

Energy Use Data Handbook

1990 and 1998 to 2004

August 2006



Natural Resources
Canada

Ressources naturelles
Canada

Canada

The digital mosaic of Canada that appears on the cover of this publication is produced by Natural Resources Canada (Canada Centre for Remote Sensing) and is a composite of individual satellite images. The colours reflect differences in the density of vegetation cover: bright green for dense vegetation in the humid southern regions; yellow for semi-arid and mountainous regions; brown for the far north where vegetation cover is very sparse; and white for the Arctic regions.

To obtain additional copies of this or other free publications on energy efficiency, please contact:

Energy Publications
Office of Energy Efficiency
Natural Resources Canada
c/o St. Joseph Communications
Order Processing Unit
1165 Kenaston Street
PO Box 9809 Station T
Ottawa ON K1G 6S1
Tel.: 1-800-387-2000 (toll-free)
Fax: 613-740-3114
TTY: 613-996-4397 (teletype for the hearing-impaired)

Cat. No. M141-11/2004E

ISBN 0-662-43662-8

© Her Majesty the Queen in Right of Canada, 2006

Aussi disponible en français sous le titre :

Guide de données sur la consommation d'énergie, 1990 et 1998 à 2004



Recycled paper



Preface

This is the fifth edition of the *Energy Use Data Handbook, 1990 and 1998 to 2004*, which fulfils part of the mandate of Natural Resources Canada's Office of Energy Efficiency (OEE) to strengthen and expand Canada's commitment to energy efficiency and to reduce greenhouse gas (GHG) emissions that contribute to climate change.

The main objective of the handbook is to provide a statistical overview of Canada's sectoral energy markets. The GHG emissions figures presented herein are for analytical purposes. Readers should consult Environment Canada's publication *Canada's Greenhouse Gas Inventory* for the official GHG inventory. For further analysis of the data contained in this publication, refer to the handbook's companion document entitled *Energy Efficiency Trends in Canada, 1990 to 2004*.

The fifth edition of the handbook differs from the previous ones in several ways:

- data are presented for 1990 and 1998 to 2004 for all sectors;
- in the industrial sector, the lime industry is now reported as part of "Other Manufacturing" for confidentiality reasons;
- in the residential sector, we have subdivided the vintage category "1996–2003" into two parts – "1996–2000" and "2001–2004"; and
- the agriculture table is no longer published in the handbook. However, detailed tables are still available in electronic version on the OEE Web site.

The handbook covers five sectors at an aggregate level: residential, commercial/institutional, industrial, transportation and electricity generation.

This handbook provides data on energy use and GHG emissions as well as information on major activities and relevant indicators influencing energy use. Such data form the foundation for OEE analysis in publications such as *Energy Efficiency Trends in Canada, 1990 to 2004*, which assesses factors influencing changes in energy use and related changes in GHGs.

A comprehensive database, including most data that the OEE uses for its analysis of historical energy use and GHG emissions, is available on the following Web site: oee.nrcan.gc.ca/tables06.

The CD – *Beyond Energy Efficiency: Data and Analysis* – contains electronic versions of this report, *Energy Efficiency Trends in Canada* and the detailed data tables for Canada from the comprehensive database. It is available upon request.

For more information on this product or other services, contact the OEE by e-mail at euc.cec@nrcan.gc.ca.

This handbook was prepared by Naima Behidj, Johanne Bernier, Samuel Blais, Dominic Demers, Sébastien Genest, Carolyn Ramsum and Katherine Sassi, all staff members of the Demand Policy and Analysis Division of the OEE, which is part of Natural Resources Canada. The project leader was Samuel Blais, with Jean-François Bilodeau and Tim McIntosh providing overall direction.

For more information, contact

Samuel Blais
Senior Economist
Office of Energy Efficiency
Natural Resources Canada
580 Booth Street, 18th Floor
Ottawa ON K1A 0E4

E-mail: euc.cec@nrcan.gc.ca



Table of Contents

Preface	i
Chapter 1 – Total End-Use Sector	1
The Data Situation.....	1
Canada’s Secondary Energy Use and GHG Emissions by Energy Source	2
Canada’s Secondary Energy Use by Sector, End-Use and Sub-Sector	4
Canada’s GHG Emissions by Sector, End-Use and Sub-Sector – <u>Including</u> Electricity-Related Emissions	8
Canada’s GHG Emissions by Sector, End-Use and Sub-Sector – <u>Excluding</u> Electricity-Related Emissions.....	12
Commodity Prices and Background Indicators	16
Chapter 2 – Residential Sector	19
The Data Situation.....	19
Residential Secondary Energy Use by Energy Source and End-Use	22
Residential GHG Emissions by Energy Source and End-Use – <u>Including</u> and <u>Excluding</u> Electricity-Related Emissions.....	24
Residential Housing Stock and Floor Space	26
Residential Space Heating Energy Use by Energy Source, Building Type and Vintage	30
Residential Space Heating System Stock Share.....	32
Residential Lighting and Space Cooling Details.....	34
Residential Appliance Details.....	36
Residential Appliance Unit Energy Consumption (UEC).....	38
Residential Water Heating Energy Use and Water Heater Stock Share	40
Residential Energy Prices and Background Indicators	42

Chapter 3 – Commercial/Institutional Sector45

The Data Situation.....	45
Commercial/Institutional Secondary Energy Use by Energy Source, End-Use and Activity Type	48
Commercial/Institutional GHG Emissions by Energy Source, End-Use and Activity Type – <u>Including</u> Electricity-Related Emissions.....	52
Commercial/Institutional GHG Emissions by End-Use and Activity Type – <u>Excluding</u> Electricity-Related Emissions.....	54
Commercial/Institutional Secondary Energy Use by Activity Type and Energy Source	56
Commercial/Institutional Energy Prices and Background Indicators	66

Chapter 4 – Industrial Sector69

The Data Situation.....	69
Industrial Secondary Energy Use and GHG Emissions by Energy Source	72
Industrial Secondary Energy Use by Industry.....	76
Industrial GHG Emissions by Industry – <u>Including</u> Electricity-Related Emissions	80
Industrial GHG Emissions by Industry – <u>Excluding</u> Electricity-Related Emissions.....	84
Industrial Gross Domestic Product by Industry	88
Industrial Energy Intensity by Industry.....	92
Industrial Energy Prices and Background Indicators	96

Chapter 5 – Transportation Sector99

The Data Situation.....	99
Transportation Secondary Energy Use by Energy Source and Transportation Mode.....	102
Transportation GHG Emissions by Energy Source and Transportation Mode.....	104
Transportation Energy Prices and Background Indicators.....	106

<i>Passenger Transportation Segment</i>	108
Passenger Transportation Secondary Energy Use by Energy Source and Transportation Mode.....	108
Passenger Transportation GHG Emissions by Energy Source and Transportation Mode.....	110
Passenger Road Transportation Secondary Energy Use and GHG Emissions by Energy Source	112
Passenger Transportation Explanatory Variables	114
<i>Freight Transportation Segment</i>	118
Freight Transportation Secondary Energy Use by Energy Source and Transportation Mode.....	118
Freight Transportation GHG Emissions by Energy Source and Transportation Mode.....	120
Freight Road Transportation Secondary Energy Use and GHG Emissions by Energy Source	122
Freight Transportation Explanatory Variables	124

Chapter 6 – Electricity Generation Sector127

The Data Situation.....	127
Electricity Generation Energy Use and Generation by Energy Source	128
Electricity Generation GHG Emissions by Energy Source.....	130

Appendix A – Reconciliation of Data.....132

Appendix B – Reconciliation of Definitions135

Appendix C – Glossary of Terms139

Appendix D – List of Abbreviations147



Total End-Use

SECTOR

Chapter

1

The Data Situation

The aggregate energy use data presented in this handbook are based on Statistics Canada's *Report on Energy Supply-Demand in Canada* (Cat. No. 57-003-XIB), Canada's official report on the energy supply and demand balance in Canada. Greenhouse gas emissions data are estimated using emissions factors developed by Environment Canada.

The Office of Energy Efficiency has developed energy models and/or databases for each sector of the economy presented in this report (i.e. residential, commercial/institutional, industrial, transportation and electricity generation) to assess trends in energy use in the Canadian economy. The data situation for a specific sector is outlined at the beginning of the corresponding chapter of this handbook.

Crude oil and natural gas commodity prices (or wholesale prices) are from the Petroleum Resources Branch of Natural Resources Canada. The crude oil wellhead price is from the Energy Information Administration of the U.S. Department of Energy.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

Canada's Secondary Energy Use and GHG Emissions by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^{a,b,c}	6,950.8	★	7,572.3	7,814.1	8,096.7	7,889.9	8,194.6	8,439.8	8,543.3	22.9%
Energy Use by Energy Source (PJ)										
Electricity	1,550.1	★	1,703.6	1,738.5	1,799.1	1,797.2	1,855.0	1,876.8	1,889.1	21.9%
Natural Gas	1,777.6	★	1,919.8	1,986.7	2,127.8	1,961.9	2,111.0	2,193.2	2,178.9	22.6%
Motor Gasoline	1,176.5	★	1,307.8	1,340.7	1,341.8	1,358.4	1,386.0	1,408.0	1,434.8	22.0%
Oil ¹	1,201.2	★	1,262.5	1,284.2	1,346.4	1,328.5	1,295.3	1,411.0	1,456.7	21.3%
Aviation Gasoline	5.5	★	3.9	3.6	3.4	3.5	3.5	3.2	2.9	-46.6%
Aviation Turbo Fuel	181.9	★	222.8	233.9	235.9	215.1	224.6	222.5	246.2	35.3%
Still Gas and Petroleum Coke	321.7	★	335.6	349.4	341.4	378.8	443.1	437.0	415.1	29.0%
Wood Waste and Pulping Liquor	341.0	★	416.3	464.0	464.4	421.1	458.6	468.0	476.4	39.7%
Other ²	310.0	★	314.5	321.2	334.5	329.8	316.6	314.5	335.5	8.3%
Residential Wood	85.3	★	85.6	91.8	102.0	95.5	101.0	105.7	107.7	26.2%
Total GHG Emissions Including Electricity (Mt of CO_{2e}) ^{a,b,c,d}	407.8	★	450.1	456.8	478.4	474.0	481.0	507.5	505.4	23.9%
GHG Emissions by Energy Source (Mt of CO_{2e})										
Electricity	87.1	★	106.0	103.6	112.4	116.5	113.4	126.9	117.3	34.6%
Natural Gas	89.5	★	95.7	99.1	106.5	98.0	105.4	109.2	108.5	21.2%
Motor Gasoline	83.9	★	92.6	94.9	95.0	96.2	98.1	99.7	101.6	21.1%
Oil ¹	89.8	★	94.3	95.9	100.5	99.1	96.5	104.9	108.3	20.7%
Aviation Gasoline	0.4	★	0.3	0.3	0.3	0.3	0.3	0.2	0.2	-46.6%
Aviation Turbo Fuel	13.2	★	15.7	16.4	16.6	15.1	15.8	15.6	17.3	31.6%
Still Gas and Petroleum Coke	20.9	★	22.6	23.0	22.6	25.1	28.7	28.3	28.0	33.7%
Wood Waste and Pulping Liquor	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Other ²	21.4	★	21.5	21.8	22.6	22.0	20.9	20.7	22.2	3.5%
Residential Wood	1.6	★	1.6	1.7	1.9	1.8	1.9	1.9	2.0	26.2%
Total GHG Emissions Excluding Electricity (Mt of CO_{2e}) ^{a,b,c,d}	320.7	★	344.1	353.2	366.1	357.5	367.5	380.6	388.1	21.0%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) "Oil" includes diesel fuel oil, light fuel oil, kerosene and heavy fuel oil.
 2) "Other" includes coal, coke, coke oven gas, LPG and Gas Plant NGL, steam and waste fuels from the cement industry.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.
 c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
 d) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Canada's Secondary Energy Use by Sector, End-Use and Sub-Sector

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
TOTAL ENERGY USE (PJ) ^{a,b,e}	6,950.8	★	7,572.3	7,814.1	8,096.7	7,889.9	8,194.6	8,439.8	8,543.3	22.9%
Residential (PJ) ^{a,b}	1,289.4	★	1,269.1	1,324.1	1,389.8	1,335.5	1,387.7	1,443.8	1,420.8	10.2%
Space Heating	753.2	★	709.7	753.4	814.0	749.9	792.1	836.8	811.1	7.7%
Water Heating	309.4	★	322.4	328.5	332.7	330.5	337.4	348.7	347.7	12.4%
Appliances	168.6	★	169.4	170.7	174.9	178.2	176.8	180.1	185.5	10.1%
Major Appliances	126.6	★	113.3	112.4	113.4	113.9	111.2	111.8	113.7	-10.2%
Other Appliances ¹	41.9	★	56.1	58.3	61.5	64.3	65.5	68.3	71.9	71.4%
Lighting	50.3	★	53.6	55.0	57.3	59.0	59.1	60.9	63.8	27.0%
Space Cooling	7.9	★	14.0	16.5	10.9	17.9	22.3	17.2	12.7	61.0%
Commercial/Institutional (PJ) ^{a,c}	867.0	★	944.1	979.2	1,072.8	1,060.9	1,131.5	1,166.5	1,171.2	35.1%
Space Heating	467.2	★	471.1	491.0	578.1	546.8	579.2	614.7	614.2	31.5%
Water Heating	67.6	★	79.6	80.7	89.8	92.0	93.0	98.9	102.7	51.9%
Auxiliary Equipment	80.8	★	110.4	114.4	130.9	137.1	141.2	154.2	165.4	104.7%
Auxiliary Motors	93.9	★	97.8	97.9	97.9	95.8	96.5	95.6	97.3	3.5%
Lighting	111.2	★	115.6	115.8	115.7	113.3	114.1	113.0	115.0	3.4%
Space Cooling	37.4	★	62.2	72.0	52.8	68.2	99.6	82.3	68.8	83.9%
Street Lighting ^f	8.9	★	7.5	7.4	7.7	7.7	7.8	7.8	7.9	-11.3%
Industrial (PJ) ^{a,e}	2,717.4	★	2,939.8	3,028.1	3,120.3	2,998.1	3,162.4	3,256.0	3,277.5	20.6%
Mining	343.4	★	457.8	459.6	516.8	522.3	562.2	628.9	635.6	85.1%
Pulp and Paper	747.5	★	823.2	891.8	894.2	812.2	847.5	853.7	876.6	17.3%
Iron and Steel	219.4	★	254.7	259.8	257.6	228.5	239.4	232.8	247.7	12.9%
Smelting and Refining	183.3	★	239.7	236.5	234.7	248.8	255.1	261.9	248.1	35.4%
Cement	59.3	★	60.4	63.5	63.6	61.9	66.4	63.2	64.2	8.3%
Chemicals	223.2	★	241.2	240.4	230.1	207.8	200.4	192.7	203.2	-9.0%
Petroleum Refining	334.9	★	291.9	288.0	295.1	311.4	365.2	373.4	340.3	1.6%
Other Manufacturing	531.8	★	510.4	523.5	562.0	538.9	555.1	573.8	579.1	8.9%
Forestry	7.7	★	12.3	14.8	16.2	18.3	17.1	18.7	22.7	193.8%
Construction	66.9	★	48.0	50.4	49.9	47.9	54.2	56.7	59.9	-10.5%

Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).b) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2006.c) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.d) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.e) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

Canada's Secondary Energy Use by Sector, End-Use and Sub-Sector (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Total Transportation (PJ) ^a	1,877.9	★	2,194.5	2,252.8	2,281.9	2,277.3	2,306.2	2,361.7	2,465.1	31.3%
Passenger Transportation (PJ) ^{a,d}	1,139.5	★	1,247.3	1,262.2	1,254.8	1,255.6	1,276.2	1,291.7	1,334.3	17.1%
Cars	675.6	★	637.0	630.3	614.1	615.8	617.7	620.8	624.4	-7.6%
Light Trucks	226.1	★	339.2	348.4	355.7	376.1	386.9	401.7	419.6	85.6%
Motorcycles	2.0	★	2.1	2.1	2.2	2.2	2.5	2.6	2.6	31.2%
Buses	50.9	★	50.6	52.4	52.8	52.0	52.1	52.3	51.0	0.1%
Air	180.2	★	216.1	226.3	227.1	206.6	214.4	211.9	234.1	29.9%
Rail	4.7	★	2.4	2.7	2.9	2.9	2.6	2.5	2.6	-45.9%
Freight Transportation (PJ) ^{a,d}	685.1	★	876.5	915.0	947.1	932.5	938.4	976.9	1,035.2	51.1%
Light Trucks	112.5	★	154.0	154.5	154.2	164.0	166.2	172.2	179.4	59.4%
Medium Trucks	127.7	★	140.1	161.2	161.6	135.5	141.4	140.9	143.4	12.3%
Heavy Trucks	246.3	★	378.5	398.2	424.9	419.1	435.1	475.4	510.7	107.3%
Air	7.3	★	10.6	11.3	12.2	12.0	13.7	13.8	15.0	106.9%
Rail	84.7	★	74.2	78.4	80.2	78.8	71.5	71.3	72.5	-14.5%
Marine	106.5	★	119.2	111.5	114.0	123.2	110.5	103.3	114.2	7.2%
Off-Road (PJ) ^d	53.3	★	70.6	75.6	80.0	89.2	91.5	93.2	95.7	79.3%
Agriculture (PJ) ^a	199.2	★	224.7	229.9	231.9	218.1	206.8	211.8	208.7	4.8%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.
 c) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
 d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
 e) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
 f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

**Canada's GHG Emissions by Sector, End-Use and Sub-Sector
– Including Electricity-Related Emissions**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
TOTAL GHG EMISSIONS INCLUDING										
ELECTRICITY (MT OF CO₂e) ^{a,b,d,e,f}	407.8	★	450.1	456.8	478.4	474.0	481.0	507.5	505.4	23.9%
Residential (Mt of CO₂e) ^{a,b,e}	69.5	★	69.5	71.1	75.8	74.2	74.8	81.1	76.7	10.3%
Space Heating	39.9	★	36.9	38.8	42.1	39.1	40.5	43.8	41.3	3.4%
Water Heating	16.9	★	17.9	17.9	18.5	18.7	18.6	20.0	19.2	13.8%
Appliances	9.5	★	10.5	10.1	10.9	11.5	10.8	12.1	11.5	21.2%
Major Appliances	7.1	★	7.0	6.7	7.0	7.3	6.8	7.5	7.0	-1.4%
Other Appliances ¹	2.4	★	3.5	3.5	3.8	4.2	4.0	4.6	4.5	89.3%
Lighting	2.8	★	3.3	3.3	3.6	3.8	3.6	4.1	4.0	40.2%
Space Cooling	0.4	★	0.9	1.0	0.7	1.2	1.4	1.2	0.8	77.8%
Commercial/Institutional (Mt of CO₂e) ^{a,c,e}	47.8	★	54.2	55.0	61.6	62.1	64.6	70.0	67.9	42.0%
Space Heating	25.5	★	25.5	26.4	31.5	29.9	31.5	34.1	34.1	33.7%
Water Heating	3.6	★	4.3	4.3	4.9	5.0	5.0	5.5	5.7	56.4%
Auxiliary Equipment	4.6	★	6.8	6.8	8.1	8.8	8.6	10.3	10.2	124.3%
Auxiliary Motors	5.3	★	6.1	5.8	6.1	6.2	5.9	6.5	6.0	14.3%
Lighting	6.3	★	7.2	6.9	7.2	7.3	7.0	7.6	7.1	14.2%
Space Cooling	2.1	★	3.8	4.3	3.3	4.4	6.0	5.5	4.2	101.3%
Street Lighting ^g	0.5	★	0.5	0.4	0.5	0.5	0.5	0.5	0.5	-2.0%
Industrial (Mt of CO₂e) ^{a,e,f}	141.7	★	153.6	153.4	161.3	159.2	162.1	172.3	169.7	19.7%
Mining	21.4	★	28.9	28.8	32.3	32.4	33.6	38.0	37.8	76.8%
Pulp and Paper	24.2	★	23.9	24.3	25.1	23.5	22.3	23.7	23.4	-3.2%
Iron and Steel	15.9	★	17.8	18.1	18.1	16.5	16.8	16.6	17.7	11.5%
Smelting and Refining	10.7	★	15.0	14.2	14.7	16.0	15.6	17.5	15.5	44.7%
Cement	4.1	★	4.2	4.4	4.5	4.4	4.6	4.7	4.7	14.2%
Chemicals	10.8	★	12.8	12.6	12.2	11.0	10.3	10.4	10.6	-2.0%
Petroleum Refining	20.8	★	19.0	18.2	18.9	20.2	23.2	23.7	22.3	7.3%
Other Manufacturing	28.6	★	27.7	28.1	30.8	30.1	30.4	32.3	31.6	10.7%
Forestry	0.6	★	1.0	1.2	1.3	1.5	1.4	1.5	1.8	196.7%
Construction	4.6	★	3.4	3.5	3.5	3.4	3.8	3.9	4.1	-9.6%
										Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2006.
c) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.
d) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.
e) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

**Canada's GHG Emissions by Sector, End-Use and Sub-Sector
– Including Electricity-Related Emissions (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Total Transportation (Mt of CO₂e) ^{a,d,e}	135.0	★	156.8	161.1	163.3	163.0	165.0	168.9	176.4	30.6%
<i>Passenger Transportation (Mt of CO₂e) ^{a,d,e}</i>	<i>81.2</i>	★	<i>88.0</i>	<i>89.1</i>	<i>88.6</i>	<i>88.7</i>	<i>90.2</i>	<i>91.3</i>	<i>94.3</i>	<i>16.2%</i>
Cars	47.8	★	44.6	44.2	43.1	43.2	43.3	43.6	43.8	-8.3%
Light Trucks	16.3	★	24.3	25.0	25.5	26.9	27.7	28.8	30.1	84.4%
Motorcycles	0.1	★	0.1	0.1	0.1	0.2	0.2	0.2	0.2	30.0%
Buses	3.6	★	3.6	3.7	3.7	3.7	3.7	3.7	3.6	1.0%
Air	13.0	★	15.2	15.9	16.0	14.5	15.1	14.9	16.5	26.4%
Rail	0.4	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-45.4%
<i>Freight Transportation (Mt of CO₂e) ^{a,d,e}</i>	<i>50.1</i>	★	<i>63.9</i>	<i>66.7</i>	<i>69.1</i>	<i>68.1</i>	<i>68.4</i>	<i>71.1</i>	<i>75.4</i>	<i>50.6%</i>
Light Trucks	7.9	★	10.9	10.9	10.9	11.6	11.8	12.3	12.8	62.1%
Medium Trucks	9.2	★	10.1	11.6	11.6	9.7	10.2	10.1	10.3	11.8%
Heavy Trucks	17.6	★	27.3	28.7	30.6	30.2	31.3	34.2	36.8	109.4%
Air	0.5	★	0.7	0.8	0.9	0.8	1.0	1.0	1.1	101.2%
Rail	6.7	★	6.0	6.3	6.4	6.3	5.7	5.7	5.8	-13.6%
Marine	8.1	★	9.0	8.5	8.6	9.3	8.4	7.8	8.7	6.3%
<i>Off-Road (Mt of CO₂e) ^{d,e}</i>	<i>3.7</i>	★	<i>4.9</i>	<i>5.3</i>	<i>5.6</i>	<i>6.2</i>	<i>6.4</i>	<i>6.5</i>	<i>6.6</i>	<i>77.6%</i>
Agriculture (Mt of CO₂e) ^{a,e}	13.7	★	16.0	16.3	16.5	15.5	14.5	15.1	14.7	7.1%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.
- Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
- Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
- Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
- Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
- Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

Canada's GHG Emissions by Sector, End-Use and Sub-Sector – Excluding Electricity-Related Emissions

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
TOTAL GHG EMISSIONS EXCLUDING ELECTRICITY (MT OF CO₂e) ^{a,b,d,e,f}	320.7	★	344.1	353.2	366.1	357.5	367.5	380.6	388.1	21.0%
Residential (Mt of CO₂e) ^{a,b,e}	43.2	★	40.5	42.5	44.7	41.5	43.1	45.1	43.0	-0.7%
Space Heating	33.1	★	29.5	31.2	33.4	30.4	31.8	33.4	31.5	-4.6%
Water Heating	10.0	★	10.9	11.1	11.1	10.9	11.1	11.5	11.2	11.6%
Appliances	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38.2%
Major Appliances	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38.2%
Other Appliances ¹	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Lighting	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Space Cooling	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Commercial/Institutional (Mt of CO₂e) ^{a,c,e}	25.9	★	27.4	28.9	33.3	33.2	35.4	38.0	38.0	46.7%
Space Heating	22.3	★	23.1	24.4	28.4	27.9	29.8	31.9	31.8	42.3%
Water Heating	3.1	★	3.7	3.8	4.1	4.5	4.7	5.1	5.2	66.1%
Auxiliary Equipment	0.3	★	0.5	0.5	0.6	0.6	0.6	0.7	0.8	122.1%
Auxiliary Motors	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Lighting	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Space Cooling	0.1	★	0.2	0.2	0.1	0.2	0.3	0.3	0.2	220.3%
Street Lighting ^g	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Industrial (Mt of CO₂e) ^{a,e,f}	104.7	★	105.8	106.7	110.7	106.7	111.8	116.2	118.5	13.2%
Mining	15.6	★	21.4	21.9	24.8	24.3	26.0	29.5	30.0	93.0%
Pulp and Paper	14.3	★	11.4	11.5	11.2	10.0	9.4	9.1	9.4	-33.8%
Iron and Steel	14.2	★	15.5	15.9	15.8	13.9	14.3	14.1	15.4	8.2%
Smelting and Refining	3.2	★	3.6	3.4	3.2	3.5	3.2	3.3	3.3	1.5%
Cement	3.8	★	3.7	4.0	4.0	4.0	4.2	4.2	4.3	13.3%
Chemicals	7.2	★	8.6	8.4	7.9	6.8	6.2	5.9	6.3	-11.3%
Petroleum Refining	19.7	★	17.9	17.0	17.7	18.9	22.0	22.3	21.0	6.6%
Other Manufacturing	21.6	★	19.3	19.9	21.3	20.5	21.4	22.4	22.8	5.6%
Forestry	0.6	★	1.0	1.2	1.3	1.5	1.4	1.5	1.8	196.7%
Construction	4.6	★	3.4	3.5	3.5	3.4	3.8	3.9	4.1	-9.6%

Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2006.
c) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.
d) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.
e) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-X1B). Data for 2004 estimated by Natural Resources Canada.

**Canada's GHG Emissions by Sector, End-Use and Sub-Sector
– Excluding Electricity-Related Emissions (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Total Transportation (Mt of CO_{2e})^{a,d,e}	134.8	★	156.7	160.9	163.1	162.8	164.8	168.7	176.2	30.6%
<i>Passenger Transportation (Mt of CO_{2e})^{a,d,e}</i>	<i>81.0</i>	★	<i>87.9</i>	<i>88.9</i>	<i>88.4</i>	<i>88.5</i>	<i>90.0</i>	<i>91.1</i>	<i>94.1</i>	<i>16.2%</i>
Cars	47.8	★	44.6	44.2	43.1	43.2	43.3	43.6	43.8	-8.3%
Light Trucks	16.3	★	24.3	25.0	25.5	26.9	27.7	28.8	30.1	84.4%
Motorcycles	0.1	★	0.1	0.1	0.1	0.2	0.2	0.2	0.2	30.0%
Buses	3.4	★	3.4	3.5	3.5	3.5	3.5	3.5	3.4	-0.1%
Air	13.0	★	15.2	15.9	16.0	14.5	15.1	14.9	16.5	26.4%
Rail	0.4	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-45.4%
<i>Freight Transportation (Mt of CO_{2e})^{a,d,e}</i>	<i>50.1</i>	★	<i>63.9</i>	<i>66.7</i>	<i>69.1</i>	<i>68.1</i>	<i>68.4</i>	<i>71.1</i>	<i>75.4</i>	<i>50.6%</i>
Light Trucks	7.9	★	10.9	10.9	10.9	11.6	11.8	12.3	12.8	62.1%
Medium Trucks	9.2	★	10.1	11.6	11.6	9.7	10.2	10.1	10.3	11.8%
Heavy Trucks	17.6	★	27.3	28.7	30.6	30.2	31.3	34.2	36.8	109.4%
Air	0.5	★	0.7	0.8	0.9	0.8	1.0	1.0	1.1	101.2%
Rail	6.7	★	6.0	6.3	6.4	6.3	5.7	5.7	5.8	-13.6%
Marine	8.1	★	9.0	8.5	8.6	9.3	8.4	7.8	8.7	6.3%
<i>Off-Road (Mt of CO_{2e})^{d,e}</i>	<i>3.7</i>	★	<i>4.9</i>	<i>5.3</i>	<i>5.6</i>	<i>6.2</i>	<i>6.4</i>	<i>6.5</i>	<i>6.6</i>	<i>77.6%</i>
Agriculture (Mt of CO_{2e})^{a,e}	12.0	★	13.8	14.2	14.3	13.3	12.4	12.7	12.5	3.9%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.
- Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
- Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
- Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
- Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.
- Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

Commodity Prices and Background Indicators

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Commodity Prices										
<i>Crude Oil Prices</i>										
Wellhead U.S. Average (\$US/bbl.) ^a	20.03	★	10.87	15.56	26.72	21.84	22.51	27.56	36.77	83.6%
Edmonton Par ¹ (\$/m ³) ^b	173.95	★	126.46	172.16	278.98	246.69	253.44	274.10	333.87	91.9%
Brent Montréal ² (\$/m ³) ^b	187.35	★	134.07	180.44	280.95	267.49	263.13	275.71	336.01	79.3%
<i>Natural Gas Price at AECO-C Hub (intra-Alberta)³ (\$/GJ)^b</i>	<i>1.34</i>	<i>★</i>	<i>1.92</i>	<i>2.77</i>	<i>4.81</i>	<i>5.91</i>	<i>3.83</i>	<i>6.31</i>	<i>6.52</i>	<i>386.6%</i>
Background Indicators										
<i>Total GDP (million \$97)^c</i>	<i>707,669</i>	<i>★</i>	<i>848,963</i>	<i>896,556</i>	<i>946,025</i>	<i>960,657</i>	<i>989,337</i>	<i>1,012,785</i>	<i>1,045,795</i>	<i>47.8%</i>
Industrial	199,905	★	234,847	249,273	271,175	265,978	271,435	277,423	290,171	45.2%
Commercial/Institutional	438,822	★	533,038	562,192	588,424	610,409	633,127	648,997	666,238	51.8%
Agriculture	13,627	★	14,693	15,980	15,181	13,076	11,955	13,809	14,491	6.3%
Electricity Generation	20,049	★	21,881	21,883	21,651	20,641	21,884	21,302	21,401	6.7%
<i>Multifactor Measure of Productivity (1997 = 100)^c</i>	<i>97.7</i>	<i>★</i>	<i>101.1</i>	<i>103.5</i>	<i>106.1</i>	<i>106.7</i>	<i>108.9</i>	<i>109.0</i>	<i>109.5</i>	

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) Edmonton crude oil price is based on the price of West Texas Intermediate (WTI) crude, sold on the Chicago Mercantile Exchange. Edmonton par is priced to be competitive with WTI, taking into account transportation costs.
- 2) Brent Montréal crude oil is the cost of Brent crude oil (in the Montréal market) including the transportation costs through the Portland-Montréal oil pipeline.
- 3) AECO-C hub is the main pricing point for Alberta natural gas and represents the major pricing point for Canadian gas.

Sources:

- a) The Energy Information Administration (EIA), *Domestic Crude Oil First Purchase Prices by Area*, December 2005.
- b) Natural Resources Canada, Petroleum Resources Branch, Ottawa, December 2005.
- c) Infometrics Limited, *T1 Model and Database*, Ottawa, November 2005.



Residential

SECTOR

Chapter

2

The Data Situation

Aggregate data on residential energy use are reported in Statistics Canada's *Report on Energy Supply-Demand in Canada* (RES-D) (Cat. No. 57-003-XIB). To provide more detail on how this energy is used, the Office of Energy Efficiency (OEE) has developed the Residential End-Use Model (REUM). This stock accounting model assesses trends in energy use in the Canadian residential sector by allocating the energy use reported in RES-D to end-uses using annual stock characteristics and sales data, coupled with usage profile and unit energy consumption for equipment stock. It is disaggregated at the provincial level and includes four building types (single attached, single detached, apartment and mobile home) and five end-uses (space heating, water heating, appliances, lighting and space cooling). Some end-uses are further disaggregated by equipment type or energy source.

The residential housing stock estimates are derived from Statistics Canada's *Survey of Household Spending* (SHS) since 1997 and *Household Facilities and Equipment Survey* (HFE) for the years prior to 1997. The two surveys collect similar information but use different methodologies. Furthermore, significant processing of the data was necessary to merge the information. By combining data from the HFE survey with data from the SHS, we estimate data on housing stock by province, building type and vintage. We obtain related floor space information by combining our housing stock estimates with data from two other Statistics Canada surveys: the *Building Permits Survey* and the OEE-sponsored *Survey of Household Energy Use* (SHEU). This year, data were released for the most recent SHEU, which covered the 2003 calendar year. SHEU data were also collected for the years 1993 and 1997. Floor space estimates between 1998 and 2003 were revised using new data from SHEU 2003.

Statistics Canada's SHS/HFE are the principal sources of information for stock data. Related data on usage profile and unit energy consumption are drawn from the internal expertise of OEE's staff, and data collected by various industry associations, as well as studies commissioned by the OEE. In particular, we use data from the Canadian Appliance Manufacturers Association, the Heating, Refrigeration and Air Conditioning Institute of Canada, the Energy Technology Database developed by Marbek Resource Consultants Ltd. and analysis done by the now defunct Canadian Residential Energy End-Use Data Analysis Centre.

This year, research from the Canadian Building Energy End-Use Data Analysis Centre was integrated for the first time into REUM, which led us to revise assumptions for hot water requirements.

REUM also takes into account the influence of weather on residential energy demand. It uses the number of heating degree-days in *Monthly Values of Degree-Days below 18.0°C* and the number of cooling degree-days in *Monthly Values of Degree-Days above 18.0°C*, two reports from Environment Canada.

Natural Resources Canada has always been committed to improving energy end-use data quality and analysis. As such, surveys sponsored by the National Energy Use Database (NEUD) collect more detailed information on the characteristics of energy-using appliances and equipment, the state of dwellings and building stock, the profile of consumers (including consumption habits), data on annual energy consumption by households, new housing, and retrofit activities. For more information on surveys conducted by NEUD, visit its Web site at oee.nrcan.gc.ca/statistics/publications.

The residential prices of heating oil and natural gas are weighted averages of regional prices from Statistics Canada's *Energy Statistics Handbook* (Cat. No. 57-601-XIE). The residential price of electricity is a weighted average of the data found in Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

Residential Secondary Energy Use by Energy Source and End-Use

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^{a,b}	1,289.4	★	1,269.1	1,324.1	1,389.8	1,335.5	1,387.7	1,443.8	1,420.8	10.2%
Energy Use by Energy Source (PJ) ^{a,b}										
Electricity	467.4	★	465.6	479.8	497.6	504.9	517.5	532.8	543.7	16.3%
Natural Gas	528.4	★	577.8	609.3	644.8	601.0	640.2	670.2	651.1	23.2%
Heating Oil	186.4	★	126.1	131.0	132.4	121.1	116.5	122.8	106.0	-43.1%
Other ¹	21.9	★	14.1	12.2	13.0	13.1	12.4	12.4	12.4	-43.2%
Wood	85.3	★	85.6	91.8	102.0	95.5	101.0	105.7	107.7	26.2%
Energy Use by End-Use (PJ) ^b										
Space Heating	753.2	★	709.7	753.4	814.0	749.9	792.1	836.8	811.1	7.7%
Water Heating	309.4	★	322.4	328.5	332.7	330.5	337.4	348.7	347.7	12.4%
Appliances	168.6	★	169.4	170.7	174.9	178.2	176.8	180.1	185.5	10.1%
<i>Major Appliances</i>	126.6	★	113.3	112.4	113.4	113.9	111.2	111.8	113.7	-10.2%
<i>Other Appliances ²</i>	41.9	★	56.1	58.3	61.5	64.3	65.5	68.3	71.9	71.4%
Lighting	50.3	★	53.6	55.0	57.3	59.0	59.1	60.9	63.8	27.0%
Space Cooling	7.9	★	14.0	16.5	10.9	17.9	22.3	17.2	12.7	61.0%
Activity										
Total Floor Space (million m ²) ^b	1,195	★	1,420	1,439	1,461	1,479	1,498	1,519	1,545	29.3%
Total Households (thousands) ^{b,c}	9,895	★	11,385	11,553	11,729	11,897	12,052	12,214	12,375	25.1%
Energy Intensity (GJ/m²) ^{a,b}										
Energy Intensity (GJ/m²) ^{a,b}	1.08	★	0.89	0.92	0.95	0.90	0.93	0.95	0.92	-14.8%
Energy Intensity (GJ/household) ^{a,b,c}										
Energy Intensity (GJ/household) ^{a,b,c}	130.3	★	111.5	114.6	118.5	112.3	115.1	118.2	114.8	-11.9%
Heating Degree-Day Index ^{b,d}										
Heating Degree-Day Index ^{b,d}	0.92	★	0.84	0.88	0.96	0.88	0.94	0.97	0.95	
Cooling Degree-Day Index ^{b,e}										
Cooling Degree-Day Index ^{b,e}	1.06	★	1.29	1.54	0.90	1.43	1.71	1.31	0.94	

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

2) "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).

b) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2006.

c) Statistics Canada, *Survey of Household Spending in 1997–2004*, Ottawa, December 2005 (Cat. No. 62F0041).

d) Environment Canada, *Climate Summaries, Monthly Values of Degree-Days below 18.0°C, 1990–2004*, Ottawa.

e) Environment Canada, *Climate Summaries, Monthly Values of Degree-Days above 18.0°C, 1990–2004*, Ottawa.

Residential GHG Emissions by Energy Source and End-Use – Including and Excluding Electricity-Related Emissions

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions Including Electricity (Mt of CO_{2e})^{a,b,c}	69.5	★	69.5	71.1	75.8	74.2	74.8	81.1	76.7	10.3%
<i>GHG Emissions by Energy Source (Mt of CO_{2e})^{a,b,c}</i>										
Electricity	26.3	★	29.0	28.6	31.1	32.7	31.6	36.0	33.8	28.5%
Natural Gas	26.6	★	28.8	30.4	32.3	30.0	32.0	33.4	32.4	21.8%
Heating Oil	13.7	★	9.2	9.6	9.7	8.9	8.5	9.0	7.8	-43.3%
Other ¹	1.4	★	0.9	0.8	0.8	0.8	0.8	0.8	0.8	-42.2%
Wood	1.6	★	1.6	1.7	1.9	1.8	1.9	1.9	2.0	26.2%
<i>GHG Emissions by End-Use (Mt of CO_{2e})^{b,c}</i>										
Space Heating	39.9	★	36.9	38.8	42.1	39.1	40.5	43.8	41.3	3.4%
Water Heating	16.9	★	17.9	17.9	18.5	18.7	18.6	20.0	19.2	13.8%
Appliances	9.5	★	10.5	10.1	10.9	11.5	10.8	12.1	11.5	21.2%
<i>Major Appliances</i>	7.1	★	7.0	6.7	7.0	7.3	6.8	7.5	7.0	-1.4%
<i>Other Appliances²</i>	2.4	★	3.5	3.5	3.8	4.2	4.0	4.6	4.5	89.3%
Lighting	2.8	★	3.3	3.3	3.6	3.8	3.6	4.1	4.0	40.2%
Space Cooling	0.4	★	0.9	1.0	0.7	1.2	1.4	1.2	0.8	77.8%
GHG Intensity (tonne/TJ)^{a,b,c}	53.9	★	54.7	53.7	54.5	55.5	53.9	56.2	54.0	0.1%
<i>GHG Emissions Excluding Electricity (Mt of CO_{2e})^{a,b,c}</i>										
Total GHG Emissions Excluding Electricity (Mt of CO_{2e})^{a,b,c}	43.2	★	40.5	42.5	44.7	41.5	43.1	45.1	43.0	-0.7%
<i>GHG Emissions by End-Use (Mt of CO_{2e})^{b,c}</i>										
Space Heating	33.1	★	29.5	31.2	33.4	30.4	31.8	33.4	31.5	-4.6%
Water Heating	10.0	★	10.9	11.1	11.1	10.9	11.1	11.5	11.2	11.6%
Appliances	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38.2%
<i>Major Appliances</i>	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38.2%
<i>Other Appliances²</i>	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Lighting	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Space Cooling	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
GHG Intensity (tonne/TJ)^{a,b,c}	33.5	★	31.9	32.1	32.2	31.1	31.1	31.2	30.2	-9.9%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) “Other” includes coal and propane.
 2) “Other Appliances” includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2006.
 c) Environment Canada, *Canada’s Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Residential Housing Stock and Floor Space

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Housing Stock (thousands) ^a	10,410	★	12,027	12,185	12,351	12,506	12,653	12,810	12,967	24.6%
<i>Housing Stock by Building Type (thousands)</i>										
Single Detached	5,865	★	6,845	6,956	7,083	7,167	7,243	7,349	7,474	27.4%
Single Attached	929	★	1,264	1,271	1,293	1,315	1,328	1,341	1,349	45.2%
Apartments	3,394	★	3,666	3,694	3,711	3,763	3,821	3,853	3,877	14.2%
Mobile Homes	222	★	253	264	264	261	261	267	266	20.1%
<i>Housing Stock by Vintage (thousands)</i>										
Before 1946	2,064	★	1,958	1,947	1,940	1,923	1,892	1,868	1,832	-11.2%
1946–1960	1,364	★	1,326	1,321	1,318	1,312	1,300	1,291	1,278	-6.3%
1961–1977	3,632	★	3,513	3,495	3,479	3,457	3,425	3,398	3,353	-7.7%
1978–1983	1,600	★	1,577	1,573	1,570	1,566	1,559	1,553	1,544	-3.5%
1984–1995	1,751	★	3,047	3,044	3,042	3,038	3,032	3,027	3,019	72.5%
1996–2000 ¹	0	★	606	805	1,002	1,002	1,002	1,002	1,002	394.1%
2001–2004 ²	0	★	0	0	0	207	442	671	938	354.3%
Total Floor Space (million m²) ^a	1,195	★	1,420	1,439	1,461	1,479	1,498	1,519	1,545	29.3%
<i>Floor Space by Building Type (million m²)</i>										
Single Detached	782	★	941	957	975	987	999	1,016	1,038	32.6%
Single Attached	106	★	145	147	150	153	155	158	159	50.8%
Apartments	287	★	311	311	311	314	318	319	323	12.3%
Mobile Homes	20	★	24	25	25	25	25	26	26	30.5%
<i>Floor Space by Vintage (million m²)</i>										
Before 1946	235	★	225	224	224	222	219	217	213	-9.4%
1946–1960	139	★	136	135	135	134	133	132	131	-6.1%
1961–1977	397	★	383	378	374	369	363	358	354	-10.8%
1978–1983	195	★	192	190	189	188	187	185	184	-5.4%
1984–1995	229	★	401	399	398	396	394	392	392	70.7%
1996–2000 ¹	0	★	85	112	140	140	139	139	139	396.9%
2001–2004 ²	0	★	0	0	0	29	62	95	133	360.4%

Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Growth rate shown in the final column entitled "Total Growth 1990–2004" is for 1996 to 2004.

2) Growth rate shown in the final column entitled "Total Growth 1990–2004" is for 2001 to 2004.

Source:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

Residential Housing Stock and Floor Space (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued
										Total Growth 1990–2004
Average Size of Housing Unit (m²/house) ^a	115	★	118	118	118	118	118	119	119	3.8%
<i>Average Size by Building Type (m²/house)</i>										
Single Detached	133	★	137	138	138	138	138	138	139	4.1%
Single Attached	114	★	115	115	116	116	117	118	118	3.8%
Apartments	85	★	85	84	84	83	83	83	83	-1.7%
Mobile Homes	90	★	93	94	94	95	96	97	97	8.7%
<i>Average Size by Vintage (m²/house)</i>										
Before 1946	114	★	115	115	115	116	116	116	116	2.1%
1946–1960	102	★	102	102	102	102	102	102	102	0.3%
1961–1977	109	★	109	108	108	107	106	105	106	-3.4%
1978–1983	122	★	122	121	121	120	120	119	119	-2.0%
1984–1995	131	★	132	131	131	130	130	130	130	-1.0%
1996–2000 ¹	0	★	140	139	140	140	139	139	139	0.6%
2001–2004 ²	0	★	0	0	0	140	141	142	142	1.4%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) Growth rate shown in the final column entitled "Total Growth 1990–2004" is for 1996 to 2004.
 2) Growth rate shown in the final column entitled "Total Growth 1990–2004" is for 2001 to 2004.

Source:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

Residential Space Heating Energy Use by Energy Source, Building Type and Vintage

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Space Heating Energy Use (PJ) ^a	753.2	★	709.7	753.4	814.0	749.9	792.1	836.8	811.1	7.7%
Energy Use by Energy Source (PJ) ^a										
Electricity	122.1	★	120.0	127.1	140.6	134.0	142.0	153.6	157.2	28.8%
Natural Gas	364.8	★	383.6	411.2	445.0	404.8	437.6	460.2	442.9	21.4%
Heating Oil	163.3	★	108.6	113.0	115.4	104.4	100.9	106.7	92.7	-43.2%
Other ¹	18.1	★	12.6	11.0	11.9	11.9	11.5	11.5	11.6	-36.2%
Wood	85.0	★	84.9	91.1	101.2	94.7	100.1	104.7	106.8	25.7%
Energy Use by Building Type (PJ) ^a										
Single Detached	574.1	★	542.6	577.1	626.0	575.0	608.1	641.2	621.7	8.3%
Single Attached	55.5	★	59.5	63.4	68.6	63.6	67.2	71.6	68.5	23.5%
Apartments	104.6	★	90.5	95.1	100.2	93.7	98.3	104.9	102.8	-1.7%
Mobile Homes	19.1	★	17.1	17.8	19.3	17.6	18.4	19.1	18.2	-5.1%
Energy Use by Vintage (PJ) ^a										
Before 1946	222.4	★	178.7	189.7	204.6	186.2	193.5	203.9	191.2	-14.0%
1946–1960	101.0	★	83.9	88.3	94.3	86.1	89.6	93.3	88.8	-12.0%
1961–1977	231.4	★	193.0	199.9	211.0	190.6	196.8	201.5	191.7	-17.1%
1978–1983	108.0	★	94.0	97.8	104.4	94.7	99.6	102.9	98.1	-9.2%
1984–1995	90.4	★	131.9	138.9	147.5	135.4	141.2	148.0	142.8	58.0%
1996–2000 ²	0.0	★	28.2	38.9	52.3	47.5	50.2	52.5	51.1	334.1%
2001–2004 ³	0.0	★	0.0	0.0	0.0	9.4	21.2	34.7	47.3	402.5%
Activity										
Total Floor Space (million m ²) ^a	1,195	★	1,420	1,439	1,461	1,479	1,498	1,519	1,545	29.3%
Energy Intensity (GJ/m²) ^a										
	0.63	★	0.50	0.52	0.56	0.51	0.53	0.55	0.52	-16.7%
Heat Gains (PJ) ^a										
	86.1	★	80.3	85.4	95.6	89.6	95.2	100.2	101.9	18.4%
Heating Degree-Day Index ^{a,b}										
	0.92	★	0.84	0.88	0.96	0.88	0.94	0.97	0.95	

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) “Other” includes coal and propane.

2) Growth rate shown in the final column entitled “Total Growth 1990–2004” is for 1996 to 2004.

3) Growth rate shown in the final column entitled “Total Growth 1990–2004” is for 2001 to 2004.

Sources:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

b) Environment Canada, Climate Summaries, *Monthly Values of Degree-Days below 18.0°C, 1990–2004*, Ottawa.

Residential Space Heating System Stock Share

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Heating System Stock Share by System Type (%)^a										
Heating Oil – Normal Efficiency	14.2	★	8.4	7.9	7.5	7.1	6.8	6.4	6.1	
Heating Oil – Medium Efficiency	0.2	★	2.0	2.1	2.3	2.4	2.5	2.6	2.7	
Heating Oil – High Efficiency	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Natural Gas – Normal Efficiency	41.1	★	32.3	31.1	29.9	28.7	27.2	25.8	24.1	
Natural Gas – Medium Efficiency	1.0	★	9.1	10.1	11.1	12.0	13.1	13.8	14.9	
Natural Gas – High Efficiency	2.1	★	5.1	5.5	5.9	6.4	7.0	7.6	8.4	
Electric Baseboard	28.0	★	28.3	28.1	27.9	27.8	27.7	27.7	27.5	
Heat Pump	2.1	★	3.1	3.1	3.3	3.5	3.6	3.7	3.8	
Other ¹	0.8	★	1.2	1.2	1.2	1.3	1.3	1.3	1.3	
Wood	1.6	★	1.7	1.9	2.0	1.9	1.9	1.9	1.9	
Dual Systems										
Wood/Electric	5.2	★	4.9	5.0	5.0	5.0	5.0	5.1	5.1	
Wood/Heating Oil	2.4	★	2.3	2.3	2.4	2.4	2.4	2.4	2.4	
Natural Gas/Electric	0.3	★	0.4	0.4	0.4	0.4	0.5	0.5	0.5	
Heating Oil/Electric	0.8	★	1.1	1.1	1.1	1.2	1.2	1.2	1.2	

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) “Other” includes coal and propane.

Source:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

Residential Lighting and Space Cooling Details

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Lighting Energy Use¹ (PJ)^a	50.3	★	53.6	55.0	57.3	59.0	59.1	60.9	63.8	27.0%
Activity										
Total Floor Space (million m ²) ^a	1,195	★	1,420	1,439	1,461	1,479	1,498	1,519	1,545	29.3%
Energy Intensity (MJ/m²)^a	42.0	★	37.7	38.2	39.2	39.9	39.4	40.1	41.3	-1.8%
Heat Loss (PJ)^a	21.1	★	20.5	22.1	25.0	23.7	25.3	26.9	27.6	30.9%
Total Space Cooling Energy Use¹ (PJ)^a	7.9	★	14.0	16.5	10.9	17.9	22.3	17.2	12.7	61.0%
Energy Use by Cooling System Type (PJ)^a										
Room	1.8	★	2.4	2.9	1.8	3.0	3.5	2.8	2.1	11.9%
Central	6.0	★	11.5	13.6	9.1	14.9	18.8	14.4	10.6	76.0%
Activity										
Floor Space (million m ²) ^a	308	★	483	508	530	554	583	611	629	103.9%
Energy Intensity (MJ/m²)^a	25.5	★	28.9	32.5	20.6	32.3	38.3	28.1	20.2	-21.0%
Cooling Degree-Day Index^{a,b}	1.06	★	1.29	1.54	0.90	1.43	1.71	1.31	0.94	
Total Cooling System Stock (thousands)^a	2,466	★	3,735	3,937	4,119	4,321	4,561	4,784	4,903	98.8%
System Stock by Cooling System Type (thousands)^a										
Room	1,090	★	1,419	1,488	1,539	1,602	1,651	1,724	1,767	62.0%
Central	1,376	★	2,316	2,449	2,580	2,720	2,911	3,060	3,137	128.0%
Cooling System New Unit Efficiency^a										
Room (EER)	7.1	★	9.4	9.4	9.4	9.4	9.4	9.4	9.4	31.5%
Central (SEER)	9.1	★	10.3	10.3	10.3	10.3	10.3	10.3	10.3	12.7%
Cooling System Stock Efficiency^a										
Room (EER)	6.8	★	7.9	8.1	8.3	8.4	8.6	8.8	8.9	30.5%
Central (SEER)	8.6	★	9.4	9.5	9.6	9.7	9.7	9.8	9.9	15.3%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Lighting and space cooling consume only electricity.

Sources:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

b) Environment Canada, Climate Summaries, *Monthly Values of Degree-Days above 18.0°C, 1990–2004*, Ottawa.

Residential Appliance Details

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Appliance Energy Use (PJ) ^a	168.6	★	169.4	170.7	174.9	178.2	176.8	180.1	185.5	10.1%
Energy Use by Energy Source (PJ) ^a										
Electricity	165.1	★	165.3	166.7	170.7	174.0	172.3	175.2	180.6	9.4%
Natural Gas	3.5	★	4.1	4.0	4.2	4.2	4.4	5.0	4.9	39.8%
Energy Use by Appliance Type (PJ) ^a										
Refrigerator	50.2	★	39.3	39.0	38.3	37.8	36.3	35.7	36.7	-27.0%
Freezer	20.3	★	16.0	15.0	14.7	14.1	13.1	12.4	11.8	-41.9%
Dishwasher ¹	3.3	★	2.8	2.7	2.7	2.7	2.6	2.5	2.5	-24.0%
Clothes Washer ¹	2.2	★	2.2	2.2	2.3	2.3	2.2	2.2	2.2	-0.1%
Clothes Dryer	27.2	★	27.4	27.3	28.2	29.0	28.5	29.2	30.2	10.8%
Range	23.4	★	25.6	26.3	27.3	28.1	28.4	29.6	30.3	29.6%
Other Appliances ²	41.9	★	56.1	58.3	61.5	64.3	65.5	68.3	71.9	71.4%
Activity										
Total Households (thousands) ^{a,b}	9,895	★	11,385	11,553	11,729	11,897	12,052	12,214	12,375	25.1%
Energy Intensity (GJ/household) ^{a,b}	17.0	★	14.9	14.8	14.9	15.0	14.7	14.7	15.0	-12.0%
Heat Loss by Appliance Type (PJ) ^a										
Refrigerator	21.3	★	15.2	15.8	16.9	15.3	15.7	15.9	16.1	-24.4%
Freezer	8.7	★	6.3	6.1	6.5	5.8	5.8	5.6	5.3	-39.5%
Dishwasher ¹	0.5	★	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-21.8%
Clothes Washer ¹	0.5	★	0.5	0.5	0.6	0.5	0.5	0.6	0.5	3.7%
Clothes Dryer	3.2	★	3.0	3.1	3.5	3.3	3.5	3.7	3.7	14.8%
Range	8.3	★	8.2	8.9	10.0	9.5	10.2	11.0	11.1	33.7%
Other Appliances ²	17.8	★	21.7	23.6	27.1	26.1	28.4	30.4	31.5	77.3%
Appliances per Household by Appliance Type ^{a,b}										
Refrigerator	1.18	★	1.22	1.24	1.22	1.23	1.24	1.24	1.26	6.6%
Freezer	0.57	★	0.59	0.58	0.58	0.58	0.57	0.56	0.55	-3.0%
Dishwasher	0.42	★	0.51	0.49	0.51	0.52	0.54	0.55	0.56	34.4%
Clothes Washer	0.75	★	0.81	0.80	0.81	0.81	0.81	0.81	0.82	9.7%
Clothes Dryer	0.73	★	0.82	0.80	0.81	0.82	0.81	0.81	0.82	12.5%
Range	0.98	★	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) Excludes hot water requirements.
 2) "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Sources:

- a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.
 b) Statistics Canada, *Survey of Household Spending in 1997–2004*, Ottawa, December 2005 (Cat. No. 62F0041).

Residential Appliance Unit Energy Consumption (UEC)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
UEC¹ for New Electric Appliances (kWh/year)^a										
Refrigerator	956	★	654	645	640	559	506	487	478	-50.0%
Freezer	714	★	381	383	391	393	368	369	373	-47.8%
Dishwasher ²	227	★	127	123	120	116	107	92	79	-65.4%
Clothes Washer ²	97	★	72	69	67	65	62	57	46	-53.0%
Clothes Dryer	1,103	★	900	908	910	916	916	914	912	-17.3%
Range	772	★	771	759	760	763	756	718	653	-15.5%
UEC¹ for New Natural Gas Appliances (kWh/year)^b										
Clothes Dryer	925	★	880	880	880	880	880	880	880	-4.9%
Range	1,357	★	1,226	1,226	1,226	1,226	1,226	1,226	1,226	-9.7%
UEC¹ for Stock of Electric Appliances (kWh/year)^b										
Refrigerator	1,525	★	1,047	993	945	896	846	801	778	-49.0%
Freezer	1,291	★	886	825	767	713	661	614	572	-55.7%
Dishwasher ²	282	★	182	170	159	149	139	129	118	-58.0%
Clothes Washer ²	106	★	89	87	84	82	79	76	72	-32.1%
Clothes Dryer	1,314	★	1,087	1,063	1,042	1,022	1,004	988	973	-26.0%
Range	802	★	785	782	780	777	774	769	759	-5.3%
UEC¹ for Stock of Natural Gas Appliances (kWh/year)^b										
Clothes Dryer	1,468	★	979	955	938	925	914	906	900	-38.7%
Range	1,534	★	1,364	1,344	1,326	1,311	1,297	1,283	1,271	-17.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) Unit energy consumption is based on rated efficiency.
- 2) Excludes hot water requirements.

Sources:

- a) Special Tabulations from Canadian Appliance Manufacturers Association, Mississauga, December 2005.
- b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

Residential Water Heating Energy Use and Water Heater Stock Share

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Water Heating Energy Use (PJ) ^a	309.4	★	322.4	328.5	332.7	330.5	337.4	348.7	347.7	12.4%
Energy Use by Energy Source (PJ) ^a										
Electricity	122.1	★	112.7	114.5	118.1	119.9	121.7	125.9	129.4	5.9%
Natural Gas	160.1	★	190.0	194.0	195.7	192.0	198.2	205.0	203.3	27.0%
Heating Oil	23.1	★	17.5	18.0	17.0	16.6	15.6	16.1	13.3	-42.5%
Other ¹	3.8	★	1.5	1.2	1.1	1.1	0.9	0.9	0.9	-76.8%
Wood	0.3	★	0.7	0.8	0.8	0.9	0.9	0.9	0.9	164.8%
Activity										
Total Households (thousands) ^{a,b}	9,895	★	11,385	11,553	11,729	11,897	12,052	12,214	12,375	25.1%
Energy Intensity (GJ/household) ^{a,b}	31.3	★	28.3	28.4	28.4	27.8	28.0	28.6	28.1	-10.1%
Water Heater Stock Market Shares (%) ^a										
Electricity	55.0	★	51.0	50.8	51.0	51.1	51.4	51.3	51.2	
Natural Gas	39.8	★	44.5	44.7	44.7	44.6	44.3	44.5	44.6	
Heating Oil	4.6	★	3.9	3.9	3.9	3.8	3.8	3.8	3.8	
Other ¹	0.5	★	0.4	0.4	0.3	0.3	0.3	0.3	0.3	
Wood	0.1	★	0.1	0.2	0.2	0.2	0.2	0.2	0.2	
Heat Loss (PJ) ^a	4.7	★	4.6	4.9	5.4	5.0	5.4	5.8	5.7	20.9%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

Sources:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2006.

b) Statistics Canada, *Survey of Household Spending in 1997–2004*, Ottawa, December 2005 (Cat. No. 62F0041).

Residential Energy Prices and Background Indicators

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m ³) ^{a,d}	19.1	★	25.1	27.3	31.9	44.6	36.6	46.9	46.6	143.9%
Heating Oil (cents/litre) ^{a,d,e}	35.6	★	36.7	37.2	53.6	53.4	49.7	57.2	60.3	69.5%
Electricity (cents/kWh) ^{b,d}	6.2	★	8.1	8.1	7.9	8.1	8.5	8.6	8.8	41.9%
Background Indicators										
<i>Consumer Price Index (1992 = 100)^c</i>										
Natural Gas	87.8	★	119.1	130.7	158.9	206.0	168.7	219.5	214.9	
Fuel Oil and Other Fuels	96.0	★	100.8	101.2	143.2	143.5	131.8	151.5	166.7	
Electricity	82.1	★	107.8	108.5	109.2	111.1	119.6	117.2	122.0	
<i>Real Personal Disposable Income per Household (\$97)^c</i>	51,572	★	48,748	49,535	51,576	52,039	52,294	52,748	53,332	3.4%
<i>Total Population (thousands)^f</i>	27,698	★	30,157	30,404	30,689	31,021	31,373	31,669	31,974	15.4%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2005 (Cat. No. 57-601-XIE).
 b) Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, April 2004.
 c) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
 d) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 e) Statistics Canada, *Total Population, Census Divisions and Census Metropolitan Areas*, Tables 051-0014 and 051-0034, Ottawa, December 2004 (CANSIM).
 f) Statistics Canada, *Estimates of Population, by Age Group and Sex, Provinces and Territories*, Table 051-0001, Ottawa, December 2005 (CANSIM).



Commercial/ Institutional

SECTOR

Chapter

3

The Data Situation

Of all the sectors reviewed in this handbook, the commercial/institutional sector has the most significant limitations with regard to available data. Aggregate data on commercial/institutional energy use are reported in Statistics Canada's *Report on Energy Supply-Demand in Canada* (RES-D) (Cat. No. 57-003-XIB), under the "public administration" and "commercial and other institutional" categories. Statistics Canada defines these categories as final consumers not reported in the other end-use sectors. Therefore, energy use data for the commercial/institutional sector essentially represent the energy use not accounted for in the residential, industrial, transportation and agriculture sectors.

Recently, the Office of Energy Efficiency (OEE) has noticed some anomalies in the petroleum products data for the commercial and institutional sector, in particular, a sharp increase in consumption since 1999. There is some evidence that fuel marketers (included in the commercial/institutional sector) are buying petroleum products from refineries and then re-selling the fuel to other sectors (e.g. industrial, transportation). As a result, some heavy fuel oil, light fuel oil and kerosene may be erroneously attributed to the commercial sector. However, there is inadequate information to determine the extent of the problem. Natural Resources Canada is currently working with Statistics Canada to better understand the data trends and to improve the quality of the commercial/institutional data reported.

The OEE developed the Commercial/Institutional End-Use Model (CEUM) to assess Canadian energy use trends in this sector. This year, the OEE reviewed CEUM and implemented a redesign to improve the way energy is allocated among the different activity types and to various end-uses of the sector. Intensities for the various breakdowns are key drivers in the allocation of energy use by CEUM. With the revisions to CEUM, the model is now using initial energy intensity estimates that match regional energy use reported in RES-D. As a result of these improvements, the energy breakdown by activity type found in this *Energy Use Data Handbook, 1990 and 1998 to 2004* is different from last year's publication.

In 2005, Statistics Canada undertook – on behalf of Natural Resources Canada’s OEE – the second *Commercial and Institutional Consumption of Energy Survey* (CICES). This survey was conducted for the reference year 2004. While the first survey (then entitled *Consumption of Energy Survey*) collected data for the 2003 calendar year and covered only universities, colleges and hospitals, the new one has been broadened to include the entire commercial and institutional sector. In addition both survey editions are based on the North American Industry Classification System (NAICS) and enable us to better understand energy consumption patterns in the commercial and institutional sector.

CEUM uses estimates of floor space which were developed by Informetrica Limited for the OEE. They are calculated from average costs per unit of floor space, and investment flows for new construction, as well as employment and gross domestic product data. As is the case for CICES, these estimates are categorized using NAICS.

A penetration rate for air conditioners was estimated from CIBEUS data in order to determine the proportion of air conditioned floor space. This is used to calculate the energy intensity related to space cooling where only the air conditioned floor space is taken into consideration.

The model also takes into account the influence of weather on commercial/institutional energy demand. It uses the number of heating degree-days in *Monthly Values of Degree-Days below 18.0°C* and the number of cooling degree-days in *Monthly Values of Degree-Days above 18.0°C*, two reports from Environment Canada.

The commercial/institutional price of heating oil and natural gas are weighted averages of regional prices taken from the Petroleum Resources Branch of Natural Resources Canada and Statistics Canada’s *Energy Statistics Handbook* (Cat. No. 57-601-XIE), respectively. The commercial/institutional price of electricity is a weighted average of the data found in Hydro-Québec’s *Comparison of Electricity Prices in Major North American Cities*.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

**Commercial/Institutional Secondary Energy Use by Energy Source,
End-Use and Activity Type**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^a	867.0	★	944.1	979.2	1,072.8	1,060.9	1,131.5	1,166.5	1,171.2	35.1%
Energy Use by Energy Source (PJ) ^a										
Electricity	390.1	★	431.3	436.8	453.0	445.2	476.8	474.4	481.8	23.5%
Natural Gas	387.1	★	418.5	443.8	503.2	488.4	517.2	525.1	514.1	32.8%
Light Fuel Oil and Kerosene	62.0	★	47.6	47.0	60.4	63.6	73.9	80.1	91.5	47.7%
Heavy Fuel Oil	11.4	★	16.8	17.0	19.8	26.8	27.4	53.5	48.8	329.5%
Steam	0.2	★	0.3	0.3	0.3	0.3	0.3	0.3	0.4	105.9%
Other ¹	16.3	★	29.5	34.3	36.1	36.6	35.9	32.9	34.5	112.2%
Energy Use by End-Use (PJ) ^b										
Space Heating	467.2	★	471.1	491.0	578.1	546.8	579.2	614.7	614.2	31.5%
Water Heating	67.6	★	79.6	80.7	89.8	92.0	93.0	98.9	102.7	51.9%
Auxiliary Equipment	80.8	★	110.4	114.4	130.9	137.1	141.2	154.2	165.4	104.7%
Auxiliary Motors	93.9	★	97.8	97.9	97.9	95.8	96.5	95.6	97.3	3.5%
Lighting	111.2	★	115.6	115.8	115.7	113.3	114.1	113.0	115.0	3.4%
Space Cooling	37.4	★	62.2	72.0	52.8	68.2	99.6	82.3	68.8	83.9%
Street Lighting ^f	8.9	★	7.5	7.4	7.7	7.7	7.8	7.8	7.9	-11.3%
Energy Use by Activity Type ² (PJ) ^b										
Wholesale Trade	46.7	★	46.3	47.6	51.7	50.5	53.0	53.9	53.8	15.2%
Retail Trade	117.9	★	118.5	122.8	133.6	131.4	138.9	142.5	142.1	20.5%
Transportation and Warehousing	54.6	★	49.6	50.0	54.0	51.1	53.3	52.9	52.0	-4.8%
Information and Cultural Industries	27.0	★	32.7	34.3	38.2	37.9	40.6	42.2	42.8	58.7%
Offices ³	270.4	★	303.1	317.0	349.0	346.2	368.5	380.4	383.6	41.8%
Educational Services	123.0	★	140.2	145.4	160.7	160.8	173.6	181.6	183.5	49.1%
Health Care and Social Assistance	108.3	★	122.1	126.6	137.9	137.1	147.9	151.6	151.7	40.2%
Arts, Entertainment and Recreation	24.7	★	30.9	32.0	35.2	34.8	37.0	38.5	38.5	56.1%
Accommodation and Food Services	64.9	★	72.0	74.3	80.9	79.9	86.2	89.6	89.5	37.8%
Other Services	20.6	★	21.3	21.8	23.9	23.5	24.7	25.5	25.7	25.0%
										Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) "Other" includes coal and propane.
- 2) Excludes street lighting.
- 3) "Offices" includes activities related to finance and insurance; real estate and rental and leasing; professional, scientific and technical services; and public administration.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- b) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.
- c) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.
- d) Environment Canada, *Climate Summaries, Monthly Values of Degree-Days below 18.0°C, 1990–2004*, Ottawa.
- e) Environment Canada, *Climate Summaries, Monthly Values of Degree-Days above 18.0°C, 1990–2004*, Ottawa.
- f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

**Commercial/Institutional Secondary Energy Use by Energy Source,
End-Use and Activity Type (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Activity										
Total Floor Space (million m ²) ^c	465.9	★	527.7	535.6	543.3	550.3	558.5	566.1	579.5	24.4%
Energy Intensity² (GJ/m²)^{a,c}	1.84	★	1.77	1.81	1.96	1.91	2.01	2.05	2.01	9.0%
Heating Degree-Day Index^{b,d}	0.92	★	0.84	0.88	0.96	0.88	0.94	0.97	0.95	
Cooling Degree-Day Index^{b,e}	1.06	★	1.29	1.54	0.90	1.43	1.71	1.31	0.94	

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) "Other" includes coal and propane.
- 2) Excludes street lighting.
- 3) "Offices" includes activities related to finance and insurance; real estate and rental and leasing; professional, scientific and technical services; and public administration.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- b) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
- c) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.
- d) Environment Canada, Climate Summaries, *Monthly Values of Degree-Days below 18.0°C, 1990–2004*, Ottawa.
- e) Environment Canada, Climate Summaries, *Monthly Values of Degree-Days above 18.0°C, 1990–2004*, Ottawa.
- f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

**Commercial/Institutional GHG Emissions by Energy Source, End-Use and Activity Type
– Including Electricity-Related Emissions**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions Including Electricity (Mt of CO_{2e})^{a,d}	47.8	★	54.2	55.0	61.6	62.1	64.6	70.0	67.9	42.0%
GHG Emissions by Energy Source (Mt of CO_{2e})^{a,d}										
Electricity	21.9	★	26.8	26.0	28.3	28.8	29.2	32.1	29.9	36.4%
Natural Gas	19.5	★	20.9	22.1	25.2	24.4	25.8	26.2	25.6	31.3%
Light Fuel Oil and Kerosene	4.6	★	3.5	3.5	4.4	4.7	5.4	5.9	6.7	47.2%
Heavy Fuel Oil	0.8	★	1.2	1.2	1.4	2.0	2.0	3.9	3.6	322.2%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Other ¹	1.0	★	1.8	2.1	2.2	2.2	2.2	2.0	2.1	113.0%
GHG Emissions by End-Use (Mt of CO_{2e})^{b,d}										
Space Heating	25.5	★	25.5	26.4	31.5	29.9	31.5	34.1	34.1	33.7%
Water Heating	3.6	★	4.3	4.3	4.9	5.0	5.0	5.5	5.7	56.4%
Auxiliary Equipment	4.6	★	6.8	6.8	8.1	8.8	8.6	10.3	10.2	124.3%
Auxiliary Motors	5.3	★	6.1	5.8	6.1	6.2	5.9	6.5	6.0	14.3%
Lighting	6.3	★	7.2	6.9	7.2	7.3	7.0	7.6	7.1	14.2%
Space Cooling	2.1	★	3.8	4.3	3.3	4.4	6.0	5.5	4.2	101.3%
Street Lighting ^c	0.5	★	0.5	0.4	0.5	0.5	0.5	0.5	0.5	-2.0%
GHG Emissions by Activity Type² (Mt of CO_{2e})^{b,d}										
Wholesale Trade	2.6	★	2.6	2.7	2.9	2.9	3.0	3.2	3.1	21.2%
Retail Trade	6.5	★	6.8	6.8	7.6	7.6	7.9	8.5	8.2	26.7%
Transportation and Warehousing	3.0	★	2.8	2.8	3.1	3.0	3.0	3.1	3.0	-0.2%
Information and Cultural Industries	1.5	★	1.9	1.9	2.2	2.2	2.3	2.6	2.5	68.1%
Offices ³	14.9	★	17.4	17.8	20.0	20.2	21.0	22.7	22.1	48.7%
Educational Services	6.8	★	8.1	8.2	9.3	9.4	9.9	10.9	10.7	56.5%
Health Care and Social Assistance	6.0	★	7.0	7.1	8.0	8.1	8.5	9.1	8.8	47.4%
Arts, Entertainment and Recreation	1.4	★	1.8	1.8	2.0	2.1	2.1	2.3	2.3	65.6%
Accommodation and Food Services	3.6	★	4.1	4.2	4.6	4.7	4.9	5.4	5.2	45.3%
Other Services	1.1	★	1.2	1.2	1.4	1.4	1.4	1.5	1.5	31.0%
GHG Intensity (tonne/TJ)^{a,d}	55.2	★	57.4	56.1	57.4	58.5	57.1	60.0	58.0	5.1%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) "Other" includes coal and propane.
 2) Excludes street lighting.
 3) "Offices" includes activities related to finance and insurance; real estate and rental and leasing; professional, scientific and technical services; and public administration.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.
 c) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.
 d) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

**Commercial/Institutional GHG Emissions by End-Use and Activity Type
– Excluding Electricity-Related Emissions**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions Excluding Electricity (Mt of CO₂e) ^{a,d}	25.9	★	27.4	28.9	33.3	33.2	35.4	38.0	38.0	46.7%
<i>GHG Emissions by End-Use (Mt of CO₂e) ^{b,d}</i>										
Space Heating	22.3	★	23.1	24.4	28.4	27.9	29.8	31.9	31.8	42.3%
Water Heating	3.1	★	3.7	3.8	4.1	4.5	4.7	5.1	5.2	66.1%
Auxiliary Equipment	0.3	★	0.5	0.5	0.6	0.6	0.6	0.7	0.8	122.1%
Auxiliary Motors	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Lighting	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Space Cooling	0.1	★	0.2	0.2	0.1	0.2	0.3	0.3	0.2	220.3%
Street Lighting ^c	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
<i>GHG Emissions by Activity Type ¹ (Mt of CO₂e) ^{b,d}</i>										
Wholesale Trade	1.4	★	1.3	1.4	1.6	1.6	1.7	1.8	1.7	24.8%
Retail Trade	3.5	★	3.4	3.6	4.1	4.1	4.3	4.6	4.6	30.4%
Transportation and Warehousing	1.8	★	1.6	1.7	1.9	1.8	1.9	2.0	1.9	9.4%
Information and Cultural Industries	0.8	★	1.0	1.0	1.2	1.2	1.3	1.4	1.4	71.9%
Offices ²	8.1	★	8.8	9.3	10.8	10.8	11.4	12.2	12.3	51.6%
Educational Services	3.7	★	4.1	4.3	5.0	5.1	5.4	5.9	5.9	60.3%
Health Care and Social Assistance	3.3	★	3.6	3.8	4.3	4.4	4.7	5.0	5.0	53.7%
Arts, Entertainment and Recreation	0.7	★	0.9	0.9	1.1	1.1	1.2	1.3	1.3	71.8%
Accommodation and Food Services	2.0	★	2.1	2.2	2.5	2.5	2.8	3.0	3.0	50.9%
Other Services	0.6	★	0.6	0.7	0.8	0.8	0.8	0.8	0.9	37.5%
GHG Intensity (tonne/TJ) ^{a,d}	29.9	★	29.0	29.5	31.0	31.3	31.3	32.5	32.4	8.6%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Excludes street lighting.

2) "Offices" includes activities related to finance and insurance; real estate and rental and leasing; professional, scientific and technical services; and public administration.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).

b) Natural Resources Canada, *Commercial/Institutional End-Use Model*, Ottawa, February 2006.

c) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2003*, Ottawa, March 2005 (Cat. No. 57-202-XIB). Data for 2004 estimated by Natural Resources Canada.

d) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Commercial/Institutional Secondary Energy Use by Activity Type and Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use for Wholesale Trade (PJ) ^a	46.7	★	46.3	47.6	51.7	50.5	53.0	53.9	53.8	15.2%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	20.8	★	21.0	21.1	21.7	21.1	22.2	21.8	22.0	5.8%
Natural Gas	21.8	★	21.3	22.4	25.3	24.2	25.0	24.7	24.5	12.7%
Light Fuel Oil and Kerosene	2.8	★	1.6	1.6	1.9	2.1	2.5	2.6	3.1	10.0%
Heavy Fuel Oil	0.5	★	0.9	0.9	1.1	1.3	1.7	3.4	2.7	431.7%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.6%
Other ¹	0.9	★	1.4	1.6	1.7	1.7	1.6	1.4	1.5	76.2%
Activity										
Floor Space (million m ²) ^b	27.92	★	28.50	28.60	28.76	28.76	28.70	28.81	29.28	4.9%
Energy Intensity (GJ/m²) ^{a,b}	1.67	★	1.63	1.66	1.80	1.76	1.85	1.87	1.84	9.8%
Total Energy Use for Retail Trade (PJ) ^a	117.9	★	118.5	122.8	133.6	131.4	138.9	142.5	142.1	20.5%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	52.7	★	54.0	54.8	56.4	55.2	58.4	57.8	58.4	10.8%
Natural Gas	54.6	★	54.4	57.5	65.1	62.8	65.4	65.1	64.6	18.3%
Light Fuel Oil and Kerosene	7.1	★	4.2	4.0	4.9	5.5	6.6	6.8	8.0	13.9%
Heavy Fuel Oil	1.3	★	2.2	2.2	2.7	3.4	4.3	9.1	7.0	426.7%
Steam	0.0	★	0.0	0.0	0.0	0.1	0.0	0.0	0.1	61.7%
Other ¹	2.2	★	3.7	4.2	4.4	4.5	4.2	3.7	4.0	84.4%
Activity										
Floor Space (million m ²) ^b	66.26	★	68.58	69.50	69.94	70.45	70.83	71.70	72.92	10.1%
Energy Intensity (GJ/m²) ^{a,b}	1.78	★	1.73	1.77	1.91	1.87	1.96	1.99	1.95	9.5%

Continued ▶

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

Sources:

- a) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
 b) Infometrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.

**Commercial/Institutional Secondary Energy Use
by Activity Type and Energy Source (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued
										Total Growth 1990–2004
Total Energy Use for Transportation and Warehousing (PJ) ^a	54.6	★	49.6	50.0	54.0	51.1	53.3	52.9	52.0	-4.8%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	21.7	★	19.6	19.0	18.9	17.6	18.3	17.1	16.9	-22.3%
Natural Gas	27.0	★	24.3	25.1	28.2	26.1	27.4	26.4	25.8	-4.3%
Light Fuel Oil and Kerosene	4.2	★	2.8	2.7	3.4	3.4	3.6	3.6	4.4	5.7%
Heavy Fuel Oil	0.7	★	1.2	1.3	1.5	2.0	2.2	4.2	3.4	367.5%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.6%
Other ¹	1.0	★	1.7	1.9	2.0	2.0	1.8	1.5	1.5	54.9%
Activity										
Floor Space (million m ²) ^b	34.48	★	33.43	32.93	32.91	32.43	31.82	31.47	31.79	-7.8%
Energy Intensity (GJ/m²) ^{a,b}	1.58	★	1.48	1.52	1.64	1.57	1.67	1.68	1.64	3.3%
Total Energy Use for Information and Cultural Industries (PJ) ^a	27.0	★	32.7	34.3	38.2	37.9	40.6	42.2	42.8	58.7%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	12.1	★	15.0	15.3	16.2	16.0	17.3	17.4	17.9	48.0%
Natural Gas	11.8	★	14.0	15.0	17.1	16.9	17.3	17.8	17.3	47.2%
Light Fuel Oil and Kerosene	2.2	★	2.3	2.3	3.1	3.0	3.8	4.1	4.7	108.3%
Heavy Fuel Oil	0.4	★	0.5	0.5	0.6	0.9	0.9	1.7	1.6	313.9%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	214.1%
Other ¹	0.5	★	1.0	1.2	1.2	1.2	1.4	1.3	1.3	171.0%
Activity										
Floor Space (million m ²) ^b	10.31	★	12.84	13.17	13.51	13.75	14.03	14.24	14.72	42.7%
Energy Intensity (GJ/m²) ^{a,b}	2.62	★	2.54	2.60	2.82	2.76	2.89	2.96	2.91	11.2%
Continued										

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

Sources:

- a) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
 b) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.

**Commercial/Institutional Secondary Energy Use
by Activity Type and Energy Source (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued
										Total Growth 1990–2004
Total Energy Use for Offices² (PJ)^a	270.4	★	303.1	317.0	349.0	346.2	368.5	380.4	383.6	41.8%
<i>Energy Use by Energy Source (PJ)^a</i>										
Electricity	121.0	★	138.6	141.8	147.7	146.0	156.6	155.9	159.1	31.4%
Natural Gas	122.3	★	135.7	144.8	165.4	160.9	171.3	175.7	172.1	40.7%
Light Fuel Oil and Kerosene	18.7	★	14.6	14.4	18.8	20.1	22.2	24.4	28.0	50.1%
Heavy Fuel Oil	3.4	★	4.6	4.6	5.4	7.5	7.1	13.8	13.2	286.0%
Steam	0.1	★	0.1	0.1	0.1	0.1	0.1	0.1	0.2	147.2%
Other ¹	5.0	★	9.4	11.1	11.6	11.7	11.2	10.4	11.0	122.2%
Activity										
Floor Space (million m ²) ^b	180.43	★	213.58	218.20	222.73	226.30	230.70	234.36	241.22	33.7%
Energy Intensity (GJ/m²)^{a,b}	1.50	★	1.42	1.45	1.57	1.53	1.60	1.62	1.59	6.1%
Total Energy Use for Educational Services (PJ)^a										
	123.0	★	140.2	145.4	160.7	160.8	173.6	181.6	183.5	49.1%
<i>Energy Use by Energy Source (PJ)^a</i>										
Electricity	55.3	★	63.8	64.5	67.8	67.5	73.4	74.3	76.1	37.6%
Natural Gas	53.7	★	61.2	65.0	74.0	72.5	78.2	80.7	79.1	47.3%
Light Fuel Oil and Kerosene	9.9	★	7.8	7.8	10.0	10.8	12.2	13.5	15.2	54.3%
Heavy Fuel Oil	1.9	★	2.8	2.8	3.2	4.2	4.1	7.8	7.6	310.5%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.1	61.9%
Other ¹	2.3	★	4.6	5.3	5.8	5.8	5.7	5.2	5.5	136.2%
Activity										
Floor Space (million m ²) ^b	65.92	★	77.33	78.59	79.96	81.77	83.59	85.41	87.61	32.9%
Energy Intensity (GJ/m²)^{a,b}	1.87	★	1.81	1.85	2.01	1.97	2.08	2.13	2.09	12.2%
Continued ▶										

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

2) "Offices" includes activities related to finance and insurance; real estate and rental and leasing; professional, scientific and technical services; and public administration.

Sources:

a) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.

b) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.

**Commercial/Institutional Secondary Energy Use
by Activity Type and Energy Source (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued
										Total Growth 1990–2004
Total Energy Use for Health Care and Social Assistance (PJ) ^a	108.3	★	122.1	126.6	137.9	137.1	147.9	151.6	151.7	40.2%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	48.4	★	55.7	56.1	57.9	57.0	61.4	60.8	61.2	26.5%
Natural Gas	47.3	★	52.7	56.0	62.8	61.6	67.0	67.6	65.4	38.2%
Light Fuel Oil and Kerosene	8.8	★	7.4	7.6	9.7	9.8	11.0	12.0	13.7	55.0%
Heavy Fuel Oil	1.6	★	2.6	2.6	3.0	4.0	3.9	7.1	7.1	335.2%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	165.2%
Other ¹	2.0	★	3.7	4.2	4.5	4.7	4.5	4.1	4.3	109.1%
Activity										
Floor Space (million m ²) ^b	34.64	★	40.19	40.85	41.19	41.96	42.91	43.32	44.08	27.3%
Energy Intensity (GJ/m²) ^{a,b}	3.13	★	3.04	3.10	3.35	3.27	3.45	3.50	3.44	10.1%
Total Energy Use for Arts, Entertainment and Recreation (PJ) ^a	24.7	★	30.9	32.0	35.2	34.8	37.0	38.5	38.5	56.1%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	11.3	★	14.4	14.6	15.2	15.0	15.8	15.9	16.2	43.5%
Natural Gas	10.6	★	13.0	13.8	15.6	15.2	15.5	15.8	15.3	44.2%
Light Fuel Oil and Kerosene	2.0	★	2.1	2.1	2.7	2.7	3.6	3.9	4.3	113.6%
Heavy Fuel Oil	0.3	★	0.4	0.5	0.5	0.8	0.8	1.6	1.5	339.4%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	184.1%
Other ¹	0.4	★	0.9	1.0	1.1	1.1	1.3	1.2	1.2	181.8%
Activity										
Floor Space (million m ²) ^b	11.09	★	14.33	14.57	14.79	15.03	15.19	15.45	15.81	42.5%
Energy Intensity (GJ/m²) ^{a,b}	2.22	★	2.15	2.19	2.38	2.31	2.44	2.49	2.43	9.5%
										Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

Sources:

- a) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
 b) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.

**Commercial/Institutional Secondary Energy Use
by Activity Type and Energy Source (Continued)**

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Total Energy Use for Accommodation and Food Services (PJ) ^a	64.9	★	72.0	74.3	80.9	79.9	86.2	89.6	89.5	37.8%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	28.5	★	32.1	32.4	33.3	32.6	35.4	35.5	35.7	25.3%
Natural Gas	29.6	★	32.9	34.6	39.2	37.8	39.1	40.2	39.2	32.7%
Light Fuel Oil and Kerosene	4.4	★	3.4	3.2	4.1	4.6	6.4	7.1	7.7	73.0%
Heavy Fuel Oil	0.8	★	1.1	1.2	1.3	1.9	1.8	3.5	3.4	323.9%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	148.8%
Other ¹	1.6	★	2.5	2.9	3.0	3.0	3.5	3.4	3.4	112.3%
Activity										
Floor Space (million m ²) ^b	22.31	★	25.55	25.83	26.04	26.27	26.99	27.59	28.05	25.7%
Energy Intensity (GJ/m²) ^{a,b}	2.91	★	2.82	2.88	3.11	3.04	3.19	3.25	3.19	9.6%
Total Energy Use for Other Services (PJ) ^a										
20.6	★	21.3	21.8	23.9	23.5	24.7	25.5	25.7	25.7	25.0%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	9.4	★	9.7	9.6	10.1	9.7	10.2	10.2	10.5	11.8%
Natural Gas	8.6	★	9.1	9.6	10.7	10.4	11.0	11.2	10.8	26.3%
Light Fuel Oil and Kerosene	1.9	★	1.4	1.4	1.7	1.8	1.9	2.1	2.4	29.1%
Heavy Fuel Oil	0.3	★	0.5	0.5	0.5	0.7	0.7	1.3	1.2	253.7%
Steam	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.6%
Other ¹	0.4	★	0.7	0.8	0.8	0.8	0.8	0.7	0.7	87.3%
Activity										
Floor Space (million m ²) ^b	12.55	★	13.39	13.40	13.48	13.59	13.74	13.77	14.00	11.5%
Energy Intensity (GJ/m²) ^{a,b}	1.64	★	1.59	1.63	1.78	1.73	1.80	1.85	1.84	12.0%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes coal and propane.

Sources:

- a) Natural Resources Canada, Commercial/Institutional End-Use Model, Ottawa, February 2006.
 b) Infometrics Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.

Commercial/Institutional Energy Prices and Background Indicators

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m ³) ^{a,d}	15.3	★	20.0	21.4	26.3	37.0	31.2	40.0	40.3	163.3%
Light Fuel Oil (cents/litre) ^e	25.8	★	19.4	24.0	40.1	35.6	34.7	38.6	38.7	50.3%
Heavy Fuel Oil (cents/litre) ^e	14.1	★	12.9	17.9	28.5	26.9	29.6	31.1	31.0	120.9%
Electricity (40 kW/10,000 kWh) ¹ (cents/kWh) ^{b,d}	7.6	★	9.1	9.1	8.6	8.7	9.1	9.3	9.7	26.9%
Electricity (500 kW/100,000 kWh) ¹ (cents/kWh) ^{b,d}	8.4	★	10.3	10.3	9.5	10.0	10.3	11.3	11.0	30.3%
Background Indicators										
Commercial/Institutional Floor Space (million m ²) ^c	465.9	★	527.7	535.6	543.3	550.3	558.5	566.1	579.5	24.4%
Commercial/Institutional Employees (thousands) ^c	9,326	★	10,350	10,638	10,933	11,167	11,426	11,734	11,957	28.2%
Employees (per thousand m ²) ^c	23.1	★	19.6	19.9	20.1	20.3	20.5	20.7	20.6	-10.7%
Commercial/Institutional GDP (million \$97) ^c	438,822	★	533,038	562,192	588,424	610,409	633,127	648,997	666,238	51.8%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) kW refers to power hook-up, whereas kWh refers to monthly electricity consumption.

Sources:

- a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2005 (Cat. No. 57-601-XIE).
 b) Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, April 2004.
 c) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005. Data for 2004 adjusted by Natural Resources Canada.
 d) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 e) Natural Resources Canada, Petroleum Resources Branch, Ottawa, December 2005.



Industrial

SECTOR

Chapter

4

The Data Situation

The aggregate energy use data presented for the industrial sector are taken from Statistics Canada's *Report on Energy Supply-Demand in Canada* (RESD) (Cat. No. 57-003-XIB).

RESD data are estimated from a suite of Statistics Canada surveys of energy distributors and end-users. Until 1993, most of the data were estimated from supply sources. This changed with the expansion of the *Industrial Consumption of Energy* (ICE) survey. The ICE survey sample was increased from 230 respondents in 1993 to approximately 2500 respondents in 1995. Therefore, as of 1995, data were available for 22 industries at the two-digit Standard Industrial Classification level and for 31 sub-industries at the three- and four-digit level. For the 2001 reporting year, the conversion to the North American Industry Classification System (NAICS), which added nine industries, combined with an increased sample size to approximately 4000 respondents, resulted in the inclusion of 36 new industries in ICE.

To examine industrial end-use energy trends over time, the Office of Energy Efficiency (OEE) asked Statistics Canada to conduct a backcast of approximately 60 NAICS manufacturing industries. In this report, we present 40 of these industries, along with 10 non-manufacturing industries (for which we have a complete data set). The backcast was completed for 1990 and for the 1995 to 2000 period. The 1990 data were estimated from a variety of sources including the RESD, ICE and the *Annual Survey of Manufactures*. However, because of the smaller sample size in years prior to 2001, it is not possible to backcast for all 27 of the new industries included in the 2001 expansion of ICE. Although they are not presented here, these industries are part of the OEE's database.

Each year, the Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC) updates its energy end-use database using energy consumption data from the ICE survey. Energy use data from CIEEDAC's database were calibrated to match the RESD energy use data in the OEE's database to produce the data reported here. Changes to this year's database include revisions to the method used to reconcile CIEEDAC's more disaggregated industry database with the 10 aggregated industries reported in RESD. Note also that, for confidentiality reasons, the lime industry is now reported under "Other Manufacturing."

For 1990 to 2004, Informetrica Limited has provided physical units, gross domestic product (GDP) and gross output (GO) data. Because of the methodology used to calculate GDP, the GDPs of industries are not additive (i.e. do not sum to the reported total) in years prior to the 1997 base year. This year Informetrica completed a revamp of its model; as a result, historical GDP and GO data were revised. In particular, GO data in some industries are very different from previous reports.

Industrial oil and natural gas prices are weighted averages of regional prices taken from the Petroleum Resources Branch of Natural Resources Canada and Statistics Canada's *Energy Statistics Handbook* (Cat. No. 57-601-XIE), respectively. Electricity prices are a weighted average of the data found in Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

Industrial Secondary Energy Use and GHG Emissions by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^{a,d}	2,717.4	★	2,939.8	3,028.1	3,120.3	2,998.1	3,162.4	3,256.0	3,277.5	20.6%
<i>Energy Use by Energy Source (PJ) ^{a,d}</i>										
Electricity	658.4	★	768.7	783.8	810.8	809.2	822.6	830.2	823.8	25.1%
Natural Gas	837.2	★	897.3	907.3	950.1	847.2	929.3	973.5	990.7	18.3%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	126.7	★	134.2	136.5	145.4	140.7	134.1	142.1	153.5	21.1%
Heavy Fuel Oil	201.1	★	149.4	140.8	144.3	144.2	125.6	153.8	148.7	-26.0%
Still Gas and Petroleum Coke	321.7	★	335.6	349.4	341.4	378.8	443.1	437.0	415.1	29.0%
LPG and Gas Plant NGL	27.0	★	31.6	30.3	39.4	41.2	36.3	32.5	34.3	26.9%
Coal	45.1	★	44.2	45.6	51.1	48.8	47.6	49.7	54.6	21.1%
Coke and Coke Oven Gas	131.3	★	131.6	135.1	136.5	128.6	125.1	125.8	135.3	3.1%
Wood Waste and Pulping Liquor	341.0	★	416.3	464.0	464.4	421.1	458.6	468.0	476.4	39.7%
Other ¹	27.9	★	31.0	35.3	36.8	38.4	40.2	43.3	45.0	61.3%
Activity										
GDP (million \$97) ^b	199,905	★	234,847	249,273	271,175	265,978	271,435	277,423	290,171	45.2%
GO (million \$97) ^b	540,406	★	648,334	714,352	765,477	760,570	784,301	783,408	819,322	51.6%
Energy Intensity (MJ/\$97 – GDP) ^{a,b,d}	13.6	★	12.5	12.1	11.5	11.3	11.7	11.7	11.3	-16.9%
Energy Intensity (MJ/\$97 – GO) ^{a,b,d}	5.0	★	4.5	4.2	4.1	3.9	4.0	4.2	4.0	-20.4%

Continued ▶

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes steam and waste fuels from the cement industry.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005.
c) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
d) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Secondary Energy Use and GHG Emissions by Energy Source (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Total GHG Emissions Including Electricity (Mt of CO_{2e})^{a,c,d}	141.7	★	153.6	153.4	161.3	159.2	162.1	172.3	169.7	19.7%
<i>GHG Emissions by Energy Source (Mt of CO_{2e})^{a,c,d}</i>										
Electricity	37.0	★	47.8	46.7	50.6	52.4	50.3	56.1	51.1	38.2%
Natural Gas	42.1	★	44.7	45.3	47.6	42.3	46.4	48.5	49.3	17.0%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	10.0	★	10.7	10.9	11.6	11.2	10.7	11.3	12.2	22.3%
Heavy Fuel Oil	15.0	★	10.9	10.3	10.6	10.6	9.2	11.3	10.9	-27.4%
Still Gas and Petroleum Coke	20.9	★	22.6	23.0	22.6	25.1	28.7	28.3	28.0	33.7%
LPG and Gas Plant NGL	1.6	★	1.9	1.8	2.4	2.5	2.2	2.0	2.1	28.0%
Coal	3.7	★	3.7	3.8	4.2	4.0	3.9	4.1	4.4	20.0%
Coke and Coke Oven Gas	11.3	★	11.3	11.6	11.7	11.0	10.7	10.8	11.6	2.5%
Wood Waste and Pulping Liquor	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Other ¹	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
GHG Intensity (tonne/TJ)^{a,c,d}	52.2	★	52.2	50.7	51.7	53.1	51.3	52.9	51.8	-0.7%
Total GHG Emissions Excluding Electricity (Mt of CO_{2e})^{a,c,d}	104.7	★	105.8	106.7	110.7	106.7	111.8	116.2	118.5	13.2%
GHG Intensity (tonne/TJ)^{a,c,d}	38.5	★	36.0	35.2	35.5	35.6	35.3	35.7	36.2	-6.1%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) "Other" includes steam and waste fuels from the cement industry.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
 c) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
 d) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Secondary Energy Use by Industry

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^{a,c}	2,717.4	★	2,939.8	3,028.1	3,120.3	2,998.1	3,162.4	3,256.0	3,277.5	20.6%
<i>Energy Use by Industry (PJ) ^{a,c}</i>										
Gold and Silver Mines	13.0	★	12.3	13.2	12.5	13.6	14.3	14.0	13.5	3.7%
Copper, Nickel, Lead and Zinc Mines	35.1	★	26.1	21.1	22.9	24.3	21.8	20.9	20.7	-41.0%
Iron Mines	36.2	★	36.0	30.1	33.7	28.3	28.2	34.1	27.8	-23.2%
Other Metal Mines	9.0	★	4.3	4.2	4.9	8.2	10.3	7.4	6.5	-27.5%
Potash Mines	27.4	★	31.6	32.5	29.7	28.5	28.3	29.9	31.7	15.8%
Salt Mines	2.9	★	2.7	2.6	2.6	2.5	2.4	2.5	2.5	-15.9%
Other Non-Metal Mines	9.1	★	7.2	8.3	9.2	8.8	8.6	10.4	10.6	16.0%
Upstream Mining	210.6	★	337.7	347.5	401.3	408.1	448.3	509.8	522.2	148.0%
Construction	66.9	★	48.0	50.4	49.9	47.9	54.2	56.7	59.9	-10.5%
Forestry	7.7	★	12.3	14.8	16.2	18.3	17.1	18.7	22.7	193.8%
Pulp Mills	309.6	★	358.2	387.1	391.4	365.4	378.3	373.5	377.8	22.0%
Paper Mills (except newsprint)	99.0	★	109.5	116.6	121.3	104.8	109.1	122.2	128.5	29.8%
Newsprint Mills	268.3	★	273.4	305.1	300.5	260.0	274.8	276.0	284.9	6.2%
Paperboard Mills	61.2	★	70.5	72.1	68.8	66.6	68.7	65.3	67.8	10.9%
Converted Paper Products Industry	9.4	★	11.6	10.9	12.3	15.4	16.5	16.7	17.6	86.9%
Primary Production of Alumina and Aluminum	109.8	★	160.1	166.2	159.8	163.9	169.0	176.4	169.6	54.4%
Other Non-Ferrous Smelting and Refining	73.5	★	79.7	70.2	74.9	84.9	86.0	85.6	78.6	6.9%
Petroleum Refining	334.9	★	291.9	288.0	295.1	311.4	365.2	373.4	340.3	1.6%
Cement Industry	59.3	★	60.4	63.5	63.6	61.9	66.4	63.2	64.2	8.3%
Petrochemical Industry	34.5	★	40.5	39.7	41.2	41.0	47.1	45.5	49.5	43.3%
Industrial Gas Industry	7.4	★	6.1	8.3	9.2	9.2	10.2	10.0	9.9	32.6%
Other Basic Chemicals Industry	142.3	★	134.3	129.0	117.8	101.2	89.8	85.5	86.7	-39.1%
Fertilizer Industry	38.9	★	60.3	63.4	61.8	56.4	53.3	51.7	57.2	47.0%
Iron and Steel	219.4	★	254.7	259.8	257.6	228.5	239.4	232.8	247.7	12.9%
Meat Products Industries	12.6	★	15.2	15.8	19.1	19.4	17.5	17.0	18.0	43.1%
Fruit and Vegetable Industries	9.2	★	12.2	10.4	12.2	13.5	12.6	13.2	12.9	40.8%
Bakery Products Industries	9.2	★	6.9	6.7	7.2	8.8	9.5	9.1	9.4	1.9%
Other Food Industries	40.6	★	42.3	44.2	45.1	38.5	39.4	40.1	40.1	-1.4%
Dairy Products Industry	11.8	★	12.2	12.9	12.6	12.4	12.3	11.9	12.0	1.8%
Beverage Industries (excluding breweries)	3.3	★	6.7	6.8	6.3	5.6	6.1	5.8	6.1	83.8%

Continued

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06**Sources:**

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Secondary Energy Use by Industry (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Energy Use by Industry (PJ) ^{a,c} (Continued)										
Breweries Industries	7.8	★	5.6	5.8	5.9	5.9	6.1	5.4	5.6	-28.4%
Tobacco Products Industries	1.3	★	1.1	1.1	1.1	1.0	1.0	1.0	1.0	-23.0%
Rubber Products Industries	9.7	★	10.8	12.3	12.0	11.8	11.9	12.2	12.2	26.4%
Plastic Products Industries	15.7	★	21.1	19.1	22.8	26.2	23.2	25.6	25.2	60.7%
Resin and Synthetic Rubber Industries	28.1	★	35.1	36.9	39.4	32.8	29.5	23.5	26.3	-6.4%
Leather and Allied Products Industries	1.4	★	1.2	1.2	1.2	1.3	1.1	0.8	0.7	-52.7%
Textile Mills	13.9	★	12.6	11.5	10.5	9.2	8.7	8.5	8.6	-38.6%
Textile Products Mills	6.8	★	6.1	4.7	4.2	4.4	4.5	3.7	3.5	-49.2%
Clothing Industries	6.0	★	5.4	4.9	5.5	5.6	5.3	5.3	4.4	-26.4%
Wood Products Industries	62.0	★	69.8	69.7	71.0	74.6	78.2	68.9	68.0	9.7%
Furniture and Related Products Industries	6.2	★	7.3	8.3	10.2	11.6	11.5	11.6	12.0	93.8%
Printing and Related Support Activities	10.9	★	8.0	8.3	10.5	9.6	9.1	9.3	9.6	-11.9%
Fabricated Metal Products Industries	37.4	★	37.4	36.6	35.5	41.2	43.2	41.3	41.6	11.2%
Machinery Industries	12.2	★	15.6	13.5	14.8	15.1	14.7	16.1	17.3	41.4%
Motor Vehicle Industry	18.7	★	27.1	28.9	29.4	25.4	24.8	25.3	23.3	24.9%
Motor Vehicle Parts and Accessories Industries	18.1	★	20.1	21.0	23.1	22.6	25.5	22.2	22.6	24.8%
Computer and Electronic Products Industries	4.6	★	7.2	6.9	7.5	4.5	4.6	5.0	5.3	14.4%
Electrical Equipment and Components Industries	8.6	★	8.5	7.6	7.5	6.8	6.3	7.0	7.5	-13.4%
Other Manufacturing n.e.c.	175.9	★	115.0	128.4	147.4	131.0	148.5	184.0	186.2	5.9%
Activity										
GDP (million \$97) ^b	199,905	★	234,847	249,273	271,175	265,978	271,435	277,423	290,171	45.2%
GO (million \$97) ^b	540,406	★	648,334	714,352	765,477	760,570	784,301	783,408	819,322	51.6%
Energy Intensity (MJ/\$97 – GDP) ^{a,b,c}										
	13.6	★	12.5	12.1	11.5	11.3	11.7	11.7	11.3	-16.9%
Energy Intensity (MJ/\$97 – GO) ^{a,b,c}										
	5.0	★	4.5	4.2	4.1	3.9	4.0	4.2	4.0	-20.4%

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005.
 c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial GHG Emissions by Industry – Including Electricity-Related Emissions ¹

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions Including Electricity (Mt of CO_{2e})^{a,b,c}	141.7	★	153.6	153.4	161.3	159.2	162.1	172.3	169.7	19.7%
<i>GHG Emissions by Industry (Mt of CO_{2e})^{a,b,c}</i>										
Gold and Silver Mines	0.8	★	0.8	0.8	0.8	0.9	0.9	1.0	0.9	9.3%
Copper, Nickel, Lead and Zinc Mines	2.2	★	1.7	1.3	1.5	1.6	1.4	1.4	1.4	-37.2%
Iron Mines	2.5	★	2.6	2.1	2.4	2.1	2.0	2.5	2.0	-22.8%
Other Metal Mines	0.5	★	0.3	0.3	0.3	0.5	0.6	0.5	0.4	-21.2%
Potash Mines	1.5	★	1.7	1.7	1.6	1.5	1.5	1.6	1.7	14.4%
Salt Mines	0.2	★	0.2	0.1	0.1	0.1	0.1	0.1	0.1	-12.7%
Other Non-Metal Mines	0.6	★	0.5	0.5	0.6	0.6	0.6	0.7	0.8	28.7%
Upstream Mining	13.1	★	21.2	21.8	24.9	25.0	26.4	30.1	30.6	133.1%
Construction	4.6	★	3.4	3.5	3.5	3.4	3.8	3.9	4.1	-9.6%
Forestry	0.6	★	1.0	1.2	1.3	1.5	1.4	1.5	1.8	196.7%
Pulp Mills	6.6	★	6.2	6.4	7.1	6.5	6.1	6.2	6.1	-7.8%
Paper Mills (except newsprint)	3.4	★	3.4	3.5	3.6	3.3	3.0	3.9	3.9	15.5%
Newsprint Mills	11.6	★	11.4	11.4	11.4	10.8	10.3	10.7	10.5	-9.4%
Paperboard Mills	2.2	★	2.3	2.4	2.3	2.2	2.1	2.1	2.1	-2.0%
Converted Paper Products Industry	0.5	★	0.6	0.6	0.6	0.8	0.8	0.8	0.9	65.5%
Primary Production of Alumina and Aluminum	6.2	★	9.9	9.8	9.9	10.5	10.3	11.8	10.5	69.4%
Other Non-Ferrous Smelting and Refining	4.5	★	5.1	4.4	4.8	5.5	5.4	5.7	5.0	10.9%
Petroleum Refining	20.8	★	19.0	18.2	18.9	20.2	23.2	23.7	22.3	7.3%
Cement Industry	4.1	★	4.2	4.4	4.5	4.4	4.6	4.7	4.7	14.2%
Petrochemical Industry	1.8	★	2.1	2.0	2.1	2.0	2.2	2.0	2.2	22.5%
Industrial Gas Industry	0.4	★	0.4	0.5	0.6	0.6	0.6	0.7	0.6	46.9%
Other Basic Chemicals Industry	6.7	★	7.2	6.9	6.4	5.6	4.8	5.0	4.9	-26.9%
Fertilizer Industry	1.9	★	3.1	3.2	3.2	2.9	2.7	2.7	2.9	50.2%
Iron and Steel	15.9	★	17.8	18.1	18.1	16.5	16.8	16.6	17.7	11.5%
Meat Products Industries	0.7	★	0.8	0.8	1.0	1.1	1.0	1.0	1.0	44.8%
Fruit and Vegetable Industries	0.5	★	0.7	0.6	0.7	0.8	0.7	0.8	0.7	47.0%
Bakery Products Industries	0.5	★	0.4	0.4	0.4	0.5	0.5	0.5	0.5	5.3%
Other Food Industries	2.1	★	2.3	2.3	2.4	2.0	2.1	2.2	2.1	-1.8%
Dairy Products Industry	0.6	★	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.5%
Beverage Industries (excluding breweries)	0.2	★	0.4	0.4	0.3	0.3	0.3	0.3	0.3	76.5%

Continued

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Includes only end-use energy-related GHG emissions.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial GHG Emissions by Industry – Including Electricity-Related Emissions ¹ (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
<i>GHG Emissions by Industry (Mt of CO_{2e})^{a,b,c} (Continued)</i>										
Breweries Industries	0.4	★	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-23.8%
Tobacco Products Industries	0.1	★	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-13.7%
Rubber Products Industries	0.5	★	0.6	0.7	0.7	0.7	0.7	0.7	0.7	29.9%
Plastic Products Industries	0.9	★	1.2	1.1	1.3	1.6	1.3	1.6	1.4	68.9%
Resin and Synthetic Rubber Industries	1.3	★	1.7	1.7	2.0	1.6	1.3	1.1	1.1	-17.1%
Leather and Allied Products Industries	0.1	★	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-48.2%
Textile Mills	0.7	★	0.7	0.6	0.6	0.5	0.5	0.5	0.5	-36.3%
Textile Products Mills	0.4	★	0.3	0.3	0.2	0.3	0.2	0.2	0.2	-45.6%
Clothing Industries	0.3	★	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-21.7%
Wood Products Industries	3.5	★	4.1	4.0	4.2	4.5	4.5	4.2	3.9	13.0%
Furniture and Related Products Industries	0.3	★	0.4	0.5	0.6	0.7	0.7	0.7	0.7	99.9%
Printing and Related Support Activities	0.6	★	0.4	0.4	0.6	0.5	0.5	0.5	0.5	-8.2%
Fabricated Metal Products Industries	2.0	★	2.0	2.0	2.0	2.3	2.3	2.3	2.2	15.1%
Machinery Industries	0.7	★	0.9	0.7	0.8	0.8	0.8	0.9	1.0	46.4%
Motor Vehicle Industry	1.0	★	1.4	1.5	1.6	1.4	1.3	1.4	1.2	23.7%
Motor Vehicle Parts and Accessories Industries	1.0	★	1.1	1.2	1.3	1.3	1.4	1.3	1.3	28.0%
Computer and Electronic Products Industries	0.3	★	0.4	0.4	0.4	0.3	0.3	0.3	0.3	19.4%
Electrical Equipment and Components Industries	0.5	★	0.4	0.4	0.4	0.4	0.3	0.4	0.4	-10.9%
Other Manufacturing n.e.c.	9.6	★	6.0	6.9	8.0	7.2	8.3	10.1	10.2	6.8%
GHG Intensity (tonne/TJ)^{a,b,c}	52.2	★	52.2	50.7	51.7	53.1	51.3	52.9	51.8	-0.7%

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Includes only end-use energy-related GHG emissions.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
 c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial GHG Emissions by Industry – Excluding Electricity-Related Emissions ¹

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions Excluding Electricity (Mt of CO_{2e})^{a,b,c}	104.7	★	105.8	106.7	110.7	106.7	111.8	116.2	118.5	13.2%
<i>GHG Emissions by Industry (Mt of CO_{2e})^{a,b,c}</i>										
Gold and Silver Mines	0.4	★	0.3	0.3	0.4	0.4	0.4	0.4	0.4	-2.8%
Copper, Nickel, Lead and Zinc Mines	0.9	★	0.7	0.6	0.7	0.7	0.7	0.6	0.6	-34.1%
Iron Mines	1.8	★	1.7	1.4	1.6	1.4	1.4	1.7	1.2	-33.1%
Other Metal Mines	0.3	★	0.2	0.2	0.2	0.3	0.3	0.2	0.2	-26.6%
Potash Mines	1.1	★	1.3	1.4	1.2	1.2	1.1	1.2	1.3	13.3%
Salt Mines	0.1	★	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-25.3%
Other Non-Metal Mines	0.5	★	0.4	0.4	0.5	0.5	0.5	0.7	0.7	48.8%
Upstream Mining	10.5	★	16.6	17.4	20.1	19.8	21.5	24.7	25.6	144.7%
Construction	4.6	★	3.4	3.5	3.5	3.4	3.8	3.9	4.1	-9.6%
Forestry	0.6	★	1.0	1.2	1.3	1.5	1.4	1.5	1.8	196.7%
Pulp Mills	4.2	★	3.4	3.4	3.6	3.1	3.2	2.9	2.9	-30.2%
Paper Mills (except newsprint)	2.2	★	2.1	2.2	2.1	1.7	1.5	1.8	1.9	-13.9%
Newsprint Mills	5.9	★	3.8	3.9	3.7	3.2	2.8	2.7	2.8	-53.2%
Paperboard Mills	1.6	★	1.6	1.7	1.6	1.4	1.4	1.4	1.4	-13.8%
Converted Paper Products Industry	0.4	★	0.4	0.3	0.3	0.5	0.4	0.4	0.5	28.9%
Primary Production of Alumina and Aluminum	0.7	★	1.0	1.0	0.8	0.9	0.8	1.0	1.1	50.9%
Other Non-Ferrous Smelting and Refining	2.5	★	2.6	2.4	2.4	2.6	2.4	2.2	2.2	-12.4%
Petroleum Refining	19.7	★	17.9	17.0	17.7	18.9	22.0	22.3	21.0	6.6%
Cement Industry	3.8	★	3.7	4.0	4.0	4.0	4.2	4.2	4.3	13.3%
Petrochemical Industry	1.6	★	1.8	1.7	1.7	1.7	1.9	1.7	1.9	16.5%
Industrial Gas Industry	0.0	★	0.0	0.1	0.1	0.1	0.1	0.0	0.0	-58.0%
Other Basic Chemicals Industry	3.8	★	4.1	3.8	3.3	2.6	1.9	1.9	1.9	-51.5%
Fertilizer Industry	1.6	★	2.7	2.8	2.8	2.5	2.3	2.3	2.6	56.2%
Iron and Steel	14.2	★	15.5	15.9	15.8	13.9	14.3	14.1	15.4	8.2%
Meat Products Industries	0.5	★	0.5	0.6	0.7	0.7	0.6	0.6	0.7	40.6%
Fruit and Vegetable Industries	0.4	★	0.5	0.4	0.5	0.6	0.6	0.6	0.6	35.8%
Bakery Products Industries	0.4	★	0.3	0.2	0.3	0.3	0.3	0.3	0.3	-17.5%
Other Food Industries	1.6	★	1.6	1.7	1.7	1.4	1.5	1.5	1.5	-10.0%
Dairy Products Industry	0.5	★	0.5	0.5	0.5	0.5	0.5	0.4	0.4	-6.6%
Beverage Industries (excluding breweries)	0.1	★	0.3	0.3	0.3	0.2	0.3	0.2	0.3	103.6%

Continued

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Includes only end-use energy-related GHG emissions.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
 c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial GHG Emissions by Industry – Excluding Electricity-Related Emissions ¹ (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
<i>GHG Emissions by Industry (Mt of CO₂e) ^{a,b,c} (Continued)</i>										
Breweries Industries	0.3	★	0.2	0.2	0.2	0.2	0.3	0.2	0.2	-30.5%
Tobacco Products Industries	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-12.3%
Rubber Products Industries	0.3	★	0.4	0.4	0.4	0.4	0.4	0.4	0.4	11.8%
Plastic Products Industries	0.4	★	0.5	0.4	0.5	0.5	0.4	0.5	0.5	50.2%
Resin and Synthetic Rubber Industries	0.9	★	1.2	1.2	1.3	1.0	0.8	0.5	0.6	-38.1%
Leather and Allied Products Industries	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-63.6%
Textile Mills	0.5	★	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-45.9%
Textile Products Mills	0.2	★	0.2	0.1	0.1	0.2	0.2	0.1	0.1	-51.3%
Clothing Industries	0.2	★	0.1	0.1	0.2	0.2	0.1	0.1	0.1	-42.8%
Wood Products Industries	2.2	★	2.4	2.2	2.3	2.3	2.2	2.0	2.1	-5.6%
Furniture and Related Products Industries	0.2	★	0.2	0.3	0.3	0.4	0.4	0.4	0.4	92.5%
Printing and Related Support Activities	0.3	★	0.2	0.2	0.3	0.3	0.3	0.3	0.3	-15.2%
Fabricated Metal Products Industries	1.4	★	1.3	1.3	1.3	1.4	1.5	1.5	1.5	3.7%
Machinery Industries	0.4	★	0.5	0.4	0.5	0.5	0.4	0.5	0.5	45.8%
Motor Vehicle Industry	0.7	★	1.0	1.0	1.0	0.9	0.9	0.9	0.9	17.6%
Motor Vehicle Parts and Accessories Industries	0.6	★	0.6	0.6	0.7	0.7	0.8	0.6	0.7	17.8%
Computer and Electronic Products Industries	0.1	★	0.1	0.1	0.1	0.1	0.1	0.1	0.1	63.1%
Electrical Equipment and Components Industries	0.3	★	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-26.6%
Other Manufacturing n.e.c.	8.9	★	6.0	6.9	7.5	7.2	8.3	10.1	10.2	14.2%
GHG Intensity (tonne/TJ) ^{a,b,c}	38.5	★	36.0	35.2	35.5	35.6	35.3	35.7	36.2	-6.1%

★ 1991–1994 data not available, 1995–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Includes only end-use energy-related GHG emissions.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).
 c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Gross Domestic Product by Industry

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Gross Domestic Product (million \$97) ^a	199,905	★	234,847	249,273	271,175	265,978	271,435	277,423	290,171	45.2%
<i>Gross Domestic Product by Industry (million \$97) ^a</i>										
Gold and Silver Mines	1,495	★	1,455	1,309	1,280	1,370	1,225	1,149	1,051	-29.7%
Copper, Nickel, Lead and Zinc Mines	2,927	★	2,775	2,725	2,669	2,636	2,394	2,103	2,204	-24.7%
Iron Mines	774	★	610	532	730	489	486	556	496	-35.9%
Other Metal Mines	543	★	401	481	761	668	934	871	898	65.4%
Potash Mines	786	★	955	985	1,010	890	923	985	1,092	38.9%
Salt Mines	195	★	218	209	215	233	204	229	229	17.4%
Other Non-Metal Mines	338	★	382	806	669	959	1,207	2,085	2,379	603.8%
Upstream Mining	20,134	★	27,665	27,352	28,125	28,262	28,839	31,122	32,076	59.3%
Construction	48,156	★	44,348	46,415	48,833	52,367	54,920	57,883	60,527	25.7%
Forestry	7,262	★	6,648	6,933	7,319	7,343	7,517	7,631	8,422	16.0%
Pulp Mills	1,510	★	1,899	2,242	2,314	2,138	2,183	2,213	2,219	47.0%
Paper Mills (except newsprint)	1,907	★	1,806	1,851	2,149	1,889	1,970	1,997	2,162	13.4%
Newsprint Mills	3,650	★	3,524	4,010	4,267	3,764	3,987	4,009	3,846	5.4%
Paperboard Mills	712	★	654	786	735	699	637	603	617	-13.3%
Converted Paper Products Industry	1,913	★	2,654	2,636	2,531	2,789	2,918	3,033	2,833	48.1%
Primary Production of Alumina and Aluminum	1,254	★	2,102	2,194	2,755	2,859	2,978	3,070	2,846	127.0%
Other Non-Ferrous Smelting and Refining	1,268	★	1,717	1,840	1,922	2,313	2,148	1,994	2,245	77.1%
Petroleum Refining	1,182	★	1,395	1,311	1,254	1,429	1,461	1,516	1,529	29.4%
Cement Industry	707	★	645	635	679	718	707	724	749	5.9%
Petrochemical Industry	806	★	876	810	965	845	805	804	877	8.8%
Industrial Gas Industry	221	★	232	233	254	275	276	285	302	36.7%
Other Basic Chemicals Industry	2,624	★	2,540	2,590	2,945	3,062	3,118	3,139	3,370	28.4%
Fertilizer Industry	815	★	1,233	1,226	1,329	1,033	923	1,028	1,150	41.1%
Iron and Steel	4,023	★	4,484	4,500	4,622	3,941	4,435	4,354	4,355	8.3%
Meat Products Industries	2,783	★	2,787	2,837	3,361	3,543	3,357	3,285	3,579	28.6%
Fruit and Vegetable Industries	1,288	★	1,760	2,032	2,074	2,407	2,436	2,350	2,510	94.9%
Bakery Products Industries	1,725	★	2,069	2,116	2,099	2,333	2,304	2,353	2,449	42.0%
Other Food Industries	4,575	★	5,825	5,863	5,933	6,264	6,509	6,663	6,727	47.0%
Dairy Products Industry	2,443	★	2,140	2,096	2,067	2,204	2,096	2,141	2,170	-11.2%
Beverage Industries (excluding breweries)	1,026	★	1,484	1,336	1,542	1,584	1,772	1,714	1,704	66.1%

Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06**Source:**a) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005.

Industrial Gross Domestic Product by Industry (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
<i>Gross Domestic Product by Industry (million \$97) ^a (Continued)</i>										
Breweries Industries	2,197	★	1,987	2,037	2,045	2,034	1,922	1,840	1,984	-9.7%
Tobacco Products Industries	1,546	★	1,708	1,369	1,347	1,143	1,114	1,024	1,020	-34.0%
Rubber Products Industries	1,261	★	2,157	2,230	2,225	2,218	2,343	2,167	2,169	72.0%
Plastic Products Industries	3,203	★	5,185	5,743	6,882	6,923	7,556	7,726	8,032	150.8%
Resin and Synthetic Rubber Industries	1,331	★	2,753	2,758	3,084	2,770	3,157	3,139	3,613	171.5%
Leather and Allied Products Industries	594	★	387	373	437	374	374	341	274	-53.9%
Textile Mills	1,441	★	1,609	1,531	1,605	1,478	1,551	1,387	1,319	-8.5%
Textile Products Mills	814	★	825	925	1,097	1,086	1,043	958	964	18.4%
Clothing Industries	3,173	★	3,266	3,135	3,743	3,634	3,388	3,181	2,870	-9.5%
Wood Products Industries	7,759	★	9,616	10,234	11,351	10,780	11,849	12,258	13,159	69.6%
Furniture and Related Products Industries	2,742	★	4,088	4,465	5,187	5,406	5,389	5,417	5,490	100.2%
Printing and Related Support Activities	5,849	★	4,304	4,384	5,002	5,562	5,281	5,371	5,424	-7.3%
Fabricated Metal Products Industries	7,532	★	9,832	10,641	13,208	12,788	13,037	13,089	13,612	80.7%
Machinery Industries	6,613	★	10,130	9,983	11,463	11,376	11,089	10,882	11,625	75.8%
Motor Vehicle Industry	4,597	★	6,527	8,727	8,505	7,387	7,789	7,738	8,734	90.0%
Motor Vehicle Parts and Accessories Industries	5,003	★	9,098	9,899	10,004	9,339	9,637	9,947	10,607	112.0%
Computer and Electronic Products Industries	4,502	★	8,905	12,447	16,070	9,306	8,595	8,816	9,864	119.1%
Electrical Equipment and Components Industries	3,655	★	3,636	3,836	4,674	4,663	4,089	3,857	4,007	9.6%
Other Manufacturing n.e.c.	17,322	★	21,551	23,665	25,838	26,405	26,565	26,396	27,792	60.4%

★ 1991–1997 data available at: oeenrncan.gc.ca/handbook06

Source:

a) Informetrica Limited, *TI Model and Database*, Ottawa, November 2005.

Industrial Energy Intensity by Industry

	Units	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Aggregate Energy Intensity^{a,b,c}	MJ/\$97 – GDP	13.6	★	12.5	12.1	11.5	11.3	11.7	11.7	11.3	-16.9%
<i>Energy Intensity by Industry^{a,b,c}</i>											
Gold and Silver Mines	MJ/tonne	549.3	★	354.4	304.0	304.1	329.5	343.5	326.3	321.9	-41.4%
Copper, Nickel, Lead and Zinc Mines	MJ/tonne	241.2	★	231.8	264.8	234.1	257.1	249.1	251.2	244.9	1.5%
Iron Mines	MJ/tonne	398.2	★	378.9	362.3	359.1	377.0	377.6	395.2	356.4	-10.5%
Other Metal Mines	MJ/tonne	406.3	★	338.8	383.3	409.6	592.1	615.8	372.9	343.4	-15.5%
Potash Mines	MJ/tonne	3,919.3	★	3,430.7	3,908.8	3,222.8	3,479.0	3,317.8	3,289.1	3,008.3	-23.2%
Salt Mines	MJ/tonne	375.5	★	258.3	266.9	281.8	224.5	227.3	214.6	215.9	-42.5%
Other Non-Metal Mines	MJ/tonne	812.1	★	637.6	546.1	622.3	577.9	498.1	510.0	454.3	-44.1%
Upstream Mining	MJ/\$97 – GDP	10.5	★	12.2	12.7	14.3	14.4	15.5	16.4	16.3	55.6%
Construction	MJ/\$97 – GO	0.6	★	0.5	0.5	0.4	0.4	0.4	0.4	0.4	-30.7%
Forestry	MJ/\$97 – GO	0.7	★	1.0	1.1	1.1	1.3	1.2	1.3	1.5	109.5%
Pulp Mills	MJ/tonne	43,305.6	★	36,776.1	36,382.8	35,153.6	38,129.8	37,887.6	35,930.5	35,888.4	-17.1%
Paper Mills (except newsprint)	MJ/tonne	21,280.4	★	17,443.2	16,921.4	16,241.1	14,305.6	14,366.2	15,976.1	15,682.3	-26.3%
Newsprint Mills	MJ/tonne	29,592.3	★	31,863.0	33,187.2	32,585.9	31,055.0	32,499.8	32,550.3	34,733.7	17.4%
Paperboard Mills	MJ/tonne	21,625.3	★	18,411.6	17,818.5	16,971.9	16,798.5	17,026.5	17,050.1	17,160.7	-20.6%
Converted Paper Products Industry	MJ/\$97 – GO	1.6	★	1.6	1.4	1.5	1.9	2.0	2.0	2.1	33.9%
Primary Production of Alumina and Aluminum	MJ/tonne	70,066.1	★	67,428.6	69,549.9	67,336.8	63,471.2	62,396.4	63,170.6	65,419.4	-6.6%
Other Non-Ferrous Smelting and Refining	MJ/tonne	47,908.8	★	41,735.9	36,949.6	39,646.6	48,569.0	46,801.2	53,485.9	48,640.4	1.5%
Petroleum Refining	MJ/m ³	3,510.8	★	2,867.0	2,784.8	2,785.4	2,861.3	3,273.4	3,238.2	2,885.1	-17.8%
Cement Industry	MJ/tonne	5,645.5	★	4,906.4	4,946.3	4,886.4	4,894.1	5,092.0	4,797.7	4,679.6	-17.1%
Petrochemical Industry	MJ/tonne	4,941.0	★	4,449.5	4,174.7	4,170.1	4,369.4	4,660.9	4,540.9	4,588.0	-7.1%
Industrial Gas Industry	MJ/\$97 – GO	17.2	★	12.1	15.8	16.2	15.4	16.8	17.0	16.8	-2.7%
Other Basic Chemicals Industry	MJ/\$97 – GO	24.2	★	21.4	19.4	15.6	13.4	11.4	11.6	11.6	-51.9%
Fertilizer Industry	MJ/tonne	6,855.9	★	8,449.8	8,615.4	8,329.7	8,741.9	7,681.3	7,421.0	8,205.6	19.7%
Iron and Steel	MJ/tonne	18,969.6	★	18,120.7	17,395.1	17,331.1	16,098.5	15,895.4	15,651.5	16,764.2	-11.6%
Meat Products Industries	MJ/tonne	4,653.2	★	4,343.5	4,174.0	4,876.9	4,776.2	4,156.0	4,104.2	4,004.9	-13.9%
Fruit and Vegetable Industries	MJ/\$97 – GO	2.3	★	2.5	2.1	2.3	2.5	2.4	2.4	2.3	1.9%
Bakery Products Industries	MJ/\$97 – GO	2.4	★	1.6	1.5	1.6	1.9	2.1	1.9	1.9	-19.6%
Other Food Industries	MJ/\$97 – GO	2.2	★	2.0	2.0	2.0	1.6	1.7	1.6	1.6	-28.5%
Dairy Products Industry	MJ/kilolitre	1,605.1	★	1,641.2	1,725.7	1,683.6	1,643.3	1,670.6	1,582.1	1,566.0	-2.4%
Beverage Industries (excluding breweries)	MJ/\$97 – GO	0.9	★	1.7	1.7	1.5	1.3	1.5	1.4	1.5	71.6%

Continued

★ 1991–1994 data not available, 1995–1997 data available at: oe.nrcan.gc.ca/handbook06**Sources:**

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Energy Intensity by Industry (Continued)

Units	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued	
										Total Growth 1990–2004	
<i>Energy Intensity by Industry^{a,b,c} (Continued)</i>											
Breweries Industries	MJ/hectolitre	326.2	★	229.7	233.9	240.0	228.4	239.8	250.1	226.4	-30.6%
Tobacco Products Industries	MJ/\$97 – GO	0.4	★	0.3	0.4	0.4	0.4	0.4	0.4	0.4	-10.7%
Rubber Products Industries	MJ/tonne	49.5	★	56.4	68.4	63.9	82.6	79.3	80.1	80.3	62.2%
Plastic Products Industries	MJ/\$97 – GO	1.5	★	1.6	1.3	1.4	1.6	1.4	1.5	1.5	-0.1%
Resin and Synthetic Rubber Industries	MJ/tonne	15,752.2	★	13,789.3	13,222.0	12,830.3	9,847.4	8,119.2	6,907.1	6,748.1	-57.2%
Leather and Allied Products Industries	MJ/\$97 – GO	1.1	★	1.0	1.0	0.9	0.9	0.8	0.6	0.5	-55.1%
Textile Mills	MJ/\$97 – GO	4.0	★	3.1	2.4	2.0	1.6	1.5	1.5	1.6	-61.2%
Textile Products Mills	MJ/\$97 – GO	3.2	★	2.6	1.8	1.5	1.5	1.4	1.2	1.1	-67.0%
Clothing Industries	MJ/\$97 – GO	0.9	★	0.8	0.7	0.7	0.7	0.6	0.7	0.6	-32.0%
Wood Products Industries	MJ/\$97 – GO	2.8	★	2.6	2.4	2.4	2.5	2.5	2.2	2.0	-29.3%
Furniture and Related Products Industries	MJ/\$97 – GO	1.0	★	0.8	0.9	0.9	1.0	0.9	0.9	1.0	-6.6%
Printing and Related Support Activities	MJ/\$97 – GO	1.4	★	0.8	0.8	1.0	0.8	0.8	0.8	0.8	-43.2%
Fabricated Metal Products Industries	MJ/\$97 – GO	1.9	★	1.7	1.5	1.3	1.5	1.5	1.5	1.5	-21.4%
Machinery Industries	MJ/\$97 – GO	0.6	★	0.6	0.5	0.5	0.5	0.5	0.6	0.6	-6.6%
Motor Vehicle Industry	MJ/\$97 – GO	0.9	★	0.9	0.7	0.7	0.7	0.7	0.7	0.6	-34.3%
Motor Vehicle Parts and Accessories Industries	MJ/\$97 – GO	0.8	★	0.5	0.4	0.5	0.5	0.5	0.5	0.5	-41.2%
Computer and Electronic Products Industries	MJ/\$97 – GO	0.3	★	0.3	0.2	0.1	0.1	0.1	0.1	0.1	-63.6%
Electrical Equipment and Components Industries	MJ/\$97 – GO	1.0	★	0.9	0.7	0.6	0.6	0.5	0.6	0.6	-37.8%
Other Manufacturing n.e.c.	MJ/\$97 – GO	2.7	★	1.5	1.5	1.6	1.4	1.6	2.1	2.1	-22.6%

★ 1991–1994 data not available, 1995–1997 data available at: oeenrcan.gc.ca/handbook06

Sources:

- Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- Informetrica Limited, *TI Model and Database*, Ottawa, November 2005.
- Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2004*, Simon Fraser University, January 2006.

Industrial Energy Prices and Background Indicators

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m ³) ^{a,e}	10.5	★	12.8	14.8	18.0	24.2	26.4	32.9	33.7	222.1%
Light Fuel Oil (cents/litre) ^f	25.8	★	19.4	24.0	40.1	35.6	34.7	38.6	38.7	50.3%
Heavy Fuel Oil (cents/litre) ^f	14.1	★	12.9	17.9	28.5	26.9	29.6	31.1	31.0	120.9%
Electricity (1,000 kW/400,000 kWh) ¹ (cents/kWh) ^{b,e}	5.7	★	7.1	7.1	6.9	7.6	7.5	8.0	7.7	36.5%
Electricity (5,000 kW/3,060,000 kWh) ¹ (cents/kWh) ^{b,e}	4.0	★	5.1	5.1	5.3	6.1	5.7	6.1	5.9	48.6%
Background Indicators										
Industrial GDP (million \$97) ^d	199,905	★	234,847	249,273	271,175	265,978	271,435	277,423	290,171	45.2%
Industrial GO (million \$97) ^d	540,406	★	648,334	714,352	765,477	760,570	784,301	783,408	819,322	51.6%
Capacity Utilization Rate (%)^c										
Mining	87.5	★	86.0	86.7	90.1	87.9	83.0	86.2	87.5	
Manufacturing	78.2	★	84.3	85.8	86.1	81.8	82.6	81.4	84.7	
<i>Pulp and Paper</i>	83.7	★	86.1	91.1	92.1	88.6	90.6	91.1	91.3	
<i>Primary Metals²</i>	85.1	★	93.8	91.1	90.9	88.6	87.8	88.4	90.0	
<i>Petroleum Refining</i>	87.5	★	95.5	94.4	92.5	95.0	96.5	95.4	93.1	
<i>Chemicals</i>	86.6	★	81.2	80.9	80.1	80.4	80.8	80.9	84.4	
Forestry	82.2	★	84.1	84.2	84.4	81.8	83.3	86.7	93.6	
Construction	91.1	★	84.7	86.8	87.9	90.1	89.1	88.4	86.1	
Industrial Employees (thousands)^d										
Mining	194	★	180	155	160	179	171	178	187	-3.2%
Manufacturing	2,054	★	2,102	2,202	2,254	2,230	2,291	2,283	2,297	11.8%
<i>Pulp and Paper</i>	139	★	122	118	116	109	106	108	104	-25.6%
<i>Primary Metals²</i>	135	★	107	105	109	99	101	98	93	-31.4%
<i>Petroleum Refining</i>	25	★	19	17	19	17	17	16	18	-30.0%
<i>Chemicals</i>	107	★	109	113	118	119	125	121	118	10.5%
Forestry	73	★	83	80	87	75	74	77	72	-1.9%
Construction	815	★	735	765	809	825	864	907	953	16.9%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) kW refers to power hook-up, whereas kWh refers to monthly electricity consumption.
 2) "Primary Metals" includes iron and steel, smelting and refining, and other primary metal activity.

Sources:

- a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2005 (Cat. No. 57-601-XIE).
 b) Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, April 2004.
 c) Statistics Canada, *Canadian Economic Observer Historical Statistical Supplement, 2004/05*, Ottawa, July 2005 (Cat No. 11-210-XIB).
 d) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
 e) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 f) Natural Resources Canada, Petroleum Resources Branch, Ottawa, December 2005.

The Data Situation

The aggregate data on transportation energy use by energy source are from Statistics Canada's *Report on Energy Supply-Demand in Canada* (RES-D) (Cat. No. 57-003-XIB). Other sources with more specific data enable the Office of Energy Efficiency (OEE) to allocate energy use by transportation mode. Using the stock, fuel efficiencies and average distance travelled, the Transportation End-Use Model (TEUM) calculates preliminary estimates for road energy use by vehicle type. Then, using origin and destination shipment data from Statistics Canada's *Trucking in Canada* (Cat. No. 53-222-XIE), TEUM takes into account the fact that heavy truck vehicles do not necessarily travel in the province where they are registered and that fuel for them is not necessarily purchased in that province. Final road energy use estimates are calibrated to match RES-D road information.

Aggregate non-road energy use data (rail, air and marine) are obtained directly from RES-D. Rail and air are further disaggregated into passenger and freight transportation on the basis of data from Statistics Canada's *Rail in Canada* (Cat. No. 52-216-XIE) and *Canadian Civil Aviation* (Cat. No. 51-206-XIB). The *Climate Change Air Sub-Group Report* by Sypher: Mueller International Inc., July 1999, is also used in the allocation of air energy use to passenger and freight modes.

Data for vehicle stock in TEUM were obtained from R. L. Polk Canada Inc., R. L. Polk & Co. and DesRosiers Automotive Consultants Inc. Specifically, they were extracted from two databases: *Canadian Vehicles in Operation Census* (CVIOC) and *Trucking Industry Profile* (TIP). Statistics Canada's *Road Motor Vehicles, Registrations* (Cat. No. 53-219-XIB), its *Canadian Vehicle Survey* (CVS) (Cat. No. 53-223-XIE) and the U.S. Department of Energy's *Transportation Energy Data Book, Edition 24*, are used to backcast car and truck stocks for years in which CVIOC and/or TIP were not available. This year, revisions to the historical truck stock prior to 1994 resulted in changes to the allocation of energy use between passenger and freight sub-sector road transportation, average distance estimates and related passenger- and tonne-kilometres estimates.

In addition, because past attempts to address inconsistencies in CVIOC (1989–2004) and TIP (1994–2002) data with various data smoothing techniques have not improved the quality of the output, these data manipulations were removed. The bus information is further disaggregated by bus type on the basis of Statistics Canada's *Passenger Bus and Urban Transit Statistics* (PBS) (Cat. No. 53-215-XIB).

Car and truck sales are derived from new vehicle registrations from R. L. Polk Canada Inc. (light-duty vehicles), R. L. Polk & Co. (trucks over 3855 kg) and Statistics Canada's *New Motor Vehicle Sales* (Cat. No. 63-007XIB). The light-truck sales were revised and differ from last year's report.

Laboratory-tested fuel efficiencies for new cars and light trucks are calculated from data in Transport Canada's *Vehicle Fuel Economy Information System*. However, no national data sources are available for on-road efficiencies. The OEE, through the National Energy Use Database, has been working with Transport Canada and Statistics Canada to address this issue. The collection of on-road fuel consumption data through CVS for all vehicle types except buses started on January 1, 2004. Survey results are expected in the 2006 calendar year. On-road fuel efficiency for buses is based on PBS.

The *National Private Vehicle Use Survey – October 1994 to September 1996* (conducted by Statistics Canada on behalf of Natural Resources Canada) and CVS provided average distances travelled for cars and trucks. With a view to achieving greater consistency with the survey data collected since 1995, heavy truck average distance travelled was revised prior to 1994. Motorcycle estimates were calculated on the basis of information from the U.S. Department of Transportation.

Occupancy rates are essential for calculating the passenger-kilometres travelled for cars and light trucks. Since 1999, occupancy rates have been obtained from CVS data. Observed trends in Transport Canada's seatbelt survey (1992–2002), total population and vehicle stock were used to backcast this series from 1998 to 1976. Motorcycle occupancy rates are based on U.S. Department of Transportation data. Finally, bus occupancy rates are taken from CVS and PBS. Non-road passenger-kilometres are taken from *Rail in Canada* and *Canadian Civil Aviation* for rail and air, respectively.

Light truck and medium truck tonne-kilometres are calculated using a TEUM assumption on load factor, heavy truck tonne-kilometres are from *Trucking in Canada*, and non-road tonne-kilometres are taken from *Canadian Civil Aviation*, *Rail in Canada* and Transport Canada's Surface and Maritime Statistics Division for air, rail and marine, respectively.

Transportation energy prices are weighted averages of regional prices from Statistics Canada's *Energy Statistics Handbook* (Cat. No. 57-601-XIE). Other transportation indicators are from Informetrica Limited's *TI Model and Database*.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^a	1,877.9	★	2,194.5	2,252.8	2,281.9	2,277.3	2,306.2	2,361.7	2,465.1	31.3%
Passenger Transportation ^b	1,139.5	★	1,247.3	1,262.2	1,254.8	1,255.6	1,276.2	1,291.7	1,334.3	17.1%
Freight Transportation ^b	685.1	★	876.5	915.0	947.1	932.5	938.4	976.9	1,035.2	51.1%
Off-Road ^b	53.3	★	70.6	75.6	80.0	89.2	91.5	93.2	95.7	79.3%
Energy Use by Energy Source (PJ) ^a										
Electricity	3.1	★	2.9	3.0	3.1	3.1	3.4	3.4	3.5	11.5%
Natural Gas	1.7	★	2.5	2.2	2.4	2.0	1.7	1.7	1.8	5.2%
Motor Gasoline	1,120.4	★	1,261.4	1,293.4	1,295.1	1,308.7	1,333.4	1,354.5	1,384.3	23.6%
Diesel Fuel Oil	469.8	★	599.1	628.2	658.3	650.4	662.4	697.5	744.7	58.5%
Light Fuel Oil and Kerosene	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Heavy Fuel Oil	60.1	★	74.8	65.9	67.8	77.5	64.8	67.1	69.1	14.8%
Aviation Gasoline	5.5	★	3.9	3.6	3.4	3.5	3.5	3.2	2.9	-46.6%
Aviation Turbo Fuel	181.9	★	222.8	233.9	235.9	215.1	224.6	222.5	246.2	35.3%
Propane	35.4	★	27.0	22.6	15.9	17.0	12.4	11.9	12.7	-64.2%
Energy Use by Transportation Mode (PJ) ^b										
Small Cars	320.2	★	329.1	326.1	318.2	319.3	320.4	321.4	323.0	0.9%
Large Cars	355.3	★	307.9	304.2	295.9	296.5	297.3	299.4	301.4	-15.2%
Passenger Light Trucks	226.1	★	339.2	348.4	355.7	376.1	386.9	401.7	419.6	85.6%
Freight Light Trucks	112.5	★	154.0	154.5	154.2	164.0	166.2	172.2	179.4	59.4%
Medium Trucks	127.7	★	140.1	161.2	161.6	135.5	141.4	140.9	143.4	12.3%
Heavy Trucks	246.3	★	378.5	398.2	424.9	419.1	435.1	475.4	510.7	107.3%
Motorcycles	2.0	★	2.1	2.1	2.2	2.2	2.5	2.6	2.6	31.2%
School Buses	13.7	★	18.6	19.2	19.0	18.3	16.9	16.6	16.3	18.7%
Urban Transit	28.4	★	25.3	26.2	27.0	26.7	28.5	29.0	28.4	0.1%
Inter-City Buses	8.9	★	6.7	6.9	6.8	7.0	6.7	6.6	6.3	-28.5%
Passenger Air	180.2	★	216.1	226.3	227.1	206.6	214.4	211.9	234.1	29.9%
Freight Air	7.3	★	10.6	11.3	12.2	12.0	13.7	13.8	15.0	106.9%
Passenger Rail	4.7	★	2.4	2.7	2.9	2.9	2.6	2.5	2.6	-45.9%
Freight Rail	84.7	★	74.2	78.4	80.2	78.8	71.5	71.3	72.5	-14.5%
Marine	106.5	★	119.2	111.5	114.0	123.2	110.5	103.3	114.2	7.2%
Off-Road	53.3	★	70.6	75.6	80.0	89.2	91.5	93.2	95.7	79.3%
Activity										
Total Passenger-kilometres ¹ (millions) ^b	443,650	★	530,174	536,550	539,218	540,248	552,941	560,250	581,352	31.0%
Total Tonne-kilometres (millions) ^b	545,198	★	674,688	703,576	734,754	726,086	764,007	779,934	825,340	51.4%
Passenger Transportation Energy Intensity ¹ (MJ/Pkm) ^b										
	2.48	★	2.29	2.30	2.27	2.27	2.25	2.26	2.24	-9.6%
Freight Transportation Energy Intensity (MJ/Tkm) ^b										
	1.26	★	1.30	1.30	1.29	1.28	1.23	1.25	1.25	-0.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Excludes non-commercial aviation.

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.

Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions (Mt of CO₂e) ^{a,b,c}	135.0	★	156.8	161.1	163.3	163.0	165.0	168.9	176.4	30.6%
Passenger Transportation ^{b,c}	81.2	★	88.0	89.1	88.6	88.7	90.2	91.3	94.3	16.2%
Freight Transportation ^{b,c}	50.1	★	63.9	66.7	69.1	68.1	68.4	71.1	75.4	50.6%
Off-Road ^{b,c}	3.7	★	4.9	5.3	5.6	6.2	6.4	6.5	6.6	77.6%
GHG Emissions by Energy Source (Mt of CO₂e) ^{a,b,c}										
Electricity	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	23.2%
Natural Gas	0.1	★	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4.0%
Motor Gasoline	80.0	★	89.3	91.6	91.8	92.7	94.5	96.0	98.1	22.6%
Diesel Fuel Oil	34.6	★	44.1	46.3	48.5	47.9	48.7	51.1	54.6	57.9%
Light Fuel Oil and Kerosene	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Heavy Fuel Oil	4.5	★	5.5	4.8	5.0	5.7	4.8	4.9	5.1	12.7%
Aviation Gasoline	0.4	★	0.3	0.3	0.3	0.3	0.3	0.2	0.2	-46.6%
Aviation Turbo Fuel	13.2	★	15.7	16.4	16.6	15.1	15.8	15.6	17.3	31.6%
Propane	2.1	★	1.6	1.4	1.0	1.0	0.7	0.7	0.8	-63.9%
GHG Emissions by Transportation Mode (Mt of CO₂e) ^{a,b,c}										
Small Cars	22.6	★	23.1	22.9	22.3	22.4	22.5	22.5	22.7	0.1%
Large Cars	25.1	★	21.6	21.3	20.8	20.8	20.9	21.0	21.1	-15.9%
Passenger Light Trucks	16.3	★	24.3	25.0	25.5	26.9	27.7	28.8	30.1	84.4%
Freight Light Trucks	7.9	★	10.9	10.9	10.9	11.6	11.8	12.3	12.8	62.1%
Medium Trucks	9.2	★	10.1	11.6	11.6	9.7	10.2	10.1	10.3	11.8%
Heavy Trucks	17.6	★	27.3	28.7	30.6	30.2	31.3	34.2	36.8	109.4%
Motorcycles	0.1	★	0.1	0.1	0.1	0.2	0.2	0.2	0.2	30.0%
School Buses	1.0	★	1.3	1.3	1.3	1.3	1.2	1.2	1.1	19.6%
Urban Transit	2.0	★	1.8	1.8	1.9	1.9	2.0	2.1	2.0	1.3%
Inter-City Buses	0.6	★	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-27.8%
Passenger Air	13.0	★	15.2	15.9	16.0	14.5	15.1	14.9	16.5	26.4%
Freight Air	0.5	★	0.7	0.8	0.9	0.8	1.0	1.0	1.1	101.2%
Passenger Rail	0.4	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-45.4%
Freight Rail	6.7	★	6.0	6.3	6.4	6.3	5.7	5.7	5.8	-13.6%
Marine	8.1	★	9.0	8.5	8.6	9.3	8.4	7.8	8.7	6.3%
Off-Road	3.7	★	4.9	5.3	5.6	6.2	6.4	6.5	6.6	77.6%
GHG Intensity (tonne/TJ) ^{a,b,c}	71.9	★	71.5	71.5	71.6	71.6	71.5	71.5	71.5	-0.5%
GHG Emissions Related to Electricity (Mt of CO₂e) ^{a,c}	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	23.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
b) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.
c) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Transportation Energy Prices and Background Indicators

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Energy Prices by Energy Source (incl. taxes)										
Regular Unleaded Gasoline ¹ (cents/litre) ^{a,d,e}	58.7	★	54.2	59.4	72.6	70.7	70.5	75.0	82.8	41.1%
Diesel Fuel Oil ¹ (cents/litre) ^{a,d,e}	51.3	★	53.5	53.9	67.9	68.3	63.2	69.0	75.7	47.5%
Propane (cents/litre) ^{a,d}	26.6	★	29.2	30.9	43.0	45.0	37.3	50.1	51.4	92.9%
Excise Tax (cents/litre) ^b										
Unleaded Gasoline	8.5	★	10.0	10.0	10.0	10.0	10.0	10.0	10.0	17.6%
Leaded Gasoline	9.5	★	11.0	11.0	11.0	11.0	11.0	11.0	11.0	15.8%
Diesel Fuel Oil	4.0	★	4.0	4.0	4.0	4.0	4.0	4.0	4.0	0.0%
Background Indicators										
Consumer Price Index (1992 = 100) ^c										
Gasoline and Other Fuels ²	105.3	★	99.1	108.0	131.7	128.3	127.2	135.4	149.6	
Public Transportation	86.2	★	138.8	148.0	152.9	156.1	164.9	169.7	173.6	
Inter-City Transportation	88.6	★	152.6	166.8	172.3	174.1	187.1	191.5	194.6	
Local and Commuter	83.3	★	121.6	124.4	128.6	133.4	136.9	142.3	147.2	
GDP at Factor Cost (million \$97) ^c										
Business Sector	572,593	★	710,535	754,069	800,590	812,197	837,676	858,025	889,421	55.3%
Transportation	32,783	★	39,890	42,314	44,339	45,269	45,628	45,898	48,104	46.7%
Real Personal Disposable Income per Household (\$97) ^c	51,572	★	48,748	49,535	51,576	52,039	52,294	52,748	53,332	3.4%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) Price at full-service stations.
- 2) "Other Fuels" includes diesel fuel oil, propane, natural gas and any other fuel that would be used for automobile propulsion.

Sources:

- a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2005 (Cat. No. 57-601-XIE).
- b) Canada Revenue Agency, *Current Rates of Excise Taxes*, Ottawa, November 2005.
- c) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.
- d) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- e) Statistics Canada, *Total Population, Census Divisions and Census Metropolitan Areas*, Tables 051-0014 and 051-0034, Ottawa, December 2005 (CANSIM).

Passenger Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Passenger Transportation Energy Use (PJ) ^a	1,139.5	★	1,247.3	1,262.2	1,254.8	1,255.6	1,276.2	1,291.7	1,334.3	17.1%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	3.1	★	2.9	3.0	3.1	3.1	3.4	3.4	3.5	11.5%
Natural Gas	0.6	★	1.0	1.0	1.2	0.9	0.9	0.9	1.0	63.0%
Motor Gasoline	880.6	★	953.7	959.0	952.5	973.6	988.0	1,003.8	1,022.5	16.1%
Diesel Fuel Oil	58.0	★	59.9	61.2	62.4	62.2	62.9	65.3	65.5	13.0%
Aviation Gasoline	5.4	★	3.8	3.5	3.4	3.5	3.4	3.1	2.9	-46.9%
Aviation Turbo Fuel	174.7	★	212.3	222.7	223.7	203.2	211.0	208.8	231.2	32.3%
Propane	17.0	★	13.7	11.8	8.5	9.2	6.7	6.4	7.7	-54.9%
<i>Energy Use by Transportation Mode (PJ) ^a</i>										
Small Cars	320.2	★	329.1	326.1	318.2	319.3	320.4	321.4	323.0	0.9%
Large Cars	355.3	★	307.9	304.2	295.9	296.5	297.3	299.4	301.4	-15.2%
Light Trucks	226.1	★	339.2	348.4	355.7	376.1	386.9	401.7	419.6	85.6%
Motorcycles	2.0	★	2.1	2.1	2.2	2.2	2.5	2.6	2.6	31.2%
School Buses	13.7	★	18.6	19.2	19.0	18.3	16.9	16.6	16.3	18.7%
Urban Transit	28.4	★	25.3	26.2	27.0	26.7	28.5	29.0	28.4	0.1%
Inter-City Buses	8.9	★	6.7	6.9	6.8	7.0	6.7	6.6	6.3	-28.5%
Air	180.2	★	216.1	226.3	227.1	206.6	214.4	211.9	234.1	29.9%
Rail	4.7	★	2.4	2.7	2.9	2.9	2.6	2.5	2.6	-45.9%
Activity										
Total Passenger-kilometres ¹ (millions) ^{a,b,c}	443,650	★	530,174	536,550	539,218	540,248	552,941	560,250	581,352	31.0%
<i>Passenger-kilometres by Transportation Mode (millions)</i>										
Small Cars ^a	152,630	★	160,880	159,593	156,019	158,161	159,503	159,936	161,451	5.8%
Large Cars ^a	120,670	★	117,261	116,503	114,314	115,814	117,090	117,808	118,887	-1.5%
Light Trucks ^a	61,501	★	107,887	111,418	114,221	121,524	126,365	132,148	139,387	126.6%
Motorcycles ^a	1,512	★	1,345	1,411	1,468	1,668	1,923	2,004	1,997	32.0%
School Buses ^a	15,274	★	24,945	26,379	26,721	24,746	23,137	23,239	23,246	52.2%
Urban Transit ^a	14,722	★	12,341	13,427	13,429	13,140	14,274	14,649	14,424	-2.0%
Inter-City Buses ^a	8,782	★	7,415	6,692	6,607	6,852	7,073	7,117	6,878	-21.7%
Air ^{1,b}	66,776	★	96,642	99,618	104,906	96,790	101,978	101,914	113,626	70.2%
Rail ^c	1,782	★	1,458	1,510	1,533	1,553	1,597	1,434	1,456	-18.3%
Energy Intensity ¹ (MJ/Pkm) ^{a,b,c}	2.48	★	2.29	2.30	2.27	2.27	2.25	2.26	2.24	-9.6%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) Excludes non-commercial aviation.

Sources:

- a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
b) Statistics Canada, *Canadian Civil Aviation, 1990–2000*, Ottawa, February 2003 (Cat. No. 51-206-XIB).
Data for 2001 to 2004 estimated by Natural Resources Canada.
c) Statistics Canada, *Rail in Canada 1990–2003*, Ottawa, May 2005 (Cat. No. 52-216-XIE).
Data for 2004 estimated by Natural Resources Canada.

Passenger Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Passenger Transportation GHG Emissions (Mt of CO₂e) ^{b,c}	81.2	★	88.0	89.1	88.6	88.7	90.2	91.3	94.3	16.2%
<i>GHG Emissions by Energy Source (Mt of CO₂e) ^{b,c}</i>										
Electricity	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	23.2%
Natural Gas	0.0	★	0.1	0.0	0.1	0.0	0.0	0.0	0.0	61.1%
Motor Gasoline	62.8	★	67.4	67.8	67.4	68.9	69.9	71.0	72.4	15.3%
Diesel Fuel Oil	4.2	★	4.3	4.4	4.5	4.5	4.6	4.7	4.8	13.7%
Aviation Gasoline	0.4	★	0.3	0.3	0.2	0.3	0.2	0.2	0.2	-46.9%
Aviation Turbo Fuel	12.6	★	14.9	15.7	15.7	14.3	14.8	14.7	16.3	28.7%
Propane	1.0	★	0.8	0.7	0.5	0.6	0.4	0.4	0.5	-54.5%
<i>GHG Emissions by Transportation Mode (Mt of CO₂e) ^{b,c}</i>										
Small Cars	22.6	★	23.1	22.9	22.3	22.4	22.5	22.5	22.7	0.1%
Large Cars	25.1	★	21.6	21.3	20.8	20.8	20.9	21.0	21.1	-15.9%
Light Trucks	16.3	★	24.3	25.0	25.5	26.9	27.7	28.8	30.1	84.4%
Motorcycles	0.1	★	0.1	0.1	0.1	0.2	0.2	0.2	0.2	30.0%
School Buses	1.0	★	1.3	1.3	1.3	1.3	1.2	1.2	1.1	19.6%
Urban Transit	2.0	★	1.8	1.8	1.9	1.9	2.0	2.1	2.0	1.3%
Inter-City Buses	0.6	★	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-27.8%
Air	13.0	★	15.2	15.9	16.0	14.5	15.1	14.9	16.5	26.4%
Rail	0.4	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-45.4%
GHG Intensity (tonne/TJ) ^{b,c}	71.2	★	70.6	70.6	70.6	70.7	70.7	70.7	70.7	-0.8%
GHG Emissions Related to Electricity (Mt of CO₂e) ^{a,c}	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	23.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
 b) Natural Resources Canada, *Transportation End-Use Model*, Ottawa, February 2006.
 c) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Passenger Road Transportation Secondary Energy Use and GHG Emissions by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Passenger Road Transportation Energy Use (PJ) ^a	954.6	★	1,028.8	1,033.3	1,024.8	1,046.1	1,059.2	1,077.3	1,097.6	15.0%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Electricity	3.1	★	2.9	3.0	3.1	3.1	3.4	3.4	3.5	11.5%
Natural Gas	0.6	★	1.0	1.0	1.2	0.9	0.9	0.9	1.0	63.0%
Motor Gasoline	880.6	★	953.7	959.0	952.5	973.6	988.0	1,003.8	1,022.5	16.1%
Diesel Fuel Oil	53.3	★	57.5	58.5	59.6	59.3	60.3	62.8	63.0	18.3%
Propane	17.0	★	13.7	11.8	8.5	9.2	6.7	6.4	7.7	-54.9%
Activity										
Passenger-kilometres (millions) ^a	375,092	★	432,074	435,422	432,779	441,905	449,366	456,902	466,270	24.3%
Energy Intensity (MJ/Pkm) ^a	2.54	★	2.38	2.37	2.37	2.37	2.36	2.36	2.35	-7.5%
Passenger Road Transportation GHG Emissions (Mt of CO₂e) ^{a,b}										
<i>GHG Emissions by Energy Source (Mt of CO₂e) ^{a,b}</i>										
Electricity	0.2	★	0.2	0.2	0.2	0.2	0.2	0.2	0.2	23.2%
Natural Gas	0.0	★	0.1	0.0	0.1	0.0	0.0	0.0	0.0	61.1%
Motor Gasoline	62.8	★	67.4	67.8	67.4	68.9	69.9	71.0	72.4	15.3%
Diesel Fuel Oil	3.8	★	4.2	4.2	4.3	4.3	4.4	4.5	4.6	19.6%
Propane	1.0	★	0.8	0.7	0.5	0.6	0.4	0.4	0.5	-54.5%
GHG Intensity (tonne/TJ) ^{a,b}	71.0	★	70.6	70.6	70.7	70.7	70.7	70.8	70.7	-0.4%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.

b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Passenger Transportation Explanatory Variables

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Light-Duty Vehicles										
Sales (thousands)										
Small Cars ^{a,d}	514	★	421	447	481	490	520	491	470	-8.5%
Large Cars ^{a,d}	358	★	319	342	367	376	399	375	356	-0.6%
Light Trucks ^{a,d}	295	★	513	506	499	500	546	526	512	73.7%
Motorcycles	n.a.	★	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	–
Stock (thousands)										
Small Cars ^{a,f}	6,037	★	5,942	5,930	5,856	5,774	5,743	6,001	6,030	-0.1%
Large Cars ^{a,f}	4,870	★	4,440	4,428	4,355	4,266	4,242	4,438	4,469	-8.2%
Light Trucks ^{a,f}	2,682	★	3,866	3,998	4,139	4,285	4,373	4,739	4,955	84.7%
Motorcycles ^{a,c}	306	★	289	298	311	318	350	373	373	22.2%
Average Distance Travelled per Year (km)										
Small Cars ^a	16,269	★	17,131	17,010	16,823	17,247	17,521	16,842	16,949	4.2%
Large Cars ^a	15,944	★	16,710	16,631	16,573	17,097	17,413	16,776	16,839	5.6%
Light Trucks ^a	15,261	★	17,089	16,998	16,767	17,164	17,336	16,585	16,590	8.7%
Motorcycles ^a	3,958	★	4,354	4,300	4,247	4,295	4,326	4,194	4,211	6.4%
On-Road Average Fuel Consumption (L/100 km)										
Small Cars ^{a,g}										
Motor Gasoline	9.4	★	9.2	9.2	9.2	9.2	9.1	9.1	9.0	-3.9%
Diesel Fuel Oil	8.0	★	8.2	8.1	7.9	7.7	7.5	7.5	7.4	-7.8%
Large Cars ^{a,g}										
Motor Gasoline	13.2	★	11.9	11.8	11.7	11.6	11.5	11.5	11.5	-13.3%
Diesel Fuel Oil	11.5	★	10.5	10.2	9.9	9.6	9.5	9.5	9.5	-17.6%
Light Trucks ^{a,g}										
Motor Gasoline	16.0	★	14.7	14.7	14.7	14.6	14.6	14.6	14.6	-8.7%
Diesel Fuel Oil	12.9	★	12.7	12.7	12.7	12.7	12.6	12.7	12.6	-1.8%
Motorcycles ^{a,e}										
Motor Gasoline	4.7	★	4.7	4.7	4.7	4.7	4.7	4.7	4.7	0.0%

Continued

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06**Sources:**

- a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–2000*, Ottawa, July 2002 (Cat. No. 53-215-XIB).
Data for 2001 to 2004 estimated by Natural Resources Canada.
c) Statistics Canada, *Road Motor Vehicle Registrations*, Ottawa, November 1999 (Cat. No. 53-219-XIB).
Statistics Canada, *Motor Vehicle Registrations 2000–2004*, Table 405-0004, Ottawa, April 2005 (CANSIM).
d) Statistics Canada, *New Motor Vehicle Sales 1990–2004*, Table 079-0001, Ottawa, November 2005 (CANSIM).
e) U.S. Department of Transportation, *National Transportation Statistics*, Table 4-1, 2004.
f) DesRosiers Automotive Consultants, *Canadian Vehicle in Operation Census 1990–2004*, Richmond Hill (Toronto), December 2005.
g) Transport Canada, *Vehicle Fuel Economy Information System 1979–2003*, Ottawa, December 2004.
Model year 2004 estimated by Natural Resources Canada.

Passenger Transportation Explanatory Variables (Continued)

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Continued Total Growth 1990–2004
Lab-Tested New Vehicle Fuel Consumption¹ (L/100 km)^g										
CAFC Standard Cars	8.6	★	8.6	8.6	8.6	8.6	8.6	8.6	8.6	0.0%
CAFC Average New Car	8.2	★	7.9	7.9	7.8	7.8	7.7	7.6	7.5	-8.5%
CAFC Standard Light Trucks	11.8	★	11.4	11.4	11.4	11.4	11.4	11.4	11.4	-3.4%
CAFC Average New Light Truck	11.4	★	11.3	11.3	11.1	11.0	11.0	10.7	10.7	-6.1%
Buses										
Stock (thousands)^a										
School Buses	44.8	★	50.4	50.4	49.3	44.5	44.9	45.5	44.1	-1.6%
Urban Transit	25.6	★	21.4	22.7	22.7	24.1	25.4	25.7	24.9	-2.6%
Inter-City Buses	6.6	★	6.1	5.5	5.3	5.5	5.8	5.9	5.7	-13.6%
Average Distance Travelled per Year (km)^{a,b}										
School Buses	19,826	★	25,978	27,147	27,770	28,174	25,781	25,292	25,806	30.2%
Urban Transit	54,734	★	54,641	55,971	56,038	51,682	53,223	53,957	54,803	0.1%
Inter-City Buses	79,059	★	71,746	72,678	73,342	73,525	72,357	71,923	71,676	-9.3%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) These series are representative of vehicles produced in the model year, not of vehicles sold in that calendar year.

Sources:

- a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
 b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–2000*, Ottawa, July 2002 (Cat. No. 53-215-XIB). Data for 2001 to 2004 estimated by Natural Resources Canada.
 c) Statistics Canada, *Road Motor Vehicle Registrations*, Ottawa, November 1999 (Cat. No. 53-219-XIB). Statistics Canada, *Motor Vehicle Registrations 2000–2004*, Table 405-0004, Ottawa, April 2005 (CANSIM).
 d) Statistics Canada, *New Motor Vehicle Sales 1990–2004*, Table 079-0001, Ottawa, November 2005 (CANSIM).
 e) U.S. Department of Transportation, *National Transportation Statistics*, Table 4-1, 2004.
 f) DesRosiers Automotive Consultants, *Canadian Vehicle in Operation Census 1990–2004*, Richmond Hill (Toronto), December 2005.
 g) Transport Canada, *Vehicle Fuel Economy Information System 1979–2003*, Ottawa, December 2004. Model year 2004 estimated by Natural Resources Canada.

Freight Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Freight Transportation Energy Use (PJ) ^a	685.1	★	876.5	915.0	947.1	932.5	938.4	976.9	1,035.2	51.1%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Natural Gas	1.0	★	1.5	1.3	1.2	1.0	0.9	0.9	0.7	-28.8%
Motor Gasoline	186.4	★	237.1	258.8	262.5	245.9	253.9	257.6	266.1	42.8%
Diesel Fuel Oil	411.8	★	539.3	566.9	595.9	588.2	599.5	632.1	679.2	64.9%
Light Fuel Oil and Kerosene	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Heavy Fuel Oil	60.1	★	74.8	65.9	67.8	77.5	64.8	67.1	69.1	14.8%
Aviation Gasoline	0.1	★	0.0	0.0	0.0	0.1	0.1	0.1	0.1	-27.9%
Aviation Turbo Fuel	7.2	★	10.5	11.2	12.2	11.9	13.6	13.7	15.0	108.4%
Propane	18.4	★	13.3	10.8	7.5	7.8	5.7	5.5	5.0	-72.7%
<i>Energy Use by Transportation Mode (PJ) ^a</i>										
Light Trucks	112.5	★	154.0	154.5	154.2	164.0	166.2	172.2	179.4	59.4%
Medium Trucks	127.7	★	140.1	161.2	161.6	135.5	141.4	140.9	143.4	12.3%
Heavy Trucks	246.3	★	378.5	398.2	424.9	419.1	435.1	475.4	510.7	107.3%
Air	7.3	★	10.6	11.3	12.2	12.0	13.7	13.8	15.0	106.9%
Rail	84.7	★	74.2	78.4	80.2	78.8	71.5	71.3	72.5	-14.5%
Marine	106.5	★	119.2	111.5	114.0	123.2	110.5	103.3	114.2	7.2%
Activity										
Total Tonne-kilometres (millions) ^a	545,198	★	674,688	703,576	734,754	726,086	764,007	779,934	825,340	51.4%
<i>Tonne-kilometres by Transportation Mode (millions)</i>										
Light Trucks ^a	10,103	★	14,975	15,003	14,982	15,917	16,157	16,727	17,418	72.4%
Medium Trucks ^a	17,056	★	19,511	22,561	22,685	19,028	19,929	20,013	20,425	19.8%
Heavy Trucks ^b	77,800	★	137,552	158,104	164,720	170,569	177,012	184,744	198,462	155.1%
Air ^c	1,754	★	2,292	2,365	2,329	2,311	2,660	2,705	3,001	71.1%
Rail ^d	248,371	★	298,797	297,504	319,769	318,264	320,556	318,345	323,658	30.3%
Marine ^e	190,115	★	201,560	208,039	210,269	199,997	227,694	237,400	262,376	38.0%
Energy Intensity (MJ/Tkm) ^a	1.26	★	1.30	1.30	1.29	1.28	1.23	1.25	1.25	-0.2%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

- Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
- Statistics Canada, *Trucking in Canada 1990–2003*, Ottawa, January 2005 (Cat. No. 53-222-X1B). Data for 2004 estimated by Natural Resources Canada.
- Statistics Canada, *Canadian Civil Aviation, 1990–2000*, Ottawa, February 2003 (Cat. No. 51-206-X1B). Data for 2001 to 2004 estimated by Natural Resources Canada.
- Statistics Canada, *Rail in Canada 1990–2003*, Ottawa, May 2005 (Cat. No. 52-216-X1E). Data for 2004 estimated by Natural Resources Canada.
- Transport Canada, Surface and Marine Statistics and Forecasts Division, Ottawa, January 2005. Data for 2004 estimated by Natural Resources Canada.

Freight Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Freight Transportation GHG Emissions (Mt of CO₂e) ^{a,b}	50.1	★	63.9	66.7	69.1	68.1	68.4	71.1	75.4	50.6%
<i>GHG Emissions by Energy Source (Mt of CO₂e) ^{a,b}</i>										
Natural Gas	0.1	★	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-29.6%
Motor Gasoline	13.5	★	17.0	18.6	18.8	17.6	18.2	18.5	19.1	41.3%
Diesel Fuel Oil	30.4	★	39.8	41.8	43.9	43.4	44.1	46.4	49.8	64.0%
Light Fuel Oil and Kerosene	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Heavy Fuel Oil	4.5	★	5.5	4.8	5.0	5.7	4.8	4.9	5.1	12.7%
Aviation Gasoline	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-27.9%
Aviation Turbo Fuel	0.5	★	0.7	0.8	0.9	0.8	1.0	1.0	1.1	102.6%
Propane	1.1	★	0.8	0.7	0.4	0.5	0.3	0.3	0.3	-72.5%
<i>GHG Emissions by Transportation Mode (Mt of CO₂e) ^{a,b}</i>										
Light Trucks	7.9	★	10.9	10.9	10.9	11.6	11.8	12.3	12.8	62.1%
Medium Trucks	9.2	★	10.1	11.6	11.6	9.7	10.2	10.1	10.3	11.8%
Heavy Trucks	17.6	★	27.3	28.7	30.6	30.2	31.3	34.2	36.8	109.4%
Air	0.5	★	0.7	0.8	0.9	0.8	1.0	1.0	1.1	101.2%
Rail	6.7	★	6.0	6.3	6.4	6.3	5.7	5.7	5.8	-13.6%
Marine	8.1	★	9.0	8.5	8.6	9.3	8.4	7.8	8.7	6.3%
GHG Intensity (tonne/TJ) ^{a,b}	73.1	★	72.9	72.9	73.0	73.0	72.9	72.8	72.8	-0.4%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.

b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Freight Road Transportation Secondary Energy Use and GHG Emissions by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Freight Road Transportation Energy Use (PJ) ^a	486.6	★	672.6	713.8	740.7	718.5	742.8	788.5	833.5	71.3%
<i>Energy Use by Energy Source (PJ) ^a</i>										
Natural Gas	1.0	★	1.5	1.3	1.2	1.0	0.9	0.9	0.7	-28.8%
Motor Gasoline	186.4	★	237.1	258.8	262.5	245.9	253.9	257.6	266.1	42.8%
Diesel Fuel Oil	280.7	★	420.7	443.0	469.5	463.8	482.3	524.6	561.6	100.1%
Propane	18.4	★	13.3	10.8	7.5	7.8	5.7	5.5	5.0	-72.7%
Activity										
Tonne-kilometres (millions) ^a	104,958	★	172,039	195,668	202,387	205,514	213,097	221,483	236,305	125.1%
Energy Intensity (MJ/Tkm) ^a	4.64	★	3.91	3.65	3.66	3.50	3.49	3.56	3.53	-23.9%
Freight Road Transportation GHG Emissions (Mt of CO_{2e}) ^{a,b}	34.7	★	48.2	51.2	53.2	51.6	53.3	56.6	59.9	72.7%
<i>GHG Emissions by Energy Source (Mt of CO_{2e}) ^{a,b}</i>										
Natural Gas	0.1	★	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-29.6%
Motor Gasoline	13.5	★	17.0	18.6	18.8	17.6	18.2	18.5	19.1	41.3%
Diesel Fuel Oil	20.0	★	30.3	31.9	33.8	33.4	34.7	37.8	40.4	102.1%
Propane	1.1	★	0.8	0.7	0.4	0.5	0.3	0.3	0.3	-72.5%
GHG Intensity (tonne/TJ) ^{a,b}	71.3	★	71.6	71.7	71.8	71.8	71.8	71.8	71.8	0.8%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.

b) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

Freight Transportation Explanatory Variables


	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Trucks										
Sales (thousands)										
Light Trucks ^{a,f}	118	★	181	175	171	169	184	178	174	47.0%
Medium Trucks ^{a,b}	43	★	61	70	72	75	73	74	76	75.6%
Heavy Trucks ^{a,b}	16	★	28	32	29	22	25	24	30	86.9%
Stock (thousands)										
Light Trucks ^{a,c,d}	1,076	★	1,362	1,381	1,418	1,453	1,476	1,603	1,682	56.3%
Medium Trucks ^{a,b}	597	★	650	730	749	640	667	685	693	16.0%
Heavy Trucks ^{a,b}	297	★	314	304	301	319	325	332	336	12.9%
Average Distance Travelled per Year (km)										
Light Trucks ^a	18,777	★	21,994	21,729	21,136	21,912	21,896	20,868	20,714	10.3%
Medium Trucks ^{a,e}	22,840	★	24,004	24,740	24,219	23,803	23,892	23,380	23,574	3.2%
Heavy Trucks ^a	62,011	★	66,391	72,405	74,217	71,810	69,519	70,343	70,992	14.5%
On-Road Average Fuel Consumption (L/100 km)										
Light Trucks ^{a,g}										
Motor Gasoline	16.6	★	14.9	14.9	14.9	14.9	14.9	14.9	14.9	-10.4%
Diesel Fuel Oil	13.2	★	12.9	12.9	12.9	12.8	12.8	12.9	12.8	-2.6%
Medium Trucks ^a										
Motor Gasoline	27.5	★	26.3	26.1	26.0	26.2	26.1	25.9	25.8	-6.3%
Diesel Fuel Oil	22.8	★	21.9	21.8	21.8	21.7	21.7	21.6	21.6	-5.5%
Heavy Trucks ^a										
Diesel Fuel Oil	44.4	★	41.3	40.5	40.3	40.1	39.9	39.7	39.5	-11.0%
Lab-Tested Light Truck Fuel Consumption ¹ (L/100 km) ^g										
CAFC Standard Light Trucks	11.8	★	11.4	11.4	11.4	11.4	11.4	11.4	11.4	-3.4%
CAFC Average New Light Truck	11.4	★	11.3	11.3	11.1	11.0	11.0	10.7	10.7	-6.1%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

1) These series are representative of vehicles produced in the model year, not of vehicles sold in that calendar year.

Sources:

- a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2006.
b) R.L. Polk & Co., *New Vehicle Registrations 1990–2003*, Southfield (Detroit), Michigan, December 2005.
c) DesRosiers Automotive Consultants, *Canadian Vehicle in Operation Census 1990–2004*, Richmond Hill (Toronto), December 2005.
d) R.L. Polk & Co., *Trucking Industry Profile 1994–2002*, Southfield (Detroit), Michigan, April 2004. Data for 2003 and 2004 estimated by Natural Resources Canada.
e) Statistics Canada, *Canadian Vehicle Survey, 1999–2004*, Ottawa, October 2005 (Cat. No. 53-223-XIE).
f) Statistics Canada, *New Motor Vehicle Sales 1990–2004*, Table 079–0001, Ottawa, November 2005 (CANSIM).
g) Transport Canada, *Vehicle Fuel Economy Information System 1979–2003*, Ottawa, December 2004. Model year 2004 estimated by Natural Resources Canada.



Electricity Generation

SECTOR

Chapter

6

The Data Situation

Energy use and production data for the electricity generation sector are reported in Statistics Canada's *Report on Energy Supply-Demand in Canada* (RESD) (Cat. No. 57-003-XIB). RESD does not provide energy use data for the electricity generated from wood and other non-specified fuel, hydro and nuclear categories. Electricity production data for these three energy sources are converted to energy use data using energy content values of 10.5, 3.6 and 11.564 megajoules per kilowatt-hour, respectively.

Gross domestic product data are provided by Informetrica Limited.

Due to rounding, the numbers in the tables may not add up or calculate to their reported totals or growth rates.

Electricity Generation Energy Use and Generation by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total Energy Use (PJ) ^{a,b}	3,002.0	★	3,536.0	3,592.1	3,787.1	3,771.6	3,744.6	3,842.7	3,903.0	30.0%
<i>Energy Use by Energy Source (PJ) ^{a,b}</i>										
Natural Gas	80.0	★	234.6	247.5	319.2	339.7	310.7	339.2	309.9	287.4%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	11.5	★	8.6	7.3	6.5	6.8	5.7	6.0	6.3	-45.4%
Heavy Fuel Oil	141.4	★	153.6	123.6	113.2	138.8	110.6	134.0	162.3	14.8%
Coal	874.5	★	1,091.4	1,090.2	1,187.8	1,167.7	1,143.1	1,210.7	1,092.7	24.9%
Hydro	1,058.3	★	1,183.3	1,231.8	1,277.3	1,187.6	1,248.8	1,202.8	1,215.4	14.8%
Nuclear	795.2	★	780.2	801.7	794.1	836.3	824.0	817.0	985.7	24.0%
Wood and Other ¹	37.2	★	67.1	71.0	70.2	74.5	80.5	73.7	77.1	107.3%
Petroleum Coke, Still Gas, Coke and Coke Oven Gas	3.8	★	17.3	19.0	18.8	20.2	21.3	59.4	53.6	1,307.5%
Total Electricity Generated (GWh) ^a	467,596	★	545,078	559,930	585,814	569,420	581,073	569,490	576,417	23.3%
<i>Electricity Generated by Energy Source (GWh) ^a</i>										
Natural Gas	9,018	★	24,477	25,961	31,678	34,055	32,214	32,174	29,686	229.2%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	994	★	863	756	798	890	870	793	799	-19.7%
Heavy Fuel Oil	13,394	★	15,241	12,483	11,540	13,657	11,153	14,844	15,521	15.9%
Coal	76,794	★	100,130	100,528	109,895	110,026	109,454	104,698	95,198	24.0%
Hydro	293,985	★	328,706	342,167	354,812	329,881	346,898	334,104	337,606	14.8%
Nuclear	68,761	★	67,466	69,331	68,674	72,320	71,252	70,652	85,240	24.0%
Wood and Other ¹	3,544	★	6,393	6,760	6,682	7,095	7,665	7,014	7,347	107.3%
Petroleum Coke, Still Gas, Coke and Coke Oven Gas	1,107	★	1,803	1,944	1,734	1,497	1,567	5,211	5,021	353.5%
Activity										
GDP (million \$97) ^c	20,049	★	21,881	21,883	21,651	20,641	21,884	21,302	21,401	6.7%
Production (GWh) ^a	467,596	★	545,078	559,930	585,814	569,420	581,073	569,490	576,417	23.3%
Energy Intensity (GJ/\$97) ^{a,b,c}	0.150	★	0.162	0.164	0.175	0.183	0.171	0.180	0.182	21.8%
Energy Intensity (GJ/GWh) ^{a,b}	6,420	★	6,487	6,415	6,465	6,624	6,444	6,748	6,771	5.5%

★ 1991–1997 data available at: oeenrncan.gc.ca/handbook06

1) "Wood and Other" includes wood waste and spent pulping liquor, manufactured gases, other petroleum products, other fuels and station service.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).

b) Natural Resources Canada, *Electricity Energy Use Model*, Ottawa, February 2006.

c) Informetrica Limited, *T1 Model and Database*, Ottawa, November 2005.

Electricity Generation GHG Emissions by Energy Source

	1990	1991–1997	1998	1999	2000	2001	2002	2003	2004	Total Growth 1990–2004
Total GHG Emissions (Mt of CO₂e) ^{a,b,c}	94.6	★	122.1	120.1	131.7	132.8	127.9	138.6	128.8	36.1%
<i>GHG Emissions by Energy Source (Mt of CO₂e) ^{a,b,c}</i>										
Natural Gas	4.1	★	11.8	12.4	16.1	17.1	15.6	17.0	15.5	283.0%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	0.8	★	0.6	0.5	0.5	0.5	0.4	0.4	0.5	-45.2%
Heavy Fuel Oil	10.5	★	11.2	9.0	8.3	10.2	8.1	9.8	11.9	12.7%
Coal	78.8	★	97.2	96.8	105.5	103.6	102.3	106.2	96.5	22.4%
Hydro	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Nuclear	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Wood and Other ¹	0.0	★	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Petroleum Coke, Still Gas, Coke and Coke Oven Gas	0.4	★	1.2	1.3	1.3	1.4	1.5	5.1	4.4	1,133.7%
GHG Intensity ² (tonne/TJ [electricity generated]) ^{a,b,c}	56.2	★	62.2	59.6	62.4	64.8	61.2	67.6	62.1	10.4%
GHG Intensity ³ (tonne/TJ [energy used]) ^{a,b,c}	31.5	★	34.5	33.4	34.8	35.2	34.2	36.1	33.0	4.7%

★ 1991–1997 data available at: oee.nrcan.gc.ca/handbook06

- 1) “Wood and Other” includes wood waste and spent pulping liquor, manufactured gases, other petroleum products, other fuels and station service.
- 2) Emissions per unit of electricity generated. This GHG emissions factor is applied to the end-use electricity consumption for the sectoral analysis including electricity-related emissions.
- 3) Emissions per unit of energy used to produce electricity. The difference between the two emissions factors represents electricity conversion losses (energy used to produce electricity versus the amount of electricity generated).

Sources:

- a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2004*, Ottawa, October 2005 (CANSIM).
- b) Natural Resources Canada, *Electricity Energy Use Model*, Ottawa, February 2006.
- c) Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2003*, Ottawa, April 2005 (Cat. No. En81-4/2003E).

**Reconciliation of Data on Energy Use Found in This Handbook With Data in Statistics
Canada's Report on Energy Supply-Demand in Canada (RES D) – 2004 (petajoules)**

	RES D Data	Residential Wood	Commercial & Public Admin. Diesel	Commercial & Public Admin. Aviation Fuels	Commercial & Public Admin. Motor Gasoline	Pipeline Fuels	Wood Waste & Pulping Liquor	Waste Fuels Used in Cement Industry	Re-allocation of Producer Consumption by Refineries and Mining Industries	Data Presented in This Handbook
Sector										
Residential	1,313	108								1,421
Commercial/Institutional	1,468		(196)	(31)	(69)					1,171
Industrial	2,355						476	4	442	3,277
Transportation	2,346		196	31	69	(178)				2,465
Agriculture	209									209
Final Demand	7,690	108	0	0	0	(178)	476	4	442	8,543
Non-Energy	1,018									1,018
Producer Consumption	1,350					178			(442)	1,086
Net Supply	10,058	108	0	0	0	0	476	4	0	10,647
Fuel Conversion										
Electricity, Steam & Coal/Coke Input Fuels ¹	4,076									4,076
Electricity, Steam & Coal/Coke Production ²	(2,243)									(2,243)
Total Primary	11,892	108	0	0	0	0	476	4	0	12,480

Notes on sources of energy use data for five end-use sectors:

Residential: Base data taken from RES D (Table 1A, line 44) plus residential wood use (estimated from Natural Resources Canada's Residential End-Use Model).

Commercial/Institutional: Base data taken from RES D (Table 1A, line 45 plus line 46) less commercial and public administration motor gasoline, diesel, aviation gasoline and aviation turbo fuel (Table 1B, motor gasoline, diesel, aviation gasoline and aviation turbo fuel columns, line 45 plus line 46).

Industrial: Base data taken from RES D (Table 1A, line 31) plus solid wood waste and spent pulping liquor (Table 20) less wood waste and spent pulping liquor used for electricity generation (Table 18) multiplied by a conversion factor, plus producer consumption by refining and mining industries of still gas, diesel, heavy fuel oil, light fuel oil, kerosene, petroleum coke and refinery LPG (Table 1B, still gas, diesel, heavy fuel oil, light fuel oil, kerosene, petroleum coke and refinery LPG columns, line 16), plus waste fuels from the cement industry (Canadian Industrial Energy End-Use Data and Analysis Centre).

Transportation: Base data taken from RES D (Table 1A, line 42) less pipeline fuels (Table 1A, line 39) plus commercial and public administration motor gasoline, diesel, aviation gasoline and aviation turbo fuel (Table 1B, motor gasoline, diesel, aviation gasoline and aviation turbo fuel columns, line 45 plus line 46).

Agriculture: Base data taken from RES D (Table 1A, line 43).

1) "Electricity, Steam & Coal/Coke Input Fuels" represents the amount of input energy from source fuels (coal, uranium, etc.) that is transformed to electricity, steam, coke and coke gas.

2) "Electricity, Steam & Coal/Coke Production" represents the amount of electricity, steam, coke and coke gas produced. The difference between these items is referred to as conversion losses.



Appendix B

RECONCILIATION OF DEFINITIONS

Reconciliation of Definitions for Estimated Greenhouse Gas Emissions Found in This Handbook With Environment Canada's *Canada's Greenhouse Gas Inventory 1990–2003*¹

Introduction

In this handbook, *Energy Use Data Handbook 1990 and 1998 to 2004* (EUDH), the data on greenhouse gas (GHG) emissions are estimated using emissions factors developed by Environment Canada (EC). The emissions estimates provided here mirror the sectoral definitions used to calculate the estimates presented in EC's *Canada's Greenhouse Gas Inventory 1990–2003* (CGGI-2003). Both Natural Resources Canada (NRCan) and EC use the energy demand data from Statistics Canada's *Report on Energy Supply-Demand in Canada* as a base. However, the two organizations use different sectoral mappings. EC prepares its emissions inventory according to the specifications of the Intergovernmental Panel on Climate Change, while NRCan has developed mapping that is more suited to energy end-use analysis.

The objective of this appendix is to help readers understand the similarities and differences between EUDH and CGGI-2003 emissions estimates for the five sectors covered in this handbook.

1) Canada's official GHG inventory is available on the Environment Canada Web site at www.ec.gc.ca/pdb/ghg/inventory_e.cfm.

Residential Sector

EUDH and CGGI-2003 differ in their definitions of residential emissions.

- EUDH residential emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-2003.
- Wood energy use differs (EC's estimate is larger than NRCan's). Hence, the GHG emissions related to wood energy use presented here are lower than those in CGGI-2003.

Commercial/Institutional Sector

There is only one difference between EUDH and CGGI-2003 definitions of commercial/institutional emissions.

- EUDH commercial/institutional emissions include end-use electricity-related emissions, which CGGI-2003 includes under power generation.

Industrial Sector

There are many differences between EUDH and CGGI-2003 definitions of the industrial sector.

- CGGI-2003 re-allocates industrial diesel fuel use from the industrial sector to the transportation sector.
- This handbook re-allocates producers' consumption of petroleum products from the producers' consumption category to the petroleum refining and upstream mining industries. CGGI-2003 reports this as consumption of fossil fuels.
- CGGI-2003 re-allocates industrial coke use from energy use in the industrial sector to non-energy use in industrial processes.
- EUDH industrial emissions include end-use electricity-related emissions. CGGI-2003 reports them under power generation.
- CGGI-2003 includes producers' consumption of non-fossil fuels in the fossil fuel categories. EUDH does not report this consumption.
- CGGI-2003 also re-allocates estimates of emissions from upstream oil and gas flaring to fugitive emissions from the fossil fuel sector.

Transportation Sector

EUDH and CGGI-2003 differ in their definitions of transportation emissions.

- CGGI-2003 re-allocates industrial and agriculture diesel and agriculture motor gasoline to the transportation sector.
- CGGI-2003 includes pipeline-related emissions in the transportation sector.
- CGGI-2003 excludes emissions resulting from the use of energy in the foreign aviation and marine sub-sectors.
- EUDH transportation emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-2003.

Electricity Generation Sector

There is only one difference between EUDH and CGGI-2003 for the electricity generation sector.

- CGGI-2003 reports emissions from electricity and steam generation at the aggregate level, while EUDH reports emissions for electricity generation only. Note that in its Annex 9 "Electricity Intensity Tables," CGGI-2003 reports detailed emissions from electricity generation that are similar to those found in this handbook.



Appendix C

GLOSSARY OF TERMS

Activity: Term used to characterize major drivers of energy use in a sector (e.g. floor space area in the commercial/institutional sector).

AECO-C Hub: A hub is a market centre where several pipelines interconnect and where many buyers and sellers trade gas, thereby creating a liquid pricing point. The AECO-C hub is the main pricing point for Alberta natural gas and represents the major pricing point for Canadian gas. Prices are determined via the spot market, which includes all transactions for sales of 30 days or less, but it typically refers to a 30-day sale.

Agriculture: The agriculture sector includes all types of farms, including livestock, field crops, grain and oilseed farms, as well as activities related to hunting and trapping. Energy used in this sector is for farm production and includes energy use by establishments engaged in agricultural activities and in providing services to agriculture. Agriculture energy use is included in total secondary energy use for Canada.

Apartment: This type of dwelling includes dwelling units in apartment blocks or apartment hotels; flats in duplexes or triplexes (i.e. where the division between dwelling units is horizontal); suites in structurally converted houses; living quarters located above or in the rear of stores, restaurants, garages or other business premises; caretakers' quarters in schools, churches, warehouses, etc.; and private quarters for employees in hospitals or other types of institutions.

Appliance: Energy-consuming equipment used in the home for purposes other than air conditioning, centralized water heating and lighting. Includes cooking appliances (gas stoves and ovens, electric stoves and ovens, microwave ovens, and propane or gas grills); cooling appliances (evaporative coolers, attic fans, window or ceiling fans, and portable or table fans); and refrigerators, freezers, clothes washers and dishwashers. Other appliances include small ones such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

Auxiliary Equipment: With the exception of auxiliary motors (see Auxiliary Motors), “auxiliary equipment” includes stand-alone equipment powered directly from an electrical outlet such as computers, photocopiers, refrigerators and desktop lamps. It also includes equipment that can be powered by natural gas, propane or other fuels, such as clothes dryers and cooking appliances.

Auxiliary Motors: Refers to devices used to transform electric power into mechanical energy in order to provide a service, such as pumps, ventilators, compressors and conveyors.

Biomass: Includes wood waste and pulping liquor. Wood waste is a fuel consisting of bark, shavings, sawdust and low-grade lumber and lumber rejects from the operation of pulp mills, sawmills and plywood mills. Pulping liquor is a substance primarily made up of lignin and other wood constituents and chemicals that are by-products of the manufacture of chemical pulp. It can produce steam for industrial processes when burned in a boiler and/or produce electricity through thermal generation.

Capacity Utilization: The rates of capacity use are measures of the intensity with which industries use their production capacity. It is the ratio of an industry’s actual output to its estimated potential output.

Carbon Dioxide (CO₂): A compound of carbon and oxygen formed whenever carbon is burned. Carbon dioxide is a colourless gas that absorbs infrared radiation, mostly at wavelengths between 12 and 18 microns. It behaves as a one-way filter, allowing incoming, visible light to pass through in one direction, while preventing outgoing infrared radiation from passing in the opposite direction. The one-way filtering effect of carbon dioxide causes an excess of the infrared radiation to be trapped in the atmosphere; thus it acts as a “greenhouse” and has the potential to increase the surface temperature of the planet (see Greenhouse Gas).

Company Average Fuel Consumption (CAFC): The Government of Canada encourages improvements in the fuel efficiency of the Canadian new vehicle fleet by setting voluntary annual company average fuel consumption (CAFC) goals for vehicle manufacturers and importers.

Cooling Degree-Day (CDD): A measure of how hot a location was over a period, relative to a base temperature. In this handbook, the base temperature is 18.0°C and the period is one year. If the daily average temperature exceeds the base temperature, the number of cooling degree-days for that day is the difference between the two temperatures. However, if the daily average is equal to or less than the base temperature, the number of cooling degree-days for that day is zero. The number of cooling degree-days for a longer period is the sum of the daily cooling degree-days for the days in that period.

Cooling Degree-Day Index: A measure of how relatively hot (or cold) a year was when compared with the cooling degree-day (CDD) average. When the CDD index is above (below) 1, the observed temperature is warmer (colder) than normal. The CDD normal represents a weighted average of the 1951–1980 CDDs observed in a number of weather stations across Canada. Its value, which varies from year to year because of population flow, was 170 CDDs in 2004.

Dwelling: A dwelling is defined as a structurally separate set of living premises with a private entrance from outside the building or from a common hallway or stairway inside. A private dwelling is one in which one person, a family or other small group of individuals may reside, such as a single house or apartment.

Electricity Conversion Loss: The energy lost during the conversion from primary energy (petroleum, natural gas, coal, hydro, uranium and biomass) into electrical energy. Losses occur during generation, transmission and distribution of electricity and include plant and unaccounted-for uses.

End-Use: Any specific activity that requires energy (e.g. refrigeration, space heating, water heating, manufacturing processes and feedstock).

Energy Intensity: The amount of energy use per unit of activity. Examples of activity measures in this report are households, floor space, passenger-kilometres, tonne-kilometres, physical units of production and constant dollar value of gross domestic product.

Energy Source: Any substance that supplies heat or power (e.g. petroleum, natural gas, coal, renewable energy and electricity).

Floor Space (area): The area enclosed by exterior walls of a building. In the residential sector, it excludes parking areas, basements or other floors below ground level; these areas are included in the commercial/institutional sector. It is measured in square metres.

Gigajoule (GJ): One gigajoule equals 1×10^9 joules (see Petajoule).

Greenhouse Gas (GHG): A greenhouse gas absorbs and radiates heat in the lower atmosphere that otherwise would be lost in space. The greenhouse effect is essential for life on this planet, since it keeps average global temperatures high enough to support plant and animal growth. The main greenhouse gases are carbon dioxide (CO₂), methane (CH₄), chlorofluorocarbons (CFCs) and nitrous oxide (N₂O). By far the most abundant greenhouse gas is CO₂, accounting for about 70 percent of total greenhouse gas emissions (see Carbon Dioxide).

Greenhouse Gas Intensity: The amount of greenhouse gas emitted per unit of energy used.

Gross Domestic Product (GDP): The total value of goods and services produced within Canada during a given year. Also referred to as annual economic output or, more simply, output. To avoid counting the same output more than once, GDP includes only final goods and services – not those that are used to make another product. GDP figures are reported in constant 1997 dollars.

Gross Output (GO): The total value of goods and services produced by an industry. It is the sum of the industry's shipments plus the change in value due to labour and capital investment. Gross output figures are reported in constant 1997 dollars.

Heat Gain: Heat gained by a building from the operation of appliances. These heat gains reduce the space heating load in the winter and increase the space cooling load in the summer.

Heat Loss: Represents the amount of energy released as heat by an appliance or piece of equipment while it is in operation.

Heating Degree-Day (HDD): A measure of how cold a location was over a period, relative to a base temperature. In this handbook, the base temperature is 18.0°C and the period is one year. If the daily average temperature is below the base temperature, the number of heating degree-days for that day is the difference between the two temperatures. However, if the daily average temperature is equal to or higher than the base temperature, the number of heating degree-days for that day is zero. The number of heating degree-days for a longer period is the sum of the daily heating degree-days for the days in that period.

Heating Degree-Day Index: A measure of how relatively cold (or hot) a year was when compared with the heating degree-day (HDD) average. When the HDD index is above (below) 1, the observed temperature is colder (warmer) than normal. The HDD normal represents a weighted average of the 1951–1980 HDDs observed in a number of weather stations across Canada. Its value, which varies from year to year because of population flow, was 4476 HDDs in 2004.

Heavy Truck: A truck with a gross vehicle weight that is more than, or equal to, 14,970 kg (33,001 lb.). The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

Household: A person or a group of people occupying one dwelling unit is defined as a household. The number of households will, therefore, be equal to the number of occupied dwellings.

Housing Stock: The physical number of dwellings is referred to as the housing stock. As opposed to the number of households, which refers to the number of occupied dwellings, housing stock includes both occupied and unoccupied dwellings.

Kilowatt-hour (kWh): The commercial unit of electricity energy equivalent to 1000 watt-hours. A kilowatt-hour can best be visualized as the amount of electricity consumed by ten 100-watt bulbs burning for an hour. One kilowatt-hour equals 3.6 million joules (see Watt).

Large Car: A car with a gross vehicle weight of 1182 kg (2601 lb.) or more. The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

Light Truck: A truck of up to 3855 kg (8500 lb.) of gross vehicle weight. The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight. This class of vehicles includes pickup trucks, minivans and sport utility vehicles.

Liquefied Petroleum Gases (LPG) and Gas Plant Natural Gas Liquids (NGL): Propane and butane are liquefied gases extracted from natural gas (i.e. gas plant NGL) or from refined petroleum products (i.e. LPG) at the processing plant.

Medium Truck: A truck with a gross vehicle weight ranging from 3856 to 14,969 kg (8501 to 33,000 lb.). The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

Megajoule (MJ): One megajoule equals 1×10^6 joules (see Petajoule).

Mobile Home: A moveable dwelling designed and constructed to be transported by road on its own chassis to a site and placed on a temporary foundation (such as blocks, posts or a prepared pad). If required, it can be moved to a new location.

Model Year: An annual period in which a national automotive industry organizes its operations and within which new models are announced. For example, if the “model year” is 2004, it begins September 1, 2003, and ends August 31, 2004.

Multifactor Productivity: The ratio of output per unit of combined inputs (capital services and labour services).

North American Industry Classification System (NAICS): A classification system that categorizes establishments into groups with similar economic activities. The structure of NAICS, adopted by Statistics Canada in 1997 to replace the 1980 Standard Industrial Classification (SIC), was developed by the statistical agencies of Canada, Mexico and the United States.

Passenger-kilometre (Pkm): An activity measure in the passenger transportation sub-sector describing the transportation of one passenger over a distance of one kilometre.

Petajoule (PJ): One petajoule equals 1×10^{15} joules. A joule is the international unit of measure of energy – the energy produced by the power of one watt flowing for a second. There are 3.6 million joules in one kilowatt-hour (see Kilowatt-hour).

Pulping Liquor: A substance primarily made up of lignin, other wood constituents and chemicals that are by-products of the manufacture of chemical pulp. It can produce steam for industrial processes when burned in a boiler and/or produce electricity through thermal generation.

Sector: The broadest category for which energy consumption and intensity are considered within the Canadian economy (e.g. residential, commercial/institutional, industrial, transportation, agriculture and electricity generation).

Single Attached (dwelling): Each half of a semi-detached (double) house and each section of a row or terrace are defined as single attached dwellings. A single dwelling attached to a non-residential structure also belongs to this category.

Single Detached (dwelling): This type of dwelling is commonly called a single house (i.e. a house containing one dwelling unit and completely separated on all sides from any other building or structure).

Small Car: A car weighing up to 1181 kg (2600 lb.) of gross vehicle weight. The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

Space Cooling: Conditioning of room air for human comfort by a refrigeration unit (e.g. air conditioner or heat pump) or by the circulation of chilled water through a central- or district-cooling system.

Space Heating: The use of mechanical equipment to heat all or part of a building. Includes the principal space heating unit and any supplementary equipment.

Standard Industrial Classification (SIC): A classification system that categorizes establishments into groups with similar economic activities.

Terajoule (TJ): One terajoule equals 1×10^{12} joules (see Petajoule).

Tonne-kilometre (Tkm): An activity measure for the freight transportation sub-sector describing the transportation of one tonne over a distance of one kilometre.

Vintage: The year of origin or age of a unit of capital stock (e.g. a building or a car).

Waste Fuel: A name applied to any number of energy sources other than conventional fuels used in the cement industry. It includes materials such as tires, municipal waste and landfill off-gases.

Water Heater: An automatically controlled vessel designed for heating water and storing heated water.

Water Heating: The use of energy to heat water for hot running water, as well as the use of energy to heat water on stoves and in auxiliary water heating equipment for bathing, cleaning and other non-cooking applications.

Watt (W): A measure of power. For example, a 40-watt light bulb uses 40 watts of electricity (see Kilowatt-hour).

Wood Waste: Fuel consisting of bark, shavings, sawdust, low-grade lumber and lumber rejects from the operation of pulp mills, sawmills and plywood mills.

Appendix D

LIST OF ABBREVIATIONS

\$97	Constant 1997 dollars
bbi.	Barrel
CAFC	Company Average Fuel Consumption
CANSIM	Canadian Socio-Economic Information Management System
CEUM	Commercial/Institutional End-Use Model
CIEEDAC	Canadian Industrial Energy End-Use Data and Analysis Centre
EC	Environment Canada
EER	Energy Efficiency Ratio
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GJ	Gigajoule = 1×10^9 joules
GO	Gross Output
GWh	Gigawatt-hour = 1×10^9 Wh
km	Kilometre
kW	Kilowatt
kWh	Kilowatt-hour = 1×10^3 Wh
L	Litre
LPG	Liquefied Petroleum Gases
m²	Square Metre
m³	Cubic Metre
MJ	Megajoule = 1×10^6 joules
Mt of CO_{2e}	Megatonne of Carbon Dioxide Equivalent = 1×10^6 tonnes
NAICS	North American Industry Classification System
n.e.c.	Not Elsewhere Classified
NEUD	National Energy Use Database
NGL	Natural Gas Liquids
NRCan	Natural Resources Canada
OEE	Office of Energy Efficiency
PJ	Petajoule = 1×10^{15} joules
Pkm	Passenger-kilometre
RESD	<i>Report on Energy Supply-Demand in Canada</i>
REUM	Residential End-Use Model
SEER	Seasonal Energy Efficiency Ratio
SIC	Standard Industrial Classification
TEUM	Transportation End-Use Model
TJ	Terajoule = 1×10^{12} joules
Tkm	Tonne-kilometre
UEC	Unit Energy Consumption
W	Watt
Wh	Watt-hour

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

Canada