Energy Use Data Handbook,

1990 and 1996 to 2002

June 2004






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Energy Use Data Handbook, 1990 and 1996 to 2002

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PREFACE

This is the third edition of the *Energy Use Data Handbook, 1990 and 1996 to 2002*, 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 in order 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 2002***.

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

- 1990 industrial energy data, based on the North American Industry Classification System introduced last year, have been added (see the industrial data situation in Chapter 4);
- in transportation, the series for air energy use has been disaggregated into passenger and freight uses; and
- data are presented for 1990 and 1996 to 2002 for all sectors.

The handbook covers six sectors at an aggregate level: residential, commercial/institutional, industrial, transportation, agriculture and electricity generation. The year 1990 is the reference year for the Kyoto Protocol, whereas 2002 is the most recent year for which actual data are available.

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 2002*, which assesses factors that influence 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 from the following Web site: *oee.nrcan.gc.ca/neud/dpa/comprehensive_tables/index.cfm*.

If you require more information on the services that the OEE offers, contact us by e-mail at *euc.cec@nrcan.gc.ca*.

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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. Data on greenhouse gas emissions 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, agriculture and electricity generation) to assess trends in energy use in the Canadian economy.

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

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

Chapter 1
Total End-Use Sectors

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,b,c]	**6,950.4**		**7,700.8**	**7,737.3**	**7,576.2**	**7,818.6**	**8,098.9**	**7,892.7**	**8,217.2**	**18.2%**
Energy Use by Energy Source (PJ)										
Electricity	1,550.1		1,697.4	1,717.0	1,703.6	1,738.5	1,799.1	1,797.2	1,834.6	18.4%
Natural Gas	1,777.6		2,124.5	2,082.8	1,919.8	1,986.7	2,127.8	1,961.9	2,145.8	20.7%
Motor Gasoline	1,176.5		1,230.3	1,257.9	1,307.8	1,340.7	1,341.8	1,358.4	1,386.0	17.8%
Oil [1]	1,201.3		1,251.3	1,290.7	1,262.5	1,284.2	1,346.3	1,328.5	1,296.7	7.9%
Aviation Gasoline	5.5		3.9	3.7	3.9	3.6	3.4	3.5	3.5	-37.0%
Aviation Turbo Fuel	181.9		205.5	210.9	222.8	233.9	235.9	215.1	224.6	23.4%
Still Gas and Petroleum Coke	321.7		363.9	350.5	335.6	349.4	341.4	378.8	443.1	37.7%
LPG and Gas Plant NGL	103.3		117.1	119.8	105.4	103.1	108.1	112.1	102.8	-0.5%
Wood Waste and Pulping Liquor	341.0		402.8	399.8	416.3	464.0	464.4	421.1	459.6	34.8%
Other [2]	206.7		211.4	205.5	212.2	221.4	226.5	217.7	216.4	4.7%
Residential Wood	84.9		92.7	98.6	86.4	93.0	104.1	98.4	104.2	22.8%
Total GHG Emissions Including Electricity (Mt) [a,b,c,d]	**407.5**		**433.5**	**447.4**	**450.2**	**456.9**	**478.6**	**474.1**	**482.0**	**18.3%**
GHG Emissions by Energy Source (Mt)										
Electricity	87.1		83.7	94.7	106.0	103.6	112.4	116.4	112.1	28.6%
Natural Gas	89.5		106.1	103.9	95.7	99.1	106.5	98.0	107.2	19.7%
Motor Gasoline	84.0		87.9	89.9	92.6	94.9	95.0	96.2	98.1	16.8%
Oil [1]	89.7		93.3	96.2	94.3	95.9	100.5	99.1	96.6	7.6%
Aviation Gasoline	0.4		0.3	0.3	0.3	0.3	0.3	0.3	0.3	-37.0%
Aviation Turbo Fuel	13.2		14.9	15.2	15.7	16.4	16.6	15.1	15.8	20.1%
Still Gas and Petroleum Coke	20.9		23.7	22.7	22.6	23.0	22.6	25.1	28.7	37.1%
LPG and Gas Plant NGL	6.2		7.0	7.2	6.4	6.2	6.5	6.8	6.2	0.6%
Wood Waste and Pulping Liquor	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Other [2]	14.9		14.9	15.4	15.3	15.7	16.3	15.4	15.2	2.2%
Residential Wood	1.6		1.7	1.8	1.6	1.7	1.9	1.8	1.9	22.8%
Total GHG Emissions Excluding Electricity (Mt) [a,b,c,d]	**320.4**		**349.7**	**352.7**	**344.2**	**353.3**	**366.2**	**357.7**	**369.9**	**15.5%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Oil" includes diesel fuel oil, light fuel oil, kerosene and heavy fuel oil.
2) "Other" includes coal, coke, coke oven gas, steam and waste fuels.

Sources:
a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
d) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 1
Total End-Use Sectors

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,b,e]	**6,950.4**		**7,700.8**	**7,737.3**	**7,576.2**	**7,818.6**	**8,098.9**	**7,892.7**	**8,217.2**	**18.2%**
Residential [a,b]	**1,288.9**		**1,450.8**	**1,393.7**	**1,269.9**	**1,325.3**	**1,391.9**	**1,338.3**	**1,399.4**	**8.6%**
Space Heating	779.7		914.4	857.9	738.2	783.5	844.8	779.3	830.8	6.6%
Water Heating	270.7		291.8	290.5	285.0	290.0	294.5	293.9	303.4	12.1%
Appliances	177.0		179.1	179.6	176.1	177.1	181.4	184.9	181.5	2.5%
Major Appliances	*132.2*		*121.9*	*120.9*	*117.0*	*115.9*	*116.9*	*117.5*	*113.6*	*-14.0%*
Other	*44.9*		*57.2*	*58.8*	*59.1*	*61.2*	*64.5*	*67.4*	*67.9*	*51.4%*
Lighting	53.2		56.3	56.3	56.1	57.6	60.1	62.0	61.5	15.7%
Space Cooling	8.4		9.2	9.4	14.4	17.0	11.2	18.2	22.1	165.0%
Commercial/Institutional [a,c,f]	**867.0**		**981.5**	**998.5**	**944.1**	**979.2**	**1072.8**	**1060.9**	**1130.1**	**30.3%**
Space Heating	465.3		536.1	537.8	480.8	510.7	581.8	562.6	604.6	29.9%
Water Heating	60.2		61.4	65.7	63.7	63.8	71.3	73.6	78.3	30.0%
Auxiliary Equipment	66.3		74.7	79.1	77.0	76.9	88.7	94.1	99.6	50.3%
Auxiliary Motors	104.1		118.0	120.0	117.3	118.6	126.1	120.5	122.1	17.3%
Lighting	133.9		150.9	154.2	150.7	151.7	159.8	152.5	151.0	12.8%
Space Cooling	28.3		32.9	34.3	47.1	50.0	37.3	50.0	66.7	136.2%
Street Lighting	8.9		7.5	7.4	7.5	7.4	7.7	7.7	7.8	-12.8%
Industrial [a,e]	**2,717.4**		**3,002.6**	**2,997.9**	**2,943.0**	**3,031.4**	**3,120.3**	**2,998.1**	**3,176.1**	**16.9%**
Mining	343.4		472.7	474.2	457.8	459.6	516.8	522.3	560.6	63.2%
Pulp and Paper	747.5		819.4	823.4	823.2	891.8	894.2	812.2	846.7	13.3%
Iron and Steel	219.4		252.1	251.2	254.7	259.8	257.6	228.5	238.4	8.7%
Smelting and Refining	183.3		233.3	231.0	239.8	236.4	234.7	248.8	257.1	40.3%
Cement	59.3		58.5	57.9	63.6	66.8	63.7	62.0	66.6	12.2%
Chemicals	223.2		255.3	245.9	241.2	240.4	230.1	207.8	205.5	-7.9%
Petroleum Refining	334.9		329.5	320.9	291.9	288.0	295.1	311.4	365.1	9.0%
Other Manufacturing	531.8		521.6	532.8	510.4	523.5	562.0	538.9	564.6	6.2%
Forestry	7.7		9.6	11.1	12.3	14.8	16.2	18.3	17.1	121.8%
Construction	66.9		50.5	49.5	48.0	50.4	49.9	47.9	54.2	-19.0%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
e) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

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

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Transportation [a]	**1,877.9**		**2,043.0**	**2,117.2**	**2,194.5**	**2,252.8**	**2,281.9**	**2,277.3**	**2,306.0**	**22.8%**
Passenger Transportation [a,d]	***1,157.7***		***1,200.9***	***1,232.5***	***1,277.2***	***1,299.0***	***1,291.1***	***1,282.2***	***1,307.6***	***13.0%***
Cars	643.4		641.2	637.7	642.7	640.9	625.0	623.0	622.2	-3.3%
Light Trucks	277.4		307.0	337.4	364.5	375.2	380.6	396.9	412.7	48.8%
Motorcycles	1.9		1.9	1.9	2.1	2.1	2.2	2.2	2.5	31.9%
Buses	50.1		47.8	47.7	49.4	51.8	53.3	50.5	53.2	6.2%
Air	180.2		200.6	205.4	216.1	226.3	227.1	206.6	214.4	19.0%
Rail	4.7		2.4	2.3	2.4	2.7	2.9	2.9	2.6	-44.5%
Freight Transportation [a,d]	***666.9***		***778.7***	***817.6***	***846.7***	***878.2***	***910.8***	***905.9***	***907.1***	***36.0%***
Light Trucks	123.1		132.5	142.7	152.1	153.3	152.0	159.6	163.0	32.4%
Medium Trucks	123.4		146.2	138.6	142.9	154.6	159.6	158.5	158.3	28.3%
Heavy Trucks	221.8		314.6	349.1	347.8	369.1	392.7	373.9	390.1	75.9%
Air	7.3		8.8	9.2	10.6	11.3	12.2	12.0	13.7	88.2%
Rail	84.7		76.7	77.9	74.2	78.4	80.2	78.8	71.4	-15.7%
Marine	106.5		99.9	100.1	119.2	111.5	114.0	123.2	110.5	3.7%
Off-Road [d]	***53.3***		***63.4***	***67.1***	***70.6***	***75.6***	***80.0***	***89.2***	***91.3***	***71.2%***
Agriculture [a]	**199.2**		**222.9**	**230.0**	**224.7**	**229.9**	**231.9**	**218.1**	**205.7**	**3.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
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f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions (Mt) [a,b,e,f]	**407.5**		**433.5**	**447.4**	**450.2**	**456.9**	**478.6**	**474.1**	**482.0**	**18.3%**
Residential [a,b,e]	**69.5**		**73.2**	**72.7**	**69.5**	**71.1**	**75.8**	**74.2**	**75.4**	**8.4%**
Space Heating	41.4		46.2	43.8	38.4	40.3	43.7	40.6	42.6	2.8%
Water Heating	14.7		14.9	15.4	15.8	15.8	16.4	16.6	16.6	13.0%
Appliances	9.9		8.8	9.9	10.9	10.5	11.3	11.9	11.0	11.2%
Major Appliances	*7.4*		*6.0*	*6.6*	*7.2*	*6.9*	*7.2*	*7.5*	*6.9*	*-7.0%*
Other	*2.5*		*2.8*	*3.2*	*3.7*	*3.7*	*4.0*	*4.4*	*4.1*	*64.5%*
Lighting	3.0		2.8	3.1	3.5	3.4	3.8	4.0	3.8	25.7%
Space Cooling	0.5		0.5	0.5	0.9	1.0	0.7	1.2	1.4	188.0%
Commercial/Institutional [a,c,e,g]	**47.8**		**50.7**	**54.2**	**54.2**	**55.0**	**61.6**	**62.1**	**64.4**	**34.7%**
Space Heating	25.3		28.4	28.8	26.0	27.5	31.6	30.8	33.0	30.4%
Water Heating	3.3		3.3	3.5	3.4	3.4	3.9	4.0	4.2	28.1%
Auxiliary Equipment	3.7		3.8	4.4	4.8	4.6	5.5	6.0	6.1	62.1%
Auxiliary Motors	5.9		5.8	6.6	7.3	7.1	7.9	7.8	7.5	27.5%
Lighting	7.5		7.4	8.5	9.4	9.0	10.0	9.9	9.2	22.5%
Space Cooling	1.6		1.6	1.9	2.9	2.9	2.3	3.1	3.9	149.1%
Street Lighting	0.5		0.4	0.4	0.5	0.4	0.5	0.5	0.5	-5.3%
Industrial [a,e,f]	**141.4**		**147.5**	**152.4**	**153.7**	**153.6**	**161.5**	**159.3**	**162.9**	**15.2%**
Mining	21.4		28.1	28.9	28.9	28.8	32.3	32.5	33.5	56.8%
Pulp and Paper	24.1		22.2	23.7	23.9	24.3	25.1	23.6	22.2	-7.7%
Iron and Steel	15.9		17.3	17.3	17.8	18.1	18.1	16.5	16.8	5.8%
Smelting and Refining	10.6		12.3	13.2	15.0	14.3	14.7	16.1	15.7	49.2%
Cement	4.2		3.6	4.1	4.2	4.5	4.5	4.5	4.8	15.3%
Chemicals	10.8		12.2	12.5	12.8	12.6	12.2	11.0	10.6	-2.0%
Petroleum Refining	20.8		20.7	20.2	19.0	18.2	18.9	20.2	23.2	11.6%
Other Manufacturing	28.6		26.9	28.1	27.7	28.1	30.8	30.1	30.8	8.0%
Forestry	0.6		0.8	0.9	1.0	1.2	1.3	1.5	1.4	124.1%
Construction	4.6		3.5	3.4	3.4	3.5	3.5	3.4	3.8	-17.9%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
e) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

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

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Transportation [a,e]	**135.0**		**146.8**	**152.1**	**156.8**	**161.1**	**163.3**	**162.9**	**164.9**	**22.1%**
Passenger Transportation [a,d,e]	***82.5***		***85.6***	***87.9***	***90.1***	***91.7***	***91.2***	***90.6***	***92.4***	***12.0%***
Cars	45.5		45.3	45.1	45.0	44.9	43.8	43.7	43.6	-4.0%
Light Trucks	20.0		22.2	24.4	26.1	26.9	27.3	28.4	29.6	47.7%
Motorcycles	0.1		0.1	0.1	0.1	0.1	0.1	0.2	0.2	30.6%
Buses	3.5		3.3	3.3	3.5	3.6	3.8	3.6	3.7	6.9%
Air	13.0		14.5	14.9	15.2	15.9	16.0	14.5	15.1	15.8%
Rail	0.4		0.2	0.2	0.2	0.2	0.2	0.2	0.2	-44.0%
Freight Transportation [a,d,e]	***48.8***		***56.7***	***59.5***	***61.8***	***64.1***	***66.5***	***66.2***	***66.2***	***35.7%***
Light Trucks	8.7		9.4	10.1	10.7	10.9	10.8	11.3	11.6	34.0%
Medium Trucks	8.9		10.5	10.0	10.3	11.1	11.5	11.4	11.4	28.3%
Heavy Trucks	15.8		22.4	24.9	25.0	26.6	28.3	26.9	28.1	77.6%
Air	0.5		0.6	0.7	0.7	0.8	0.9	0.8	1.0	83.1%
Rail	6.7		6.1	6.2	6.0	6.3	6.4	6.3	5.7	-14.8%
Marine	8.1		7.6	7.7	9.0	8.5	8.6	9.3	8.4	3.0%
Off-Road [d,e]	***3.7***		***4.4***	***4.7***	***4.9***	***5.3***	***5.6***	***6.2***	***6.3***	***69.5%***
Agriculture [a,e]	**13.7**		**15.2**	**16.0**	**16.0**	**16.3**	**16.5**	**15.5**	**14.4**	**5.1%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
e) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions (Mt) [a,b,e,f]	**320.4**		**349.7**	**352.7**	**344.2**	**353.3**	**366.2**	**357.7**	**369.9**	**15.5%**
Residential [a,b,e]	**43.2**		**49.2**	**46.0**	**40.5**	**42.5**	**44.7**	**41.5**	**44.0**	**1.7%**
Space Heating	34.4		39.1	35.9	30.7	32.5	34.7	31.6	33.6	-2.1%
Water Heating	8.7		9.9	9.8	9.6	9.8	9.9	9.7	10.1	16.6%
Appliances	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	25.1%
Major Appliances	*0.2*		*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*25.1%*
Other	*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 [a,c,e,g]	**25.9**		**29.7**	**30.1**	**27.4**	**28.9**	**33.3**	**33.2**	**35.9**	**38.6%**
Space Heating	22.3		25.8	25.9	23.3	24.7	28.6	28.0	30.2	35.6%
Water Heating	3.0		3.1	3.3	3.2	3.2	3.6	3.7	3.9	31.4%
Auxiliary Equipment	0.5		0.6	0.7	0.6	0.6	0.8	1.1	1.1	102.9%
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	0.3	0.4	0.3	0.5	0.6	676.2%
Street Lighting	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Industrial [a,e,f]	**104.4**		**110.8**	**110.6**	**105.9**	**106.8**	**110.8**	**106.9**	**112.9**	**8.2%**
Mining	15.6		22.3	22.5	21.4	21.9	24.8	24.4	26.0	67.3%
Pulp and Paper	14.2		12.5	12.4	11.4	11.5	11.3	10.0	9.3	-34.3%
Iron and Steel	14.2		15.7	15.5	15.5	15.9	15.8	13.9	14.3	0.6%
Smelting and Refining	3.1		3.5	3.3	3.6	3.4	3.3	3.5	3.3	8.9%
Cement	3.8		3.3	3.7	3.8	4.1	4.1	4.0	4.4	15.1%
Chemicals	7.1		8.8	8.9	8.6	8.5	7.9	6.8	6.5	-8.9%
Petroleum Refining	19.7		19.8	19.2	17.9	17.1	17.7	18.9	22.0	11.9%
Other Manufacturing	21.6		20.6	20.8	19.4	19.9	21.3	20.6	22.0	1.7%
Forestry	0.6		0.8	0.9	1.0	1.2	1.3	1.5	1.4	124.1%
Construction	4.6		3.5	3.4	3.4	3.5	3.5	3.4	3.8	-17.9%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
e) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

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

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Transportation [a,e]	**134.9**		**146.6**	**152.0**	**156.6**	**160.9**	**163.1**	**162.7**	**164.7**	**22.2%**
Passenger Transportation [a,d,e]	***82.3***		***85.5***	***87.8***	***89.9***	***91.5***	***91.0***	***90.4***	***92.2***	***12.0%***
Cars	45.5		45.3	45.1	45.0	44.9	43.8	43.7	43.6	-4.0%
Light Trucks	20.0		22.2	24.4	26.1	26.9	27.3	28.4	29.6	47.7%
Motorcycles	0.1		0.1	0.1	0.1	0.1	0.1	0.2	0.2	30.6%
Buses	3.3		3.2	3.2	3.3	3.5	3.6	3.4	3.5	6.5%
Air	13.0		14.5	14.9	15.2	15.9	16.0	14.5	15.1	15.8%
Rail	0.4		0.2	0.2	0.2	0.2	0.2	0.2	0.2	-44.0%
Freight Transportation [a,d,e]	***48.8***		***56.7***	***59.5***	***61.8***	***64.1***	***66.5***	***66.2***	***66.2***	***35.7%***
Light Trucks	8.7		9.4	10.1	10.7	10.9	10.8	11.3	11.6	34.0%
Medium Trucks	8.9		10.5	10.0	10.3	11.1	11.5	11.4	11.4	28.3%
Heavy Trucks	15.8		22.4	24.9	25.0	26.6	28.3	26.9	28.1	77.6%
Air	0.5		0.6	0.7	0.7	0.8	0.9	0.8	1.0	83.1%
Rail	6.7		6.1	6.2	6.0	6.3	6.4	6.3	5.7	-14.8%
Marine	8.1		7.6	7.7	9.0	8.5	8.6	9.3	8.4	3.0%
Off-Road [d,e]	***3.7***		***4.4***	***4.7***	***4.9***	***5.3***	***5.6***	***6.2***	***6.3***	***69.5%***
Agriculture [a,e]	**12.0**		**13.5**	**14.0**	**13.8**	**14.2**	**14.3**	**13.3**	**12.4**	**3.2%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
d) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
e) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
f) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.
g) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 1
Total End-Use Sectors

Commodity Prices and Background Indicators

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Commodity Prices										
Crude Oil Prices										
Wellhead U.S. Average ($US/bbl.) [a]	20.03		18.46	17.23	10.87	15.56	26.72	21.84	22.51	12.4%
Edmonton Par [1] ($/m³) [b]	173.95		183.92	173.86	126.46	172.16	278.98	246.69	253.44	45.7%
Brent Montréal [2] ($/m³) [b]	187.35		190.41	180.39	134.07	180.44	280.95	267.49	263.13	40.4%
Natural Gas Price at AECO-C Hub (intra-Alberta)[3] ($/GJ) [b]	***1.34***		***1.32***	***1.75***	***1.92***	***2.77***	***4.81***	***5.91***	***3.83***	***185.8%***
Background Indicators										
Total GDP (million $97) [c]	***707,669***		***783,810***	***816,763***	***848,963***	***896,490***	***945,783***	***961,522***	***992,319***	***40.2%***
Industrial	198,428		212,520	224,776	233,840	248,102	268,596	265,057	269,779	36.0%
Commercial/Institutional	471,513		529,895	550,439	572,928	604,503	633,917	655,283	681,768	44.6%
Agriculture	13,627		13,866	13,614	14,693	15,981	15,249	13,857	12,906	-5.3%
Electricity Generation	20,049		22,305	22,417	21,881	21,884	21,639	21,140	21,514	7.3%
Other [4]	4,052		5,224	5,517	5,621	6,020	6,382	6,185	6,352	56.8%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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.
4) "Other" includes natural gas, water, sewage and other utilities as well as fishing.

Sources:

a) The Energy Information Administration (EIA), *Monthly Energy Review*, Table 9.1, August 2003.
b) Natural Resources Canada, Energy Resources Branch, Ottawa, December 2003.
c) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.

Chapter 2
Residential Sector

The Data Situation

Statistics Canada reports aggregate data on residential energy use in its *Report on Energy Supply-Demand in Canada* (RESD) (Cat. No. 57-003-XIB), whereas its *Survey of Household Spending* (SHS) collects additional data on the characteristics of residential equipment and housing stock. Before 1997, which was the first year Statistics Canada conducted the survey, the *Household Facilities and Equipment Survey* (HFE) collected similar data. The residential stock estimates in this handbook derive from both surveys; however, although the surveys use similar methodologies, they are not identical. Furthermore, because there was a re-base of the SHS data in 1999, significant processing of the data was necessary to merge the information.

Natural Resources Canada (NRCan) has also collected additional information through two types of surveys sponsored by the National Energy Use Database (NEUD) – stock surveys and flow surveys. Stock surveys have two main goals. First, they collect information on the characteristics of energy-using appliances and equipment, the state of dwellings and building stock, and the profile of consumers (including consumption habits). Second, they collect data on annual energy consumption by households. Flow surveys gather information on variables affecting housing stock, such as the characteristics of new equipment and new housing, and retrofit activities. For more information on surveys conducted by NEUD, visit its Web site at *oee.nrcan.gc.ca/neud/dpa/data_e/neud_publications.cfm.*

The Office of Energy Efficiency (OEE) has also developed the Residential End-Use Model (REUM). This stock accounting model assesses trends in energy use in the Canadian residential sector. It is disaggregated at the provincial level and includes five end-uses (space heating, water heating, appliances, lighting and space cooling), some of which are further disaggregated at the level of equipment or energy sources.

To estimate end-use energy use, REUM allocates the energy use reported in RESD to the five end-uses by using annual stock characteristics and sales data, coupled with demand loads and unit energy consumption for equipment stock.

By combining data from the HFE survey with data from the SHS, REUM estimates data on housing stock by province, building type and vintage. The OEE estimates data on floor space by combining REUM's housing stock estimates with data on floor space from two other surveys: the *Building Permits Survey* and the OEE-sponsored 1993 and 1997 *Survey of Household Energy Use* (SHEU), both conducted by Statistics Canada. Plans are underway to collect SHEU data for the 2003 reporting year. Field data collection is expected to commence in the spring of 2004.

REUM estimates data on residential equipment stock by using data from Statistics Canada's stock surveys and other industry surveys. The data on demand load and unit energy consumption comes from various studies, some conducted at the request of NRCan.

The model also takes into account the influence of weather on residential energy demand. It uses the number of heating degree-days in *Monthly Summary of Degree-Days below 18.0°C* and the number of cooling degree-days in *Monthly Summary of Degree-Days above 18.0°C*, two reports from Environment Canada. This year, to address some data continuity issues, one of the weather stations used to calculate the heating and cooling degree-day indices was changed. The resulting heating index was not substantially different; however, the cooling index has more variability than in the past.

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.

Chapter 2
Residential Sector

Residential Secondary Energy Use by Energy Source and End-Use

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,b]	**1,288.9**		**1,450.8**	**1,393.7**	**1,269.9**	**1,325.3**	**1,391.9**	**1,338.3**	**1,399.4**	**8.6%**
Energy Use by Energy Source (PJ) [a,b]										
Electricity	467.4		486.9	484.2	465.6	479.8	497.6	504.9	513.5	9.9%
Natural Gas	528.4		696.0	648.1	577.8	609.3	644.8	601.0	646.8	22.4%
Heating Oil	186.4		158.9	147.1	126.1	131.0	132.4	121.1	120.7	-35.2%
Propane	19.9		14.2	13.8	12.4	10.5	11.3	11.7	11.5	-42.2%
Other [1]	2.0		2.3	2.0	1.7	1.7	1.6	1.3	2.6	31.5%
Wood	84.9		92.7	98.6	86.4	93.0	104.1	98.4	104.2	22.8%
Energy Use by End-Use (PJ) [b]										
Space Heating	779.7		914.4	857.9	738.2	783.5	844.8	779.3	830.8	6.6%
Water Heating	270.7		291.8	290.5	285.0	290.0	294.5	293.9	303.4	12.1%
Appliances	177.0		179.1	179.6	176.1	177.1	181.4	184.9	181.5	2.5%
Major Appliances	*132.2*		*121.9*	*120.9*	*117.0*	*115.9*	*116.9*	*117.5*	*113.6*	*-14.0%*
Other	*44.9*		*57.2*	*58.8*	*59.1*	*61.2*	*64.5*	*67.4*	*67.9*	*51.4%*
Lighting	53.2		56.3	56.3	56.1	57.6	60.1	62.0	61.5	15.7%
Space Cooling	8.4		9.2	9.4	14.4	17.0	11.2	18.2	22.1	165.0%
Activity										
Total Floor Space (million m^2) [b]	1,195		1,377	1,401	1,425	1,450	1,476	1,500	1,518	27.0%
Total Households (thousands) [b,c]	9,895		11,069	11,224	11,385	11,553	11,728	11,897	12,021	21.5%
Energy Intensity (GJ/m^2) [a,b]	**1.08**		**1.05**	**0.99**	**0.89**	**0.91**	**0.94**	**0.89**	**0.92**	**-14.5%**
Energy Intensity (GJ/household) [a,b,c]	**130.3**		**131.1**	**124.2**	**111.5**	**114.7**	**118.7**	**112.5**	**116.4**	**-10.6%**
Heating Degree-Day Index [b,d]	**0.92**		**1.03**	**0.98**	**0.84**	**0.88**	**0.96**	**0.88**	**0.94**	
Cooling Degree-Day Index [b,e]	**1.06**		**0.94**	**0.93**	**1.29**	**1.54**	**0.90**	**1.43**	**1.71**	

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) Statistics Canada, *Survey of Household Spending in 1997–2002*, Ottawa, December 2003 (Cat. No. 62F0041).
d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2002.
e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2002.

Chapter 2
Residential Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions Including Electricity (Mt) [a,b,c]	**69.5**		**73.2**	**72.7**	**69.5**	**71.1**	**75.8**	**74.2**	**75.4**	**8.4%**
GHG Emissions by Energy Source (Mt) [a,b,c]										
Electricity	26.3		24.0	26.7	29.0	28.6	31.1	32.7	31.4	19.4%
Natural Gas	26.6		34.8	32.3	28.8	30.4	32.3	30.0	32.3	21.4%
Heating Oil	13.7		11.7	10.8	9.2	9.6	9.7	8.9	8.8	-35.4%
Propane	1.2		0.9	0.8	0.7	0.6	0.7	0.7	0.7	-41.7%
Other [1]	0.2		0.2	0.2	0.2	0.2	0.2	0.1	0.2	28.3%
Wood	1.6		1.7	1.8	1.6	1.7	1.9	1.8	1.9	22.8%
GHG Emissions by End-Use (Mt) [b,c]										
Space Heating	41.4		46.2	43.8	38.4	40.3	43.7	40.6	42.6	2.8%
Water Heating	14.7		14.9	15.4	15.8	15.8	16.4	16.6	16.6	13.0%
Appliances	9.9		8.8	9.9	10.9	10.5	11.3	11.9	11.0	11.2%
Major Appliances	*7.4*		*6.0*	*6.6*	*7.2*	*6.9*	*7.2*	*7.5*	*6.9*	*-7.0%*
Other	*2.5*		*2.8*	*3.2*	*3.7*	*3.7*	*4.0*	*4.4*	*4.1*	*64.5%*
Lighting	3.0		2.8	3.1	3.5	3.4	3.8	4.0	3.8	25.7%
Space Cooling	0.5		0.5	0.5	0.9	1.0	0.7	1.2	1.4	188.0%
GHG Intensity (tonne/TJ) [a,b,c]	**53.9**		**50.4**	**52.1**	**54.7**	**53.6**	**54.5**	**55.5**	**53.9**	**-0.1%**
Total GHG Emissions Excluding Electricity (Mt) [a,b,c]	**43.2**		**49.2**	**46.0**	**40.5**	**42.5**	**44.7**	**41.5**	**44.0**	**1.7%**
GHG Emissions by End-Use (Mt) [b,c]										
Space Heating	34.4		39.1	35.9	30.7	32.5	34.7	31.6	33.6	-2.1%
Water Heating	8.7		9.9	9.8	9.6	9.8	9.9	9.7	10.1	16.6%
Appliances	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	25.1%
Major Appliances	*0.2*		*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*25.1%*
Other	*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**		**33.9**	**33.0**	**31.9**	**32.1**	**32.1**	**31.0**	**31.4**	**-6.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 2
Residential Sector

Residential Housing Stock and Floor Space

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Housing Stock (thousands) [a]	**10,410**		**11,712**	**11,869**	**12,031**	**12,196**	**12,375**	**12,546**	**12,663**	**21.6%**
Housing Stock by Building Type (thousands)										
Single Detached	5,865		6,655	6,743	6,846	6,959	7,080	7,165	7,214	23.0%
Single Attached	929		1,199	1,235	1,264	1,272	1,288	1,321	1,330	43.2%
Apartments	3,394		3,617	3,646	3,668	3,701	3,736	3,786	3,846	13.3%
Mobile Homes	222		242	245	253	264	271	273	274	23.4%
Housing Stock by Vintage (thousands)										
Before 1946	2,064		1,991	1,968	1,959	1,948	1,943	1,935	1,889	-8.5%
1946–1960	1,364		1,338	1,329	1,326	1,321	1,319	1,316	1,299	-4.8%
1961–1977	3,632		3,545	3,524	3,513	3,497	3,487	3,477	3,435	-5.4%
1978–1983	1,600		1,584	1,580	1,577	1,573	1,570	1,569	1,560	-2.5%
1984–1995	1,751		3,051	3,048	3,047	3,044	3,043	3,042	3,034	73.3%
1996–2002 [1]	0		203	419	608	813	1,013	1,208	1,447	613.3%
Total Floor Space (million m²) [a]	**1,195**		**1,377**	**1,401**	**1,425**	**1,450**	**1,476**	**1,500**	**1,518**	**27.0%**
Floor Space by Building Type (million m²)										
Single Detached	782		910	926	944	963	983	998	1,009	29.0%
Single Attached	106		136	141	145	146	149	153	154	46.0%
Apartments	287		308	311	313	316	319	324	329	14.6%
Mobile Homes	20		22	23	23	25	25	26	26	29.5%
Floor Space by Vintage (million m²)										
Before 1946	235		228	225	224	223	222	221	216	-8.2%
1946–1960	139		137	136	136	135	135	135	133	-4.6%
1961–1977	397		389	386	385	384	383	382	377	-4.9%
1978–1983	195		193	193	192	192	192	192	191	-2.2%
1984–1995	229		403	402	402	402	402	402	401	74.7%
1996–2002 [1]	0		28	58	85	114	142	169	201	618.7%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

1) Growth rate shown in the final column entitled "Total Growth 1990–2002" is for the period 1996 to 2002.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.

Chapter 2
Residential Sector

Residential Housing Stock and Floor Space *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Average Size of Housing Unit (m^2/house) [a]	**115**		**118**	**118**	**118**	**119**	**119**	**120**	**120**	**4.4%**
By Building Type (m^2/house)										
Single Detached	133		137	137	138	138	139	139	140	4.9%
Single Attached	114		114	114	115	115	115	116	116	1.9%
Apartments	85		85	85	85	85	85	85	86	1.2%
Mobile Homes	90		92	92	93	93	93	94	94	5.0%
By Vintage (m^2/house)										
Before 1946	114		114	114	114	114	114	114	114	0.3%
1946–1960	102		102	102	102	102	102	102	102	0.2%
1961–1977	109		110	110	110	110	110	110	110	0.6%
1978–1983	122		122	122	122	122	122	122	122	0.3%
1984–1995	131		132	132	132	132	132	132	132	0.8%
1996–2002 [1]	0		138	139	140	140	140	140	139	0.8%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Growth rate shown in the final column entitled "Total Growth 1990–2002" is for the period 1996 to 2002.

Sources:

a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.

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Residential Sector

Residential Space Heating Energy Use and System Stock Share

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Space Heating Energy Use (PJ) [a]	**779.7**		**914.4**	**857.9**	**738.2**	**783.5**	**844.8**	**779.3**	**830.8**	**6.6%**
Energy Use by Energy Source (PJ) [a]										
Electricity	125.2		145.9	142.4	123.7	131.2	145.4	138.7	146.5	17.0%
Natural Gas	384.2		519.4	471.9	405.7	433.8	467.0	425.1	461.7	20.2%
Heating Oil	167.3		143.6	132.6	111.8	116.2	118.4	107.4	107.4	-35.8%
Propane	16.6		11.6	11.2	9.8	8.4	9.3	9.4	9.2	-44.4%
Other [1]	1.8		2.1	1.8	1.6	1.6	1.5	1.3	2.6	45.1%
Wood	84.6		91.9	97.9	85.6	92.2	103.3	97.5	103.3	22.1%
Energy Use by Vintage (PJ) [a]										
Before 1946	230.5		244.2	224.7	184.8	194.8	208.1	188.9	195.2	-15.3%
1946–1960	104.5		111.5	102.8	87.1	91.3	97.1	88.6	92.9	-11.2%
1961–1977	239.4		254.6	234.6	201.5	210.0	222.7	203.1	213.4	-10.8%
1978–1983	112.0		123.2	112.7	97.7	101.6	108.2	98.2	104.5	-6.7%
1984–1995	93.3		168.7	160.1	137.4	144.7	153.6	141.4	150.0	60.8%
1996–2002 [2]	0.0		12.2	23.0	29.6	41.1	55.1	59.2	74.8	512.1%
Activity										
Total Floor Space (million m^2) [a]	1,195		1,377	1,401	1,425	1,450	1,476	1,500	1,518	27.0%
Energy Intensity (GJ/m^2) [a]	**0.65**		**0.66**	**0.61**	**0.52**	**0.54**	**0.57**	**0.52**	**0.55**	**-16.1%**
Heat Gains (PJ) [a]	**93.7**		**108.2**	**102.9**	**86.6**	**91.9**	**102.9**	**96.6**	**101.3**	**8.2%**
Heating Degree-Day Index [a,b]	**0.92**		**1.03**	**0.98**	**0.84**	**0.88**	**0.96**	**0.88**	**0.94**	

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

1) "Other" includes coal and steam.
2) Growth rate shown in the final column entitled "Total Growth 1990–2002" is for the period 1996 to 2002.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2002.

Chapter 2
Residential Sector

Residential Space Heating Energy Use and System Stock Share *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Heating System Stock Share by System Type (%) [a]										
Heating Oil – Normal Efficiency	14.2		9.9	9.1	8.4	7.9	7.6	7.3	7.0	
Heating Oil – Medium Efficiency	0.2		1.5	1.8	2.0	2.1	2.3	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		35.1	33.7	32.3	31.1	29.9	28.6	27.1	
Natural Gas – Medium Efficiency	1.0		7.0	8.1	9.1	10.1	11.1	12.0	12.9	
Natural Gas – High Efficiency	2.1		4.3	4.8	5.1	5.5	5.8	6.4	6.9	
Electric Baseboard	28.0		29.0	28.6	28.3	28.1	27.9	27.6	27.4	
Heat Pump	2.1		2.5	2.5	3.1	3.1	3.3	3.4	3.6	
Propane	0.7		0.9	1.0	1.0	1.0	1.0	1.0	1.0	
Other [1]	0.1		0.2	0.2	0.2	0.2	0.3	0.3	0.3	
Wood	1.6		2.1	1.8	1.7	1.9	2.0	2.0	2.0	
Dual Systems										
Wood/Electric	5.2		4.3	4.9	4.9	5.0	5.0	5.0	5.0	
Wood/Heating Oil	2.4		2.0	2.3	2.3	2.3	2.3	2.4	2.4	
Natural Gas/Electric	0.3		0.3	0.4	0.4	0.4	0.4	0.4	0.5	
Heating Oil/Electric	0.8		0.9	1.0	1.1	1.1	1.1	1.2	1.2	

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2002.

Chapter 2
Residential Sector

Residential Lighting and Space Cooling Details

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Lighting Energy Use[1] (PJ)[a]	**53.2**		**56.3**	**56.3**	**56.1**	**57.6**	**60.1**	**62.0**	**61.5**	**15.7%**
Activity										
Total Floor Space (million m²)[a]	1,195		1,377	1,401	1,425	1,450	1,476	1,500	1,518	27.0%
Energy Intensity (MJ/m²)[a]	**44.5**		**40.9**	**40.2**	**39.4**	**39.8**	**40.7**	**41.4**	**40.5**	**-8.9%**
Heat Loss (PJ)[a]	**22.4**		**26.5**	**25.2**	**21.5**	**23.2**	**26.2**	**25.0**	**26.2**	**17.4%**
Total Space Cooling Energy Use[1] (PJ)[a]	**8.4**		**9.2**	**9.4**	**14.4**	**17.0**	**11.2**	**18.2**	**22.1**	**165.0%**
Energy Use by Cooling System Type (PJ)[a]										
Room	2.0		1.7	1.8	2.5	3.1	1.9	3.1	3.6	83.2%
Central	6.4		7.5	7.7	11.9	14.0	9.3	15.1	18.5	190.3%
Activity										
Floor Space (million m²)[a]	308		429	455	481	508	534	554	569	84.5%
Energy Intensity (MJ/m²)[a]	**27.1**		**21.4**	**20.7**	**30.0**	**33.5**	**21.0**	**32.8**	**38.9**	**43.6%**
Cooling Degree-Day Index[a,b]	**1.06**		**0.94**	**0.93**	**1.29**	**1.54**	**0.90**	**1.43**	**1.71**	
Total Cooling System Stock (thousands)[a]	**2,466**		**3,320**	**3,518**	**3,710**	**3,909**	**4,096**	**4,247**	**4,364**	**76.9%**
System Stock by Cooling System Type (thousands)[a]										
Room	1,090		1,257	1,353	1,405	1,473	1,527	1,567	1,593	46.1%
Central	1,376		2,063	2,165	2,305	2,436	2,569	2,680	2,771	101.4%
Cooling System New Unit Efficiencies[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 Efficiencies[a]										
Room (EER)	6.8		7.6	7.8	7.9	8.1	8.3	8.4	8.6	25.2%
Central (SEER)	8.6		9.3	9.4	9.5	9.6	9.7	9.8	9.9	14.4%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Lighting and space cooling consume only electricity.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2002.

Chapter 2
Residential Sector

Residential Appliance Details

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Appliance Energy Use (PJ) [a]	**177.0**		**179.1**	**179.6**	**176.1**	**177.1**	**181.4**	**184.9**	**181.5**	**2.5%**
Energy Use by Energy Source (PJ) [a]										
Electricity	173.3		174.7	175.4	171.8	172.9	177.0	180.5	176.9	2.0%
Natural Gas	3.7		4.3	4.3	4.3	4.2	4.4	4.4	4.7	26.1%
Energy Use by Appliance Type (PJ) [a]										
Refrigerator	53.2		44.7	43.4	41.0	40.6	39.8	39.2	37.4	-29.6%
Freezer	21.5		18.3	17.9	16.8	15.8	15.5	15.0	13.8	-36.0%
Dishwasher [1]	1.5		1.5	1.5	1.5	1.4	1.5	1.5	1.5	-4.4%
Clothes Washer [1]	2.4		2.4	2.4	2.3	2.3	2.4	2.4	2.3	-2.7%
Clothes Dryer	28.8		28.3	28.9	28.7	28.4	29.3	30.1	29.3	1.7%
Range	24.8		26.8	26.8	26.8	27.4	28.4	29.3	29.3	18.4%
Other [2]	44.9		57.2	58.8	59.1	61.2	64.5	67.4	67.9	51.4%
Activity										
Total Households (thousands) [a,b]	9,895		11,069	11,224	11,385	11,553	11,728	11,897	12,021	21.5%
Energy Intensity (GJ/household) [a,b]	**17.9**		**16.2**	**16.0**	**15.5**	**15.3**	**15.5**	**15.5**	**15.1**	**-15.6%**
Heat Loss by Appliance Type (PJ) [a]										
Refrigerator	22.5		21.3	19.6	15.9	16.4	17.6	15.9	16.1	-28.5%
Freezer	9.2		8.8	8.2	6.6	6.5	6.9	6.2	6.0	-34.4%
Dishwasher	0.7		0.7	0.7	0.6	0.6	0.6	0.6	0.6	-3.3%
Clothes Washer	1.0		1.1	1.1	0.9	0.9	1.0	1.0	1.0	-0.8%
Clothes Dryer	3.4		3.7	3.7	3.1	3.2	3.6	3.4	3.5	3.5%
Range	10.5		12.7	12.1	10.3	11.1	12.5	11.9	12.6	20.0%
Other [2]	19.0		27.1	26.6	22.9	24.8	28.4	27.4	29.2	53.6%
Appliances per Household by Appliance Type [a,b]										
Refrigerator	1.18		1.20	1.22	1.22	1.24	1.22	1.23	1.24	5.2%
Freezer	0.57		0.57	0.59	0.59	0.58	0.58	0.58	0.57	0.3%
Dishwasher	0.42		0.48	0.49	0.51	0.49	0.51	0.52	0.54	30.3%
Clothes Washer	0.75		0.78	0.81	0.81	0.80	0.81	0.81	0.81	8.4%
Clothes Dryer	0.73		0.76	0.80	0.82	0.80	0.81	0.82	0.81	11.6%
Range	0.98		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.9%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Excludes hot water requirements.
2) "Other" includes televisions, video cassette recorders, digital video disc players, radios, computers, toasters, etc.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Statistics Canada, *Survey of Household Spending in 1997–2002*, Ottawa, December 2003 (Cat. No. 62F0041).

Chapter 2
Residential Sector

Residential Appliance Unit Energy Consumption (UEC)

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
UEC [1] for New Electric Appliances (kWh/year) [b]										
Refrigerator	956		640	657	654	645	640	559	550	-42.5%
Freezer	714		377	376	381	383	391	393	390	-45.4%
Dishwasher [2]	101		66	64	64	63	63	62	63	-37.9%
Clothes Washer [2]	97		76	74	72	69	67	65	66	-31.9%
Clothes Dryer	1,103		887	887	900	908	910	916	910	-17.5%
Range	772		774	772	771	759	760	763	760	-1.6%
UEC [1] for New Natural Gas Appliances (kWh/year) [a]										
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%
UEC [1] for Stock of Electric Appliances (kWh/year) [a]										
Refrigerator	1,525		1,166	1,105	1,047	993	945	896	849	-44.3%
Freezer	1,291		1,004	948	892	835	781	729	681	-47.3%
Dishwasher [2]	125		100	95	91	87	83	80	76	-39.2%
Clothes Washer [2]	106		94	92	89	87	84	82	79	-25.2%
Clothes Dryer	1,314		1,141	1,112	1,087	1,063	1,042	1,022	1,004	-23.6%
Range	802		789	787	785	782	780	777	775	-3.4%
UEC [1] for Stock of Natural Gas Appliances (kWh/year) [a]										
Clothes Dryer	1,468		1,050	1,010	979	955	938	925	914	-37.7%
Range	1,534		1,410	1,387	1,364	1,344	1,326	1,311	1,297	-15.5%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Special Tabulations from *Energy Consumption of Major Household Appliances Shipped in Canada – Trends for 1990–2002*, Ottawa, December 2003.

Chapter 2
Residential Sector

Residential Water Heating Energy Use and Water Heater Stock Share

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Water Heating Energy Use (PJ) [a]	**270.7**		**291.8**	**290.5**	**285.0**	**290.0**	**294.5**	**293.9**	**303.4**	**12.1%**
Energy Use by Energy Source (PJ) [a]										
Electricity	107.3		100.8	100.7	99.6	101.0	104.0	105.4	106.5	-0.8%
Natural Gas	140.5		172.3	171.9	167.7	171.2	173.5	171.5	180.4	28.4%
Heating Oil	19.0		15.2	14.4	14.3	14.8	14.1	13.7	13.3	-30.1%
Propane	3.3		2.6	2.6	2.6	2.1	2.1	2.3	2.3	-31.3%
Other [1]	0.2		0.2	0.2	0.1	0.1	0.1	0.1	0.0	-100.0%
Wood	0.3		0.8	0.7	0.7	0.8	0.8	0.9	0.9	232.4%
Activity										
Total Households (thousands) [a,b]	9,895		11,069	11,224	11,385	11,553	11,728	11,897	12,021	21.5%
Energy Intensity (GJ/household) [a,b]	**27.4**		**26.4**	**25.9**	**25.0**	**25.1**	**25.1**	**24.7**	**25.2**	**-7.7%**
Water Heater Stock Market Shares (%) [a]										
Electricity	55.0		52.1	51.9	51.8	51.4	51.2	50.9	50.6	
Natural Gas	39.8		42.7	43.0	43.2	43.5	43.7	43.9	44.1	
Heating Oil	4.6		4.1	4.0	4.0	4.0	4.0	4.0	4.0	
Propane	0.5		0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Other [1]	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Wood	0.1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Heat Loss (PJ) [a]	**5.0**		**6.2**	**5.7**	**4.9**	**5.3**	**5.9**	**5.4**	**6.0**	**19.4%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.

Sources:
a) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2004.
b) Statistics Canada, *Survey of Household Spending in 1997–2002*, Ottawa, December 2003 (Cat. No. 62F0041).

Chapter 2
Residential Sector

Residential Energy Prices and Background Indicators

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m^3) [a,d]	19.1		21.8	23.7	25.1	27.3	31.7	44.5	36.9	93.3%
Heating Oil (cents/litre) [a,d,e]	35.6		38.3	41.0	36.7	37.2	53.6	53.5	49.9	40.1%
Electricity (cents/kWh) [b,d]	6.2		7.9	8.0	8.1	8.1	7.9	8.1	8.4	35.7%
Background Indicators										
Consumer Price Index (1992 = 100) [c]										
Natural Gas	87.8		104.4	112.2	119.1	130.7	158.9	206.0	168.7	
Fuel Oil and Other Fuels	96.0		105.8	112.3	100.8	101.2	143.2	143.5	131.8	
Electricity	82.1		105.6	106.8	107.8	108.5	109.2	111.1	119.6	
Real Personal Disposable Income per Household ($97) [c]	*52,584*		*48,473*	*48,642*	*49,269*	*50,123*	*51,910*	*52,483*	*53,211*	*1.2%*
Total Population (thousands) [c]	*27,698*		*29,611*	*29,907*	*30,157*	*30,404*	*30,689*	*31,021*	*31,362*	*13.2%*

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2003 (Cat. No. 57-601-XIE).
b) Calculated based on Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, May 2002.
c) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
d) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
e) Statistics Canada, *Total Population, Census Divisions and Census Metropolitan Areas, 1996 Census Boundaries, Table 051-0014, 1990–2002*, Ottawa, December 2003 (CANSIM).

Chapter 3
Commercial/Institutional Sector

The Data Situation

Of the six sectors of the economy reviewed in this handbook, the commercial/institutional sector has the most significant limitations with regard to available data.

Statistics Canada publishes energy use data for "public administration" and "commercial and other institutional" categories in its *Report on Energy Supply-Demand in Canada* (Cat. No. 57-003-XIB). These two categories define the commercial/institutional sector used in this handbook. 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 are essentially the energy use not accounted for in the residential, industrial, transportation and agriculture sectors.

The Office of Energy Efficiency (OEE) developed the Commercial End-Use Model (CEUM) to assess trends in energy use in the Canadian commercial/institutional sector. CEUM uses estimates of energy intensity to allocate energy use to various end-uses. These intensity estimates are partially based on the *Commercial and Institutional Building Energy Use Survey* conducted by Statistics Canada and funded by the OEE in 2001, which collected data for the 2000 calendar year.

CEUM also uses estimates of floor space, by region and building type, which Informetrica Limited developed for the OEE. These estimates are based on average costs per unit of floor space and on investment flows for new construction.

This year, the model was revised to take into account service levels for space cooling and auxiliary equipment (e.g. computers, printers and fax machines) and to determine their impact on energy use and energy efficiency. Between 1990 and 2002, the use of space cooling and auxiliary equipment increased, but due to technological advances, the level of service provided by equipment has improved significantly since 1990, particularly for computers. Since we have only limited data on stocks, sales and unit energy consumption levels, an index has been estimated to capture the impact of these changes over time.

The model takes into account the influence of weather on commercial/institutional energy demand. It uses the number of heating degree-days in *Monthly Summary of Degree-Days below 18.0°C* and the number of cooling degree-days in *Monthly Summary of Degree-Days above 18.0°C*, two reports from Environment Canada. This year, to address some data continuity issues, one of the weather stations used to calculate the heating and cooling degree-day indices was changed. The resulting heating index was not substantially different; however, the cooling index has more variability than in the past.

The commercial/institutional price of heating oil and natural gas comes from Statistics Canada's *Energy Statistics Handbook* (Cat. No. 57-601-XIE). 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.

Chapter 3
Commercial/Institutional Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a]	**867.0**		**981.5**	**998.5**	**944.1**	**979.2**	**1,072.8**	**1,060.9**	**1,130.1**	**30.3%**
Energy Use by Energy Source (PJ) [a]										
Electricity	390.1		426.9	436.6	431.3	436.8	453.0	445.2	466.7	19.6%
Natural Gas	387.1		451.2	452.7	418.5	443.8	503.2	488.4	526.6	36.0%
Light Fuel Oil and Kerosene	62.0		59.7	57.5	47.6	47.0	60.4	63.6	69.6	12.3%
Heavy Fuel Oil	11.4		9.0	11.8	16.8	17.0	19.8	26.8	27.4	141.6%
Propane	16.1		34.3	39.3	29.5	34.3	36.1	36.3	36.0	123.9%
Other [1]	0.4		0.4	0.6	0.4	0.3	0.4	0.6	3.8	830.0%
Energy Use by End-Use (PJ) [b,f]										
Space Heating	465.3		536.1	537.8	480.8	510.7	581.8	562.6	604.6	29.9%
Water Heating	60.2		61.4	65.7	63.7	63.8	71.3	73.6	78.3	30.0%
Auxiliary Equipment	66.3		74.7	79.1	77.0	76.9	88.7	94.1	99.6	50.3%
Auxiliary Motors	104.1		118.0	120.0	117.3	118.6	126.1	120.5	122.1	17.3%
Lighting	133.9		150.9	154.2	150.7	151.7	159.8	152.5	151.0	12.8%
Space Cooling	28.3		32.9	34.3	47.1	50.0	37.3	50.0	66.7	136.2%
Street Lighting	8.9		7.5	7.4	7.5	7.4	7.7	7.7	7.8	-12.8%
Energy Use by Building Type [2] ***(PJ)*** [b]										
Schools	75.1		86.9	88.8	81.2	84.4	97.1	90.8	95.3	26.9%
Health Care Institutions	84.3		93.2	95.6	91.7	95.1	102.4	99.3	104.6	24.1%
Religious Institutions	14.7		15.1	15.2	13.8	14.1	15.5	15.4	16.1	9.4%
Other Institutions	39.5		46.9	48.3	45.9	48.3	54.4	54.3	60.4	53.2%
Offices	254.9		304.6	313.1	295.8	313.4	351.4	352.8	382.2	49.9%
Retail Organizations	194.8		206.4	207.1	199.2	203.7	217.9	221.7	237.1	21.7%
Hotels and Restaurants	68.4		78.2	80.8	79.4	81.1	84.8	84.1	85.9	25.6%
Recreational Facilities	49.9		65.2	66.6	62.0	63.9	71.7	65.9	70.5	41.1%
Warehouses	76.5		77.4	75.5	67.6	67.8	69.9	68.9	70.2	-8.2%
Activity										
Total Floor Space (million m^2) [c]	465.9		513.5	520.5	527.7	535.6	563.4	576.6	589.2	26.5%
Energy Intensity [2] **(GJ/m^2)** [a,c]	**1.84**		**1.90**	**1.90**	**1.77**	**1.81**	**1.89**	**1.83**	**1.90**	**3.4%**
Heating Degree-Day Index [b,d]	**0.92**		**1.03**	**0.98**	**0.84**	**0.88**	**0.96**	**0.88**	**0.94**	
Cooling Degree-Day Index [b,e]	**1.06**		**0.94**	**0.93**	**1.29**	**1.54**	**0.90**	**1.43**	**1.71**	

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.
2) Excludes street lighting.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
c) Informetrica Limited, *TI Model and Historical Estimates of Commercial Floor Space*, 2002 Database Update, Ottawa, November 2003. Data for 2000 to 2002 adjusted by Natural Resources Canada.
d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2002.
e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2002.
f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.

Chapter 3
Commercial/Institutional Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions Including Electricity (Mt) [a,d]	**47.8**		**50.7**	**54.2**	**54.2**	**55.0**	**61.6**	**62.1**	**64.4**	**34.7%**
GHG Emissions by Energy Source (Mt) [a,d]										
Electricity	21.9		21.1	24.1	26.8	26.0	28.3	28.8	28.5	30.0%
Natural Gas	19.5		22.5	22.6	20.9	22.1	25.2	24.4	26.3	34.9%
Light Fuel Oil and Kerosene	4.6		4.4	4.2	3.5	3.5	4.4	4.7	5.1	11.9%
Heavy Fuel Oil	0.8		0.7	0.9	1.2	1.2	1.4	2.0	2.0	137.2%
Propane	1.0		2.1	2.4	1.8	2.1	2.2	2.2	2.2	125.9%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.3	–
GHG Emissions by End-Use (Mt) [b,c,d]										
Space Heating	25.3		28.4	28.8	26.0	27.5	31.6	30.8	33.0	30.4%
Water Heating	3.3		3.3	3.5	3.4	3.4	3.9	4.0	4.2	28.1%
Auxiliary Equipment	3.7		3.8	4.4	4.8	4.6	5.5	6.0	6.1	62.1%
Auxiliary Motors	5.9		5.8	6.6	7.3	7.1	7.9	7.8	7.5	27.5%
Lighting	7.5		7.4	8.5	9.4	9.0	10.0	9.9	9.2	22.5%
Space Cooling	1.6		1.6	1.9	2.9	2.9	2.3	3.1	3.9	149.1%
Street Lighting	0.5		0.4	0.4	0.5	0.4	0.5	0.5	0.5	-5.3%
GHG Emissions by Building Type [2] (Mt) [b,d]										
Schools	4.1		4.6	4.8	4.6	4.7	5.4	5.2	5.3	29.0%
Health Care Institutions	4.7		4.9	5.2	5.3	5.4	5.9	5.8	5.9	27.3%
Religious Institutions	0.8		0.8	0.8	0.8	0.8	0.9	0.9	0.9	10.3%
Other Institutions	2.2		2.5	2.6	2.6	2.7	3.1	3.1	3.4	56.9%
Offices	14.0		15.7	16.9	16.9	17.5	20.1	20.5	21.6	54.4%
Retail Organizations	10.8		10.6	11.3	11.7	11.6	12.8	13.3	13.8	27.5%
Hotels and Restaurants	3.8		4.0	4.4	4.6	4.6	4.9	5.0	5.0	31.5%
Recreational Facilities	2.8		3.4	3.6	3.6	3.6	4.1	3.9	4.0	46.5%
Warehouses	4.2		4.0	4.1	3.8	3.8	4.0	4.0	4.0	-5.7%
GHG Intensity (tonne/TJ) [a,d]	**55.2**		**51.7**	**54.2**	**57.4**	**56.1**	**57.4**	**58.5**	**57.0**	**3.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.
2) Excludes street lighting.

Sources:
a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
c) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.
d) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 3
Commercial/Institutional Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions Excluding Electricity (Mt) [a,d]	**25.9**		**29.7**	**30.1**	**27.4**	**28.9**	**33.3**	**33.2**	**35.9**	**38.6%**
GHG Emissions by End-Use (Mt) [b,c,d]										
Space Heating	22.3		25.8	25.9	23.3	24.7	28.6	28.0	30.2	35.6%
Water Heating	3.0		3.1	3.3	3.2	3.2	3.6	3.7	3.9	31.4%
Auxiliary Equipment	0.5		0.6	0.7	0.6	0.6	0.8	1.1	1.1	102.9%
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	0.3	0.4	0.3	0.5	0.6	676.2%
Street Lighting	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
GHG Emissions by Building Type [1] ***(Mt)*** [b,d]										
Schools	3.0		3.5	3.6	3.2	3.4	4.0	3.8	4.1	34.1%
Health Care Institutions	3.0		3.3	3.3	3.1	3.3	3.7	3.6	3.9	31.1%
Religious Institutions	0.6		0.6	0.6	0.5	0.6	0.6	0.6	0.7	14.5%
Other Institutions	1.5		1.8	1.9	1.7	1.8	2.2	2.1	2.4	58.1%
Offices	7.6		9.2	9.5	8.7	9.4	11.0	11.2	12.1	60.1%
Retail Organizations	4.6		5.0	4.9	4.4	4.6	5.2	5.5	5.9	27.6%
Hotels and Restaurants	1.7		1.9	2.0	1.8	1.9	2.2	2.2	2.2	29.0%
Recreational Facilities	1.6		2.0	2.1	1.9	1.9	2.3	2.1	2.3	50.3%
Warehouses	2.3		2.4	2.3	2.0	2.0	2.1	2.1	2.3	-1.8%
GHG Intensity (tonne/TJ) [a,d]	**29.9**		**30.2**	**30.1**	**29.0**	**29.5**	**31.0**	**31.3**	**31.8**	**6.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Excludes street lighting.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
c) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 2001*, Ottawa, December 2003 (Cat. No. 57-202-XIB). Data for 2002 estimated by Natural Resources Canada.
d) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 3
Commercial/Institutional Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use by Schools (PJ) [a]	**75.1**		**86.9**	**88.8**	**81.2**	**84.4**	**97.1**	**90.8**	**95.3**	**26.9%**
Energy Use by Energy Source (PJ) [a]										
Electricity	19.8		22.2	22.7	21.3	21.3	22.4	21.3	21.0	5.8%
Natural Gas	43.6		51.0	51.1	47.4	50.0	58.7	53.2	56.7	30.0%
Light Fuel Oil and Kerosene	8.3		8.2	8.2	6.5	6.5	8.4	8.6	9.4	13.0%
Heavy Fuel Oil	1.6		1.3	1.8	2.3	2.3	2.7	3.1	3.0	92.5%
Propane	1.6		4.3	5.0	3.7	4.3	4.8	4.5	4.7	185.6%
Other [1]	0.1		0.1	0.1	0.0	0.0	0.0	0.1	0.5	418.0%
Activity										
Floor Space (million m^2) [b]	66.88		75.86	77.27	78.36	79.62	84.01	86.01	87.92	31.5%
Energy Intensity (GJ/m^2) [a,b]	**1.12**		**1.15**	**1.15**	**1.04**	**1.06**	**1.16**	**1.06**	**1.08**	**-3.5%**
Total Energy Use by Health Care Institutions (PJ) [a]	**84.3**		**93.2**	**95.6**	**91.7**	**95.1**	**102.4**	**99.3**	**104.6**	**24.1%**
Energy Use by Energy Source (PJ) [a]										
Electricity	30.3		32.9	34.5	34.3	35.0	35.1	33.3	33.7	11.0%
Natural Gas	42.6		47.3	47.1	44.8	46.9	52.4	50.5	54.8	28.6%
Light Fuel Oil and Kerosene	8.5		8.2	8.1	7.0	6.9	8.6	8.8	9.3	9.7%
Heavy Fuel Oil	1.6		1.6	2.0	2.8	3.0	3.1	3.6	3.3	112.4%
Propane	1.3		3.2	3.9	2.8	3.2	3.2	3.2	3.0	140.6%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.5	–
Activity										
Floor Space (million m^2) [b]	32.75		35.71	36.35	36.86	37.34	38.86	39.65	40.39	23.3%
Energy Intensity (GJ/m^2) [a,b]	**2.57**		**2.61**	**2.63**	**2.49**	**2.55**	**2.63**	**2.51**	**2.59**	**0.7%**
Total Energy Use by Religious Institutions (PJ) [a]	**14.7**		**15.1**	**15.2**	**13.8**	**14.1**	**15.5**	**15.4**	**16.1**	**9.4%**
Energy Use by Energy Source (PJ) [a]										
Electricity	4.0		3.9	4.0	3.8	3.7	3.9	3.7	3.6	-8.6%
Natural Gas	8.4		9.0	8.9	8.0	8.2	9.2	9.2	9.9	17.5%
Light Fuel Oil and Kerosene	1.7		1.4	1.4	1.2	1.2	1.4	1.4	1.5	-13.4%
Heavy Fuel Oil	0.3		0.3	0.3	0.4	0.4	0.5	0.5	0.5	61.7%
Propane	0.3		0.5	0.6	0.4	0.5	0.5	0.5	0.5	82.5%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	–
Activity										
Floor Space (million m^2) [b]	8.85		8.90	8.88	8.84	8.73	9.00	9.00	8.99	1.5%
Energy Intensity (GJ/m^2) [a,b]	**1.66**		**1.70**	**1.71**	**1.56**	**1.61**	**1.72**	**1.71**	**1.79**	**7.8%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

1) "Other" includes coal and steam.

Sources:
a) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
b) Informetrica Limited, *TI Model and Historical Estimates of Commercial Floor Space*, 2002 Database Update, Ottawa, November 2003. Data for 2000 to 2002 adjusted by Natural Resources Canada.

Chapter 3
Commercial/Institutional Sector

Commercial/Institutional Secondary Energy Use by Building Type and Energy Source *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use by Other Institutions (PJ) [a]	**39.5**		**46.9**	**48.3**	**45.9**	**48.3**	**54.4**	**54.3**	**60.4**	**53.2%**
Energy Use by Energy Source (PJ) [a]										
Electricity	10.9		12.9	13.5	13.8	14.1	14.2	14.7	15.4	41.6%
Natural Gas	23.8		28.1	28.2	26.1	27.6	32.5	31.3	35.9	51.2%
Light Fuel Oil and Kerosene	3.4		3.4	3.4	2.9	3.1	3.8	4.1	4.6	36.5%
Heavy Fuel Oil	0.6		0.7	1.0	1.5	1.6	1.8	2.1	2.3	254.6%
Propane	0.8		1.8	2.2	1.6	1.9	2.0	2.1	2.1	170.1%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	–
Activity										
Floor Space (million m^2) [b]	19.80		24.27	24.93	25.32	26.00	27.54	28.50	29.44	48.7%
Energy Intensity (GJ/m^2) [a,b]	**1.99**		**1.93**	**1.94**	**1.81**	**1.86**	**1.97**	**1.91**	**2.05**	**3.0%**
Total Energy Use by Offices (PJ) [a]	**254.9**		**304.6**	**313.1**	**295.8**	**313.4**	**351.4**	**352.8**	**382.2**	**49.9%**
Energy Use by Energy Source (PJ) [a]										
Electricity	114.1		131.6	134.4	132.0	135.4	145.7	143.9	155.2	36.0%
Natural Gas	116.6		143.4	147.5	136.5	148.8	170.8	170.5	185.5	59.0%
Light Fuel Oil and Kerosene	16.4		16.6	16.2	13.4	13.3	17.8	18.2	20.0	21.7%
Heavy Fuel Oil	3.0		2.1	2.9	4.1	4.0	5.3	8.5	8.4	178.2%
Propane	4.6		10.7	11.8	9.6	11.7	11.6	11.4	12.2	164.2%
Other [1]	0.1		0.2	0.3	0.2	0.2	0.2	0.2	0.9	928.6%
Activity										
Floor Space (million m^2) [b]	121.11		141.80	145.31	149.36	153.43	163.71	169.30	174.72	44.3%
Energy Intensity (GJ/m^2) [a,b]	**2.10**		**2.15**	**2.15**	**1.98**	**2.04**	**2.15**	**2.08**	**2.19**	**3.9%**
Total Energy Use by Retail Organizations (PJ) [a]	**194.8**		**206.4**	**207.1**	**199.2**	**203.7**	**217.9**	**221.7**	**237.1**	**21.7%**
Energy Use by Energy Source (PJ) [a]										
Electricity	109.9		113.4	116.2	116.5	117.5	120.1	119.6	128.8	17.2%
Natural Gas	68.2		75.0	72.7	67.0	70.1	78.8	80.1	84.2	23.4%
Light Fuel Oil and Kerosene	11.4		9.9	8.7	7.3	7.0	8.7	10.1	11.7	2.4%
Heavy Fuel Oil	2.4		1.5	1.9	2.8	2.8	3.5	4.6	5.5	133.3%
Propane	2.8		6.5	7.5	5.5	6.3	6.8	7.2	6.0	115.8%
Other [1]	0.1		0.1	0.1	0.0	0.0	0.0	0.1	0.9	793.0%
Activity										
Floor Space (million m^2) [b]	110.31		112.42	113.12	114.67	116.47	121.59	124.76	127.76	15.8%
Energy Intensity (GJ/m^2) [a,b]	**1.77**		**1.84**	**1.83**	**1.74**	**1.75**	**1.79**	**1.78**	**1.86**	**5.1%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

1) "Other" includes coal and steam.

Sources:

a) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.

b) Informetrica Limited, *TI Model and Historical Estimates of Commercial Floor Space*, 2002 Database Update, Ottawa, November 2003. Data for 2000 to 2002 adjusted by Natural Resources Canada.

Chapter 3
Commercial/Institutional Sector

Commercial/Institutional Secondary Energy Use by Building Type and Energy Source *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use by Hotels and Restaurants (PJ) [a]	**68.4**		**78.2**	**80.8**	**79.4**	**81.1**	**84.8**	**84.1**	**85.9**	**25.6%**
Energy Use by Energy Source (PJ) [a]										
Electricity	37.4		42.6	43.4	45.1	45.3	44.3	44.2	45.9	22.9%
Natural Gas	24.5		28.6	29.7	28.1	29.6	32.9	30.9	31.1	26.9%
Light Fuel Oil and Kerosene	3.1		3.0	2.9	2.6	2.4	3.2	3.7	3.8	21.5%
Heavy Fuel Oil	0.6		0.5	0.6	0.8	0.8	0.9	1.9	1.7	191.2%
Propane	2.8		3.6	4.1	2.8	3.0	3.4	3.4	3.3	17.6%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	–
Activity										
Floor Space (million m^2) [b]	26.14		29.14	29.46	29.87	30.17	31.53	32.06	32.57	24.6%
Energy Intensity (GJ/m^2) [a,b]	**2.62**		**2.69**	**2.74**	**2.66**	**2.69**	**2.69**	**2.62**	**2.64**	**0.8%**
Total Energy Use by Recreational Facilities (PJ) [a]	**49.9**		**65.2**	**66.6**	**62.0**	**63.9**	**71.7**	**65.9**	**70.5**	**41.1%**
Energy Use by Energy Source (PJ) [a]										
Electricity	21.2		27.3	28.2	27.3	27.8	29.1	27.8	27.6	30.2%
Natural Gas	23.5		30.9	31.1	28.3	29.5	34.3	29.2	33.1	40.9%
Light Fuel Oil and Kerosene	4.1		5.0	4.8	4.0	4.0	5.4	5.5	6.0	48.6%
Heavy Fuel Oil	0.5		0.4	0.5	0.7	0.8	0.9	1.2	1.3	166.7%
Propane	0.7		1.7	2.0	1.5	1.8	2.1	2.1	2.1	210.2%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.3	–
Activity										
Floor Space (million m^2) [b]	25.91		32.95	33.52	33.84	34.40	36.17	37.01	37.82	46.0%
Energy Intensity (GJ/m^2) [a,b]	**1.93**		**1.98**	**1.99**	**1.83**	**1.86**	**1.98**	**1.78**	**1.86**	**-3.3%**
Total Energy Use by Warehouses (PJ) [a]	**76.5**		**77.4**	**75.5**	**67.6**	**67.8**	**69.9**	**68.9**	**70.2**	**-8.2%**
Energy Use by Energy Source (PJ) [a]										
Electricity	33.5		32.7	32.3	29.8	29.2	30.4	29.0	27.6	-17.6%
Natural Gas	35.9		38.1	36.6	32.3	33.0	33.4	33.5	35.4	-1.2%
Light Fuel Oil and Kerosene	5.1		4.0	3.7	2.7	2.6	3.1	3.2	3.3	-35.0%
Heavy Fuel Oil	0.9		0.6	0.8	1.3	1.3	1.1	1.4	1.5	74.9%
Propane	1.2		2.0	2.2	1.6	1.7	1.8	1.8	1.9	63.1%
Other [1]	0.0		0.0	0.0	0.0	0.0	0.0	0.1	0.4	–
Activity										
Floor Space (million m^2) [b]	54.14		52.40	51.61	50.60	49.48	51.01	50.34	49.65	-8.3%
Energy Intensity (GJ/m^2) [a,b]	**1.41**		**1.48**	**1.46**	**1.34**	**1.37**	**1.37**	**1.37**	**1.41**	**0.1%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes coal and steam.

Sources:
a) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2004.
b) Informetrica Limited, *TI Model and Historical Estimates of Commercial Floor Space*, 2002 Database Update, Ottawa, November 2003. Data for 2000 to 2002 adjusted by Natural Resources Canada.

Chapter 3
Commercial/Institutional Sector

Commercial/Institutional Energy Prices and Background Indicators

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m^3) [a,e]	15.3		17.3	18.9	20.1	21.4	25.9	34.9	31.4	104.6%
Light Fuel Oil (cents/litre) [a]	25.8		27.0	25.3	19.4	24.0	40.1	35.6	35.3	37.2%
Heavy Fuel Oil (cents/litre) [a]	14.1		18.1	17.7	12.9	17.9	28.5	26.9	29.7	111.3%
Electricity (40 kW/10,000 kWh) [1] (cents/kWh) [b,e]	7.7		9.4	9.4	9.2	9.2	8.7	8.8	9.1	17.6%
Electricity (500 kW/100,000 kWh) [1] (cents/kWh) [b,e]	8.4		10.4	10.5	10.3	10.3	9.5	10.0	10.3	22.2%
Background Indicators										
Commercial Floor Space (million m^2) [c]	466		513	520	528	536	563	577	589	26.5%
Commercial Employees (thousands) [d]	9,319		9,975	10,189	10,449	10,745	11,042	11,214	11,470	23.1%
Employees (per thousand m^2) [c,d]	23.1		20.1	20.4	19.8	20.1	19.6	19.4	19.5	-15.8%
Commercial GDP (million $97) [d]	471,513		529,895	550,439	572,928	604,503	633,917	655,283	681,768	44.6%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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

Sources:

a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2003 (Cat. No. 57-601-XIE).
b) Calculated based on Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, May 2002.
c) Informetrica Limited, *TI Model and Historical Estimates of Commercial Floor Space*, 2002 Database Update, Ottawa, November 2003. Data for 2000 to 2002 adjusted by Natural Resources Canada.
d) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
e) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).

Chapter 4
Industrial Sector

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 2,000 respondents in 1995. Therefore, from 1995 to 2000, data were available for 22 industries at the two-digit Standard Industrial Classification (SIC) level and for 31 sub-industries at the three- and four-digit level.

In 2001, two major changes were made to the ICE survey. First, the survey was converted from the SIC system to the North American Industry Classification System (NAICS), which was created under the *North American Free Trade Agreement* to provide common industrial classification structures in Canada, Mexico and the United States. Second, Natural Resources Canada funded a 256-establishment increase in the sample size of the ICE survey. This increased the total number of respondents to approximately 2,500. As a result of the expanded sample, 27 four-, five- and six-digit NAICS industries were added to the survey for the 2001 reporting year. The conversion to NAICS, which added nine industries, combined with a larger survey sample, led to the inclusion of 36 new industries for that year.

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, 50 of which are presented here. In 2001, the backcast was completed for the 1995 to 2000 period. In 2002, Statistics Canada completed the backcast exercise with the production of a NAICS-based set of data for 1990. The 1990 data were estimated from a variety of sources including the RESD, ICE and the Annual Survey of Manufactures and will serve as the base year for the OEE's industrial energy use analysis.

Due to the smaller sample size in years prior to 2001, it is not possible to backcast for all 27 of the new industries that were included in the 2001 expansion of ICE. The OEE is working with Statistics Canada and the Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC) to examine the possibility of developing 1990 estimates for a selection of these industries. Although they are not presented here, these industries are part of the OEE's database.

Other changes to the 2002 database include the separation of the lime industry from other manufacturing not elsewhere classified, the consolidation of the synthetic dye and pigment industry with the other basic chemicals industry, which was required for confidentiality reasons, and improvements to the accuracy of biomass data in the pulp and paper industry.

Prior to 2002, the ICE survey included both quarterly and annual components. In 2002, the quarterly survey was discontinued. This freed up resources to increase the sample for the annual survey by approximately 1,000 establishments. The OEE is working closely with Statistics Canada and CIEEDAC to define how to allocate the new establishments.

Each year, CIEEDAC's end-use energy database is updated using energy consumption data from the ICE survey. This year, the NAICS-based 1990 data were incorporated into CIEEDAC's database. 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.

Informetrica Limited provided physical units, Gross Domestic Product (GDP) and Gross Output data for all 50 industries from 1990 to 2002. Because of the methodology used to calculate GDP, industries are not additive (i.e. do not sum to the reported total) in years prior to the 1997 base year.

Industrial oil and natural gas prices are taken from Statistic Canada's *Energy Statistics Handbook* (Cat. No. 57-601-XIE). 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.

Chapter 4
Industrial Sector

Industrial Secondary Energy Use and GHG Emissions by Energy Source

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,d]	**2,717.4**		**3,002.6**	**2,997.9**	**2,943.0**	**3,031.4**	**3,120.3**	**2,998.1**	**3,176.1**	**16.9%**
Energy Use by Energy Source (PJ) [a,d]										
Electricity	658.4		745.2	757.6	768.7	783.8	810.8	809.2	817.4	24.1%
Natural Gas	837.2		948.2	953.1	897.3	907.3	950.2	847.2	948.3	13.3%
Light Fuel Oil, Diesel Fuel Oil and Kerosene	126.7		148.1	148.2	134.2	136.5	145.4	140.7	135.2	6.7%
Heavy Fuel Oil	201.1		154.2	154.4	149.4	140.8	144.3	144.2	126.0	-37.3%
Still Gas and Petroleum Coke	321.7		363.9	350.5	335.6	349.4	341.4	378.8	443.1	37.7%
LPG and Gas Plant NGL	27.0		31.3	31.4	31.6	30.2	39.4	41.2	36.6	35.3%
Coal	45.1		42.0	44.4	44.2	45.6	51.1	48.8	46.6	3.4%
Coke and Coke Oven Gas	131.3		135.1	132.4	131.6	135.1	136.5	128.6	125.2	-4.6%
Wood Waste and Pulping Liquor	341.0		402.8	399.8	416.3	464.0	464.4	421.1	459.6	34.8%
Other [1]	27.9		31.6	26.1	34.2	38.6	36.8	38.4	38.2	36.8%
Activity										
GDP (million $97) [b]	198,428		212,520	224,776	233,840	248,102	268,596	265,057	269,779	36.0%
GO (million $97) [b]	516,540		590,490	623,180	644,418	699,111	784,588	784,324	811,958	57.2%
Energy Intensity (MJ/$97 – GDP) [a,b,d]	**13.7**		**14.1**	**13.3**	**12.6**	**12.2**	**11.6**	**11.3**	**11.8**	**-14.0%**
Energy Intensity (MJ/$97 – GO) [a,b,d]	**5.3**		**5.1**	**4.8**	**4.6**	**4.3**	**4.0**	**3.8**	**3.9**	**-25.6%**
Total GHG Emissions Including Electricity (Mt) [a,c,d]	**141.4**		**147.5**	**152.4**	**153.7**	**153.6**	**161.5**	**159.3**	**162.9**	**15.2%**
GHG Emissions by Energy Source (Mt) [a,c,d]										
Electricity	37.0		36.8	41.8	47.8	46.7	50.6	52.4	49.9	34.9%
Natural Gas	42.1		47.3	47.6	44.7	45.3	47.6	42.3	47.4	12.3%
Light Fuel Oil, Diesel Fuel Oil and Kerosene	10.0		11.7	11.7	10.7	10.9	11.6	11.2	10.8	7.7%
Heavy Fuel Oil	15.0		11.5	11.5	10.9	10.3	10.6	10.6	9.2	-38.5%
Still Gas and Petroleum Coke	20.9		23.7	22.7	22.6	23.0	22.6	25.1	28.7	37.1%
LPG and Gas Plant NGL	1.6		1.9	1.9	1.9	1.8	2.4	2.5	2.2	36.5%
Coal	3.4		3.1	3.8	3.8	3.9	4.4	4.2	4.0	17.7%
Coke and Coke Oven Gas	11.3		11.7	11.4	11.3	11.6	11.7	11.0	10.8	-5.2%
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]	**52.0**		**49.1**	**50.8**	**52.2**	**50.7**	**51.8**	**53.1**	**51.3**	**-1.5%**
Total GHG Emissions Excluding Electricity (Mt) [a,c,d]	**104.4**		**110.8**	**110.6**	**105.9**	**106.8**	**110.8**	**106.9**	**112.9**	**8.2%**
GHG Intensity (tonne/TJ) [a,c,d]	**38.4**		**36.9**	**36.9**	**36.0**	**35.2**	**35.5**	**35.7**	**35.6**	**-7.4%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) "Other" includes steam and waste fuels.

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
d) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial Secondary Energy Use by Industry

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,c]	**2,717.4**		**3,002.6**	**2,997.9**	**2,943.0**	**3,031.4**	**3,120.3**	**2,998.1**	**3,176.1**	**16.9%**
Energy Use by Industry (PJ) [a,c]										
Gold and Silver Mines	13.0		15.1	14.6	12.3	13.2	12.5	13.6	14.3	10.1%
Copper, Nickel, Lead and Zinc Mines	35.1		29.1	26.9	26.1	21.2	22.9	24.3	22.1	-36.9%
Iron Mines	36.2		36.3	39.5	36.0	30.1	33.7	28.3	27.8	-23.3%
Other Metal Mines	9.0		5.5	4.9	4.3	4.2	4.9	8.2	12.8	41.8%
Potash Mines	27.4		31.4	32.6	31.6	32.5	29.7	28.5	28.2	3.1%
Salt Mines	2.9		2.9	2.9	2.7	2.6	2.6	2.5	2.4	-19.7%
Other Non-Metal Mines	9.1		7.5	8.3	7.2	8.3	9.2	8.8	8.7	-4.2%
Upstream Mining	210.6		344.9	344.4	337.7	347.5	401.3	408.1	444.2	110.9%
Construction	66.9		50.5	49.5	48.0	50.4	49.9	47.9	54.2	-19.0%
Forestry	7.7		9.6	11.1	12.3	14.8	16.2	18.3	17.1	121.8%
Pulp Mills	309.1		355.7	358.4	358.2	387.1	391.4	356.8	369.4	19.5%
Paper Mills (except newsprint)	99.4		97.7	103.3	109.5	116.7	121.3	113.6	122.7	23.5%
Newsprint Mills	268.3		290.4	282.4	273.5	305.0	300.5	260.1	270.9	1.0%
Paperboard Mills	61.0		64.5	67.7	70.4	72.1	68.8	66.3	65.6	7.4%
Converted Paper Products Industry	9.6		11.1	11.5	11.6	10.9	12.3	15.4	18.1	89.0%
Primary Production of Alumina and Aluminum	109.8		151.8	156.8	159.8	166.0	159.9	164.1	171.4	56.1%
Other Non-Ferrous Smelting and Refining	73.4		81.5	74.2	79.9	70.5	74.9	84.8	85.7	16.6%
Petroleum Refining	334.9		329.5	320.9	291.9	288.0	295.1	311.4	365.1	9.0%
Cement Industry	59.3		58.5	57.9	63.6	66.8	63.7	62.0	66.6	12.2%
Petrochemical Industry	32.3		32.9	41.8	40.5	38.9	42.5	44.9	46.3	43.3%
Industrial Gas Industry	5.9		5.7	5.8	6.3	7.3	8.5	8.9	8.9	51.0%
Other Basic Chemicals Industry	149.2		161.1	139.3	134.2	131.7	115.5	91.7	94.9	-36.4%
Fertilizer Industry	35.7		55.6	59.1	60.2	62.4	63.5	62.2	55.4	55.0%
Iron and Steel	219.4		252.1	251.2	254.7	259.8	257.6	228.5	238.4	8.7%
Meat Products Industries	12.6		16.1	15.5	15.7	16.3	19.2	19.6	17.2	36.2%
Fruit and Vegetable Industries	9.2		11.6	12.6	13.2	11.2	13.1	14.1	15.0	63.5%
Bakery Products Industries	9.2		6.9	6.3	7.1	6.8	7.2	8.9	7.9	-13.6%
Other Food Industries	40.9		43.4	47.7	39.9	42.9	44.4	37.6	38.0	-7.0%
Dairy Products Industry	11.8		12.0	11.9	12.1	12.9	12.6	9.4	9.6	-18.9%
Beverage Industries (excluding breweries)	3.3		5.6	5.9	6.6	6.8	6.3	5.6	4.7	42.2%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial Secondary Energy Use by Industry *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Use by Industry (PJ) [a,c] **(continued)**										
Breweries Industries	7.8		5.7	5.9	5.6	5.7	5.9	5.9	6.1	-22.3%
Tobacco Products Industries	1.3		1.0	1.1	1.1	1.0	1.1	1.1	1.0	-19.6%
Rubber Products Industries	9.7		10.6	10.0	10.6	12.3	12.0	11.8	14.8	53.3%
Plastic Products Industries	15.8		18.5	20.0	21.0	19.0	22.8	26.2	24.3	53.8%
Resin and Synthetic Rubber Industries	28.4		32.4	33.7	34.8	36.8	39.4	32.8	32.0	12.9%
Leather and Allied Products Industries	1.4		1.1	1.2	1.2	1.2	1.2	1.2	1.1	-21.2%
Textile Mills	13.9		14.3	14.4	12.5	11.5	10.5	9.2	8.4	-39.8%
Textile Products Mills	6.8		6.8	6.8	6.1	4.6	4.2	4.4	4.6	-32.8%
Clothing Industries	6.0		4.8	5.1	5.3	4.8	5.5	5.6	4.8	-19.9%
Wood Products Industries	62.0		62.6	66.7	69.4	69.3	70.8	74.7	80.8	30.4%
Furniture and Related Products Industries	6.2		6.6	7.4	7.6	8.2	10.2	11.6	10.7	72.3%
Printing and Related Support Activities	10.9		7.8	8.0	8.0	8.3	10.5	9.6	9.2	-15.3%
Fabricated Metal Products Industries	37.4		37.9	39.8	37.2	36.2	35.3	41.3	45.4	21.5%
Machinery Industries	12.2		15.4	14.6	15.6	13.5	14.8	15.1	15.3	24.6%
Motor Vehicle Industry	18.7		26.2	27.5	27.0	28.8	29.3	25.5	25.2	35.2%
Motor Vehicle Parts and Accessories Industries	18.5		18.4	19.0	19.9	20.8	23.0	22.5	24.1	30.3%
Computer and Electronic Products Industries	4.6		6.4	6.5	7.2	6.8	7.5	4.3	4.0	-12.5%
Electrical Equipment and Components Industries	8.6		8.6	8.7	8.4	7.6	7.6	6.8	5.9	-31.2%
Lime Industry	15.5		15.6	15.9	15.8	16.7	16.0	15.0	15.0	-3.7%
Other Manufacturing n.e.c.	159.3		125.2	120.6	101.5	113.3	132.0	119.3	139.5	-12.4%
Activity										
GDP (million $97) [b]	198,428		212,520	224,776	233,840	248,102	268,596	265,057	269,779	36.0%
GO (million $97) [b]	516,540		590,490	623,180	644,418	699,111	784,588	784,324	811,958	57.2%
Energy Intensity (MJ/$97 – GDP) [a,b,c]	**13.7**		**14.1**	**13.3**	**12.6**	**12.2**	**11.6**	**11.3**	**11.8**	**-14.0%**
Energy Intensity (MJ/$97 – GO) [a,b,c]	**5.3**		**5.1**	**4.8**	**4.6**	**4.3**	**4.0**	**3.8**	**3.9**	**-25.6%**

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions Including Electricity (Mt) [a,b,c]	**141.4**		**147.5**	**152.4**	**153.7**	**153.6**	**161.5**	**159.3**	**162.9**	**15.2%**
GHG Emissions by Industry (Mt) [a,b,c]										
Gold and Silver Mines	0.8		0.9	0.9	0.8	0.8	0.8	0.9	0.9	15.6%
Copper, Nickel, Lead and Zinc Mines	2.2		1.7	1.6	1.7	1.3	1.5	1.6	1.4	-33.6%
Iron Mines	2.5		2.4	2.8	2.6	2.1	2.4	2.1	2.0	-21.8%
Other Metal Mines	0.5		0.3	0.3	0.3	0.3	0.3	0.5	0.8	41.5%
Potash Mines	1.5		1.6	1.7	1.7	1.7	1.6	1.5	1.5	3.0%
Salt Mines	0.2		0.2	0.2	0.2	0.1	0.1	0.1	0.1	-15.7%
Other Non-Metal Mines	0.6		0.5	0.5	0.5	0.5	0.6	0.6	0.6	2.1%
Upstream Mining	13.1		20.5	20.9	21.3	21.8	24.9	25.1	26.2	99.3%
Construction	4.6		3.5	3.4	3.4	3.5	3.5	3.4	3.8	-17.9%
Forestry	0.6		0.8	0.9	1.0	1.2	1.3	1.5	1.4	124.1%
Pulp Mills	6.5		5.9	6.4	6.2	6.4	7.1	6.2	6.0	-8.1%
Paper Mills (except newsprint)	3.4		3.0	3.2	3.4	3.5	3.6	3.6	3.1	-7.2%
Newsprint Mills	11.5		10.7	11.3	11.4	11.4	11.4	10.8	10.1	-11.6%
Paperboard Mills	2.1		2.1	2.2	2.3	2.4	2.3	2.1	2.0	-5.3%
Converted Paper Products Industry	0.5		0.6	0.6	0.6	0.6	0.6	0.8	0.9	68.6%
Primary Production of Alumina and Aluminum	6.2		7.6	8.7	9.8	9.8	9.9	10.5	10.4	67.3%
Other Non-Ferrous Smelting and Refining	4.3		4.7	4.6	5.2	4.4	4.8	5.5	5.4	23.3%
Petroleum Refining	20.8		20.7	20.2	19.0	18.2	18.9	20.2	23.2	11.6%
Cement Industry	4.2		3.6	4.1	4.2	4.5	4.5	4.5	4.8	15.3%
Petrochemical Industry	1.7		1.7	2.1	2.1	2.0	2.1	2.2	2.2	29.3%
Industrial Gas Industry	0.3		0.3	0.3	0.4	0.4	0.5	0.6	0.5	61.3%
Other Basic Chemicals Industry	7.0		7.4	7.1	7.2	7.0	6.3	5.1	5.1	-27.4%
Fertilizer Industry	1.8		2.8	3.0	3.1	3.2	3.2	3.2	2.8	54.9%
Iron and Steel	15.9		17.3	17.3	17.8	18.1	18.1	16.5	16.8	5.8%
Meat Products Industries	0.7		0.8	0.8	0.9	0.9	1.1	1.1	0.9	37.0%
Fruit and Vegetable Industries	0.5		0.6	0.7	0.8	0.6	0.8	0.8	0.9	67.5%
Bakery Products Industries	0.5		0.3	0.3	0.4	0.4	0.4	0.5	0.4	-10.4%
Other Food Industries	2.2		2.1	2.4	2.1	2.2	2.3	2.0	2.0	-7.2%
Dairy Products Industry	0.6		0.6	0.6	0.7	0.7	0.7	0.5	0.5	-20.0%
Beverage Industries (excluding breweries)	0.2		0.3	0.3	0.4	0.4	0.3	0.3	0.2	35.6%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

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

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial GHG Emissions by Industry – Including Electricity-Related Emissions[1] *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
GHG Emissions by Industry (Mt) [a,b,c] **(continued)**										
Breweries Industries	0.4		0.3	0.3	0.3	0.3	0.3	0.3	0.3	-19.4%
Tobacco Products Industries	0.1		0.0	0.1	0.1	0.1	0.1	0.1	0.1	-15.3%
Rubber Products Industries	0.5		0.6	0.5	0.6	0.7	0.7	0.7	0.8	53.7%
Plastic Products Industries	0.9		0.9	1.1	1.2	1.1	1.3	1.6	1.4	59.5%
Resin and Synthetic Rubber Industries	1.3		1.4	1.5	1.7	1.7	2.0	1.6	1.5	11.6%
Leather and Allied Products Industries	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	-18.1%
Textile Mills	0.7		0.7	0.8	0.7	0.6	0.6	0.5	0.5	-37.8%
Textile Products Mills	0.4		0.3	0.4	0.3	0.3	0.2	0.3	0.3	-30.9%
Clothing Industries	0.3		0.2	0.3	0.3	0.3	0.3	0.3	0.3	-16.6%
Wood Products Industries	3.5		3.3	3.7	4.0	4.0	4.2	4.5	4.6	32.8%
Furniture and Related Products Industries	0.3		0.3	0.4	0.4	0.4	0.6	0.7	0.6	76.2%
Printing and Related Support Activities	0.6		0.4	0.4	0.4	0.4	0.6	0.5	0.5	-12.5%
Fabricated Metal Products Industries	2.0		1.9	2.1	2.0	1.9	1.9	2.3	2.5	28.0%
Machinery Industries	0.7		0.8	0.8	0.9	0.7	0.8	0.8	0.8	27.6%
Motor Vehicle Industry	1.0		1.3	1.4	1.4	1.5	1.6	1.4	1.3	31.1%
Motor Vehicle Parts and Accessories Industries	1.0		0.9	1.0	1.1	1.1	1.3	1.3	1.3	26.4%
Computer and Electronic Products Industries	0.3		0.3	0.3	0.4	0.4	0.4	0.3	0.2	-7.5%
Electrical Equipment and Components Industries	0.5		0.4	0.5	0.4	0.4	0.4	0.4	0.3	-30.0%
Lime Industry	1.0		1.1	1.1	1.1	1.2	1.1	1.2	1.1	15.0%
Other Manufacturing n.e.c.	8.5		6.7	6.3	5.1	5.8	6.9	6.3	7.4	-12.9%
GHG Intensity (tonne/TJ) [a,b,c]	**52.0**		**49.1**	**50.8**	**52.2**	**50.7**	**51.8**	**53.1**	**51.3**	**-1.5%**

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

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

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions Excluding Electricity (Mt) [a,b,c]	**104.4**		**110.8**	**110.6**	**105.9**	**106.8**	**110.8**	**106.9**	**112.9**	**8.2%**
GHG Emissions by Industry (Mt) [a,b,c]										
Gold and Silver Mines	0.4		0.5	0.5	0.3	0.3	0.4	0.4	0.4	7.7%
Copper, Nickel, Lead and Zinc Mines	0.9		0.8	0.8	0.7	0.6	0.7	0.7	0.7	-25.4%
Iron Mines	1.8		1.7	1.9	1.7	1.4	1.6	1.4	1.4	-24.3%
Other Metal Mines	0.3		0.2	0.2	0.2	0.2	0.2	0.3	0.4	41.7%
Potash Mines	1.1		1.3	1.4	1.3	1.4	1.2	1.2	1.1	2.7%
Salt Mines	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	-26.8%
Other Non-Metal Mines	0.5		0.4	0.4	0.4	0.4	0.5	0.5	0.5	13.2%
Upstream Mining	10.5		17.2	17.1	16.6	17.4	20.1	19.8	21.4	104.5%
Construction	4.6		3.5	3.4	3.4	3.5	3.5	3.4	3.8	-17.9%
Forestry	0.6		0.8	0.9	1.0	1.2	1.3	1.5	1.4	124.1%
Pulp Mills	4.1		3.7	3.8	3.4	3.4	3.6	3.0	3.0	-26.5%
Paper Mills (except newsprint)	2.2		2.1	2.1	2.1	2.2	2.1	1.9	1.6	-26.8%
Newsprint Mills	5.9		4.7	4.6	3.8	3.9	3.7	3.2	2.8	-52.7%
Paperboard Mills	1.6		1.5	1.6	1.6	1.7	1.6	1.4	1.3	-17.2%
Converted Paper Products Industry	0.4		0.4	0.4	0.4	0.3	0.3	0.5	0.5	47.9%
Primary Production of Alumina and Aluminum	0.7		0.8	0.8	1.0	1.0	0.8	0.9	1.0	34.6%
Other Non-Ferrous Smelting and Refining	2.4		2.6	2.5	2.7	2.4	2.5	2.6	2.4	1.1%
Petroleum Refining	19.7		19.8	19.2	17.9	17.1	17.7	18.9	22.0	11.9%
Cement Industry	3.8		3.3	3.7	3.8	4.1	4.1	4.0	4.4	15.1%
Petrochemical Industry	1.5		1.5	1.9	1.8	1.7	1.8	1.9	1.9	22.6%
Industrial Gas Industry	0.0		0.0	0.0	0.0	0.1	0.1	0.1	0.1	102.1%
Other Basic Chemicals Industry	4.0		4.8	4.3	4.1	3.9	3.1	2.1	2.1	-47.5%
Fertilizer Industry	1.6		2.5	2.7	2.7	2.8	2.9	2.8	2.4	53.5%
Iron and Steel	14.2		15.7	15.5	15.5	15.9	15.8	13.9	14.3	0.6%
Meat Products Industries	0.5		0.5	0.5	0.5	0.6	0.7	0.7	0.6	35.7%
Fruit and Vegetable Industries	0.4		0.5	0.6	0.6	0.5	0.6	0.6	0.7	59.2%
Bakery Products Industries	0.4		0.3	0.2	0.3	0.2	0.3	0.3	0.3	-32.9%
Other Food Industries	1.6		1.6	1.7	1.5	1.7	1.6	1.4	1.5	-8.2%
Dairy Products Industry	0.5		0.5	0.5	0.5	0.5	0.5	0.4	0.4	-18.2%
Beverage Industries (excluding breweries)	0.1		0.2	0.3	0.3	0.3	0.3	0.2	0.2	62.6%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued ——>

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

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial GHG Emissions by Industry – Excluding Electricity-Related Emissions [1] *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
GHG Emissions by Industry (Mt) [a,b,c] **(continued)**										
Breweries Industries	0.3		0.2	0.2	0.2	0.2	0.2	0.2	0.3	-22.4%
Tobacco Products Industries	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	-35.9%
Rubber Products Industries	0.3		0.4	0.4	0.4	0.4	0.4	0.4	0.5	49.5%
Plastic Products Industries	0.4		0.4	0.4	0.5	0.4	0.5	0.5	0.5	24.7%
Resin and Synthetic Rubber Industries	0.9		1.1	1.1	1.1	1.2	1.3	1.0	1.0	9.0%
Leather and Allied Products Industries	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	-26.7%
Textile Mills	0.5		0.5	0.5	0.4	0.4	0.3	0.3	0.3	-46.1%
Textile Products Mills	0.2		0.2	0.2	0.2	0.1	0.1	0.2	0.2	-35.8%
Clothing Industries	0.2		0.1	0.1	0.1	0.1	0.2	0.2	0.1	-32.0%
Wood Products Industries	2.2		2.1	2.3	2.4	2.2	2.3	2.3	2.3	4.7%
Furniture and Related Products Industries	0.2		0.2	0.2	0.2	0.3	0.3	0.4	0.4	84.0%
Printing and Related Support Activities	0.3		0.2	0.2	0.2	0.2	0.3	0.3	0.3	-14.4%
Fabricated Metal Products Industries	1.4		1.4	1.5	1.3	1.3	1.2	1.4	1.7	18.8%
Machinery Industries	0.4		0.4	0.4	0.5	0.4	0.5	0.5	0.5	46.1%
Motor Vehicle Industry	0.7		1.0	1.0	1.0	1.0	1.1	0.9	0.9	26.0%
Motor Vehicle Parts and Accessories Industries	0.6		0.5	0.5	0.6	0.6	0.7	0.7	0.7	12.6%
Computer and Electronic Products Industries	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	-9.4%
Electrical Equipment and Components Industries	0.3		0.3	0.3	0.3	0.2	0.2	0.2	0.2	-41.3%
Lime Industry	1.0		1.0	1.1	1.1	1.1	1.1	1.1	1.1	15.0%
Other Manufacturing n.e.c.	7.9		6.7	6.3	5.1	5.8	6.5	6.3	7.4	-7.3%
GHG Intensity (tonne/TJ) [a,b,c]	**38.4**		**36.9**	**36.9**	**36.0**	**35.2**	**35.5**	**35.7**	**35.6**	**-7.4%**

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial Gross Domestic Product by Industry

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Gross Domestic Product (million $97) [a]	**198,428**		**212,520**	**224,776**	**233,840**	**248,102**	**268,596**	**265,057**	**269,779**	**36.0%**
Gross Domestic Product by Industry (million $97) [a]										
Gold and Silver Mines	1,237		1,359	1,301	1,455	1,310	1,303	1,355	1,312	6.1%
Copper, Nickel, Lead and Zinc Mines	3,097		2,736	2,662	2,775	2,726	2,663	2,724	2,544	-17.9%
Iron Mines	902		705	647	610	533	731	595	586	-35.0%
Other Metal Mines	503		426	417	401	481	650	760	715	42.1%
Potash Mines	700		956	1,038	955	986	1,024	907	949	35.6%
Salt Mines	218		228	243	218	209	215	252	232	6.4%
Other Non-Metal Mines	270		338	362	382	715	563	669	814	201.5%
Upstream Mining	19,994		26,201	27,265	27,665	27,351	26,958	27,403	26,929	34.7%
Construction	48,156		40,715	42,995	44,348	46,406	48,461	51,567	52,480	9.0%
Forestry	5,740		5,275	5,564	5,641	5,849	6,201	5,882	5,786	0.8%
Pulp Mills	1,717		1,801	1,883	1,899	2,243	2,364	2,191	2,254	31.3%
Paper Mills (except newsprint)	1,824		1,805	1,876	1,806	1,851	2,156	2,117	2,187	19.9%
Newsprint Mills	3,546		3,682	3,839	3,524	4,010	4,180	3,804	3,846	8.5%
Paperboard Mills	692		673	696	654	786	738	719	741	7.1%
Converted Paper Products Industry	2,011		2,691	2,542	2,654	2,636	2,550	2,523	2,553	27.0%
Primary Production of Alumina and Aluminum	1,591		1,897	1,797	2,102	2,195	2,692	2,927	3,089	94.2%
Other Non-Ferrous Smelting and Refining	1,105		1,416	1,556	1,717	1,841	1,911	1,905	1,904	72.3%
Petroleum Refining	1,173		1,265	1,319	1,395	1,317	1,264	1,296	1,323	12.8%
Cement Industry	703		579	680	645	634	683	688	702	-0.1%
Petrochemical Industry	831		814	844	876	811	966	856	860	3.5%
Industrial Gas Industry	223		221	228	239	287	302	215	220	-1.3%
Other Basic Chemicals Industry	2,377		2,200	2,405	2,301	2,305	2,416	2,159	2,229	-6.2%
Fertilizer Industry	827		1,077	1,347	1,387	1,385	1,362	1,333	1,202	45.3%
Iron and Steel	3,804		4,085	4,237	4,484	4,502	4,582	4,300	4,584	20.5%
Meat Products Industries	2,783		2,528	2,649	2,787	2,839	3,357	3,539	3,468	24.6%
Fruit and Vegetable Industries	1,288		1,626	1,858	1,760	2,032	2,064	2,288	2,275	76.6%
Bakery Products Industries	1,671		2,085	1,954	2,069	2,107	2,071	2,063	2,202	31.8%
Other Food Industries	4,629		5,587	5,439	5,825	5,864	5,909	6,303	6,599	42.6%
Dairy Products Industry	2,443		1,982	1,961	2,140	2,097	2,089	2,147	2,169	-11.2%
Beverage Industries (excluding breweries)	1,026		1,122	1,281	1,484	1,337	1,524	1,618	1,683	64.0%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

a) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, December 2003.

Chapter 4
Industrial Sector

Industrial Gross Domestic Product by Industry *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Gross Domestic Product by Industry (million $97) [a] **(continued)**										
Breweries Industries	2,197		2,155	2,118	1,987	2,037	2,054	2,138	2,121	-3.5%
Tobacco Products Industries	1,546		1,534	1,521	1,708	1,369	1,375	1,310	1,227	-20.6%
Rubber Products Industries	1,261		2,068	2,162	2,157	2,229	2,231	2,219	2,255	78.8%
Plastic Products Industries	3,203		4,563	4,905	5,185	5,736	6,899	7,184	8,105	153.0%
Resin and Synthetic Rubber Industries	1,331		2,319	2,503	2,753	2,759	3,089	3,030	3,108	133.5%
Leather and Allied Products Industries	594		392	421	387	372	437	421	392	-34.0%
Textile Mills	1,475		1,408	1,414	1,609	1,531	1,616	1,421	1,355	-8.1%
Textile Products Mills	779		733	790	825	926	1,100	1,008	1,029	32.1%
Clothing Industries	3,173		3,029	3,267	3,266	3,139	3,754	3,487	3,478	9.6%
Wood Products Industries	7,759		7,902	9,199	9,616	10,231	11,403	11,194	12,177	56.9%
Furniture and Related Products Industries	2,742		3,086	3,466	4,088	4,467	5,214	5,013	5,175	88.7%
Printing and Related Support Activities	5,849		4,273	4,325	4,304	4,383	5,030	4,863	4,693	-19.8%
Fabricated Metal Products Industries	7,532		7,789	9,327	9,832	10,645	13,345	13,147	13,608	80.7%
Machinery Industries	6,613		9,101	9,831	10,130	9,984	11,572	11,072	11,293	70.8%
Motor Vehicle Industry	4,597		5,962	6,129	6,527	8,726	8,479	7,312	7,700	67.5%
Motor Vehicle Parts and Accessories Industries	5,003		7,752	8,523	9,098	9,901	9,919	9,365	10,241	104.7%
Computer and Electronic Products Industries	4,502		6,635	7,631	8,905	12,449	16,122	11,783	10,141	125.3%
Electrical Equipment and Components Industries	3,655		3,238	3,330	3,636	3,836	4,788	4,262	4,065	11.2%
Lime Industry [1,b]	105		91	107	99	85	98	95	112	6.7%
Other Manufacturing n.e.c.	17,386		20,402	20,922	21,530	23,652	26,122	27,628	29,067	67.2%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Estimated using Informetrica GDP data for lime and gypsum manufacturing and the value added for lime manufacturing from the *Annual Survey of Manufactures*.

Sources:
a) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, December 2003.
b) Statistics Canada, *Annual Survey of Manufactures, 1990–2001*, Ottawa, May 2003 (CANSIM).

Chapter 4
Industrial Sector

Industrial Energy Intensity by Industry

	Units	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Aggregate Energy Intensity [a,b,c]	**MJ/$97 – GDP**	**13.7**		**14.1**	**13.3**	**12.6**	**12.2**	**11.6**	**11.3**	**11.8**	**-14.0%**
Energy Intensity by Industry [a,b,c]											
Gold and Silver Mines	MJ/tonne	549.3		506.1	466.5	354.4	304.0	304.1	329.5	341.3	-37.9%
Copper, Nickel, Lead and Zinc Mines	MJ/tonne	241.2		263.7	262.0	231.8	264.8	234.1	257.1	254.3	5.4%
Iron Mines	MJ/tonne	398.1		400.4	431.7	378.9	362.3	359.1	377.0	371.5	-6.7%
Other Metal Mines	MJ/tonne	406.3		414.8	406.7	338.9	383.2	409.5	592.1	791.5	94.8%
Potash Mines	MJ/tonne	3,918.7		3,935.4	3,630.9	3,431.1	3,910.6	3,223.5	3,479.5	3,302.6	-15.7%
Salt Mines	MJ/tonne	375.3		311.0	274.3	258.3	266.8	281.8	224.5	233.7	-37.7%
Other Non-Metal Mines	MJ/tonne	811.6		691.6	715.1	637.6	544.8	622.1	578.0	496.5	-38.8%
Upstream Mining	MJ/$97 – GDP	10.5		13.2	12.6	12.2	12.7	14.9	14.9	16.5	56.6%
Construction	MJ/$97 – GDP	1.4		1.2	1.2	1.1	1.1	1.0	0.9	1.0	-25.7%
Forestry	MJ/$97 – GDP	1.3		1.8	2.0	2.2	2.5	2.6	3.1	3.0	120.0%
Pulp Mills	MJ/tonne	43,231.4		36,743.3	35,454.3	36,772.3	36,382.4	35,195.8	37,248.7	36,938.7	-14.6%
Paper Mills (except newsprint)	MJ/tonne	23,899.4		18,338.0	18,510.0	18,945.4	18,256.8	17,396.4	16,678.4	17,434.6	-27.0%
Newsprint Mills	MJ/tonne	29,585.1		32,161.3	30,667.1	31,877.1	33,188.7	32,587.9	31,070.0	31,984.0	8.1%
Paperboard Mills	MJ/tonne	21,572.4		17,913.8	18,352.5	18,392.1	17,800.7	16,988.9	16,748.2	16,113.5	-25.3%
Converted Paper Products Industry	MJ/$97 – GO	1.6		1.5	1.7	1.5	1.3	1.3	1.7	1.9	18.6%
Primary Production of Alumina and Aluminum	MJ/tonne	69,960.5		66,591.2	67,292.7	67,438.4	69,451.0	67,448.9	63,593.0	63,265.3	-9.6%
Other Non-Ferrous Smelting and Refining	MJ/tonne	48,004.1		43,567.4	40,751.4	41,852.8	36,888.9	39,822.8	48,722.3	47,062.1	-2.0%
Petroleum Refining	MJ/m^3	3,510.8		3,322.5	3,156.6	2,866.9	2,784.9	2,785.3	2,861.3	3,285.5	-6.4%
Cement Industry	MJ/tonne	5,646.9		5,250.2	4,821.0	5,162.3	5,205.2	4,889.7	4,897.6	5,107.5	-9.6%
Petrochemical Industry	MJ/tonne	4,620.9		3,952.8	4,818.9	4,450.1	4,087.5	4,295.0	4,790.1	4,582.6	-0.8%
Industrial Gas Industry	MJ/$97 – GO	12.7		12.7	12.5	12.3	12.3	13.9	15.0	14.4	13.4%
Other Basic Chemicals Industry	MJ/$97 – GO	23.8		29.0	22.9	21.7	22.0	18.7	12.2	12.0	-49.4%
Fertilizer Industry	MJ/tonne	6,570.2		9,687.8	10,266.3	10,489.7	10,509.6	10,589.8	11,365.6	9,808.0	49.3%
Iron and Steel	MJ/tonne	18,961.6		17,842.2	17,324.9	18,117.9	17,390.6	17,325.2	16,101.9	15,829.8	-16.5%
Meat Products Industries	MJ/tonne	4,649.8		5,193.5	4,809.0	4,486.0	4,288.9	4,892.4	4,819.5	4,086.2	-12.1%
Fruit and Vegetable Industries	MJ/$97 – GO	2.4		2.7	2.6	2.8	2.1	2.3	2.5	2.7	11.2%
Bakery Products Industries	MJ/$97 – GO	2.7		1.6	1.5	1.6	1.4	1.5	2.0	1.7	-37.0%
Other Food Industries	MJ/$97 – GO	2.5		2.2	2.3	1.9	2.0	2.0	1.6	1.6	-32.7%
Dairy Products Industry	MJ/kilolitre	1,604.2		1,679.6	1,603.2	1,628.1	1,719.9	1,675.0	1,265.3	1,295.8	-19.2%
Beverage Industries (excluding breweries)	MJ/$97 – GO	0.9		1.5	1.4	1.5	1.5	1.3	1.1	1.0	2.9%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial Energy Intensity by Industry *(continued)*

continued

	Units	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Intensity by Industry [a,b,c] **(continued)**											
Breweries Industries	MJ/hectolitre	326.3		239.3	248.9	228.6	233.4	239.7	230.1	238.9	-26.8%
Tobacco Products Industries	MJ/$97 – GO	0.7		0.3	0.4	0.3	0.4	0.4	0.4	0.4	-45.0%
Rubber Products Industries	MJ/$97 – GO	2.9		2.1	1.9	1.9	2.2	2.0	2.0	2.4	-17.2%
Plastic Products Industries	MJ/$97 – GO	1.9		1.6	1.6	1.6	1.3	1.3	1.5	1.3	-31.1%
Resin and Synthetic Rubber Industries	MJ/tonne	15,931.4		13,161.5	13,824.2	13,683.5	13,183.8	12,826.1	9,827.7	8,799.4	-44.8%
Leather and Allied Products Industries	MJ/$97 – GO	1.3		1.1	1.1	0.9	0.9	0.8	0.7	0.8	-38.7%
Textile Mills	MJ/$97 – GO	3.9		3.8	3.7	2.6	2.5	2.1	1.6	1.4	-64.6%
Textile Products Mills	MJ/$97 – GO	3.4		3.3	3.0	2.5	1.7	1.4	1.3	1.3	-62.6%
Clothing Industries	MJ/$97 – GO	0.8		0.7	0.7	0.7	0.6	0.6	0.6	0.5	-41.3%
Wood Products Industries	MJ/$97 – GO	3.8		2.7	2.5	2.7	2.3	2.2	2.5	2.6	-31.2%
Furniture and Related Products Industries	MJ/$97 – GO	0.9		0.9	0.9	0.8	0.8	0.8	0.9	0.8	-14.8%
Printing and Related Support Activities	MJ/$97 – GO	1.2		0.8	0.9	0.8	0.8	0.9	0.8	0.7	-40.5%
Fabricated Metal Products Industries	MJ/$97 – GO	2.2		2.0	1.9	1.6	1.4	1.1	1.3	1.4	-37.5%
Machinery Industries	MJ/$97 – GO	0.8		0.7	0.6	0.6	0.6	0.5	0.5	0.5	-38.0%
Motor Vehicle Industry	MJ/$97 – GDP	4.1		4.4	4.5	4.1	3.3	3.5	3.5	3.3	-19.3%
Motor Vehicle Parts and Accessories Industries	MJ/$97 – GDP	3.7		2.4	2.2	2.2	2.1	2.3	2.4	2.3	-36.3%
Computer and Electronic Products Industries	MJ/$97 – GO	0.4		0.3	0.3	0.2	0.2	0.2	0.1	0.1	-79.2%
Electrical Equipment and Components Industries	MJ/$97 – GO	1.0		1.0	1.0	0.9	0.7	0.6	0.5	0.4	-60.0%
Lime Industry	MJ/tonne	8,393.0		7,107.0	6,901.9	6,832.9	7,001.2	6,787.4	7,300.6	7,153.8	-14.8%
Other Manufacturing n.e.c.	MJ/$97 – GDP	9.2		6.1	5.8	4.7	4.8	5.1	4.3	4.8	-47.6%

1991–1994 DATA NOT AVAILABLE, 1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) Canadian Industrial Energy End-Use Data and Analysis Centre, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2002*, Simon Fraser University, February 2004.

Chapter 4
Industrial Sector

Industrial Energy Prices and Background Indicators

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Prices by Energy Source (incl. taxes)										
Natural Gas (cents/m^3) [a,e]	10.5		10.7	11.6	12.8	14.8	18.0	27.1	24.8	136.5%
Light Fuel Oil (cents/litre) [a]	25.8		27.0	25.3	19.4	24.0	40.1	35.6	35.3	37.2%
Heavy Fuel Oil (cents/litre) [a]	14.1		18.1	17.7	12.9	17.9	28.5	26.9	29.7	111.3%
Electricity (1,000 kW/400,000 kWh) [1] (cents/kWh) [b,e]	5.7		7.0	7.1	7.1	7.1	6.9	7.6	7.5	31.4%
Electricity (5,000 kW/3,060,000 kWh) [1] (cents/kWh) [b,e]	4.0		4.9	5.0	5.1	5.1	5.3	6.1	5.7	42.2%
Background Indicators										
Business Sector Multifactor Measure of Productivity (1997 = 100) [d]	96.6		98.9	100.0	100.7	103.0	105.4	105.7	107.8	
Industrial Gross Output (million $97) [d]	516,540		590,490	623,180	644,418	699,111	784,588	784,324	811,958	57.2%
Capacity Utilization Rate (%) [c]										
Mining	82.8		78.0	78.1	77.2	75.2	79.2	76.6	71.9	
Manufacturing	78.2		82.8	83.6	84.3	85.8	86.2	81.9	83.5	
Pulp and Paper	*83.7*		*89.1*	*90.4*	*86.1*	*90.9*	*92.1*	*88.6*	*90.4*	
Primary Metals [2]	*85.1*		*88.0*	*89.0*	*93.8*	*91.1*	*90.7*	*88.6*	*91.2*	
Petroleum Refining	*87.5*		*92.8*	*93.1*	*95.5*	*94.4*	*93.6*	*94.9*	*96.4*	
Chemicals	*86.6*		*86.3*	*80.2*	*81.2*	*80.9*	*80.1*	*80.4*	*81.1*	
Forestry	82.2		76.0	81.4	82.0	81.8	82.0	76.8	77.2	
Construction	91.1		78.6	83.1	84.4	86.5	86.6	86.4	84.5	
Industrial Employees (thousands) [d]										
Mining	193		178	185	180	156	163	187	169	-12.4%
Manufacturing	2,053		1,931	2,022	2,114	2,217	2,280	2,275	2,325	13.2%
Pulp and Paper	*141*		*118*	*116*	*122*	*117*	*116*	*111*	*109*	*-22.7%*
Primary Metals [2]	*133*		*113*	*109*	*107*	*106*	*109*	*101*	*104*	*-21.8%*
Petroleum Refining	*25*		*18*	*21*	*19*	*17*	*20*	*17*	*17*	*-32.0%*
Chemicals	*106*		*96*	*99*	*109*	*113*	*120*	*121*	*126*	*18.9%*
Forestry	74		84	83	84	80	89	78	75	1.4%
Construction	817		714	730	739	775	816	843	882	8.0%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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 2003 (Cat. No. 57-601-XIE).
b) Calculated based on Hydro-Québec's *Comparison of Electricity Prices in Major North American Cities*, May 2002.
c) Statistics Canada, *Canadian Economic Observer Historical Statistical Supplement*, Ottawa, July 2003 (Cat. No. 11-210).
d) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
e) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).

Chapter 5
Transportation Sector

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* (RESD) (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 and then calibrates the information to match RESD data. In 2002, we reviewed the allocation of energy use within the road sector, particularly with respect to diesel fuel oil; as a result, some energy was shifted from the passenger road sector to the freight road sector.

Aggregate non-road energy use data (air, rail and marine) are directly obtained from RESD. Rail is further disaggregated between passenger and freight transportation using Statistics Canada's *Rail in Canada* (Cat. No. 52-216-XIE). In previous years, total air energy use was allotted to passenger transportation. In 2002, for the first time, air has been disaggregated into passenger and freight components using Statistics Canada's *Canadian Civil Aviation* (Cat. No. 51-206-XIB) and the *Climate Change Air Sub-Group Report* by Sypher: Mueller International Inc., July 1999. The result is the availability of detailed data on passenger and freight transportation by transportation mode, province and energy source.

Data for vehicle stock in TEUM are obtained from R.L. Polk Canada Inc., R.L. Polk & Co. and DesRosiers Automotive Consultants Inc. in the form of two databases: *Canadian Vehicles in Operation Census* (CVIOC) and *Trucking Industry Profile* (TIP). Statistics Canada's *Road Motor Vehicles, Registrations* (RMVR) (Cat. No. 53-219-XIB) is used for years in which CVIOC and/or TIP were not available. Since 1999, data on aggregate bus stock are based on Statistics Canada's *Canadian Vehicle Survey* (CVS) (Cat. No. 53-223-XIE) (information was previously available through the RMVR).This information is further disaggregated by bus type using Statistics Canada's *Passenger Bus and Urban Transit Statistics* (PBS) (Cat. No. 53-215-XIB). For the 2002 database, we revised the methodology for smoothing the bus data; as a result, bus stock, fuel efficiency and average kilometre data are now more consistent. Urban transit was most affected by this review; this energy use series was revised downward.

Laboratory-tested fuel efficiencies for new cars and light trucks are calculated using Transport Canada's *Vehicle Fuel Economy Information System*, whereas fuel efficiency for buses is based on the PBS. 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 requirement. Pilot tests were conducted in 2002 to determine the most feasible method of collecting on-road fuel consumption data through CVS. Results from the pilot testing were released in summer 2003. On January 1, 2004, the CVS started the collection of on-road fuel consumption data for all vehicles except buses.

The *National Private Vehicle Use Survey – October 1994 to September 1996*, conducted by Statistics Canada on behalf of Natural Resources Canada, provided average distances travelled for passenger cars and trucks. The PBS is used for average distance travelled by buses. Motorcycle estimates are calculated based on information from the United States' Department of Transportation.

Occupancy rates are essential for calculating the passenger-kilometres travelled for cars and light trucks. Previously, they were based on information from *Getting There: The Interim Report of the Royal Commission on National Passenger Transportation*, April 1991. Since 1999, occupancy rates have been obtained from CVS data. Motorcycle occupancy rates are also from the U.S. Department of Transportation. Finally, bus occupancy rates are taken from CVS and PBS.

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 National Reference Forecast*.

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

Chapter 5
Transportation Sector

Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a]	**1,877.9**		**2,043.0**	**2,117.2**	**2,194.5**	**2,252.8**	**2,281.9**	**2,277.3**	**2,306.0**	**22.8%**
Passenger Transportation [b]	1,157.7		1,200.9	1,232.5	1,277.2	1,299.0	1,291.1	1,282.2	1,307.6	13.0%
Freight Transportation [b]	666.9		778.7	817.6	846.7	878.2	910.8	905.9	907.1	36.0%
Off-Road [b]	53.3		63.4	67.1	70.6	75.6	80.0	89.2	91.3	71.2%
Energy Use by Energy Source (PJ) [a]										
Electricity	3.1		3.0	3.0	2.9	3.0	3.1	3.1	3.3	5.2%
Natural Gas	1.7		2.2	2.6	2.5	2.2	2.4	2.0	1.7	4.8%
Motor Gasoline	1,120.4		1,186.6	1,213.1	1,261.4	1,293.4	1,295.1	1,308.7	1,333.4	19.0%
Diesel Fuel Oil	469.8		556.0	599.0	599.1	628.2	658.3	650.4	662.4	41.0%
Light Fuel Oil and Kerosene	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
Heavy Fuel Oil	60.1		54.9	56.7	74.8	65.9	67.8	77.5	64.8	7.7%
Aviation Gasoline	5.5		3.9	3.7	3.9	3.6	3.4	3.5	3.5	-37.0%
Aviation Turbo Fuel	181.9		205.5	210.9	222.8	233.9	235.9	215.1	224.6	23.4%
Propane	35.4		30.9	28.3	27.0	22.6	15.9	17.0	12.4	-65.0%
Energy Use by Transportation Mode (PJ) [b]										
Small Cars	302.9		326.8	327.2	331.5	331.1	323.5	322.9	322.7	6.5%
Large Cars	340.5		314.4	310.5	311.2	309.8	301.5	300.1	299.5	-12.0%
Passenger Light Trucks	277.4		307.0	337.4	364.5	375.2	380.6	396.9	412.7	48.8%
Freight Light Trucks	123.1		132.5	142.7	152.1	153.3	152.0	159.6	163.0	32.4%
Medium Trucks	123.4		146.2	138.6	142.9	154.6	159.6	158.5	158.3	28.3%
Heavy Trucks	221.8		314.6	349.1	347.8	369.1	392.7	373.9	390.1	75.9%
Motorcycles	1.9		1.9	1.9	2.1	2.1	2.2	2.2	2.5	31.9%
School Buses	13.6		16.8	16.5	18.7	19.0	19.0	18.6	19.1	40.9%
Urban Transit	27.8		23.5	24.2	24.7	27.1	27.9	26.2	27.9	0.4%
Inter-City Buses	8.7		7.5	7.0	6.1	5.7	6.4	5.8	6.1	-29.2%
Passenger Air	180.2		200.6	205.4	216.1	226.3	227.1	206.6	214.4	19.0%
Freight Air	7.3		8.8	9.2	10.6	11.3	12.2	12.0	13.7	88.2%
Passenger Rail	4.7		2.4	2.3	2.4	2.7	2.9	2.9	2.6	-44.5%
Freight Rail	84.7		76.7	77.9	74.2	78.4	80.2	78.8	71.4	-15.7%
Marine	106.5		99.9	100.1	119.2	111.5	114.0	123.2	110.5	3.7%
Off-Road	53.3		63.4	67.1	70.6	75.6	80.0	89.2	91.3	71.2%
Activity										
Passenger-kilometres [1] (millions) [b]	485,144		534,108	550,581	562,954	569,089	569,801	558,565	561,192	15.7%
Tonne-kilometres (millions) [b]	546,349		630,506	668,403	675,314	702,922	734,768	729,435	740,571	35.5%
Passenger Transportation Energy Intensity [1] (MJ/Pkm) [b]	**2.31**		**2.19**	**2.18**	**2.21**	**2.23**	**2.22**	**2.24**	**2.28**	**-1.2%**
Freight Transportation Energy Intensity (MJ/Tkm) [b]	**1.22**		**1.24**	**1.22**	**1.25**	**1.25**	**1.24**	**1.24**	**1.22**	**0.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Excludes non-commercial aviation.

Sources:
a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.

Chapter 5
Transportation Sector

Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions (Mt) [a,c]	**135.0**		**146.8**	**152.1**	**156.8**	**161.1**	**163.3**	**162.9**	**164.9**	**22.1%**
Passenger Transportation [b,c]	82.5		85.6	87.9	90.1	91.7	91.2	90.6	92.4	12.0%
Freight Transportation [b,c]	48.8		56.7	59.5	61.8	64.1	66.5	66.2	66.2	35.7%
Off-Road [b,c]	3.7		4.4	4.7	4.9	5.3	5.6	6.2	6.3	69.5%
GHG Emissions by Energy Source (Mt) [a,c]										
Electricity	0.2		0.1	0.2	0.2	0.2	0.2	0.2	0.2	14.2%
Natural Gas	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	4.0%
Motor Gasoline	80.0		84.8	86.7	89.3	91.6	91.7	92.7	94.5	18.0%
Diesel Fuel Oil	34.6		40.6	43.7	44.1	46.2	48.4	47.9	48.7	40.7%
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		4.1	4.2	5.5	4.8	5.0	5.7	4.8	5.7%
Aviation Gasoline	0.4		0.3	0.3	0.3	0.3	0.3	0.3	0.3	-37.0%
Aviation Turbo Fuel	13.2		14.9	15.2	15.7	16.4	16.6	15.1	15.8	20.1%
Propane	2.1		1.8	1.7	1.6	1.4	1.0	1.0	0.7	-64.6%
GHG Emissions by Transportation Mode (Mt) [b,c]										
Small Cars	21.4		23.1	23.1	23.2	23.2	22.7	22.6	22.6	5.8%
Large Cars	24.1		22.2	22.0	21.8	21.7	21.1	21.0	21.0	-12.7%
Passenger Light Trucks	20.0		22.2	24.4	26.1	26.9	27.3	28.4	29.6	47.7%
Freight Light Trucks	8.7		9.4	10.1	10.7	10.9	10.8	11.3	11.6	34.0%
Medium Trucks	8.9		10.5	10.0	10.3	11.1	11.5	11.4	11.4	28.3%
Heavy Trucks	15.8		22.4	24.9	25.0	26.6	28.3	26.9	28.1	77.6%
Motorcycles	0.1		0.1	0.1	0.1	0.1	0.1	0.2	0.2	30.6%
School Buses	0.9		1.2	1.1	1.3	1.3	1.3	1.3	1.3	41.9%
Urban Transit	1.9		1.6	1.7	1.7	1.9	2.0	1.8	2.0	1.2%
Inter-City Buses	0.6		0.5	0.5	0.4	0.4	0.5	0.4	0.4	-28.5%
Passenger Air	13.0		14.5	14.9	15.2	15.9	16.0	14.5	15.1	15.8%
Freight Air	0.5		0.6	0.7	0.7	0.8	0.9	0.8	1.0	83.1%
Passenger Rail	0.4		0.2	0.2	0.2	0.2	0.2	0.2	0.2	-44.0%
Freight Rail	6.7		6.1	6.2	6.0	6.3	6.4	6.3	5.7	-14.8%
Marine	8.1		7.6	7.7	9.0	8.5	8.6	9.3	8.4	3.0%
Off-Road	3.7		4.4	4.7	4.9	5.3	5.6	6.2	6.3	69.5%
GHG Intensity (tonne/TJ) [a,c]	**71.9**		**71.8**	**71.9**	**71.5**	**71.5**	**71.5**	**71.6**	**71.5**	**-0.5%**
GHG Emissions Related to Electricity (Mt) [a,c]	**0.2**		**0.1**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**14.2%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 5
Transportation Sector

Transportation Energy Prices and Background Indicators

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Energy Prices by Energy Source (incl. taxes) [a]										
Unleaded Gasoline [1] (cents/litre) [a,d,e]	58.7		58.3	59.4	54.1	59.4	72.6	70.6	70.5	20.1%
Diesel Fuel Oil [1] (cents/litre) [a,d,e]	51.3		52.0	54.1	52.4	52.8	66.5	67.0	61.9	20.5%
Propane (cents/litre) [a,d]	26.6		32.6	31.5	29.2	30.8	43.0	45.1	37.7	41.5%
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%
Provincial Fuel Taxes (cents/litre) [c]										
Regular Unleaded Gasoline	10.7		13.3	13.3	13.3	13.3	13.3	13.3	13.3	24.5%
Diesel Fuel Oil	10.5		12.8	12.9	13.3	13.3	13.3	13.3	13.3	27.4%
Background Indicators										
Consumer Price Index (1992 = 100) [c]										
Gasoline and Other Fuels [2]	105.3		106.4	108.4	99.1	108.0	131.7	128.3	127.2	
Public Transportation	86.2		122.0	132.2	138.8	148.0	152.9	156.1	164.9	
Inter-City Transportation	88.6		127.1	142.3	152.6	166.8	172.3	174.1	187.1	
Local and Commuter	83.3		115.8	119.5	121.6	124.4	128.6	133.4	136.9	
GDP at Factor Cost (million $97) [c]										
Business Sector	572,593		644,837	679,522	710,535	753,989	800,169	812,778	840,395	46.8%
Transportation	28,203		33,086	34,483	35,038	37,277	39,080	38,545	39,374	39.6%
Real Personal Disposable Income per Household ($97) [c]	***52,584***		***48,473***	***48,642***	***49,269***	***50,123***	***51,910***	***52,483***	***53,211***	***1.2%***

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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

Sources:
a) Statistics Canada, *Energy Statistics Handbook*, Ottawa, May 2003 (Cat. No. 57-601-XIE).
b) Canada Customs and Revenue Agency, *Current Rates of Excise Taxes – Revised*, Ottawa, November 2003.
c) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
d) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
e) Statistics Canada, *Total Population, Census Divisions and Census Metropolitan Areas, 1996 Census Boundaries, Table 051-0014, 1990–2002*, Ottawa, December 2003 (CANSIM).

Chapter 5
Transportation Sector – Passenger

Passenger Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Passenger Transportation Energy Use (PJ) [a]	**1,157.7**		**1,200.9**	**1,232.5**	**1,277.2**	**1,299.0**	**1,291.1**	**1,282.2**	**1,307.6**	**13.0%**
Energy Use by Energy Source (PJ) [a]										
Electricity	3.1		3.0	3.0	2.9	3.0	3.1	3.1	3.3	5.2%
Natural Gas	1.6		2.1	2.4	2.4	2.1	2.3	1.9	1.6	4.8%
Motor Gasoline	901.4		931.0	958.7	992.8	1,003.1	995.3	1,011.7	1,029.0	14.2%
Diesel Fuel Oil	54.3		49.7	49.6	49.6	52.8	54.8	49.4	52.0	-4.3%
Aviation Gasoline	5.4		3.8	3.7	3.8	3.5	3.4	3.5	3.4	-37.3%
Aviation Turbo Fuel	174.7		196.8	201.7	212.3	222.7	223.7	203.2	211.0	20.7%
Propane	17.1		14.5	13.5	13.4	11.7	8.5	9.5	7.3	-57.3%
Energy Use by Transportation Mode (PJ) [a]										
Small Cars	302.9		326.8	327.2	331.5	331.1	323.5	322.9	322.7	6.5%
Large Cars	340.5		314.4	310.5	311.2	309.8	301.5	300.1	299.5	-12.0%
Light Trucks	277.4		307.0	337.4	364.5	375.2	380.6	396.9	412.7	48.8%
Motorcycles	1.9		1.9	1.9	2.1	2.1	2.2	2.2	2.5	31.9%
School Buses	13.6		16.8	16.5	18.7	19.0	19.0	18.6	19.1	40.9%
Urban Transit	27.8		23.5	24.2	24.7	27.1	27.9	26.2	27.9	0.4%
Inter-City Buses	8.7		7.5	7.0	6.1	5.7	6.4	5.8	6.1	-29.2%
Air	180.2		200.6	205.4	216.1	226.3	227.1	206.6	214.4	19.0%
Rail	4.7		2.4	2.3	2.4	2.7	2.9	2.9	2.6	-44.5%
Activity										
Total Passenger-kilometres (millions) [a,b,c]	485,144		534,108	550,581	562,954	569,089	569,801	558,565	561,192	15.7%
Passenger-kilometres by Transportation Mode (millions)										
Small Cars [a]	167,425		178,295	176,219	174,728	172,283	167,485	163,762	160,370	-4.2%
Large Cars [a]	133,052		131,305	128,977	127,348	125,775	122,503	119,608	117,432	-11.7%
Light Trucks [a]	76,859		96,996	107,640	116,357	120,680	123,733	129,422	134,740	75.3%
Motorcycles [a]	1,443		1,302	1,303	1,339	1,412	1,469	1,653	1,839	27.5%
School Buses [a]	14,783		22,435	22,647	26,190	27,440	28,285	26,085	25,028	69.3%
Urban Transit [a]	14,449		11,875	12,617	12,045	13,920	13,688	12,815	13,691	-5.2%
Inter-City Buses [a]	8,575		8,267	7,803	6,849	6,484	7,334	6,677	7,082	-17.4%
Air [1,b]	66,776		82,120	91,859	96,642	99,585	103,772	96,989	99,413	48.9%
Rail [c]	1,782		1,513	1,515	1,458	1,510	1,533	1,553	1,597	-10.4%
Energy Intensity [1] **(MJ/Pkm)** [a]	**2.31**		**2.19**	**2.18**	**2.21**	**2.23**	**2.22**	**2.24**	**2.28**	**-1.2%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Excludes non-commercial aviation.

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
b) Statistics Canada, *Canadian Civil Aviation 1990–2000*, Ottawa, February 2003 (Cat. No. 51-206-XIB). Data for 2001and 2002 estimated by Natural Resources Canada.
c) Statistics Canada, *Rail in Canada 1990–2001*, Ottawa, December 2003 (Cat. No. 52-216-XIE). Data for 2002 estimated by Natural Resources Canada.

Chapter 5
Transportation Sector – Passenger

Passenger Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Passenger Transportation GHG Emissions (Mt) [b,c]	**82.5**		**85.6**	**87.9**	**90.1**	**91.7**	**91.2**	**90.6**	**92.4**	**12.0%**
GHG Emissions by Energy Source (Mt) [b,c]										
Electricity	0.2		0.1	0.2	0.2	0.2	0.2	0.2	0.2	14.2%
Natural Gas	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.9%
Motor Gasoline	64.3		66.4	68.4	70.2	71.0	70.4	71.6	72.8	13.3%
Diesel Fuel Oil	3.9		3.6	3.6	3.6	3.8	4.0	3.6	3.8	-3.9%
Aviation Gasoline	0.4		0.3	0.3	0.3	0.3	0.2	0.3	0.2	-37.3%
Aviation Turbo Fuel	12.6		14.2	14.6	14.9	15.7	15.7	14.3	14.8	17.4%
Propane	1.0		0.9	0.8	0.8	0.7	0.5	0.6	0.4	-56.9%
GHG Emissions by Transportation Mode (Mt) [b,c]										
Small Cars	21.4		23.1	23.1	23.2	23.2	22.7	22.6	22.6	5.8%
Large Cars	24.1		22.2	22.0	21.8	21.7	21.1	21.0	21.0	-12.7%
Light Trucks	20.0		22.2	24.4	26.1	26.9	27.3	28.4	29.6	47.7%
Motorcycles	0.1		0.1	0.1	0.1	0.1	0.1	0.2	0.2	30.6%
School Buses	0.9		1.2	1.1	1.3	1.3	1.3	1.3	1.3	41.9%
Urban Transit	1.9		1.6	1.7	1.7	1.9	2.0	1.8	2.0	1.2%
Inter-City Buses	0.6		0.5	0.5	0.4	0.4	0.5	0.4	0.4	-28.5%
Air	13.0		14.5	14.9	15.2	15.9	16.0	14.5	15.1	15.8%
Rail	0.4		0.2	0.2	0.2	0.2	0.2	0.2	0.2	-44.0%
GHG Intensity (tonne/TJ) [b,c]	**71.3**		**71.3**	**71.4**	**70.6**	**70.6**	**70.6**	**70.6**	**70.7**	**-0.9%**
GHG Emissions Related to Electricity (Mt) [a,c]	**0.2**		**0.1**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**14.2%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 5
Transportation Sector – Passenger

Passenger Road Transportation Secondary Energy Use and GHG Emissions

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Passenger Road Transportation Energy Use (PJ) [a]	**972.8**		**997.9**	**1,024.8**	**1,058.7**	**1,070.0**	**1,061.1**	**1,072.7**	**1,090.6**	**12.1%**
Energy Use by Energy Source (PJ) [a]										
Electricity	3.1		3.0	3.0	2.9	3.0	3.1	3.1	3.3	5.2%
Natural Gas	1.6		2.1	2.4	2.4	2.1	2.3	1.9	1.6	4.8%
Motor Gasoline	901.4		931.0	958.7	992.8	1,003.1	995.3	1,011.7	1,029.0	14.2%
Diesel Fuel Oil	49.6		47.3	47.3	47.2	50.2	51.9	46.6	49.4	-0.5%
Propane	17.1		14.5	13.5	13.4	11.7	8.5	9.5	7.3	-57.3%
Activity										
Passenger-kilometres (millions) [a]	416,586		450,475	457,207	464,854	467,994	464,496	460,023	460,182	10.5%
Energy Intensity (MJ/Pkm) [a]	**2.3**		**2.2**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**2.4**	**1.5%**
Passenger Road Transportation GHG Emissions (Mt) [a,b]	**69.1**		**70.9**	**72.9**	**74.7**	**75.6**	**75.0**	**75.8**	**77.1**	**11.6%**
GHG Emissions by Energy Source (Mt) [a,b]										
Electricity	0.2		0.1	0.2	0.2	0.2	0.2	0.2	0.2	14.2%
Natural Gas	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.9%
Motor Gasoline	64.3		66.4	68.4	70.2	71.0	70.4	71.6	72.8	13.3%
Diesel Fuel Oil	3.5		3.4	3.4	3.4	3.6	3.7	3.4	3.6	0.4%
Propane	1.0		0.9	0.8	0.8	0.7	0.5	0.6	0.4	-56.9%
GHG Intensity (tonne/TJ) [a,b]	**71.1**		**71.1**	**71.1**	**70.6**	**70.6**	**70.7**	**70.7**	**70.7**	**-0.5%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 5
Transportation Sector – Passenger

Passenger Transportation Explanatory Variables

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Light-Duty Vehicles										
Sales (thousands)										
Small Cars [a,d]	514		374	413	421	447	481	490	520	1.2%
Large Cars [a,d]	357		280	311	319	342	367	376	399	11.8%
Light Trucks [a,d]	324		399	503	528	519	530	492	536	65.7%
Motorcycles	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	–
Stock (thousands)										
Small Cars [a,f]	5,935		5,969	6,026	6,083	6,110	6,044	5,988	5,913	-0.4%
Large Cars [a,f]	4,801		4,487	4,507	4,537	4,559	4,487	4,414	4,364	-9.1%
Light Trucks [a,f]	3,506		3,501	3,883	4,188	4,359	4,499	4,594	4,712	34.4%
Motorcycles [a,c]	306		268	275	289	298	311	318	350	14.5%
Average Distance Travelled per Year (km)										
Small Cars [a]	15,672		17,168	16,904	16,699	16,491	16,300	16,576	16,846	7.5%
Large Cars [a]	15,396		16,819	16,543	16,318	16,133	16,058	16,424	16,715	8.6%
Light Trucks [a]	14,613		17,100	16,904	16,737	16,480	16,177	16,572	16,819	15.1%
Motorcycles [a]	3,776		4,372	4,346	4,334	4,303	4,250	4,256	4,307	14.0%
On-Road Average Fuel Consumption (L/100 km)										
Small Cars [a,g]										
Motor Gasoline	*9.4*		*9.2*	*9.3*	*9.3*	*9.4*	*9.4*	*9.3*	*9.3*	*-1.5%*
Diesel Fuel Oil	*7.8*		*8.2*	*8.2*	*8.2*	*8.3*	*8.2*	*7.9*	*7.7*	*-1.3%*
Large Cars [a,g]										
Motor Gasoline	*13.3*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*11.8*	*11.7*	*-11.8%*
Diesel Fuel Oil	*11.1*		*10.6*	*10.6*	*10.6*	*10.5*	*10.4*	*10.0*	*9.7*	*-12.3%*
Light Trucks [a,g]										
Motor Gasoline	*15.6*		*14.8*	*14.8*	*14.8*	*14.9*	*14.9*	*14.9*	*14.9*	*-4.5%*
Diesel Fuel Oil	*15.4*		*13.4*	*13.5*	*13.5*	*13.5*	*13.6*	*13.3*	*13.3*	*-14.0%*
Motorcycles [a,e]										
Motor Gasoline	*4.7*		*4.7*	*4.7*	*4.7*	*4.7*	*4.7*	*4.7*	*4.7*	*0.0%*

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

continued

Sources:

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

Chapter 5
Transportation Sector – Passenger

Passenger Transportation Explanatory Variables *(continued)*

continued

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Lab-Tested New Vehicle Fuel Consumption (L/100 km)										
CAFC Standard Cars [1]	8.6		8.6	8.6	8.6	8.6	8.6	8.6	8.6	0.0%
Average Cars (Motor Gasoline) [a,g]	8.3		8.3	8.1	8.2	8.2	8.1	8.0	7.9	-4.4%
Small Cars (Motor Gasoline) [a,g]	7.6		7.4	7.3	7.4	7.3	7.3	7.2	7.1	-5.9%
Large Cars (Motor Gasoline) [a,g]	9.4		9.5	9.2	9.2	9.2	9.2	9.1	9.0	-3.9%
CAFC Standard Light Trucks [1]	11.8		11.4	11.4	11.4	11.4	11.4	11.4	11.4	-3.4%
Light Trucks (Motor Gasoline) [a,g]	11.2		11.5	11.3	11.3	11.2	11.3	11.2	11.1	-1.1%
Buses										
Stock (thousands) [a]										
School Buses	44.8		49.3	50.3	51.2	50.0	49.0	46.8	50.0	11.8%
Urban Transit	25.6		20.5	20.7	20.5	23.1	22.7	22.0	23.2	-9.6%
Inter-City Buses	6.6		7.4	6.2	6.1	5.5	5.6	5.4	5.7	-13.1%
Average Distance Travelled per Year (km) [a,b]										
School Buses	19,657		23,795	23,054	25,681	27,057	27,889	28,649	27,578	40.3%
Urban Transit	53,718		54,949	57,817	55,585	57,050	57,168	55,330	56,011	4.3%
Inter-City Buses	77,189		66,341	74,263	66,264	70,417	77,487	73,647	73,323	-5.0%

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) The CAFC Standard is representative of vehicles produced in the model year, not for vehicles sold in that calendar year.

Sources:

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

Chapter 5
Transportation Sector – Freight

Freight Transportation Secondary Energy Use by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Freight Transportation Energy Use (PJ)[a]	**666.9**		**778.7**	**817.6**	**846.7**	**878.2**	**910.8**	**905.9**	**907.1**	**36.0%**
Energy Use by Energy Source (PJ)[a]										
Natural Gas	0.1		0.1	0.2	0.1	0.1	0.1	0.1	0.1	5.5%
Motor Gasoline	165.7		192.2	187.3	198.0	214.7	219.7	207.8	213.1	28.6%
Diesel Fuel Oil	415.5		506.3	549.4	549.6	575.3	603.5	601.0	610.4	46.9%
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		54.9	56.7	74.8	65.9	67.8	77.5	64.8	7.7%
Aviation Gasoline	0.1		0.0	0.0	0.0	0.0	0.0	0.1	0.1	-18.1%
Aviation Turbo Fuel	7.2		8.8	9.2	10.5	11.2	12.2	11.9	13.6	89.4%
Propane	18.2		16.4	14.8	13.6	10.9	7.4	7.5	5.1	-72.1%
Energy Use by Transportation Mode (PJ)[a]										
Light Trucks	123.1		132.5	142.7	152.1	153.3	152.0	159.6	163.0	32.4%
Medium Trucks	123.4		146.2	138.6	142.9	154.6	159.6	158.5	158.3	28.3%
Heavy Trucks	221.8		314.6	349.1	347.8	369.1	392.7	373.9	390.1	75.9%
Air	7.3		8.8	9.2	10.6	11.3	12.2	12.0	13.7	88.2%
Rail	84.7		76.7	77.9	74.2	78.4	80.2	78.8	71.4	-15.7%
Marine	106.5		99.9	100.1	119.2	111.5	114.0	123.2	110.5	3.7%
Activity										
Total Tonne-kilometres (millions)[a]	546,349		630,506	668,403	675,314	702,922	734,768	729,435	740,571	35.5%
Tonne-kilometres by Transportation Mode (millions)										
Light Trucks[a]	11,422		12,875	13,873	14,655	14,729	14,624	15,382	15,763	38.0%
Medium Trucks[a]	16,888		20,543	19,691	20,458	22,181	22,980	23,045	23,126	36.9%
Heavy Trucks[b]	77,800		120,000	130,141	137,552	158,104	164,720	170,569	176,626	127.0%
Air[c]	1,754		2,178	2,371	2,292	2,365	2,329	2,327	2,324	32.5%
Rail[d]	248,371		282,482	306,198	298,797	297,504	319,769	317,904	317,286	27.7%
Marine[e]	190,115		192,427	196,129	201,560	208,039	210,347	200,209	205,446	8.1%
Energy Intensity (MJ/Tkm)[a]	**1.22**		**1.24**	**1.22**	**1.25**	**1.25**	**1.24**	**1.24**	**1.22**	**0.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:
a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
b) Statistics Canada, *Trucking in Canada 1990–2001*, Ottawa, May 2003 (Cat. No. 53-222-XIB). Data for 2002 estimated by Natural Resources Canada.
c) Statistics Canada, *Canadian Civil Aviation 1990–2000*, Ottawa, February 2003 (Cat. No. 51-206-XIB). Data for 2001 and 2002 estimated by Natural Resources Canada.
d) Statistics Canada, *Rail in Canada 1990–2001*, Ottawa, December 2003 (Cat. No. 52-216-XIE). Data for 2002 estimated by Natural Resources Canada.
e) Transport Canada, Surface and Maritime Statistics and Forecast Division, Ottawa, January 2004.

Chapter 5
Transportation Sector – Freight

Freight Transportation GHG Emissions by Energy Source and Transportation Mode

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Freight Transportation GHG Emissions (Mt) [a,b]	**48.8**		**56.7**	**59.5**	**61.8**	**64.1**	**66.5**	**66.2**	**66.2**	**35.7%**
GHG Emissions by Energy Source (Mt) [a,b]										
Natural Gas	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6%
Motor Gasoline	12.0		13.9	13.6	14.2	15.4	15.8	14.9	15.3	27.3%
Diesel Fuel Oil	30.7		37.1	40.1	40.5	42.4	44.5	44.3	44.9	46.4%
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		4.1	4.2	5.5	4.8	5.0	5.7	4.8	5.7%
Aviation Gasoline	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	-18.1%
Aviation Turbo Fuel	0.5		0.6	0.7	0.7	0.8	0.9	0.8	1.0	84.2%
Propane	1.1		1.0	0.9	0.8	0.7	0.4	0.4	0.3	-71.9%
GHG Emissions by Transportation Mode (Mt) [a,b]										
Light Trucks	8.7		9.4	10.1	10.7	10.9	10.8	11.3	11.6	34.0%
Medium Trucks	8.9		10.5	10.0	10.3	11.1	11.5	11.4	11.4	28.3%
Heavy Trucks	15.8		22.4	24.9	25.0	26.6	28.3	26.9	28.1	77.6%
Air	0.5		0.6	0.7	0.7	0.8	0.9	0.8	1.0	83.1%
Rail	6.7		6.1	6.2	6.0	6.3	6.4	6.3	5.7	-14.8%
Marine	8.1		7.6	7.7	9.0	8.5	8.6	9.3	8.4	3.0%
GHG Intensity (tonne/TJ) [a,b]	**73.1**		**72.8**	**72.8**	**73.0**	**73.0**	**73.0**	**73.0**	**73.0**	**-0.2%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 5
Transportation Sector – Freight

Freight Road Transportation Secondary Energy Use and GHG Emissions

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Freight Road Transportation Energy Use (PJ) [a]	**468.4**		**593.2**	**630.4**	**642.8**	**677.1**	**704.3**	**691.9**	**711.5**	**51.9%**
Energy Use by Energy Source (PJ) [a]										
Natural Gas	0.1		0.1	0.2	0.1	0.1	0.1	0.1	0.1	5.5%
Motor Gasoline	165.7		192.2	187.3	198.0	214.7	219.7	207.8	213.1	28.6%
Diesel Fuel Oil	284.3		384.5	428.1	431.0	451.3	477.1	476.5	493.2	73.4%
Propane	18.2		16.4	14.8	13.6	10.9	7.4	7.5	5.1	-72.1%
Activity										
Tonne-kilometres (millions) [a]	106,110		153,419	163,705	172,665	195,014	202,323	208,995	215,515	103.1%
Energy Intensity (MJ/Tkm) [a]	**4.41**		**3.87**	**3.85**	**3.72**	**3.47**	**3.48**	**3.31**	**3.30**	**-25.2%**
Freight Road Transportation GHG Emissions (Mt) [a,b]	**33.4**		**42.3**	**45.0**	**46.1**	**48.6**	**50.6**	**49.7**	**51.1**	**53.2%**
GHG Emissions by Energy Source (Mt) [a,b]										
Natural Gas	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6%
Motor Gasoline	12.0		13.9	13.6	14.2	15.4	15.8	14.9	15.3	27.3%
Diesel Fuel Oil	20.3		27.4	30.5	31.0	32.5	34.4	34.3	35.5	75.2%
Propane	1.1		1.0	0.9	0.8	0.7	0.4	0.4	0.3	-71.9%
GHG Intensity (tonne/TJ) [a,b]	**71.2**		**71.3**	**71.4**	**71.7**	**71.7**	**71.8**	**71.8**	**71.8**	**0.8%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

a) Natural Resources Canada, Transportation End-Use Model, Ottawa, February 2004.
b) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 5
Transportation Sector – Freight

Freight Transportation Explanatory Variables

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Trucks										
Sales (thousands)										
Light Trucks [a,f]	119		152	189	195	189	194	177	193	61.7%
Medium Trucks [a,b]	43		53	58	61	70	72	75	72	66.7%
Heavy Trucks [a,b]	16		22	27	28	32	29	22	21	28.5%
Stock (thousands)										
Light Trucks [a,c,d]	1,153		1,105	1,212	1,294	1,331	1,364	1,390	1,427	23.8%
Medium Trucks [a,d]	577		675	654	688	723	748	790	780	35.1%
Heavy Trucks [a,d]	256		292	295	316	303	304	321	322	25.8%
Average Distance Travelled per Year (km)										
Light Trucks [a]	19,815		23,296	22,896	22,656	22,131	21,448	22,126	22,088	11.5%
Medium Trucks [a,e]	23,407		24,346	24,081	23,802	24,531	24,573	23,325	23,731	1.4%
Heavy Trucks [a]	70,097		66,591	69,318	69,513	73,271	73,761	67,431	67,415	-3.8%
On-Road Average Fuel Consumption (L/100 km)										
Light Trucks [a,g]										
Motor Gasoline	*15.4*		*14.7*	*14.7*	*14.7*	*14.8*	*14.8*	*14.8*	*14.7*	*-4.1%*
Diesel Fuel Oil	*15.2*		*13.3*	*13.3*	*13.4*	*13.4*	*13.5*	*13.3*	*13.2*	*-13.1%*
Medium Trucks [a]										
Motor Gasoline	*27.3*		*26.7*	*26.8*	*26.6*	*26.3*	*26.1*	*26.3*	*26.1*	*-4.6%*
Diesel Fuel Oil	*22.8*		*22.0*	*21.9*	*21.8*	*21.7*	*21.6*	*21.6*	*21.6*	*-5.2%*
Heavy Trucks [a]										
Diesel Fuel Oil	*44.6*		*42.2*	*41.6*	*41.1*	*40.5*	*40.2*	*40.0*	*39.8*	*-10.6%*

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

Sources:

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

Chapter 6
Agriculture Sector

The Data Situation

The aggregate energy use data presented for the agriculture sector are reported in Statistics Canada's *Report on Energy Supply-Demand in Canada* (Cat. No. 57-003-XIB). Informetrica Limited provided aggregate data on agriculture gross domestic product.

Energy-related data in the agriculture sector are available only at an aggregate level. The data represent all energy use related to crop and animal production and their related support activities as well as to hunting and trapping activities.

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

Chapter 6
Agriculture Sector

Agriculture Secondary Energy Use and GHG Emissions by Energy Source and End-Use

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a]	**199.2**		**222.9**	**230.0**	**224.7**	**229.9**	**231.9**	**218.1**	**205.7**	**3.3%**
Energy Use by End-Use (PJ) [a]										
Non-Motive Energy Use	71.6		84.6	84.7	78.4	79.9	78.3	72.4	69.5	-2.9%
Motive Energy Use [1]	127.6		138.3	145.3	146.3	150.0	153.6	145.7	136.2	6.7%
Energy Use by Energy Source (PJ) [a]										
Electricity	31.1		35.4	35.7	35.1	35.2	34.6	34.9	33.7	8.4%
Natural Gas	23.2		26.9	26.3	23.7	24.1	27.3	23.3	22.4	-3.5%
Motor Gasoline	56.1		43.7	44.9	46.4	47.3	46.8	49.7	52.5	-6.3%
Diesel Fuel Oil	71.5		94.6	100.5	99.9	102.7	106.8	96.0	83.6	16.9%
Light Fuel Oil	10.8		13.8	13.8	13.0	13.5	9.5	5.9	5.2	-52.1%
Kerosene	1.0		1.7	1.5	1.2	1.1	0.6	0.4	0.4	-60.4%
Heavy Fuel Oil	0.6		0.5	0.3	0.3	0.5	1.0	1.9	1.5	160.0%
Propane	5.0		6.4	7.0	4.9	5.4	5.4	5.9	6.4	28.2%
Steam	0.0		0.1	0.0	0.1	0.1	0.0	0.0	0.0	–
Activity										
GDP (million $97) [b]	13,627		13,866	13,614	14,693	15,981	15,249	13,857	12,906	-5.3%
Energy Intensity (MJ/$97) [a,b]	**14.6**		**16.1**	**16.9**	**15.3**	**14.4**	**15.2**	**15.7**	**15.9**	**9.0%**
Total GHG Emissions Including Electricity (Mt) [a,c]	**13.7**		**15.2**	**16.0**	**16.0**	**16.3**	**16.5**	**15.5**	**14.4**	**5.1%**
GHG Emissions by End-Use (Mt) [a,c]										
Non-Motive GHG Emissions	4.1		4.6	4.8	4.7	4.7	4.7	4.4	4.1	-1.1%
Motive GHG Emissions [1]	9.6		10.6	11.1	11.2	11.5	11.8	11.2	10.4	7.7%
GHG Emissions by Energy Source (Mt) [a,c]										
Electricity	1.7		1.7	2.0	2.2	2.1	2.2	2.3	2.1	17.8%
Natural Gas	1.2		1.3	1.3	1.2	1.2	1.4	1.2	1.1	-4.3%
Motor Gasoline	3.9		3.1	3.1	3.2	3.3	3.3	3.5	3.7	-7.2%
Diesel Fuel Oil	5.7		7.5	8.0	8.0	8.2	8.6	7.7	6.7	18.1%
Light Fuel Oil	0.8		1.0	1.0	0.9	1.0	0.7	0.4	0.4	-52.3%
Kerosene	0.1		0.1	0.1	0.1	0.1	0.0	0.0	0.0	-60.4%
Heavy Fuel Oil	0.0		0.0	0.0	0.0	0.0	0.1	0.1	0.1	155.3%
Propane	0.3		0.4	0.4	0.3	0.3	0.3	0.4	0.4	29.3%
Steam	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
GHG Intensity (tonne/TJ) [a,c]	**69.0**		**68.3**	**69.5**	**71.1**	**70.7**	**71.1**	**71.2**	**70.2**	**1.8%**
Total GHG Emissions Excluding Electricity (Mt) [a,c]	**12.0**		**13.5**	**14.0**	**13.8**	**14.2**	**14.3**	**13.3**	**12.4**	**3.2%**
GHG Emissions by End-Use (Mt) [a,c]										
Non-Motive GHG Emissions	2.4		2.9	2.9	2.5	2.6	2.5	2.1	2.0	-15.0%
Motive GHG Emissions [1]	9.6		10.6	11.1	11.2	11.5	11.8	11.2	10.4	7.7%
GHG Intensity (tonne/TJ) [a,c]	**60.2**		**60.5**	**60.9**	**61.3**	**61.6**	**61.7**	**60.9**	**60.2**	**0.0%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

1) Includes motor gasoline and diesel fuel oil. All other energy sources are included in non-motive.

Sources:
a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Chapter 7
Electricity Generation Sector

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 hydro, nuclear, wood and other non-specified fuel categories. Electricity production data for these fuels are converted to energy use data using energy content values of 3.6, 11.564 and 10.5 megajoules per kilowatt-hour, respectively.

Gross domestic product data for Canada 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.

Chapter 7
Electricity Generation Sector

Electricity Generation Energy Use and Generation by Energy Source

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total Energy Use (PJ) [a,b]	**3,002.0**		**3,502.2**	**3,533.3**	**3,536.0**	**3,592.1**	**3,787.1**	**3,771.6**	**3,741.4**	**24.6%**
Energy Use by Energy Source (PJ) [a,b]										
Natural Gas	80.0		154.8	192.6	234.6	247.5	319.2	339.7	307.3	284.2%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	11.5		11.1	8.0	8.6	7.3	6.5	6.8	5.1	-55.6%
Heavy Fuel Oil	141.4		64.4	101.0	153.6	123.6	113.2	138.8	111.3	-21.3%
Coal	874.5		929.6	1,000.4	1,091.4	1,090.2	1,187.8	1,167.7	1,144.1	30.8%
Hydro	1,058.3		1,267.9	1,250.2	1,183.3	1,231.8	1,277.3	1,187.6	1,248.9	18.0%
Nuclear	795.2		1,012.0	900.3	780.2	801.7	794.1	836.3	824.0	3.6%
Wood and Other [1]	37.2		58.8	63.9	67.1	71.0	70.2	74.5	79.5	113.6%
Petroleum Coke, Still Gas, Coke and Coke Oven Gas	3.8		3.7	16.8	17.3	19.0	18.8	20.2	21.2	456.8%
Total Electricity Generated (GWh) [a]	**467,596**		**555,812**	**556,076**	**545,078**	**559,930**	**585,814**	**569,420**	**581,096**	**24.3%**
Electricity Generated by Energy Source (GWh) [a]										
Natural Gas	9,018		17,150	20,031	24,477	25,961	31,678	34,055	32,041	255.3%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	994		1,372	975	863	756	798	890	894	-10.1%
Heavy Fuel Oil	13,394		6,483	10,194	15,240	12,483	11,540	13,657	11,479	-14.3%
Coal	76,794		83,981	92,903	100,130	100,528	109,895	110,026	109,390	42.4%
Hydro	293,985		352,183	347,274	328,706	342,167	354,812	329,881	346,917	18.0%
Nuclear	68,761		87,510	77,857	67,466	69,331	68,674	72,320	71,252	3.6%
Wood and Other [1]	3,544		5,599	6,086	6,393	6,760	6,682	7,095	7,570	113.6%
Petroleum Coke, Still Gas, Coke and Coke Oven Gas	1,107		1,534	756	1,803	1,944	1,734	1,497	1,553	40.3%
Activity										
GDP (million $97) [c]	20,049		22,305	22,417	21,881	21,884	21,639	21,140	21,514	7.3%
Production (GWh) [a]	467,596		555,812	556,076	545,078	559,930	585,814	569,420	581,096	24.3%
Energy Intensity (GJ/$97) [a,b,c]	**0.150**		**0.157**	**0.158**	**0.162**	**0.164**	**0.175**	**0.178**	**0.174**	**16.1%**
Energy Intensity (GJ/GWh) [a,b]	**6,420**		**6,301**	**6,354**	**6,487**	**6,415**	**6,465**	**6,624**	**6,439**	**0.3%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Electricity Energy Use Model, Ottawa, February 2004.
c) Informetrica Limited, *TI Model and National Reference Forecast*, Ottawa, November 2003.

Chapter 7
Electricity Generation Sector

Electricity Generation GHG Emissions by Energy Source

	1990	1991–1995	1996	1997	1998	1999	2000	2001	2002	Total Growth 1990–2002
Total GHG Emissions (Mt) [a,b,c]	**94.6**		**98.7**	**110.4**	**122.1**	**120.1**	**131.7**	**132.8**	**127.8**	**35.0%**
GHG Emissions by Energy Source (Mt) [a,b,c]										
Natural Gas	4.1		7.8	9.7	11.8	12.4	16.1	17.1	15.5	281.1%
Diesel Fuel Oil, Light Fuel Oil and Kerosene	0.8		0.8	0.6	0.6	0.5	0.5	0.5	0.4	-55.5%
Heavy Fuel Oil	10.5		4.8	7.5	11.2	9.0	8.3	10.2	8.1	-22.8%
Coal	78.8		85.0	91.5	97.2	96.8	105.5	103.6	102.3	29.8%
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		0.3	1.2	1.2	1.3	1.3	1.4	1.5	323.6%
GHG Intensity [2] **(tonne/TJ [electricity generated])** [a,b,c]	**56.2**		**49.3**	**55.2**	**62.2**	**59.6**	**62.4**	**64.8**	**61.1**	**8.7%**
GHG Intensity [3] **(tonne/TJ [energy used])** [a,b,c]	**31.5**		**28.2**	**31.3**	**34.5**	**33.4**	**34.8**	**35.2**	**34.2**	**8.4%**

1991–1995 DATA AVAILABLE AT OEE.NRCAN.GC.CA/NEUD/DPA/HANDBOOK_TABLES.CFM

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 emission factors represents conversion losses (energy used to produce electricity versus the amount of electricity generated).

Sources:

a) Statistics Canada, *Report on Energy Supply-Demand in Canada, 1990–2002*, Ottawa, October 2003 (CANSIM).
b) Natural Resources Canada, Electricity Energy Use Model, Ottawa, February 2004.
c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–2001*, Ottawa, August 2003 (Cat. No. En49-5/5-9-2-2001E).

Appendix A
Reconciliation of Data

Reconciliation of Data on Energy Use Found in This Handbook With Data in Statistics Canada's *Report on Energy Supply-Demand in Canada* (RESD) – 2002 (petajoules)

	RESD 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	1,295	104								1,399
Commercial/Institutional	1,410		(171)	(30)	(79)					1,130
Industrial	2,244						460	3	470	3,176
Transportation	2,250		171	30	79	(224)				2,306
Agriculture	206									206
Final Demand	***7,404***	***104***	***0***	***0***	***0***	***(224)***	***460***	***3***	***470***	***8,217***
Non-Energy	894									894
Producer Consumption	1,370					224			(470)	1,124
Net Supply	***9,669***	***104***	***0***	***0***	***0***	***0***	***460***	***3***	***0***	***10,236***
Fuel Conversion										
Electricity, Steam & Coal/Coke Input Fuels [1]	3,896									3,896
Electricity, Steam & Coal/Coke Production [2]	(2,247)									(2,247)
Total Primary	***11,318***	***104***	***0***	***0***	***0***	***0***	***460***	***3***	***0***	***11,885***

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

Residential: Base data taken from RESD (Table 1A, line 44) plus residential wood use (estimated from NRCan's Residential End-Use Model).

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

Industrial: Base data taken from RESD (Table 1A, line 31) plus solid wood waste and spent pulping liquor (Table 20) less wood 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 (Canadian Industrial Energy End-Use Data and Analysis Centre).

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

Agriculture: Base data taken from RESD (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 1990–2001*

Introduction

In this handbook, the data on greenhouse gas (GHG) emissions are estimated using emissions factors developed by Environment Canada (EC). The emissions estimates provided herein mirror the sectoral definitions used to calculate the estimates presented in *Canada's Greenhouse Gas Inventory 1990–2001* (CGGI-2001). Both Natural Resources Canada (NRCan) and EC use the energy demand data from Statistics Canada's *Report on Energy Supply-Demand in Canada* (RESD) 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. NRCan, meanwhile, has developed mapping that is most suited to energy end-use analysis.

The objective of this appendix is to help readers understand the similarities and differences between CGGI-2001 and NRCan emissions estimates for the six sectors covered in this handbook.

Residential Sector

NRCan and CGGI-2001 differ in their definitions of residential emissions.

- NRCan residential emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-2001.
- Wood energy use differs (EC's estimate is larger than NRCan's). Hence, the GHG emissions related to wood energy use presented here are less than those in CGGI-2001.

Commercial/Institutional Sector

There is only one difference between NRCan and CGGI-2001 definitions of commercial/institutional emissions.

- NRCan commercial/institutional emissions include end-use electricity-related emissions, which CGGI-2001 includes under power generation.

Industrial Sector

There are many differences between CGGI-2001 and this handbook in defining the industrial sector.

- CGGI-2001 re-allocates industrial diesel fuel use from the industrial sector to the transportation sector.
- This handbook re-allocates producer consumption of petroleum products by the petroleum refining and upstream mining industry from the producer consumption sector to petroleum refining and upstream mining within the industrial sector. CGGI-2001 reports this consumption under fossil fuels.
- CGGI-2001 re-allocates industrial coke use from energy use in the industrial sector to non-energy use in industrial processes.
- NRCan industrial emissions include end-use electricity-related emissions. CGGI-2001 reports them under power generation.
- CGGI-2001 includes producers' consumption of non-fossil fuels in the fossil fuel categories. NRCan does not report this consumption.
- CGGI-2001 also re-allocates estimates of emissions from upstream oil and gas flaring to fugitive emissions from the fossil fuel sector.

Transportation Sector

Differences in the transportation sector relate to CGGI-2001 re-allocating or excluding RESD data from its inventory, whereas NRCan allocates end-use electricity-related emissions to the end-use sectors.

- CGGI-2001 re-allocates industrial diesel, farm diesel and motor gasoline to the transportation sector.
- EC's inventory excludes emissions resulting from the use of energy in the foreign aviation and marine sub-sectors.
- NRCan transportation emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-2001.

Agriculture Sector

There are two differences between CGGI-2001 and NRCan in the agriculture sector.

- CGGI-2001 allocates all farm diesel and motor gasoline to the transportation sector, whereas NRCan leaves this consumption in agriculture (as does RESD).
- NRCan includes end-use electricity-related emissions in agriculture, whereas CGGI-2001 reports them under power generation.

Electricity Generation Sector

There is only one difference between CGGI-2001 and NRCan for the electricity generation sector.

- CGGI-2001 reports emissions from electricity and steam generation, while NRCan reports emissions for electricity generation only.

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 most typically refers to a 30-day sale.

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; janitors' quarters in schools, churches, warehouses, etc.; and private quarters for employees in hospitals or other types of institutions.

Appliances: 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, dishwashers, clothes dryers, outdoor gas lights, dehumidifiers, personal computers, pumps for well water, televisions, water-bed heaters, swimming pool heaters, hot tubs and spas.

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.

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

Capacity Utilization: The rates of capacity use are measures of the intensity with which industries use their production capacity. Capacity use is the percentage of actual to potential output.

Carbon Dioxide (CO_2): 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," with the potential to increase the surface temperature of the planet.

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

Cooling Degree-Days (CDDs): A measure of how hot a location was over a period of time, relative to a base temperature. In this handbook, the base temperature is 18.0°C and the period of time is one year. If the daily average temperature exceeds the base temperature, the cooling degree-day 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 cooling degree-day for that day is zero. The number of cooling degree-days for a longer period of time is the sum of the daily cooling degree-days from the days in the period.

Cooling Degree-Day Index: A measure of how relatively hot (or cold) a year was when compared with the cooling degree-days (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 CDD normals observed in a number of weather stations across Canada. Its value, which varies from year to year because of the flow of population, was 171 CDDs in 2002.

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, apartment, etc.

End-Use: Any specific activity that requires energy (e.g. refrigeration, space heating, water heating, manufacturing process 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, including the use of a fuel as a non-energy feedstock).

Floor Space (area): The area enclosed by exterior walls of a building. Parking areas, basements or other floors below ground level are excluded in the residential sector, while they are included in the commercial/institutional sector. Floor space is measured in square metres.

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

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 (CO_2), methane (CH_4), chlorofluorocarbons (CFCs) and nitrous oxide (N_2O). By far the most abundant greenhouse gas is CO_2, accounting for 70 percent of greenhouse gases (see Carbon Dioxide).

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

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 Gains: 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-Days (HDDs): A measure of how cold a location was over a period of time relative to a base temperature. In this handbook, the base temperature is 18.0°C, and the period of time is one year. If the daily average temperature is below the base temperature, the heating degree-day 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 heating degree-day for that day is zero. The number of heating degree-days for a longer period of time 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-days (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 HDD normals observed in a number of weather stations across Canada. Its value, which varies from year to year because of the flow of population, was 4474 HDDs in 2002.

Heavy Trucks: Trucks 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. The person or people occupying a private dwelling form a private household.

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 takes into account both occupied and unoccupied dwellings.

Kilowatt-hour (kWh): The commercial unit of electricity energy equivalent to 1,000 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.

Large Cars: Cars with a gross vehicle weight of 1,182 kg (2,601 lb.) or more. The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

Light Trucks: Trucks of up to 3,855 kg (8,500 lb.) of gross vehicle weight. The gross vehicle weight is the weight of the empty vehicle plus the maximum anticipated load weight.

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) and refined petroleum products (i.e. LPG) at the processing plant.

Medium Trucks: Trucks with a gross vehicle weight ranging from 3,856 to 14,969 kg (8,501 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 Gigajoule).

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). It should be capable of being moved to a new location.

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), has been developed by the statistical agencies of Canada, Mexico and the United States.

Passenger-kilometre (Pkm): The transport of one passenger over a distance of one kilometre.

Petajoule (PJ): One petajoule equals 1×10^{15} joules (see Gigajoule).

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 Cars: Cars weighing up to 1,181 kg (2,600 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 circulating chilled water through a central- or district-cooling system.

Space Heating: The use of mechanical equipment to heat all or part of a building. It includes both principal space heating and 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 Gigajoule).

Tonne-kilometre (Tkm): The transport of one tonne over a distance of one kilometre.

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

Waste Fuel: A name applied to any number of energy sources outside of conventional fuels. It can include 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 and 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
bbl.	Barrel
CAFC	Company Average Fuel Consumption
CANSIM	Canadian Socio-Economic Information Management System
CEUM	Commercial 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 x 10^9 joules
GO	Gross Output
GWh	Gigawatt-hour = 1 x 10^9 Wh
km	Kilometre
kW	Kilowatt
kWh	Kilowatt-hour = 1 x 10^3 Wh
L	Litre
LPG	Liquefied Petroleum Gases
MJ	Megajoule = 1 x 10^6 joules
Mt	Megatonne = 1 x 10^6 tonnes
m^2	Square Metre
m^3	Cubic Metre
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 x 10^{15} joules
Pkm	Passenger-kilometre
RESD	*Report on Energy Supply-Demand in Canada*
REUM	Residential End-Use Model
SEER	Seasonal Energy Efficiency Ratio
SIC	Standard Industrial Classification
TEUM	Transportation End-Use Model
TJ	Terajoule = 1 x 10^{12} joules
Tkm	Tonne-kilometre
UEC	Unit of Energy Consumption
W	Watt
Wh	Watt-hour

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