promotes the development and use of alternative transportation fuels, seeking ways to reduce GHG emissions in the transportation sector through such energy sources as natural gas, ethanol, bio-diesel and fuel cells.

Selected Progress Indicators in Transportation

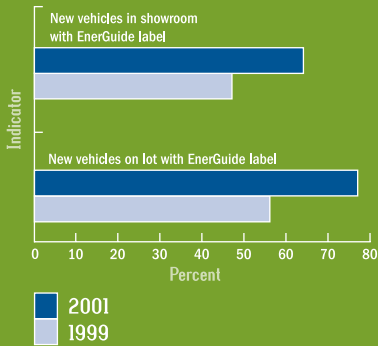
- The Motor Vehicle Fuel Efficiency Initiative aims at improving the fuel efficiency of new light-duty vehicles sold in Canada. The indicator currently used to measure annual progress is new vehicle fuel consumption, expressed in litres per 100 kilometres (L/100 km).

Currently, Canada has a voluntary system of fuel consumption standards for each manufacturer, known as company average fuel consumption (CAFC). These standards – 8.6 L/100 km for passenger cars and 11.4 L/100 km for light trucks – are consistent with the regulatory standards in the United States. In 2003, passenger cars were, on average, 12 percent below the standards at 7.6 L/100 km, and light trucks were 6 percent below the standard at 10.7 L/100 km (see Figure 18 on page 24).

- While fuel consumption remained fairly flat between 1990 and 2003, new vehicles changed significantly due to technological advances. There was a marked increase in power in the average vehicle sold in Canada over this period and an increase in vehicle weight due, in part, to a market shift towards light trucks from passenger cars. While incremental improvements to vehicles continued, they were devoted primarily to increasing the vehicles' power and weight and not specifically to reducing fuel consumption (see Figure 19 on page 24). While the market share of new passenger cars and light trucks sold in Canada has stabilized at approximately 55 percent and 45 percent respectively, the trend of increasing average horsepower continues.

Figure 20

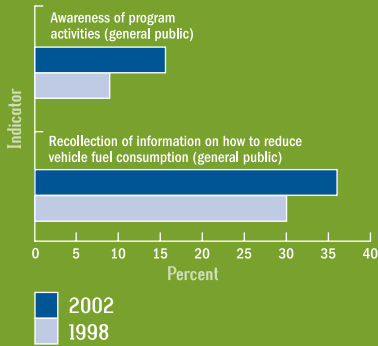
Vehicle Fuel Efficiency Awareness – EnerGuide Labels



- For personal vehicles, the Transportation Program aims at improving the energy efficiency practices of private motorists by influencing car purchase decisions, on-road driving practices and vehicle maintenance practices through the use of driver information. Figures 20 and 21 illustrate the awareness levels of Canadians with respect to Transportation Program activities. In fiscal year 2003–2004, a tire inflation campaign entitled “Be Tire Smart” was developed and launched. Idle-Free Awareness campaigns were completed in Calgary, Edmonton, the Greater Toronto Area, Caledon (in Ontario), Ottawa, Sherbrooke (in Quebec) and Québec City. (Visit the Web site at oee.nrcan.gc.ca/idling/.)

Figure 21

Vehicle Fuel Efficiency Awareness – AutoSmart



- For fleet vehicles, the Transportation Program is aimed at improving the fuel efficiency and use of alternative fuels in commercially and publicly managed vehicle fleets. In fiscal year 2003–2004, the Commercial Transportation Energy Efficiency Rebate (CTEER) initiative was launched. CTEER provided over \$850,000 in incentives to certified idling-reduction technology purchasers. As well, the SmartDriver initiative trained more than 160 000 new and experienced commercial drivers and introduced over 700 new instructors to the SmartDriver materials. Over the same period, SmartDriver for Transit was launched. And 57 truck stop sites across Canada participated in the second annual Idle-Free Quiet Zone campaign, an education and awareness campaign on unnecessary idling at truck stops.

The OEE’s Transportation Program

The vehicle efficiency component of the OEE’s Transportation Program is seeking to develop a voluntary agreement with vehicle manufacturers who sell vehicles in Canada, aimed at a 25 percent improvement in vehicle fuel efficiency by 2010. In 2003, new vehicles sold in Canada (both passenger cars and light trucks) had improved fuel

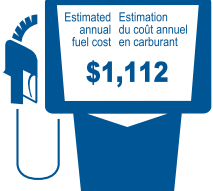
efficiency by 9 percent; this represents one third of the progress required to meet the 25 percent target. The Government of Canada has been discussing options for a voluntary agreement with manufacturers to improve efficiency, as these arrangements are generally more flexible than regulations. Once an agreement is reached, the Government of Canada will continue to work with manufacturers to prepare the Canadian market to receive the most appropriate fuel-efficient technologies and vehicles to meet this target. For more information, visit the Web site at oee.nrcan.gc.ca/transportation/fuels/motorvehicles.cfm.

For personal vehicles, information and tools have been developed to encourage motorists to buy, drive and maintain their vehicles in ways that reduce fuel consumption, save money and help protect the environment. In addition, under a voluntary agreement, manufacturers affix an EnerGuide label to new cars, vans and light-duty trucks sold in Canada. The label indicates the vehicle's fuel consumption rating and estimated annual fuel costs to help consumers select the most fuel-efficient vehicle that meets their everyday needs. For more information, visit the Web site at vehicles.gc.ca.

The OEE's activities regarding fleet vehicles provide private-sector fleet managers with information, workshops, technical demonstrations and training programs on fuel-efficient practices for fleet vehicles. For more information, visit the Web site at fleetsmart.nrcan.gc.ca.

The OEE's work in alternative transportation fuels promotes the development and use of alternative and future fuels in Canada. Information on conventional and alternative fuels is disseminated through reports, brochures and public events. Information on economic impacts, GHG emissions and general technical aspects are shared with the public and private sectors. The OEE forms partnerships with industry, research and other organizations in transportation, industry and energy. Such partnerships allow the OEE to follow and promote new developments on alternative transportation fuels, including further improvements in environmental and economic performance. Alternative transportation fuels include propane, natural gas, alcohols, electricity and hydrogen; conventional fuels include gasoline and diesel. For more information, consult the Web site at oee.nrcan.gc.ca/vehiculfuels.

ENERGUIDE Ask your dealer for the **FUEL CONSUMPTION GUIDE** or call 1-800-387-2000.

CITY / VILLE		HIGHWAY / ROUTE
10.1 / 28		6.1 / 46
L/100 km mi/gal		L/100 km mi/gal

Estimated annual fuel cost: **\$1,112**

Estimated annual fuel cost in French: **\$1,112**

These estimates are based on the Government of Canada's approved criteria and testing methods. The actual fuel consumption of this vehicle may vary. Refer to the **Fuel Consumption Guide**.

Données obtenues selon les critères et méthodes d'essais approuvés par le gouvernement du Canada. La consommation réelle de carburant de ce véhicule peut varier. Consultez le **Guide de consommation de carburant**.

Canada

Demandez le GUIDE DE CONSOMMATION DE CARBURANT à votre concessionnaire ou composez le 1 800 387-2000.

Figure 22

GHG Emissions Reductions From Federal Operations, 1990–1991 to 2010–2011

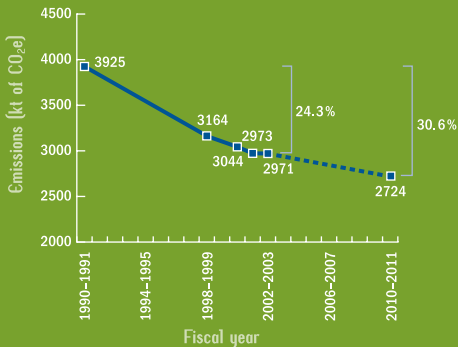
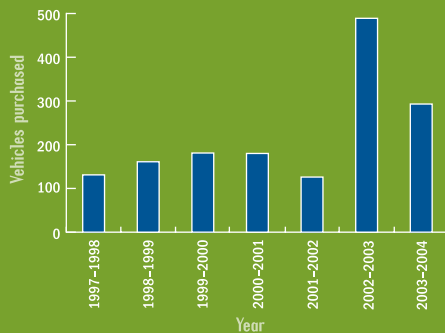


Figure 23

Purchases of Alternative Fuel Vehicles for the Federal Fleet, 1997–1998 to 2003–2004



Measures for Alternative Transportation Fuels

- **Ethanol Expansion** – Co-managed with Agriculture and Agri-Food Canada, this new \$100-million initiative encourages fuel ethanol production and use in Canada. In 2003–2004, contributions were allocated to seven projects across Canada that plan to increase domestic ethanol production by a total of 750 million litres per year.
- **Future Fuels Initiative** – Co-managed with Agriculture and Agri-Food Canada, this initiative aims to increase the supply and use of fuel ethanol produced from biomass, such as plant fibre, corn, wheat and other grains. In March 2004, a national ethanol awareness survey was completed; results indicated that 85 percent of Canadians are in favour of increased ethanol-blended gasoline use in Canada (Ipsos-Reid).
- **Canadian Transportation Fuel Cell Alliance (CTFCA)** – a private-public partnership co-managed by NRCan’s OEE and CANMET Energy Technology Centre (CETC). The CTFCA encourages advancements in hydrogen and fuel cell technologies through demonstration projects. During 2003–2004, several studies were completed on the assessment and evaluation of hydrogen-fuelling pathways.
- **Biodiesel Initiative** – a \$11.9-million initiative led by CETC and supported by the OEE. The initiative supports the Government of Canada’s proposed target of 500 million litres of biodiesel production per year by 2010. A biofuels quality registry was established with the Alberta Research Council to set an industry protocol and standard for fuel analysis.

Government Operations

The Government of Canada is committed to “getting its own house in order” by setting a target of 31 percent reduction in greenhouse gas (GHG) emissions from its own operations by 2010.

Since 1990, through building retrofits, better fleet management, strategic “green power” purchases and the downsizing of operations, the Government of Canada has already achieved a 24 percent emissions reduction (see Figure 22 on page 28).

The Office of Energy Efficiency (OEE) has played and will continue to play an important role in helping to achieve this reduction by providing programs targeted to improving the efficiency of energy use in government operations. The OEE’s goal is to assist Government of Canada organizations to implement energy efficiency improvements, leading to reduced energy use, GHG emissions and operating costs. It offers two initiatives in this area – one for federal buildings and one for federal vehicles.

The OEE also contributed to the development and implementation of the Federal House in Order initiative. This initiative formally centralizes the Government of Canada’s efforts to monitor, track and reduce its own GHG emissions. For more information, see the Federal House in Order Web site at www.fhio.gc.ca.

The Federal Buildings Initiative (FBI) is a voluntary initiative that helps Government of Canada departments and agencies improve the energy efficiency of their facilities. It provides them with a model framework for updating their facilities with energy-saving technologies and practices. FBI energy management service contracts with private-sector energy management firms have financed energy efficiency improvements in more than 7500 Government of Canada buildings, resulting in \$240 million of private sector investment and \$33 million in annual energy savings and approximately 200 kilotonnes of GHG emissions reductions. The energy intensity improvement has averaged more than 20 percent per project undertaken. The initiative’s approach is being replicated by some provinces and municipalities in Canada. For more information, visit the Web site at oee.nrcan.gc.ca/fbi.

The Federal Vehicles Initiative assists Government of Canada departments and agencies to reduce operating costs by increasing the energy efficiency of their motor vehicle fleets and making greater use of alternative transportation fuels (see Figure 23 on page 28). This initiative provides federal fleet managers with information and tools to improve the operational efficiency of their fleets and increase their use of alternative fuels. In 2003–2004, the Government of Canada acquired 377 “leadership vehicles,” of which 293 were alternative fuel vehicles, in compliance with the *Alternative Fuels Act* (see Figure 23 on page 28). For more information, visit the Web site at oee.nrcan.gc.ca/greening.

Government Operations Initiatives

Federal Buildings Initiative – The FBI provides project facilitation, planning advice and contracting help to secure energy management services for projects in federal facilities.

Federal Vehicles Initiative (FVI) – The FVI promotes life-cycle costing, best-in-class vehicle identification and greater use of alternative fuels. It also supports increased penetration of ethanol-blended fuels in the federal fleet.

Federal House in Order (FHIO) – The OEE, together with Environment Canada and Public Works and Government Services Canada, plays an important role in helping departments meet the Government of Canada’s GHG emissions reduction target.

- Eleven key departments are responsible for 95 percent of Government of Canada GHG emissions. They have been assigned specific targets and must report annually on their progress. The task of target sharing entails assigning specific targets to these departments based on the emissions reduction opportunities identified within each organization.
- The FHIO’s Leadership Challenge component, led by Environment Canada, encourages all Government of Canada departments and agencies to participate in emissions reduction efforts by engaging the active participation of the departments, agencies and Crown corporations that were not designated with a target.

Outreach and One-Tonne Challenge

In addition to delivering sector-specific programs, the Office of Energy Efficiency (OEE) manages measures that pertain to all energy-using sectors of the economy:

- The OEE's Outreach Program provides information and activities to encourage Canadians to integrate energy efficiency into their energy-use decisions. Outreach supplements program communications activities with publications, exhibits, joint projects and the OEE Web site.
- The One-Tonne Challenge was launched in March 2004 and is co-managed with Environment Canada, with input from and coordination with other departments, such as Transport Canada. Canadians are challenged to use less energy, reduce waste and conserve water and other resources. Reduced emissions will protect the climate and result in cleaner air and healthier communities for all Canadians. For more information, visit the Web site at www.climatechange.gc.ca/onetonne.
- Public information activities increase awareness of the environmental impact of energy use. They also encourage consumers to adopt energy-efficient practices and to switch to alternative forms of energy. Numerous publications are available on-line at oee.nrcan.gc.ca.

The OEE's work in youth and education seeks to create a greater awareness of climate change and the need for energy efficiency among young Canadians. The kindergarten to Grade 12 stream builds around the annual *Energy and the Environment* calendar, which is produced in cooperation with stakeholders and the education community. At the post-secondary level, the OEE's Outreach Program builds links using such tools as its Energy Ambassadors competition. For more information, visit the Web sites at oee.nrcan.gc.ca/calendarclub and oee.nrcan.gc.ca/corporate/awards/ambassadors/index.cfm.

Selected Progress Indicators

- Each year the OEE distributes about 2 million copies of more than 300 energy efficiency and alternative energy publications to individuals and program partners. More than 75 percent of these publications are available on-line.
- In 2003–2004, the 30 percent increase in the volume of publications distributed and 300 percent increase in Web site visits indicated increasing interest in energy efficiency.
- Since the launch of the One-Tonne Challenge, over 10 000 Canadians have pledged on-line to take the One-Tonne Challenge. Additionally, there have been more than 500 000 Web site visits and publications distributed.



