



Federal House in Order
Annual Report on Emissions Reductions
From Federal Operations



O c t o b e r 2 0 0 4



Government
of Canada

Gouvernement
du Canada

Canada 

Federal House in Order
Annual Report on Emissions Reductions From Federal Operations

Published by the authority of the Minister of Natural Resources
Government of Canada

Cat. No. M141-9/2004

ISBN 0-662-68799-X

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Message from the Ministers

The global challenge of climate change has become, now more than ever, a national priority for Canadians. In February 2005, the Kyoto Protocol came into effect, and the Government of Canada introduced a number of climate change measures in its budget. In April, the Government launched the first element of Project Green by releasing a plan honouring our Kyoto commitment and a healthy environment and a competitive economy.

The Government of Canada is committed to leading the way in reducing greenhouse gas (GHG) emissions through the Federal House in Order (FHIO) initiative, led jointly by our departments — Natural Resources Canada, Environment Canada and Public Works and Government Services Canada.

Under this initiative, 11 departments that together account for approximately 95 percent of total federal GHG emissions are working toward reducing these emissions to 31 percent below 1990 levels. Other departments and agencies have also volunteered to track and report on their own emissions through the FHIO Leadership Challenge.

The Government of Canada has accomplished much in recent years, and we will build on these achievements by ensuring that our internal operations are among the greenest in the world.

As mentioned above, the Government of Canada recently released an updated plan to address climate change. *Moving Forward on Climate Change: A Plan for Honouring our Kyoto Commitments* highlights that the Government of Canada will ensure that new government office buildings will meet Leadership in Energy and Environmental Design (LEED) Gold Standards. In addition, the Government of Canada has committed to modernize its office inventory using new innovative means.

We are committed to continuing to build all our new facilities to be 25 percent more energy efficient than the existing Model National Energy Code for Buildings. We will also retrofit a further 20 percent of our commercial buildings by 2010 to improve energy efficiency.

In addition, we will continue to pursue energy efficiency improvements under the Federal Buildings Initiative. To date, 7,500 federal buildings, about 35 percent of the federal building stock, have been addressed — resulting in \$240 million in private sector investment, \$33 million in annual energy savings and reduced GHG emissions by 20 percent on average.

As an organization that spends more than \$13 billion a year on goods and services, the Government of Canada will use this purchasing power to demonstrate leadership in climate change action. To that end, we will implement a new Green Procurement Policy to govern our purchases by 2006.

We will also take a series of measures to ensure that our fleet of vehicles is among the greenest in the country. This will include replacing vehicles more quickly, choosing more efficient models, and adopting more stringent user practices such as anti-idling and vehicle sharing.

Last December, we announced that our vehicle fleet would be the first in the world to use cellulose ethanol on an ongoing basis. We also plan to significantly increase the purchase of hybrid vehicles and vehicles that operate on E85 and other alternative fuels. By demonstrating the environmental and economic effectiveness of these measures, we are challenging other government and commercial fleets to follow suit.

Message from the Ministers (cont'd.)

Our quality of life today, and the legacy we leave to future generations, demands fundamental change in the way we think about the environment. As the Ministers responsible for the FHIO initiative, we are proud to report on its ongoing success, and to provide an example for all Canadians — encouraging each of us to put our house in order.



A handwritten signature in cursive script that reads "John McCallum".

The Honourable John McCallum
Minister of National Revenue and
Acting Minister of Natural Resources



A handwritten signature in cursive script that reads "Stéphane Dion".

The Honourable Stéphane Dion
Minister of the Environment



A handwritten signature in cursive script that reads "Scott Brison".

The Honourable Scott Brison
Minister of Public Works and
Government Services Canada



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Executive Summary

The Government of Canada is taking action to address climate change and is demonstrating leadership by reducing greenhouse gas (GHG) emissions within its own operations. The Federal House in Order (FHIO) initiative formally centralizes the Government of Canada's efforts to monitor, track and reduce its own emissions. Supported by lead departments Environment Canada, Natural Resources Canada and Public Works and Government Services Canada, the initiative specifically targets 11 departments and agencies that together account for an estimated 95 percent of all Government of Canada emissions.

This *Annual Report on Emissions Reductions From Federal Operations* is under the FHIO initiative and meets the Government of Canada's commitment to report annually on its progress in reducing GHG emissions. Under the initiative, emissions data reported by federal departments are centralized in a federal GHG inventory. The resulting information was used in the April 2001 report to announce a revised Government of Canada target. This report goes beyond target setting and updates the Government of Canada's progress toward reducing its own GHG emissions by providing current emissions data for 2002.

Highlights include the following:

- The *Government of Canada Action Plan 2000 on Climate Change* announced a revised target of a reduction of 31 (30.6) percent from 1990 levels by the year 2010. The Government of Canada is well on its way to achieving this target, having reduced GHG emissions from its operations by 24 (24.4) percent between 1990 and 2002.
- In 2002, about 81 percent of emissions came from facilities (i.e. buildings), 15 percent came from vehicle fleets, and 4 percent came from non-energy sources.
- Since 1998, the Government of Canada has reduced its emissions from buildings by 119 kilotonnes of carbon dioxide equivalent and emissions from its on-road fleet by 9 kilotonnes of carbon dioxide equivalent.

For further information on the FHIO initiative, visit the Web site at www.fhio.gc.ca.



Study Context

1.1 Background

GHG emissions contribute to global climate change. These emissions are a product of the combustion of fossil fuels, such as coal, oil and natural gas, and their concentrations in the earth's atmosphere are increasing. In partnership with other levels of government, industry and energy consumers, the Government of Canada is working to limit these emissions.

In 1992, Canada ratified the United Nations Framework Convention on Climate Change (UNFCCC). In 1995, federal, provincial and territorial energy and environment ministers approved the National Action Program on Climate Change to demonstrate leadership in reducing GHG emissions by "getting their own houses in order." By reducing emissions from their own operations, participants sought to encourage other sectors of the economy to do the same.

Accordingly, the Government of Canada registered its action plan with Canada's Climate Change Voluntary Challenge and Registry Inc. (VCR Inc.) in 1995, stating its commitment to reduce GHG emissions from federal operations by at least 20 percent from 1990 levels by the year 2005. This target has since been revised under the FHIO initiative to 31 percent below 1990 levels by 2010.

In December 1997, more than 160 nations attending the third UNFCCC Conference of the Parties negotiated the Kyoto Protocol. In the fall of 2002, the Government of Canada ratified the Kyoto Protocol, agreeing to reduce Canada's GHG emissions to 6 percent below 1990 levels between 2008 and 2012.

1.2 The Federal House in Order Initiative

In 2001, the Government of Canada launched the FHIO initiative, with Environment Canada and Natural Resources Canada as co-lead departments. In 2002, Public Works and Government Services Canada joined as a third lead department for the initiative. This initiative recognizes that the Government of Canada's operations produce GHG emissions and as a result must meet their share of the responsibility for honouring Canada's Kyoto commitment. Through the FHIO initiative, the Government of Canada will demonstrate that it is taking a leadership role in getting its own "house in order." Reducing its own emissions may ultimately encourage others to do their part in addressing the climate change issue.

Through the FHIO initiative, the Government of Canada developed a target for reducing GHG emissions within its own operations. This target, along with a strengthened and formal reporting system to track and monitor federal emissions, was announced in the *Government of Canada Action Plan 2000 on Climate Change*. Emissions data under the FHIO initiative are based on data quantified and provided by participating departments and agencies and are tracked through a central GHG inventory. This approach promotes consistent, reliable annual reporting.

The *Annual Report on Emissions Reductions From Federal Operations* (ERFO) is the FHIO initiative's annual report. Its objective is to report on the Government of Canada's progress toward achieving its emissions reduction target.

Setting Emissions-Reporting Boundaries

Setting and defining boundaries for collecting GHG emissions data for the federal GHG inventory promotes the collection of consistent and reliable data. These boundaries recognize the challenges and current limitations to collecting data across federal departments and agencies, and they serve to clearly identify the scope of emissions included in the inventory. The scope of emissions included in the inventory is expected to increase as data infrastructure improves across the Government of Canada.

The following identifies the GHG inventory boundaries for emissions sources and types of GHG emissions.

2.1 Participating Departments

Eleven departments and agencies report data to the FHIO initiative's GHG inventory. They have been identified as the largest emitters of GHG emissions within the federal government. Through the FHIO initiative's Leadership Challenge, other departments, agencies and Crown corporations are being recruited to participate.

Table 1. Federal Departments Reporting to the FHIO Initiative's GHG Inventory

Agriculture and Agri-Food Canada
Correctional Service Canada
Department of National Defence
Environment Canada
Fisheries and Oceans Canada
National Research Council Canada
Natural Resources Canada
Parks Canada Agency
Public Works and Government Services Canada
Royal Canadian Mounted Police
Transport Canada

2.2 Emissions Sources

The most significant source of GHG emissions from federal activities comes from the combustion of fossil fuels. The combustion of fossil fuels – whether direct (consumed at source) or indirect (consumed upstream, such as in the generation of electricity) – results in GHG emissions attributed to a variety of gases. Increasing concentrations of GHGs in the atmosphere contribute to climate change. The FHIO initiative collects data on the three most prevalent GHGs: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).

Non-energy sources, such as landfills and agricultural operations, also emit GHGs. Currently, the amount of GHG emissions from non-energy sources is an estimate. A methodology to account for these emissions will be included in future reports. The Government of Canada as an organization emits GHGs primarily from federal facilities and vehicle fleets. These sources are now captured in the federal GHG inventory.

■ 2.2.1 FACILITIES

“Facilities” refers mainly to building infrastructure such as office buildings, laboratories and warehouses. The main criterion for including facilities in the GHG inventory is custodial responsibility for the building. Emissions data are collected only for those facilities for which the Government of Canada has custodial responsibility and therefore direct control and influence over curbing future emissions.

■ 2.2.2 FLEETS

Fleet emissions sources encompass the on- and off-road federal fleets. The on-road fleet includes a variety of cars, vans, trucks and other vehicles that the Government of Canada owns/leases and operates for on-road travel. The off-road fleet includes a wide variety of vehicles and equipment used in federal operations. Within the off-road category is a marine fleet, which includes the boats and ships owned by the Government of Canada. Aircraft are also included in the off-road category, as are field equipment such as all-terrain vehicles, lawn mowers and generators.

2.3 Emissions Sources Outside the Scope of the FHIO Initiative

The FHIO initiative's GHG inventory tries to include all sources of GHG emissions from the Government of Canada's operations. However, a few sources currently fall outside the scope of the inventory. Efforts are being made to broaden the scope to include the following emissions sources.

Non-Participating Organizations

Not all federal departments and agencies are included in the inventory. The 11 organizations (see Table 1 on page 4) that are now reporting data to the FHIO initiative's GHG inventory represent about 95 percent of the Government of Canada's emissions. The remaining departments and agencies are actively being recruited through the Leadership Challenge. An update on the activities of the Leadership Challenge can be found in Chapter 6.

Crown Corporations

Although Crown corporations are not included in the FHIO initiative's GHG inventory, several have launched their own reduction strategies. For example, Atomic Energy of Canada Limited, Canada Post Corporation, Petro-Canada and VIA Rail Canada, Inc. have each developed their own action plans. Given the relationship between the Government of Canada and Crown corporations, there is great interest in eventually expanding the data collection for the inventory to include emissions from those corporations.

National Safety and Security Sources

National Safety and Security (NSS) activities such as search and rescue and operation of military vehicles are excluded from the inventory because of their important role in ensuring the safety and security of Canadians. These emissions are

exempt from the federal emissions tracking and target-setting exercise so as to not impair the Government of Canada's role in providing these services. They will also be exempt until emissions from these sources are addressed through international protocols. Departments identifying NSS emissions have been asked to track them independently and to make their best efforts to reduce them.

Outside Emissions

Other related emissions that are a consequence of the activities of the Government of Canada are not reported in the inventory. These are often referred to as "outside" emissions. They include GHG emissions resulting from employee commuting, business travel, the movement of goods, and government activities that are outsourced. Some initial scoping has been done on the impact of outside emissions. This work may be integrated into future ERFO reports if it is at a stage where a related reporting protocol and an infrastructure have been developed to allow for the annual collection of emissions data.

Nevertheless, activities are underway to reduce such emissions under the FHIO's Leadership Challenge (see Section 6.2). For example, a transit pass pilot has been launched in the National Capital Region. Through payroll deductions, federal employees in four pilot departments can purchase an annual public transit pass at a reduced rate. This reduces GHG emissions by encouraging employees to leave their cars at home and use public transportation. The Government of Canada is currently exploring options to expand this program within the National Capital Region and nationally.

2.4 Divestiture

The intent of the FHIO initiative is to reduce GHG emissions. This will be done by investing in emerging renewable resources (e.g. wind-generated power), switching to cleaner fuels and replacing old technologies with newer, more efficient ones, such as energy-efficient boilers. The Government of Canada will not take credit for emissions reductions if facilities are sold and their emissions are divested to other sectors of the economy. Credit can be given only if a building is decommissioned through downsizing. Any emissions associated with the divesting of assets since 1998 will be taken out of the Government of Canada baseline to ensure that they are not being included in the Government of Canada's emissions reductions to date.

2.5 Emissions Types

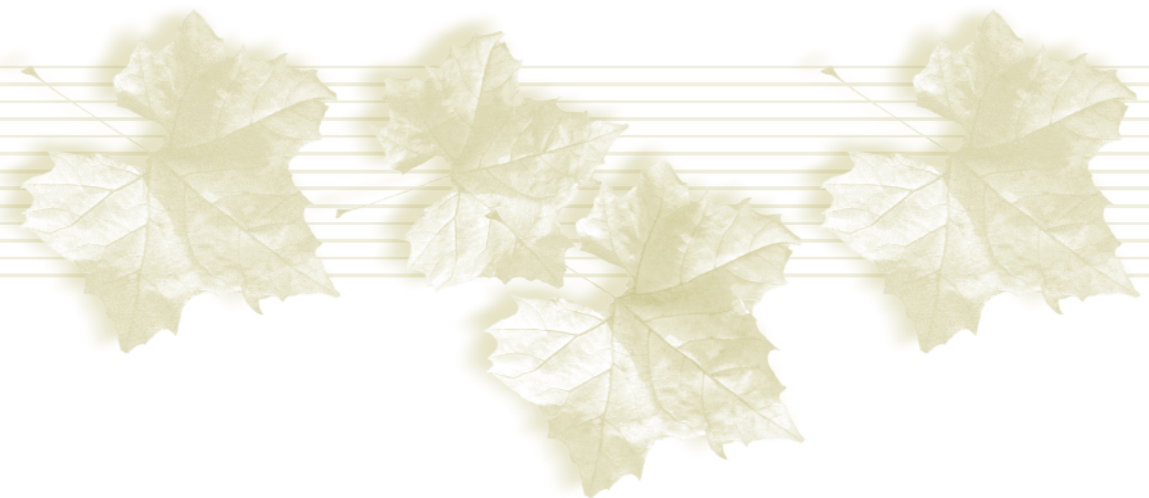
The data collected in the GHG inventory encompass direct, indirect and non-energy GHG emissions. Direct emissions are a result of the combustion of fossil fuels by the federal fleet and facilities. Indirect emissions result from the purchase and use of electricity and steam, primarily for facilities. Non-energy emissions from landfills and agricultural operations are also accounted for in the GHG inventory. However, their quantification is based on a scoping study, and the annual collection of this data is not yet feasible. A process is being developed to start collecting this data annually for the GHG inventory.

2.6 Greenhouse Gases

In this report, the federal GHG footprint is described in terms of total CO₂ equivalent (CO₂e). CO₂e is an aggregate GHG emissions unit composed of a global warming potential (GWP) weighted value for CO₂, CH₄ and N₂O (see Table 2). A summary of the 2002 GHG emissions by gas type is available in Appendices A and B.

Table 2. Greenhouse Gases and Their Global Warming Potential

Greenhouse Gas	GWP
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous oxide (N ₂ O)	310



Estimating GHG Emissions

The method for estimating the Government of Canada's GHG emissions has evolved over the years. The first versions of this report were based on a combination of departmental reports and estimates derived from a modelling exercise. The launching of the FHIO initiative led to a major shift in methodology toward the collection of energy consumption data from departments. The energy consumption data are the basis for producing estimates of GHG emissions.

The FHIO initiative's methodology for producing GHG emissions estimates continues to evolve over time, in compliance with VCR Inc.¹ and the Greenhouse Gas Protocol² reporting standards identified by the World Resources Institute.

The following general steps are taken to produce GHG emissions estimates for the Government of Canada.

3.1 Step 1 – Data Collection

Departments are responsible for their annual data collection and reporting to the FHIO initiative's GHG inventory. Annual data collection is aided by the GHG inventory's data collection tools (see Appendix C). The departments report energy consumption by fuel type for facilities and fleets. Non-energy-related emissions data are not yet reported to the inventory. However, this is now being addressed, and a non-energy data collection tool is in development.

The data collection tools available to the departments calculate GHGs based on the amount of fuel used over the course of one fiscal year (April to March). Each department submits aggregated data to the FHIO initiative's GHG inventory for all of their facilities and fleets located across the country.

Departments are constantly developing their data collection systems and incorporating these into their real property management, environmental management and financial systems. These efforts are resulting in more timely and accurate data.

3.2 Step 2 – Data Validation

The staff who manage and administer the GHG inventory validate departmental data in relation to what has been reported in the past, identifying anomalies in the data and contacting departments for further explanation or correction of reported data when necessary. Data are also compared with related reporting activities in the Government of Canada by outside experts in federal fleet and building emissions.

3.3 Step 3 – Emissions Calculations

Estimating the emissions for the Government of Canada involves applying GHG conversion factors to the fuel consumption reported by federal departments to the FHIO initiative's GHG inventory. GHG conversion factors exist for the various fuel types in the market. Appendix D identifies the GHG conversion factors used by the FHIO initiative.

The GHG inventory collects fuel use by fuel type. Therefore, calculating associated GHG emissions involves applying the appropriate conversion factor to each fuel type. This process is automated in the inventory's data collection tools. When information on fuel use is reported, the resulting emissions are calculated in the reporting tool for the department.

¹ The VCR Inc.'s reporting guidelines can be viewed on its Web site at www.ghgregistries.ca.

² The Greenhouse Gas Protocol can be viewed on the World Resources Institute's Web site at climate.wri.org.

Setting a Federal Target

This section identifies the federal target and details the process for establishing a federal emissions-reduction target. This includes aspects of the baseline data and the process for compiling emissions data for the two important reference time frames for the target-setting process in the Kyoto Protocol. Essentially, this involved establishing emissions levels for 1990 and 2010, given that the Protocol requires emissions to be below 1990 levels between 2008 and 2012.

The following steps were followed to establish a new federal emissions target.

4.1 Step 1 – Establishing and Revising Baseline Data for 1998

Baseline data are the basis for all federal emissions and emissions-target calculations. Any change to the baseline data set will ultimately affect all subsequent data. The first year of data collection reported to the GHG inventory under the FHIO initiative was 1998. It is therefore the baseline year. That year, the Government of Canada's emissions were 3102 kilotonnes (kt) of CO₂e.

The quality of the data that departments collect is always improving. By investing in better data collection systems, some departments have been able to resubmit past data to the FHIO initiative's GHG inventory. Other scenarios require corrections to baseline data, as more accurate accounting methodologies have identified assets not previously included in the inventory. GHG emissions associated with divestiture also affect historical data. Therefore, there is a need to adjust the baseline on an ongoing basis.

Due to an improved data infrastructure, this report is the second of the annual reports to change the 1998 baseline; future reports will incorporate baseline changes as required. The new baseline for 1998 is 3164 kt of CO₂e. This represents a 62-kt change from the baseline reported in the 2002 ERFO report. Due to the change in baseline, GHG emissions in 1990 and those estimated for 2010 had to be recalculated. The remaining steps explain how this was done.

4.2 Step 2 – Backcast to the 1990 Reference Year

Under the Kyoto Protocol, 1990 is the reference year with which all subsequent emissions levels are compared. Similarly, this is the reference year for the FHIO initiative, for referencing the Government of Canada's GHG emissions target, and for reporting progress toward reaching that target.

Because the quantifiable data needed to establish the 1990 reference year were not available from all departments, the 1990 reference was backcast from the 1998 baseline year. Information on Government of Canada downsizing, energy intensity improvements and fuel switching between 1990 and 1998, and reported information in previous ERFO submissions, were used to backcast a 1990 emissions level for the Government of Canada. As a result, federal emissions were estimated at 3925 kt of CO₂e in 1990.

4.3 Step 3 – Forecasting Emissions Levels in 2010

The time frame for attaining the Kyoto Protocol target levels is between 2008 and 2012. Departments projected their emissions levels to 2010, the midpoint for this target reference time frame, under a business-as-usual scenario in which no new actions are taken to reduce emissions.

Projected emissions estimates are based on planned growth in floor space that departments and agencies reported in their capital plans. It is assumed that, between 1998 and 2010, new buildings will be constructed by following current building practices and maintaining current performance levels. For the building stock existing in 1998, it is assumed that the efficiencies will remain largely unchanged in the absence of measures through the FHIO initiative. It is also assumed that GHG emissions from vehicle fleets will remain relatively constant in the absence of Government of Canada measures.

Cumulatively, the Government of Canada's emissions are estimated to increase by 2 percent between 1998 and 2010 under a business-as-usual scenario. Federal emissions would therefore reach 3246 kt of CO₂e by 2010 if no actions to reduce emissions were taken. The business-as-usual forecast becomes the basis for calculating an emissions target, as the identified emissions-reduction potential is subtracted from this base case.

4.4 Step 4 – Calculating an Emissions Target for 2010

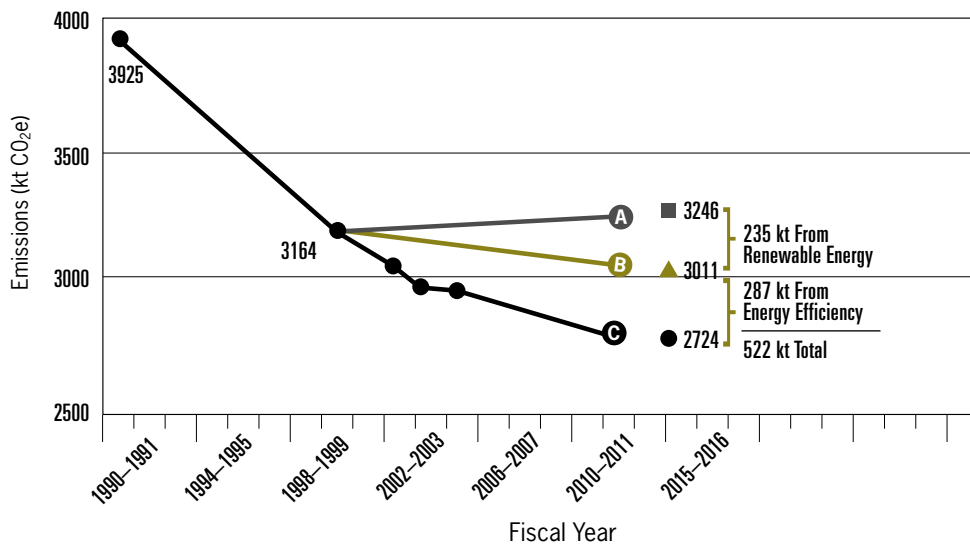
Departments assessed a variety of cost-effective measures to improve energy efficiency and emissions levels in their respective organizations between 1998 and 2010.

In addition, the Government of Canada is proposing to reduce emissions by using renewable energy from proposed renewable energy projects.

The emissions reductions to be achieved through departmental energy efficiency measures and the use of energy from renewable resources were subtracted from the business-as-usual scenario emissions value of 3246 kt CO₂e (see Figure 1, line A). It was estimated that emissions would be reduced by 235 kt by implementing renewable energy projects (see Figure 1, line B). The remainder of the estimated emissions reduction will be 287 kt.³ This will be achieved collectively through departments' individual energy management plans and emissions-reduction activities (see Figure 1, line C). In total, the Government of Canada estimates that it will reduce its emissions by 522 kt from the 2010 business-as-usual scenario.

Emissions for the Government of Canada are projected at 2724 kt of CO₂e in 2010, given the planned emissions reduction of 522 kt from the 2010 business-as-usual scenario (3246 kt). The federal target is therefore to reduce GHG emissions by 31 (30.6) percent from 1990 levels.

Figure 1. The Government of Canada's GHG Emissions Reduction Target for 2010



³The original Federal House in Order target called for a 275-kt reduction from energy efficiency measures. However, due to the improvements in baseline data (see Section 4.1), the reduction amount has changed to 287 kt in order to meet the 31 percent reduction target.

Progress Toward Achieving the Federal Target

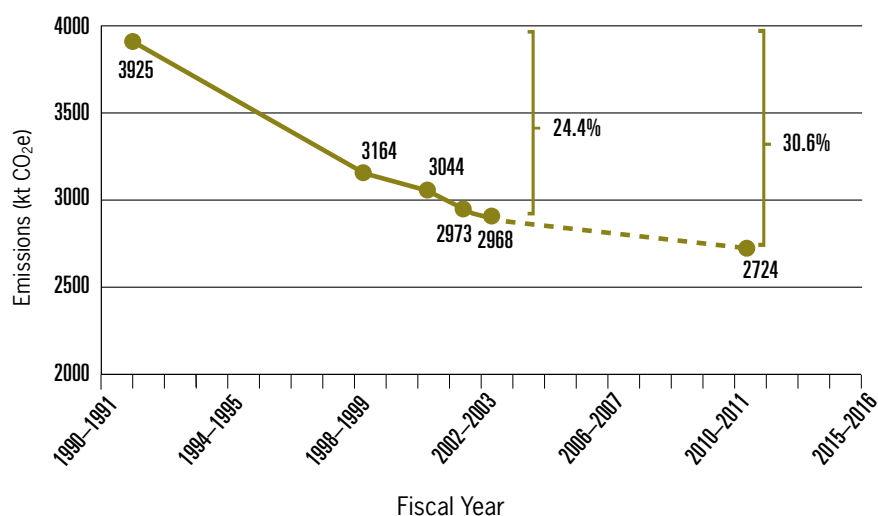
The main objective of this ERFO document is to report on the Government of Canada's progress toward achieving its FHIO target. This chapter profiles the characteristics of the most recent year's data collection and outlines progress based on the 2002 emissions data. It also provides, where possible, an explanation of the federal emissions situation.

5.1 Profile of 2002 Inventory*

Overall, federal emissions declined 24.4 percent, from 3925 kt to 2968 kt of CO₂e, between 1990 and 2002 (see Figure 2). As a result, the Government of Canada is required to reduce emissions an additional 6.2 percent between 2002 and 2010 to achieve its reduction target of 31 (30.6) percent.

Figure 3 on page 11 shows the reduction in GHG emissions between 1990 and 2002 by source for the 11 federal departments and agencies listed in Table 1 on page 4. Emissions declined 761 kt, or about 19.4 percent, from 1990 to 1998. Emissions were further reduced by 195 kt between 1998 and 2002, representing an additional 5 percent reduction relative to 1990 emissions levels.

Figure 2. The Government of Canada's GHG Emissions Reductions, 2002–2003



*Note: Because of rounding, the numbers in this section may not add up and may show slight variations.

In 2002, about 81 percent (2417 kt) of the GHG emissions were associated with buildings, 15 percent with the federal on- and off-road fleets (452 kt), and 4 percent (100 kt) with non-energy sources.

Overall, the Government of Canada's emissions reductions between 1998 and 2002 were achieved by reducing energy use and by switching to fuels that were less GHG intensive. As Figure 4 shows, 56 percent (110 kt) of the Government of Canada's total reduction came from reducing energy use and 44 percent (86 kt) came from switching to fuels that are less GHG intensive.

Chapter 6 highlights some of the Government of Canada's programs and efforts to reduce energy use and, ultimately, GHGs. The remainder of this chapter explores the Government of Canada's GHG emissions by examining GHG emissions by sector.

Figure 3. GHG Emissions by Sector and Fiscal Year

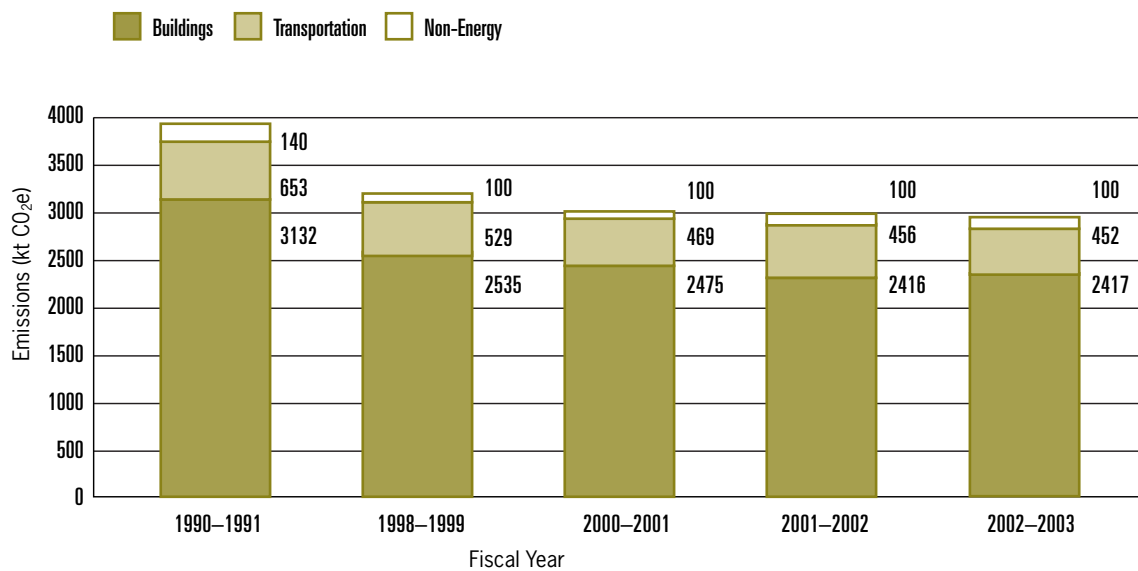


Figure 4. The Influence of Energy Use and GHG Intensity on the Change in the Government of Canada's Emissions, 1998 to 2002

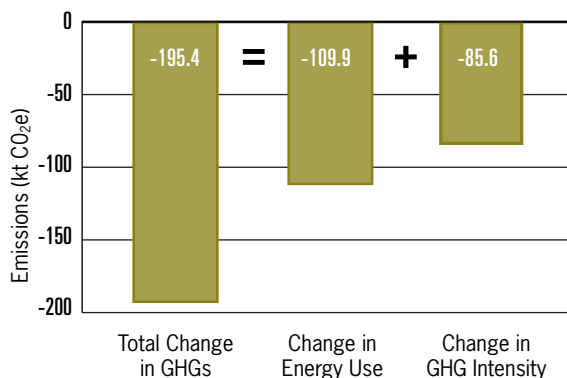


Figure 5. The Influence of Energy Use and GHG Intensity on the Change in Emissions From Federal Buildings, 1998 to 2002

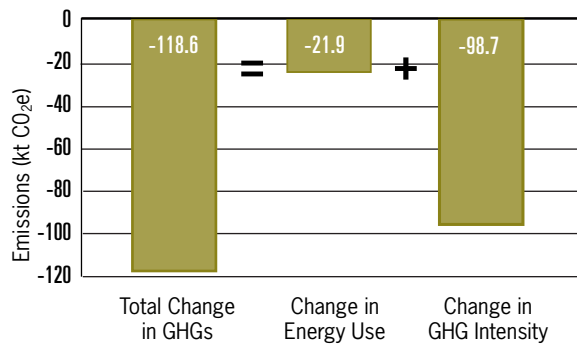
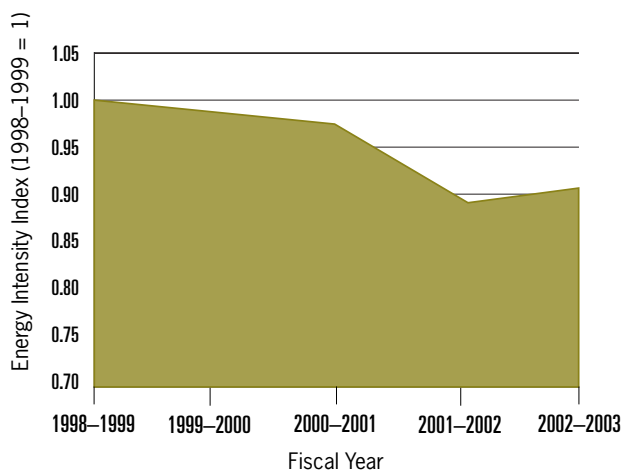


Figure 6. Trend in Energy Intensity for Federal Buildings, 1998 to 2002



5.2 Federal Buildings

In 2002, federal facilities emitted about 2417 kt of CO₂e. This represents a reduction of approximately 1 kt of CO₂e since 2001. Between 1998 and 2002, reductions totalled 119 kt of CO₂e. They resulted from a switch to fuels that are less GHG intensive and from reduced energy use. Figure 5 shows how these two factors combine to yield an overall reduction of 119 kt of CO₂e.

Energy intensity is a measure used to estimate the amount of energy consumed per square metre of floor space. Changes in this value over time can give insights into the energy-use performance of the federal building sector. A decline in energy intensity can be attributed to energy efficiency efforts. In addition, changes in weather and even building inventory can affect energy use and, ultimately, intensity. For example, buildings housing laboratories typically consume more energy than do buildings used for office space. A reduction in laboratory space and an equal increase in office space can result in a lower energy intensity value. Weather is another important factor that can influence energy intensity. An especially cold winter or hot summer can have a profound impact on energy use. Details on the federal building stock and weather information will be incorporated into the analysis presented in future ERFO reports.

Nevertheless, energy intensity can still be calculated to gain some insight into the Government of Canada's total energy use. Overall, as shown in Figure 6, energy intensity improved by 9 percent between 1998 and 2002; that is, less energy per square metre was used in federal facilities in 2002.

Figure 7 shows energy use in 2002 by fuel type. This is the second ERFO report to cover the procurement of energy from renewable resources, or “green” power. As mentioned in Chapter 4, the Government of Canada intends to achieve a 235-kt reduction by 2010 through investment in emerging renewable resources. (This initiative is described further in Chapter 6.) For emissions from electricity, the FHIO initiative uses a national average emissions factor that assumes natural gas is burned at the margin. Therefore, electricity from “green” sources, which have no associated GHG emissions, displaces the need to purchase electricity generated from the combustion of fossil fuels such as natural gas. In 2002, the Government of Canada displaced about 46 kt of CO₂e by purchasing electricity from renewable energy sources.

Figure 8 shows GHG emissions from federal facilities by fuel type over time. Between 1998 and 2002, emissions from electricity declined by 119 kt of CO₂e, accounting for most of the Government of Canada’s reductions from facilities. Reductions in emissions from heavy oil and purchased steam used for heating equalled the increase in natural gas, propane, light oil and “other.”⁴ This represents a switch to fuels that are less GHG intensive, as illustrated in Figure 5.

Figure 7. Building Energy Use by Fuel Type, 2002–2003

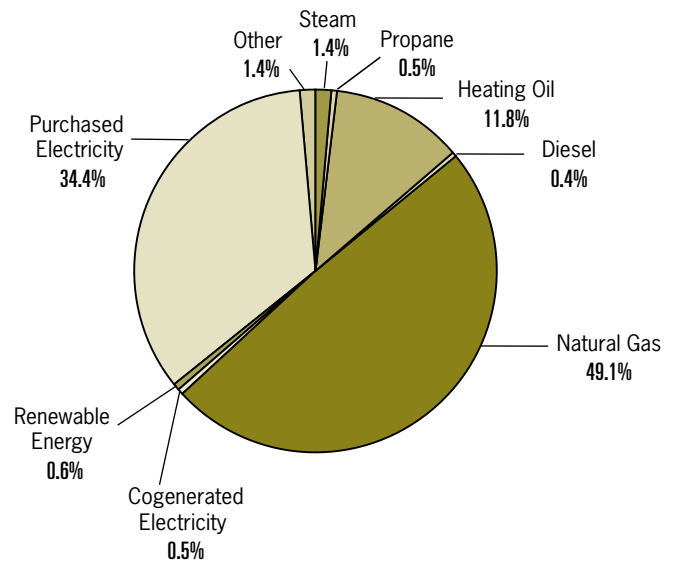
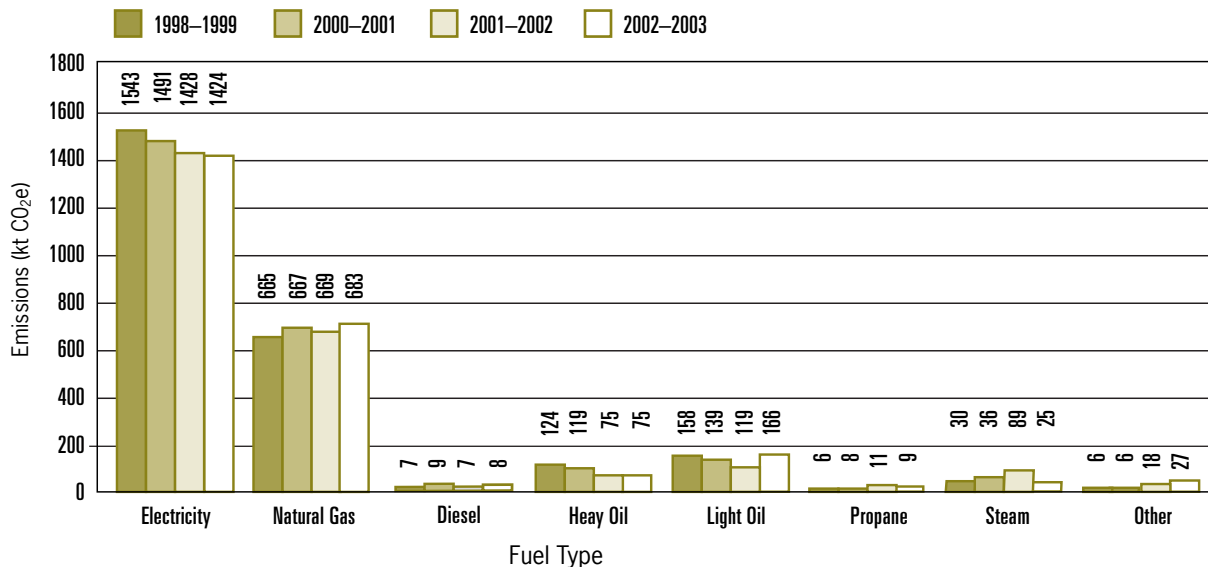


Figure 8. GHG Emissions by Fuel Type and Fiscal Year for Federal Buildings



⁴“Other” is a category for non-traditional fuels used in federal facilities. For example, the Department of National Defence uses aviation fuel to heat facilities in the extreme cold of the Canadian Arctic.

5.3 Federal Fleet

The Government of Canada experienced an emissions reduction of 77 kt of CO₂e in the transportation sector between 1998 and 2002. As Figure 9 shows, 97 percent (74.6 kt) of the reduction came from reduced energy use.

The transportation sector has two subsectors: on-road and off-road. The off-road subsector comprises the federal air and marine fleets and field equipment, including off-road vehicles, such as all-terrain vehicles, portable generators and lawn mowers. Figure 10 shows the emissions for each component by year. Reductions in GHGs were achieved in all four components.

Figure 9. The Influence of Energy Use and GHG Intensity on the Change in Emissions From the Federal On- and Off-Road Fleets, 1998 to 2002

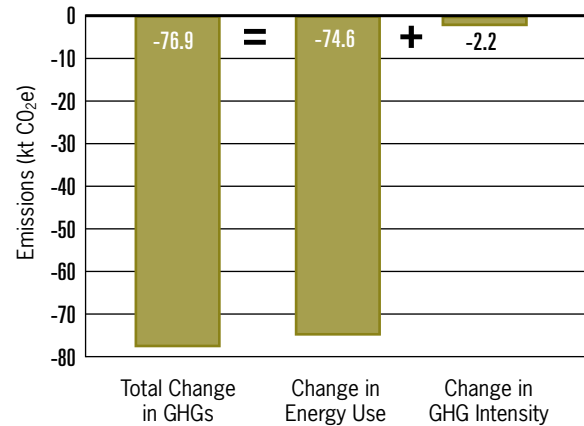
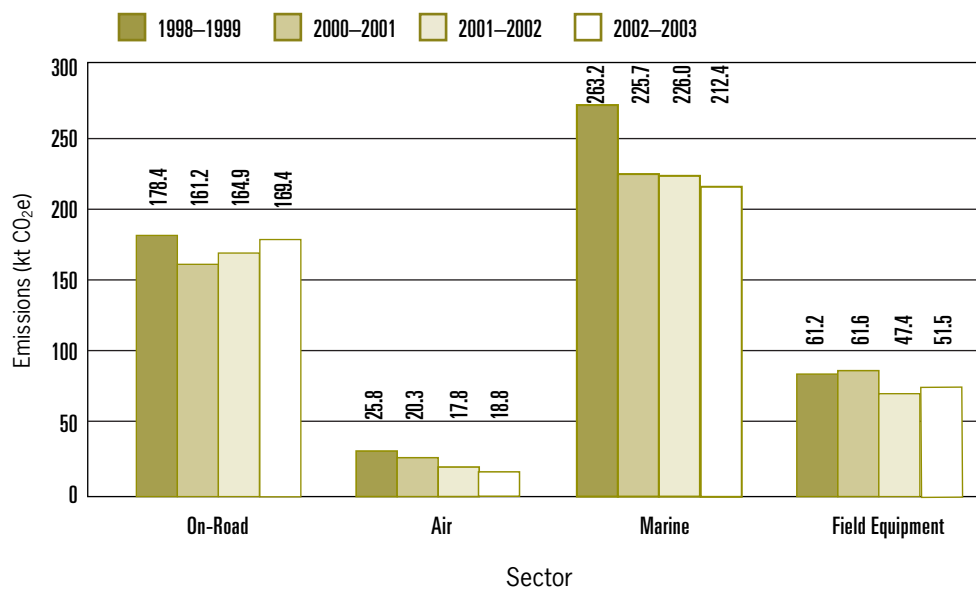


Figure 10. GHG Emissions by Sector and Fiscal Year for Federal On- and Off-Road Fleets



ON-ROAD FLEET

Emissions for the Government of Canada's on-road fleet declined by 9 kt of CO₂e between 1998 and 2002. Figure 11 shows that the emissions reduction came from a decrease in energy use. In addition, a decrease in GHG intensity contributed 0.4 kt of CO₂e to the reduction.

Figure 12 shows GHG emissions by fuel type for the on-road fleet. Emissions from the use of gasoline and diesel declined between 1998 and 2002. Since 2000, emissions from the use of gasoline have been on the rise. This may be attributed to increased security requirements following the terrorist attacks of September 11, 2001. The levels of emissions from ethanol, and to a lesser degree from natural gas, have increased since 1998. In the past it has been very difficult to track ethanol fuel purchases. As a result of improvements to databases for tracking fleet fuel purchases, the Government of Canada is getting a more accurate picture of ethanol fuel use. Chapter 6 explains how ethanol is being promoted in the federal fleet. This is indicative of the fact that the federal fleet is switching to vehicles powered by alternative fuels, particularly natural gas.

Figure 11. The Influence of Energy Use and GHG Intensity on the Change in Emissions From the Federal On-Road Fleet, 1998 to 2002

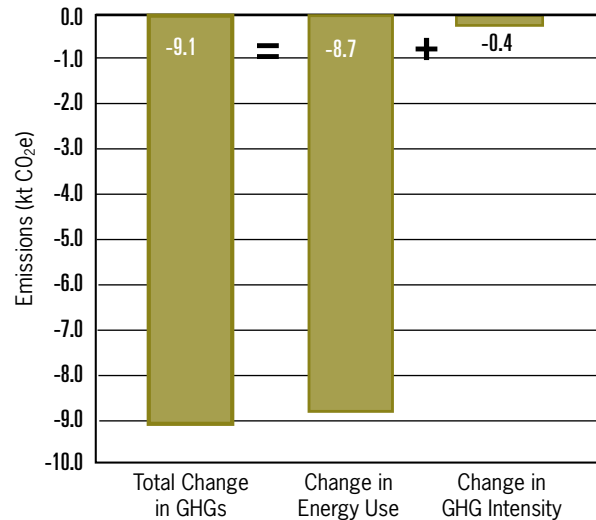
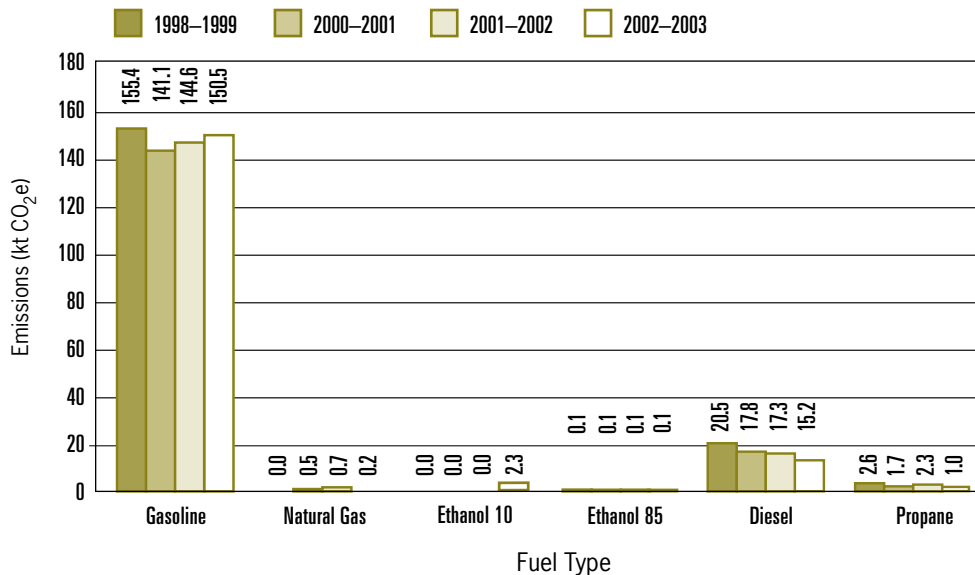
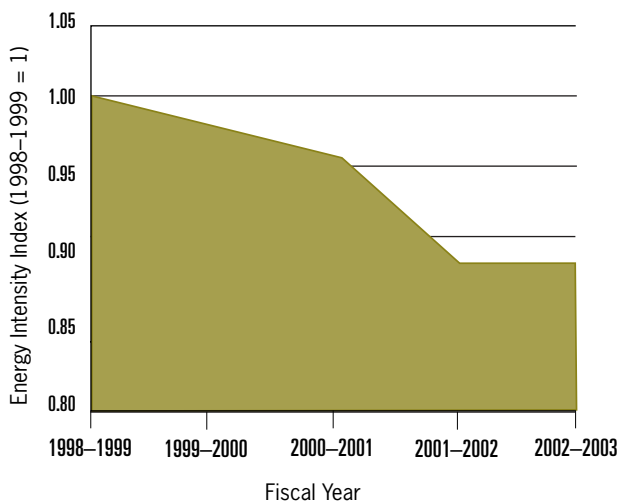


Figure 12. GHG Emissions by Fuel Type and Fiscal Year for the Federal On-Road Fleet



Energy intensity for the federal on-road fleet has also improved since 1998. Like energy intensity for buildings, energy intensity for the on-road fleet is the ratio of energy use to activity. In this case, it is the unit of energy used per kilometre driven. Between 1998 and 2002, energy intensity declined by about 12 percent (see Figure 13). The combination of fewer kilometres driven and an even greater decrease in energy use have contributed to the overall decrease in energy intensity. Efforts such as matching the appropriate vehicle to the task and increasing the proportion of alternative-fuel vehicles in the fleet have contributed to the overall improvement in energy efficiency and, ultimately, have led to a reduction in GHG emissions. These efforts are described in Chapter 6.

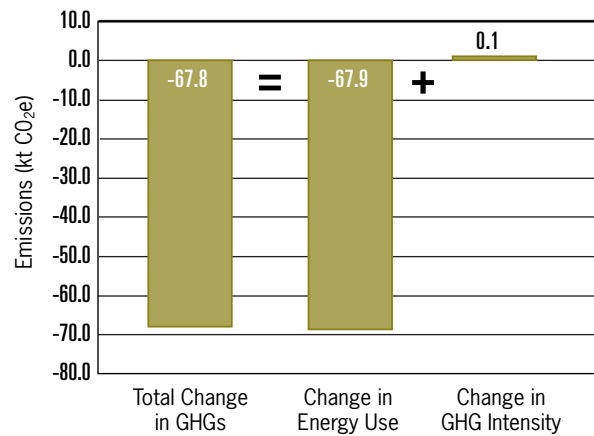
Figure 13. Trend in Energy Intensity for the Federal On-Road Fleet, 1998 to 2002



OFF-ROAD FLEET

The off-road sector, which includes the Government of Canada’s air, marine and field fleets, saw an overall reduction of 68 kt of CO₂e. Most of the reduction occurred in the marine sector, with a 51-kt reduction. The field fleet had a 9-kt reduction, and the air fleet had a 7-kt reduction. All of these reductions can be attributed to reduced energy use, as Figure 14 shows. The off-road sector has less potential than the on-road sector to switch to fuels that are less GHG intensive. Therefore, as illustrated in Figure 14, reductions in GHG emissions come from lower energy consumption, either through the operation of energy-efficient vehicles and equipment or simply through more limited use of vehicles. Since 1998, this is what has been happening in the federal off-road fleet.

Figure 14. The Influence of Energy Use and GHG Intensity on the Change in Emissions From the Federal Off-Road Fleet, 1998 to 2002



5.4 Non-Energy Sources

Non-energy GHG emissions from federal operations were estimated for 1990 and 1998, based on an inventory of known sources. These included federal landfill sites and agricultural operations. In 1990, estimated GHG emissions from non-energy sources were 140 kt, and this amount was estimated to have decreased to 100 kt by 1998. For 2002, the estimate is the same – 100 kt – as it was for 1998. Due to difficulties in collecting reliable non-energy emissions data, all 11 departments and agencies reporting under the FHIO initiative have agreed to flatline this figure at 100 kt until a suitable data-collection strategy for non-energy emissions has been established and appropriate data-collection tools developed. Research is underway, and non-energy GHG emissions will therefore remain at 100 kt until the work is completed and the feasibility of collecting the data has been determined.

Federal GHG Emissions-Reduction Programs and Initiatives

Between 1990 and 2001, the Government of Canada reduced GHG emissions from its own operations by about 24 percent (963 kt of CO₂e). These reductions were achieved with the assistance of programs and initiatives run by such federal departments as Environment Canada, Natural Resources Canada (NRCan) and Public Works and Government Services Canada. This section outlines specific program contributions to the reduction of GHG emissions since 1990.

6.1 Current Program Highlights

Programs such as the Federal Buildings Initiative, the Federal Industrial Boiler Program and renewable energy programs helped reduce GHG emissions by supporting energy retrofits, providing energy managers with information about energy efficiency and GHG issues, and encouraging the design of buildings that are more energy efficient.

■ 6.1.1 FEDERAL BUILDINGS INITIATIVE

The Federal Buildings Initiative (FBI) is a voluntary program developed and administered by NRCan's Office of Energy Efficiency (OEE) to help federal departments, agencies and Crown corporations cut their GHG emissions, energy use and operating costs by upgrading the energy efficiency of their facilities. The FBI model can help federal organizations achieve their GHG emissions reduction targets under the FHIO initiative. The program's wide range of products and services – including its model documents, employee-awareness products, skills development services and environmental, health and safety guidelines – gives organizations the confidence and flexibility they need to implement an energy management project without necessarily using their capital funds. Through the FBI's savings-financing option, a department can enter into a contractual agreement with a pre-qualified energy management services company (EMSC), which allows it to pay for the project's costs through the guaranteed savings generated by energy efficiency improvements.

A key component of the FBI is the Qualified Bidders List. Organizations interested in an energy performance contract need to know that the companies they do business with are dependable and competent. The FBI maintains a list of pre-qualified EMSCs that may respond to requests for proposals. This streamlines the early stages of the contracting process and ensures the best fit between the client and an EMSC. The pre-qualified firms on the list have demonstrated that they clearly meet all program criteria and are capable of providing a full range of energy management services.

Typical measures in comprehensive energy efficiency projects include lighting systems; heating, ventilating and air-conditioning (HVAC) systems; the building envelope; control systems; integrated systems; recommissioning; fuel conversions; cogeneration; water efficiency; renewable energy technology; training; and employee awareness programs.

Federal organizations have implemented more than 80 FBI projects, reducing GHG emissions by approximately 200 kt. These projects have attracted \$240 million in private sector investment and have generated \$33 million in annual energy savings.

The FBI works with a number of federal organizations. Here are some examples of the work being done and the results achieved.

- The Department of National Defence continues to be an important client of the FBI, having awarded numerous energy performance contracts in all regions of the country. These contracts have resulted in over \$130 million in private sector investment and close to \$17 million in annual energy savings.
- In 2004, Canadian Forces Base (CFB) Kingston awarded its first energy performance contract under the FBI. The \$23.5-million project is expected to generate energy savings of \$2.6 million per year and substantially reduce GHG emissions. In addition to dozens of energy efficiency measures, renewable energy options such as solar and wind will further help to reduce GHG emissions at the site.

Energy efficiency measures associated with the energy performance contract at CFB Greenwood have led to reductions of hundreds of thousands of litres of heavy oil and GHG emission reductions of 9800 tonnes per year.

Federal Buildings Initiative Recent Program Activity

Atomic Energy of Canada Limited	Chalk River, Ontario
Canada Border Services Agency	Quebec Region
Canada Mortgage and Housing Corporation	Ottawa, Ontario
Communications Research Centre	Ottawa, Ontario
Fisheries and Oceans Canada	Atlantic Canada
National Defence	Various Locations
Natural Resources Canada	Various Locations
Parks Canada Agency	Various Locations
Public Works and Government Services Canada	Gatineau, Quebec
Royal Canadian Mint	Ottawa, Ontario
Royal Canadian Mounted Police	Ottawa, Ontario
Transport Canada	Various Locations

- The Canada Centre for Inland Waters (CCIW) of Environment Canada, located in Burlington, Ontario, is one of the world's leading sites for aquatic research. An energy efficiency retrofit under the FBI was proposed in response to the pressing need to control energy costs, upgrade equipment and installations and reduce the environmental impact of operations. In May 2003, project costs of \$7.4 million were paid out with actual energy savings exceeding original projections for the seven-year efficiency retrofit program. The project has also reduced GHG emissions by about 5000 tonnes per year.

Since project implementation, new measures were added to the CCIW project, including the construction and operation of two solar walls, a photovoltaics system to generate electricity, and a living wall. A living wall is an air biofilter that removes and treats airborne contaminants.

Building on its success, CCIW continues to track and monitor energy systems and use, and it is considering the naturalization of the grounds and the retrofit of the boiler plant to further increase efficiency and reduce emissions.

■ The Parks Canada Agency awarded its first FBI energy management services contract at Banff National Park, Alberta. The contract includes measures to improve energy efficiency at residences, campgrounds, office complexes, maintenance yards and historic sites. In the first year of project monitoring, annual savings of \$77,000 were recorded, exceeding original expectations. The efficiency improvements have led to reductions of more than 150 tonnes of GHG emissions each year. Parks Canada's Terra Nova and Gros Morne national parks in Newfoundland and Labrador are proceeding with an FBI project, and Parks Canada locations in the Québec City area, including Grosse-Île National Historic Site, have also expressed interest in implementing FBI projects.

Parks Canada has taken up the challenge of improving energy efficiency to reduce GHG emissions. Asset managers and building personnel from a number of locations in the Quebec and Atlantic regions attended customized versions of the Office of Energy Efficiency's Dollars to Sense workshops. Topics included advice on designing cost-effective energy-saving plans, improving the energy efficiency of heritage buildings, and incorporating operator training as an energy- and cost-saving measure. With Parks Canada pursuing several FBI projects, time was spent explaining how an energy performance contract can reduce operating costs through energy efficiency improvements.

■ 6.1.2 FEDERAL VEHICLES INITIATIVE

NRCan developed the Federal Vehicles Initiative (FVI) in the 1990s to assist federal departments in increasing the energy efficiency of their motor vehicle fleets and to promote the *Alternative Fuels Act* within the federal fleet. The FVI's current role is to help departments reduce their GHG emissions from vehicle operations as part of the FHIO initiative. Some of the approaches being promoted include reducing the overall fleet size through initiatives such as vehicle pooling, encouraging the purchase of fuel-efficient vehicles, and creating a mix of vehicles that are better suited for particular tasks (e.g. using a subcompact car instead of a van when only two

passengers are in the vehicle). Other methods include promoting innovative use of new technologies in all aspects of fleet operations and creating environmental standards for fleet repair and maintenance. In addition, the FVI plays a key role in promoting the purchase of alternative fuels and hybrid vehicles and encouraging greater alternative fuel use in the federal fleet through education, tools and resources, and the expansion of alternative-fuel infrastructure.

Approximately 1650 Government of Canada drivers will be trained during fiscal year 2003–2004 as part of a project to encourage and implement safe and energy-efficient driving practices. Currently a new “Green Driver Certificate” course is being designed for launch by January 2005.

Table 3 shows the number of vehicles acquired for the federal fleet of about 26 000 on-road vehicles for the largest federal departments, including the 11 targeted FHIO departments and agencies. In the 2002–2003 fiscal year, 12.2 percent of all new vehicles purchased were capable of operating on alternative fuels. The total share of alternative

Table 3. Acquisition of Alternative Fuel Vehicles in the Federal On-Road Fleet

Fiscal Year	Total On-Road Vehicles Acquired	Total Alternative Vehicles Acquired
1997–1998	2250	131 (5.8%)
1998–1999	2409	161 (6.7%)
1999–2000	2522	181 (7.2%)
2000–2001	3282	226 (6.9%)
2001–2002	3984	126 (3.1%)
2002–2003	4004	489 (12.2%)

fuel vehicles in the federal fleet was 5 percent in fiscal year 2002–2003. If hybrid-electric vehicles are included, this group accounts for 6 percent of the federal fleet.

Examples of the FVI's activities include the following:

■ The FVI has actively promoted E-85⁵ within the federal vehicle fleet. Currently, there are a total of 13 federal E-85 bulk fuelling sites and one commercial E-85 station, operated by MacEwen at 920 Montreal Road in Ottawa. There are plans to open approximately seven new federal

⁵ E-85, or ethanol-85, is a high-level blended fuel that contains approximately 85 percent ethanol and 15 percent gasoline. E-85 is a much less GHG-intensive fuel than traditional gasoline. For more information on E-85 and other alternative fuels, visit the Office of Energy Efficiency Web site at oee.nrcan.gc.ca/vehiclefuels/home.cfm.

bulk fuelling sites at Agriculture and Agri-Food Canada and Correctional Service Canada locations across Canada. In 2002–2003, the number of vehicles in the federal fleet using E-85 increased to 158 from 57 in fiscal year 2000–2001. During the same time frame, E-85 use increased by nearly 600 percent to 269 000 litres.

- The FVI has started to develop a “Green Driver Certificate” training course with the Canada Safety Council. Several departments require that drivers successfully complete this course in order to operate departmental vehicles.
- The federal fleet acquired 46 gasoline-electric hybrid vehicles in 2002–2003, increasing the total number of hybrid vehicles in the fleet to 126. The FVI has promoted these energy-efficient vehicles and highlighted the Government of Canada’s leadership at trade auto shows for the public.
- The FVI helped organize the first workshop for federal fleet managers by sponsoring sessions on vehicle safety, the acquisition of alternative fuel vehicles and the on-road testing of natural gas and electric vehicles.

■ 6.1.3 EMERGING RENEWABLE ELECTRICITY

In 1997, Environment Canada and NRCan made a commitment to purchase 15 to 20 percent of their electrical energy from emerging renewable energy sources by 2010. To meet this commitment, ENMAX Energy Corporation, an Alberta electric utility company, is providing NRCan with 10 000 megawatt hours (MWh) and Environment Canada with 2200 MWh of wind-generated electricity every year for 10 years to operate their facilities in Alberta. During 2000–2001, ENMAX Energy reported reductions of 10.9 kt of GHG emissions through the displacement of electricity generated by a mix of coal and natural gas.

In response to a proposal made by the Electricity Table as part of Canada’s climate change consultations, the *Government of Canada Action Plan 2000 on Climate Change* announced that the Government of Canada was committed to purchasing 20 percent of federal electricity requirements in the form of emerging renewable electricity by 2010. This measure is expected to yield two main benefits. First, it will help suppliers of these emerging renewable sources to become more experienced and cost-competitive. Second, it will enable the Government of Canada to cut an additional 240 kt or more of GHG emissions by 2010.

In 2000, the Government of Canada signed a \$12.4-million, 10-year agreement with SaskPower for the annual delivery of about 32 000 MWh of wind power from the SunBridge Wind Power Project in southwestern Saskatchewan. The SunBridge facility was developed in partnership by Enbridge Inc. and Suncor Energy Inc. SaskPower began delivering the wind power to Government of Canada facilities in Saskatchewan in February 2002. During the last two months of fiscal year 2001–2002, the Government of Canada received 5400 MWh of electricity and reduced its GHG emissions by 5 kt.

Additional funding in 2001 under the *Government of Canada Action Plan 2000 on Climate Change* permitted the Government of Canada to sign a \$4.6-million agreement with Maritime Electric Company Limited. This agreement is for 10 years and will result in the purchase of 13 000 MWh of wind power a year. The electricity is being generated at a facility built and operated by the provincial government at North Cape, Prince Edward Island. During the last half of fiscal year 2001–2002, 6600 MWh of wind power was delivered, and GHG emissions were reduced by 5.6 kt. For each of the pilots, ownership of the emissions reductions is transferred to the Government of Canada.

During 2001–2002, the Government of Canada also signed memoranda of understanding with Nova Scotia Power and NB Power to negotiate purchases of emerging renewable electricity.

In May 2004, following a request for proposals that closed in December 2003, the Government of Canada signed a five-year contract for the purchase of 90 GWh annually of electricity from emerging renewable energy sources in Ontario. Currently, further negotiations are underway in British Columbia, Alberta, New Brunswick, Nova Scotia, and Newfoundland and Labrador.

■ 6.1.4 RENEWABLE ENERGY DEPLOYMENT INITIATIVE

NRCan’s Renewable Energy Deployment Initiative (REDI) was launched in April 1998 and has been extended for an additional three years to March 2007. REDI promotes the market for heating and cooling systems in commercial buildings, including federal facilities, that use energy from the sun, the earth and biomass sources. These systems include the following: solar air heating, solar water heating, clean biomass heating and ground-source heat pump (earth energy) systems.

REDI focuses on increasing market awareness of renewable energy, stimulating renewable energy installations through project facilitation, providing a direct financial incentive, and building capacity for renewable energy industries. REDI for Federal Facilities encourages federal organizations to include renewable energy systems in their building decisions and provides funding support for solar and biomass systems that meet REDI criteria. Under the *Government of Canada Action Plan 2000 on Climate Change*, REDI was expanded to include on-site electricity generation from solar photovoltaics, wind and micro-hydro at federal facilities. This initiative, called On-Site Generation at Federal Facilities, is designed to promote installation of these systems in high-visibility federal buildings in grid-connected locations, and to develop a sustainable market for cost-effective renewable energy applications in off-grid federal facilities.

Examples of renewable energy considerations within the federal sector are as follows:

- In 1997, the first air-heating system was installed on an exterior wall of a laboratory building at NRCan's Bells Corners CANMET complex in Ottawa. This has led to a reduction of 44 tonnes of CO₂ per year.
- In 1998, NRCan's CANMET Energy Technology Centre (CETC) in Varennes, Quebec, installed a 220-square-metre (m²) SOLARWALL[®] that can supply 340 m³ (12 000 cubic feet) of warmed air per minute, or about 400 gigajoules of renewable energy to the building per year, resulting in an annual reduction of 30 tonnes of CO₂.
- Also in 1998, the Canadian Coast Guard installed a solar air-heating system in a maintenance building in Prescott, Ontario, that has reduced GHG emissions by 11 tonnes per year.
- Guidelines for FBI projects now specify that the feasibility of including renewable energy systems should be evaluated by EMSCs when proposing energy performance contracts for federal facilities.
- CETC-Varennes has developed and delivers training on the use of the RETScreen[®] International tool, which enables decision-makers to assess renewable energy project investments before they are made. The Centre also provides post-training technical support for EMSCs, employees and contractors on energy efficiency and renewable energy projects in federal facilities.
- REDI assisted the Canada Customs and Revenue Agency and the Royal Canadian Mounted Police to advance earth energy system projects in their facilities through support

for developing communications strategies and management tools to facilitate renewable energy project decisions.

■ 6.1.5 FEDERAL INDUSTRIAL BOILER PROGRAM

The Federal Industrial Boiler Program (FIBP) provides technical and project management services to assist federal facilities in implementing energy reduction projects. FIBP's extensive experience in building energy systems and its access to the engineering and scientific network within the CANMET Energy Technology Centre ensure that environmentally responsible technologies are considered when federal government clients replace or modify their space heating and cooling systems. Since its inception in 1991, FIBP has worked with many departments, including Agriculture and Agri-Food Canada, Correctional Service Canada, the Department of National Defence, Environment Canada, Foreign Affairs Canada and International Trade Canada, to reduce their energy costs. Under the FIBP, GHG emissions are reduced by an average of 4.7 kt per year. Recent examples of initiatives under FIBP include the following:

1. FIBP worked with Agriculture and Agri-Food Canada, Correctional Service Canada, Natural Resources Canada and Public Works and Government Services Canada to develop project proposals for the FHIO initiative. The projects included wind turbines ranging in size from 20 kW to 1 MW, a SOLARWALL application, an innovative HVAC heat recovery system, and more efficient building heating through conversion to local high-efficiency heaters. Five projects were approved for funding. Once implemented, they will reduce annual CO₂ emissions by 668 000 kg.
2. FIBP has been working with the Department of National Defence at CFB Bagotville to upgrade the central heating plant's equipment. This \$1.5-million project involved installing energy-efficient boilers with low-nitrogen-oxide burners and upgrading or replacing controls and ancillary equipment.
3. FIBP conducted a study for Environment Canada to compare the operating costs, environmental emissions and GHG production from heating plants operating on No. 6 fuel oil and No. 2 fuel oil. Many federal facilities in Atlantic Canada have heating plants that rely on No. 6 fuel oil. The study is intended to initiate discussion on reducing the use of this oil, which is a relatively heavier pollutant.

4. FIBP has worked with Foreign Affairs Canada and International Trade Canada at its embassy in New Delhi, India, to implement a cogeneration-based site power generation system. The project involves the removal of existing standby generators and the installation of three new 750-kW generators with heat recovery for site cooling, by means of absorption chiller technology, and for heating. Completion of this project will stabilize the power supply at the embassy and help cut pollution and GHG emissions by reducing the load on the Indian electric generating system, which is primarily coal-fired.
5. FIBP is participating in Correctional Service Canada's sustainable development strategy by inspecting heating systems in federal penitentiaries across the country to identify problems and recommend options for improving energy efficiency and reducing operating costs and GHG emissions. The central heating plants at Kingston Penitentiary and Collins Bay Institution in the region of Kingston, Ontario, are being reviewed with the aim of devising a retrofit plan that will reduce operating costs. The study will also identify heat recovery options to reduce fuel consumption and GHG and environmental emissions.

6.2 The Leadership Challenge

The Leadership Challenge, led by Environment Canada, is a component of the FHIO initiative. It is designed to demonstrate leadership by issuing a challenge to all federal departments, agencies and Crown corporations to design and implement a GHG-emissions-reduction program and to report annually on progress. The Leadership Challenge is now assisting federal entities in establishing baseline data and developing GHG-emissions-reduction programs. To date, Canada Post Corporation and the Canada Revenue Agency have formally joined FHIO by signing onto the Leadership Challenge. Federal entities signing onto the Leadership Challenge will be asked to voluntarily report on their GHG reduction activities as well as share best practices and success stories resulting from their participation.

Environment Canada's Leadership Challenge Office has begun working with various federal entities on GHG data collection and analysis, has helped launch various GHG reduction initiatives (e.g. anti-idling campaigns), and has actively communicated the FHIO initiative's programs to employees. As part of the Government of Canada's broader commitment to sustainable development and to "greening" government operations, the Leadership Challenge will also promote and support continuous improvement over the FHIO

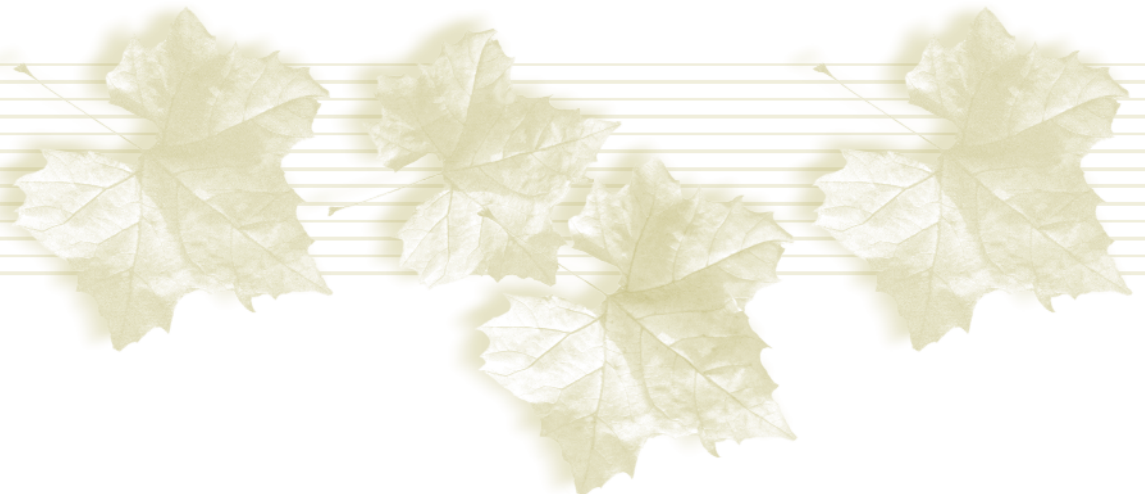
initiative's 10-year commitment period. Moreover, it will ensure that GHG emissions reduction is integrated into the environmental management systems of federal entities.

Through the Leadership Challenge, Environment Canada is also working with Transport Canada to undertake projects and promote best practices for reducing "outside emissions." Outside emissions are defined as GHG and other air emissions that are not directly attributable to Government of Canada operations but are a result of government and work-related activities, such as employee commuting, business travel and the movement of goods. The first outside emissions project under the FHIO initiative is the National Capital Region (NCR) Transit Pass Pilot, which was launched on November 1, 2002, in Environment Canada, Natural Resources Canada, Transport Canada and the Treasury Board of Canada Secretariat. This program offers employees in the four departments a discounted annual transit pass through monthly payroll deductions. As of June 2003, over 900 employees had signed up for the transit pass pilot. The pilot was evaluated in the fall of 2003 to assess the feasibility of rolling it out to all departments in the NCR and nationally. The findings from the Transit Pass Pilot evaluation will be reported in the next ERFO report.

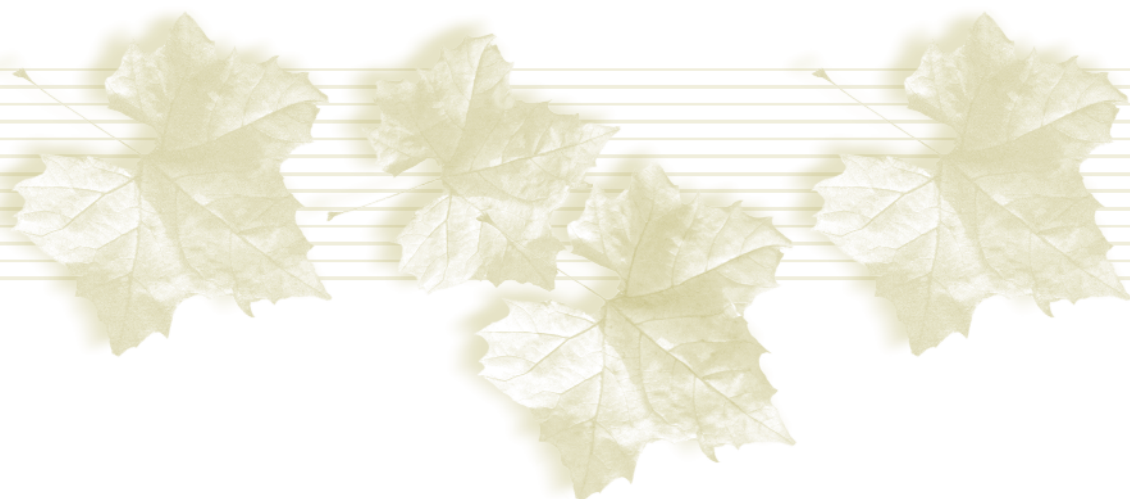
Other tools have been developed to assist departments in implementing outside emissions projects, including a Web-based commuter options survey and a site assessment protocol on commuter options. Environment Canada's Quebec Region developed the Travel Alternately Program to encourage employees to use alternative modes of transportation (e.g. biking, bus, walking, carpooling) when commuting to and from work and to track GHG emissions from employee travel and taxi use with a view to reducing GHG emissions. The Government of Canada has also participated in over 10 carbon-neutral conferencing initiatives since 2002, leading to a total offset of approximately 5000 tonnes of CO₂e. In these projects, carbon credits were purchased from international projects (e.g. energy-efficient social housing in South Africa) to offset the GHG emissions associated with hosting a conference and/or the travel associated with Canadian delegations attending a conference. Most of these credits have already been retired to Canada's Climate Change Voluntary Challenge and Registry Inc. (VCR Inc.) to ensure that the credits have been taken off the international trading market.

Conclusion

The Government of Canada is committed to reducing GHG emissions from its operations and reaching the federal target in 2010. Future FHIO annual reports will continue to monitor and report on progress toward reaching the target. They will also continue to improve the scope of emissions and the quality of information contained in them. This report and related information can be found on the FHIO Web site at www.fhio.gc.ca.



Appendices



Appendix A. Energy Use and Emissions Data for Buildings

Energy Use and GHG Emissions by Fuel Type for Fiscal Year 2002–2003

Fuel	Energy Units (TJ)	CO ₂ (kt of CO ₂ e)	CH ₄ (kt of CO ₂ e)	N ₂ O (kt of CO ₂ e)	CO ₂ e (kt)
Electricity Total	9 736.1				1 516
<i>Purchased</i>	9 766.9				1 470
<i>Green Power (departmental)</i>	4.8				0
<i>Green Power Initiative</i>	(163.4)				(46)
<i>Cogeneration</i>	127.8				0
Natural Gas	13 681.7	679.23	0.28	3.90	683
Light Oil (#2)	2 268.2	165.44	0.01	0.56	166
Heavy Oil (#6)	1 017.9	74.01	0.06	0.48	75
Diesel	109.9	7.83	0.01	0.36	8
Propane	146.9	8.70	0.00	0.19	9
Steam	384.6				25
Other	380.7	25.96	0.02	0.79	27
Total	27 725.9	961.17	0.37	6.27	2 417

Energy Use and GHG Emissions by Fuel Type From 1998–1999 to 2002–2003

Fuel	1998–1999		2000–2001		2001–2002		2002–2003	
	Energy Units (TJ)	CO ₂ e (kt)	Energy Units (TJ)	CO ₂ e (kt)	Energy Units (TJ)	CO ₂ e (kt)	Energy Units (TJ)	CO ₂ e (kt)
Electricity Total	10 250	1 543	9 909	1 491	9 522	1 449	9 736	1 516
<i>Purchased</i>	10 249	1 543	9 909	1 491	9 559	1 439	9 767	1 470
<i>Green Power (departmental)</i>	0.5	0	0	0	5	0	5	0
<i>Green Power Initiative</i>	0.0	0	0	0	(42)	(10)	(163)	(46)
<i>Cogeneration</i>	0.0	0	0	0	0	0	128	0
Natural Gas	13 334	665	13 324	667	13 392	669	13 682	683
Light Oil (#2)	2 125	156	1 901	139	1 626	119	2 268	166
Heavy Oil (#6)	1 690	124	1 618	119	1 022	75	1 018	75
Diesel	88	7	115	9	97	7	110	8
Propane	102	6	131	8	175	11	147	9
Steam	465	30	563	36	1 391	89	385	25
Other	83	6	83	6	249	18	381	27
Total	28 137	2 535	27 644	2 475	27 475	2 416	27 726	2 417
Floor Space (m²)	18 483 320		18 494 191		20 277 476		20 184 693	

Appendix B. Energy Use and Emissions Data for Transportation

Energy Use and GHG Emissions by Fuel Type for Fiscal Year 2002–2003

Fuel	Energy Units (TJ)	CO ₂ (kt of CO ₂ e)	CH ₄ (kt of CO ₂ e)	N ₂ O (kt of CO ₂ e)	CO ₂ e (kt)
On-Road Total	2 406	162.2	0.355	06.8	169.4
Gasoline	2 133	143.8	0.291	06.3	150.5
CNG*	4	00.2	0.044	00.0	00.2
Diesel	208	14.8	0.007	00.3	15.2
Propane	17	01.0	0.007	00.0	01.0
Ethanol 10	36	02.2	0.005	00.1	02.3
Ethanol 85	7	00.1	0.001	00.0	00.1
Air Total	264	18.0	0.017	00.5	18.6
Turbo Fuel	260	17.7	0.012	00.5	18.3
Aviation Gas	4	00.3	0.005	00.0	00.3
Marine Total	2 673	190.5	0.221	21.6	212.4
Gasoline	2	00.1	0.002	00.0	00.1
Diesel	2 671	190.4	0.220	21.6	212.2
Field Total	665	46.7	0.305	04.5	51.5
Gasoline	163	11.0	0.264	00.1	11.3
Diesel	495	35.3	0.038	04.4	39.7
Propane	7	00.4	0.003	00.0	00.4
Total	6 008	417.4	0.899	33.5	451.8

*Compressed natural gas

Energy Use and GHG Emissions by Fuel Type From 1998–1999 to 2002–2003

Fuel	1998–1999		2000–2001		2001–2002		2002–2003	
	Energy Units (TJ)	CO ₂ e (kt)	Energy Units (MJ)	CO ₂ e (kt)	Energy Units (MJ)	CO ₂ e (kt)	Energy Units (MJ)	CO ₂ e (kt)
On-Road Total	2 529	178.4	2 287	161.2	2 341	164.9	2 406	169.4
Gasoline	2 203	155.4	2 000	141.1	2 050	144.6	2 133	150.5
CNG*	0	00.0	9	00.5	11	00.7	4	00.2
Diesel	281	20.5	244	17.8	237	17.3	208	15.2
Propane	41	02.5	28	01.7	38	02.3	17	01.0
Ethanol 10	0	00.0	0	00.0	0	00.0	36	02.3
Ethanol 85	4	00.1	6	00.1	5	00.1	7	00.1
Air Total	367	25.8	289	20.3	253	17.8	264	18.6
Turbo Fuel	362	25.5	286	20.1	249	17.5	260	18.3
Aviation Gas	5	00.4	3	00.3	4	00.3	4	00.3
Marine Total	3 313	263.2	2 842	225.7	2 854	226.0	2 673	212.4
Gasoline	1	00.1	6	00.4	71	04.9	2	00.1
Diesel	3 312	263.2	2 836	225.3	2 783	221.2	2 671	212.2
Field Total	789	61.2	799	61.6	614	47.4	665	51.5
Gasoline	177	12.3	211	14.7	160	11.1	163	11.3
Diesel	600	48.2	575	46.2	445	35.7	495	39.7
Propane	11	00.7	12	00.7	9	00.5	7	00.4
Total	6 998	528.6	6 217	468.9	6 062	456.1	6 008	451.8

*Compressed natural gas

Appendix C. Data Collection Tools

Buildings	Version 7b					
Federal House in Order Data Report Form - Buildings						
Fiscal Year: _____ please select the appropriate fiscal year Department: _____ please select your department from the list Division: _____ your division						
Contact information:						
Name: _____ your name Address: _____ your address City: _____ your city Province/Territory : _____ select your province from the list Postal code: _____ your postal code Phone number: _____ your phone number E-mail address: _____ your e-mail address						
General Building Information						
<i>Please enter the total number of buildings in your department, and the estimated floor space.</i> Total number of buildings: _____ Total floor space (m ²): _____						
Electricity Consumption						
<i>In kilowatt-hours(kWh), please enter your total electricity usage over the fiscal year.</i> Purchased electricity from conventional sources (kWh): _____ Purchased electricity from renewable sources (kWh): _____ Electricity from Cogeneration (kWh): _____ Amount Used in Energy Units (MJ): _____ 0.00 GHG emissions (CO ₂ equivalent in tonnes): _____ 0.00						
Facility fuel Consumption						
<i>For the following table, please enter your department's facility fuel consumption over the fiscal year. Be sure to enter the amount of fuel consumed in the units specified for each particular fuel type.</i>						
	Commercial Units	Energy Units (MJ)	GHG (tonnes)			
			CO ₂	CH ₄	N ₂ O	CO ₂ equiv.
Natural gas	m ³	0.00	0.00	0.00	0.00	0.00
Light oil	L	0.00	0.00	0.00	0.00	0.00
Heavy oil	L	0.00	0.00	0.00	0.00	0.00
Diesel	L	0.00	0.00	0.00	0.00	0.00
Propane	L	0.00	0.00	0.00	0.00	0.00
Steam *	lb.	0.00				0.00
Subtotal		0.00	0.00	0.00	0.00	0.00
* Please, only record information for steam that was purchased						

Summary Information

Total Energy (GJ):	0.00
Total GHG Emissions (kilotonnes of CO ₂ equiv.):	0.00

Comments and Suggestions

Please type any comments or suggestions here.

Federal House in Order Data Report Form - *Transportation*

Fiscal Year: _____ please select the appropriate fiscal year
Department: _____ please select your department from the list
Division: _____ your division

Contact's Information

Name: _____ your name
Address: _____ your address
City: _____ your city
Province / Territory: _____ please select your province
Postal Code: _____ your postal code
Phone Number: _____ your phone number
E-mail Address: _____ your e-mail address

General Fleet Information

Please enter the number of vehicles in your fleet for each of the following vehicle types. If you do not know the number, or a particular vehicle type is not applicable, then enter 0 (zero) in the corresponding field.

Number of Vehicles

On-Road: _____
Marine:
 Under 10m _____
 10m to 30m _____
 Over 30m _____
Total _____ *0*

Air:
 Planes _____
 Helicopters _____
Total _____ *0*

Field:
 ATV's _____
 Snowmobiles _____
 Other All-terrain Veh. _____
 Agricultural Tractors _____
 Other Agricultural Equip. _____
 Small Equipment _____
(e.g. ride-on lawn mower)
 Generators _____
 Forklift _____
 Backhoe/Loader _____
 Grader _____
 Other Construction Equip. _____
Total _____ *0*
Total: _____ *0*

If you are unable to provide a detailed account of vehicles for marine, air and field, please enter manually, a total for each category in the following fields.

Marine total: _____

 Air total: _____

 Field total: _____

Fuel Consumption

For each of the following fleet categories, please enter the amount of fuel consumed. Be sure to enter the amount of fuel consumed in the units specified for each particular fuel type.

On Road Fuel Consumption

	Commercial Units	Energy Units (MJ)	GHG (tonnes)			
			CO ₂	CH ₄	N ₂ O	CO ₂ equiv.
Gasoline	L	0.00	0.00	0.00	0.00	0.00
Diesel	L	0.00	0.00	0.00	0.00	0.00
CNG*	L	0.00	0.00	0.00	0.00	0.00
Propane	L	0.00	0.00	0.00	0.00	0.00
Ethanol 10**	L	0.00	0.00	0.00	0.00	0.00
Ethanol 85**	L	0.00	0.00	0.00	0.00	0.00
Subtotal		0.00	0.00	0.00	0.00	0.00

*Compressed Natural Gas

Marine Fuel Consumption

	Commercial Units	Energy Units (MJ)	GHG (tonnes)			
			CO ₂	CH ₄	N ₂ O	CO ₂ equiv.
Gasoline	L	0.00	0.00	0.00	0.00	0.00
Diesel	L	0.00	0.00	0.00	0.00	0.00
Light Fuel Oil	L	0.00	0.00	0.00	0.00	0.00
Subtotal		0.00	0.00	0.00	0.00	0.00

Aircraft Fuel Consumption

	Commercial Units	Energy Units (MJ)	GHG (tonnes)			
			CO ₂	CH ₄	N ₂ O	CO ₂ equiv.
Aviation Turbo Fuel	L	0.00	0.00	0.00	0.00	0.00
Aviation Gasoline	L	0.00	0.00	0.00	0.00	0.00
Subtotal		0.00	0.00	0.00	0.00	0.00

Field Vehicle and Equipment Fuel Consumption

	Commercial Units	Energy Units (MJ)	GHG (tonnes)			
			CO ₂	CH ₄	N ₂ O	CO ₂ equiv.
Gasoline	L	0.00	0.00	0.00	0.00	0.00
Diesel	L	0.00	0.00	0.00	0.00	0.00
Propane	L	0.00	0.00	0.00	0.00	0.00
Subtotal		0.00	0.00	0.00	0.00	0.00

Summary

Total Energy (GJ)	0.00
Total GHG Emissions (kilotonnes of CO ₂ equiv.)	0.00

Comments and Suggestions

Please type any comments or suggestions here.

Appendix D. GHG Conversion Factors

Converting From Natural Units to Component Greenhouse Gases			
Fuel	GHG (g/L or m ³)		
	CO ₂	CH ₄	N ₂ O
Global Warming Potential	1	21	310
Aviation Gasoline			
Air	2330	2.19	0.23
Aviation Turbo Fuel			
Air	2550	0.08	0.25
Diesel			
Stationary	2730	0.133	0.4
On-Road	2730	0.0605	0.2
Marine	2730	0.15	1.0
Field Equipment	2730	0.14	1.1
Ethanol-10			
On-Road	2124	0.2273	0.335 8
Ethanol-85			
On-Road	531	0.2273	0.335 8
Natural Gas			
Stationary (m ³)	1891	0.037	0.035
On-Road (L)	1.89	0.022	0.000 06
Motor Gasoline			
On-Road	2360	0.2273	0.335 8
Marine	2360	1.300	0.06
Field Equipment	2360	2.7	0.05
Light Oil – No. 2			
Stationary	2830	0.006	0.031
Marine	2830	0.300	0.07
Heavy Oil – No. 6			
Stationary	3090	0.1200	0.064
Marine	3090	0.3000	0.08
Propane			
Stationary	1500	0.024	0.108
On-Road and Field Equipment	1500	0.52	0.028

Converting From Natural Units to Energy Units (MJ)

Fuel	Conversion Factor
Aviation Gasoline (L)	33.62
Aviation Turbo Fuel (L)	35.93
Diesel (L)	38.68
Electricity (kWh)	3.6
Ethanol-10 (L)	34.66
Ethanol-85 (L)	41.72
Heavy Oil – No. 6 (L)	41.73
Light Oil – No. 2 (L)	38.68
Motor Gasoline (L)	34.66
Natural Gas (m ³)	37.23
Natural Gas (L)	0.037 23
Propane (L)	25.53
Steam (lb.)	1.266

Converting From Energy Units to CO₂ Equivalent

Fuel	CO₂e (t/TJ)
Electricity	150.5
Steam	64.23

