

# End-Use Energy Data Handbook 1990 to 2000

*June 2002*



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Handbook 1990–2000



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End-Use Energy Data Handbook 1990 to 2000

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# Preface

This is the first edition of the *End-Use Energy Data Handbook 1990 to 2000*.

The mandate of the Office of Energy Efficiency (OEE) of Natural Resources Canada is to renew, strengthen and expand Canada's commitment to energy efficiency; therefore, this handbook fulfils part of this mandate.

The main objective of this handbook is to provide an overview of Canada's sectoral end-use energy markets. 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 2000***.

The *End-Use Energy Data Handbook 1990 to 2000* covers the five sectors that the OEE analyses — i.e., the residential, commercial/institutional, industrial, transportation and agriculture sectors — at a rather aggregate level. The period 1990 to 2000 was chosen because 1990 is the reference year for the Kyoto Protocol, and 2000 is the most recent year for which actual data is available.

This handbook provides data on energy and greenhouse gas (GHG) emissions, as well as activity information and relevant indicators. Such data form the foundation for OEE analysis and of publications such as *Energy Efficiency Trends in Canada 1990 to 2000*. The latter assesses the influence of several factors over changes in energy use by sector (and the related changes in GHGs) over the last decade.

You can access a comprehensive database, including most of the historical energy use and GHG emissions data used by the OEE for its analysis, at the following Web site:

[http://oee.nrcan.gc.ca/neud/dpa/data\\_e/databases.cfm](http://oee.nrcan.gc.ca/neud/dpa/data_e/databases.cfm).

If you require more information on this publication or the services that the OEE offers, contact us by e-mail at [euc.cec@nrcan.gc.ca](mailto:euc.cec@nrcan.gc.ca).

*End-Use Energy Data Handbook — 1990 to 2000*

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# Chapter 1 Economy Wide

The aggregate energy use data presented in this report are based on *Statistics Canada's Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). The QRES is Canada's official energy supply and demand balance in Canada. With regards to the greenhouse gases, particularly the data on carbon dioxide, they are estimated using emissions factors developed by Environment Canada.

The *Office of Energy Efficiency* (OEE) developed energy models for each sector of the economy that are presented in this report – i.e., the residential, commercial/institutional, industrial, transportation and agriculture – to assess trends in energy use in the Canadian economy.

The OEE is continually improving the quality of information used to understand the evolution of energy use in Canada.

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

	1990	1991	1992	1993	1994
<b>Residential <sup>a,b</sup></b>	<b>1,299.8</b>	<b>1,277.9</b>	<b>1,307.3</b>	<b>1,356.1</b>	<b>1,385.7</b>
Space Heating	784.7	770.2	801.3	837.1	849.8
Water Heating	279.4	275.6	276.9	283.5	295.3
Space Cooling	6.9	9.5	3.5	7.0	7.2
Appliances	176.8	171.1	173.0	176.6	179.6
<i>Major Appliances</i>	<i>129.2</i>	<i>125.1</i>	<i>125.2</i>	<i>122.0</i>	<i>122.3</i>
<i>Other</i>	<i>47.6</i>	<i>46.0</i>	<i>47.7</i>	<i>54.6</i>	<i>57.4</i>
Lighting	52.0	51.4	52.7	52.0	53.9
<b>Commercial <sup>a,c,d</sup></b>	<b>867.0</b>	<b>888.9</b>	<b>901.2</b>	<b>933.1</b>	<b>927.6</b>
Space Heating	428.1	434.4	465.6	482.0	469.4
Water Heating	93.3	94.5	94.3	95.5	96.2
Space Cooling	39.8	49.8	29.1	40.4	44.1
Auxiliary Equipment	65.5	67.3	67.2	67.8	68.6
Auxiliary Motors	103.8	105.2	106.2	107.3	108
Lighting	127.4	129.0	130.3	131.8	133.2
Street Lighting	8.9	8.7	8.4	8.3	8.0
<b>Industrial <sup>e</sup></b>	<b>2,754.7</b>	<b>2,701.0</b>	<b>2,723.0</b>	<b>2,748.0</b>	<b>2,911.5</b>
Mining	343.4	327.1	338.6	406.8	415.8
Pulp and Paper	784.7	779.2	780.1	782.7	866.1
Iron and Steel	219.4	235.0	244.9	241.9	250.3
Smelting and Refining	183.3	188.4	198.0	210.8	222.7
Cement	59.3	50.8	50.8	51.1	59.2
Chemicals	223.2	232.6	222.5	211.2	242.1
Petroleum Refining	334.9	314.0	321.5	325.0	317.3
Other Manufacturing	531.8	509.5	501.5	460.0	476.5
Forestry	7.7	6.5	7.4	7.9	7.5
Construction	66.9	57.9	57.6	50.7	54.0

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
 Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
 Data for 2000 estimated by Natural Resources Canada.
- g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- h) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999.  
 Data for 2000 estimated by Natural Resources Canada.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
<b>1,354.7</b>	<b>1,451.1</b>	<b>1,404.5</b>	<b>1,272.7</b>	<b>1,323.3</b>	<b>1,388.1</b>	<b>6.8%</b>
824.3	904.5	860.4	729.8	769.8	830.7	5.9%
290.7	302.5	299.0	293.8	298.1	302.4	8.2%
9.4	7.9	7.6	11.8	13.0	8.6	24.6%
176.6	180.6	181.7	180.5	183.7	186.0	5.2%
<b>118.6</b>	<b>120.1</b>	<b>119.1</b>	<b>116.6</b>	<b>116.7</b>	<b>116.5</b>	<b>-9.8%</b>
<b>58.0</b>	<b>60.6</b>	<b>62.6</b>	<b>63.9</b>	<b>66.9</b>	<b>69.6</b>	<b>46.2%</b>
53.7	55.6	55.9	56.7	58.7	60.3	16.0%
<b>960.9</b>	<b>981.5</b>	<b>998.5</b>	<b>944.1</b>	<b>979.2</b>	<b>1,058.8</b>	<b>22.1%</b>
499.6	522.5	532.9	455.3	481.0	550.8	28.7%
96.2	96.2	97.1	97.9	99.3	104.1	11.6%
47.5	44.7	44.4	61.0	62.3	46.1	15.8%
68.4	68.4	70.2	71.4	73.5	78.5	19.8%
108.3	108.5	110	112	114	120.8	16.4%
133.3	133.7	136.4	139.0	141.7	151.2	18.7%
7.8	7.5	7.4	7.5	7.4	7.3	-18.0%
<b>2,973.6</b>	<b>3,057.5</b>	<b>3,057.2</b>	<b>3,004.0</b>	<b>3,098.5</b>	<b>3,203.5</b>	<b>16.3%</b>
443.7	472.7	474.2	455.1	458.3	490.3	42.8%
871.4	874.4	882.8	884.2	958.9	961.2	22.5%
247.9	252.1	251.2	254.7	259.8	257.7	17.5%
219.9	233.3	231.0	239.7	236.4	226.1	23.3%
61.3	58.5	57.9	63.6	66.8	66.5	12.1%
253.1	255.3	245.9	241.2	240.4	239.4	7.3%
308.4	329.5	320.9	294.6	289.3	296.6	-11.4%
510.9	521.6	532.8	510.4	523.5	599.6	12.7%
7.9	9.6	11.1	12.3	14.8	16.2	110.4%
48.9	50.5	49.5	48.0	50.4	49.9	-25.4%
<i>continued</i>						

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

	1990	1991	1992	1993	1994
<b>Total Transportation <sup>a</sup></b>	<b>1,877.9</b>	<b>1,807.3</b>	<b>1,850.1</b>	<b>1,873.2</b>	<b>1,967.8</b>
<i>Passenger Transportation <sup>a,e,f,g</sup></i>	<i>1,149.0</i>	<i>1,094.9</i>	<i>1,125.2</i>	<i>1,143.6</i>	<i>1,193.8</i>
Cars	680.4	659.2	660.6	660.3	659.9
Light Trucks	216.5	206.3	225.5	250.7	284.4
Motorcycles	1.7	1.6	1.7	1.8	2.0
Bus	57.9	57.0	61.6	61.9	70.1
Rail	5.1	3.3	3.2	3.4	2.9
Air	187.4	167.5	172.8	165.4	174.5
<i>Freight Transportation <sup>a,f,g,h</sup></i>	<i>675.3</i>	<i>655.9</i>	<i>666.3</i>	<i>669.9</i>	<i>713.6</i>
Light Trucks	134.9	139.0	144.8	140.1	137.5
Medium Trucks	101.3	98.4	103.4	107.5	114.9
Heavy Trucks	248.2	228.3	225.0	242.5	270.9
Rail	84.4	79.6	83.5	83.0	86.4
Marine	106.5	110.6	109.7	96.8	103.9
<i>Off-Road <sup>a</sup></i>	<i>53.6</i>	<i>56.5</i>	<i>58.6</i>	<i>59.7</i>	<i>60.4</i>
<b>Agriculture <sup>a</sup></b>	<b>199.2</b>	<b>195.2</b>	<b>196.9</b>	<b>198.8</b>	<b>195.8</b>
<b>Total Energy Use</b>	<b>6,998.6</b>	<b>6,870.3</b>	<b>6,978.5</b>	<b>7,109.2</b>	<b>7,388.4</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990-1998 revisions*, Ottawa, January 2001 (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999-2000 revisions*, Ottawa, February 2002.
- b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990-1998*, February 1993-December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
 Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- f) Statistics Canada, *Rail in Canada 1990-1999*, Ottawa, July 1992-April 2000, (Cat. No. 52-216).  
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- g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- h) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999.  
 Data for 2000 estimated by Natural Resources Canada.

*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
2,004.9	2,043.0	2,117.2	2,194.5	2,252.8	2,282.1	21.5%
<b>1,207.8</b>	<b>1,226.4</b>	<b>1,245.2</b>	<b>1,285.1</b>	<b>1,301.1</b>	<b>1,294.3</b>	<b>12.6%</b>
638.1	623.7	614.5	603.7	595.8	575.8	-15.4%
304.9	320.1	341.3	377.7	394.5	401.0	85.2%
1.8	1.8	1.9	2.0	2.1	2.3	35.3%
73.3	68.8	70.5	72.9	68.6	73.2	26.4%
2.4	2.5	2.3	2.2	2.5	2.5	-51.0%
187.3	209.4	214.6	226.7	237.5	239.5	27.8%
<b>734.7</b>	<b>752.9</b>	<b>805.1</b>	<b>839.3</b>	<b>876.3</b>	<b>905.5</b>	<b>34.1%</b>
136.4	141.9	148.2	161.4	165.6	163.8	21.4%
119.8	126.0	135.0	136.6	149.7	158.1	56.1%
298.3	308.5	344.0	347.8	371.0	389.0	56.7%
78.5	76.6	77.9	74.4	78.6	80.5	-4.6%
101.7	99.9	100.1	119.2	111.5	114.0	7.0%
<b>62.4</b>	<b>63.7</b>	<b>66.9</b>	<b>70.1</b>	<b>75.5</b>	<b>82.3</b>	<b>53.5%</b>
209.2	222.9	230.0	224.7	229.9	231.9	16.4%
<b>7,503.3</b>	<b>7,756.0</b>	<b>7,807.4</b>	<b>7,640.0</b>	<b>7,883.7</b>	<b>8,164.4</b>	<b>16.7%</b>

Canada's GHG Emissions — Including Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes)

	1990	1991	1992	1993	1994
<b>Residential</b> <sup>a,b,i</sup>	<b>69.6</b>	<b>66.9</b>	<b>71.9</b>	<b>68.9</b>	<b>69.1</b>
Space Heating	41.3	39.8	42.6	42.6	42.5
Water Heating	15.2	14.6	15.4	14.5	14.9
Space Cooling	0.4	0.5	0.2	0.3	0.3
Appliances	9.9	9.2	10.5	8.8	8.7
Major Appliances	7.2	6.8	7.6	6.1	5.8
Other	2.7	2.5	2.9	2.7	2.8
Lighting	2.9	2.8	3.2	2.6	2.6
<b>Commercial</b> <sup>a,c,d,i</sup>	<b>47.8</b>	<b>47.9</b>	<b>51.2</b>	<b>48.5</b>	<b>47.4</b>
Space Heating	23.4	23.5	25.5	25.6	24.7
Water Heating	5.0	5.0	5.0	5.0	5.0
Space Cooling	2.2	2.7	1.7	2.0	2.1
Auxiliary Equipment	3.7	3.7	4.0	3.5	3.4
Auxiliary Motors	5.8	5.7	6.4	5.4	5.3
Lighting	7.1	6.9	7.9	6.6	6.5
Street Lighting	0.5	0.5	0.5	0.4	0.4
<b>Industrial</b> <sup>a,i</sup>	<b>141.1</b>	<b>136.0</b>	<b>141.2</b>	<b>135.5</b>	<b>138.1</b>
Mining	21.2	20.1	21.3	23.7	24.3
Pulp and Paper	24.1	23.2	23.4	21.7	21.5
Iron and Steel	15.9	17.0	17.7	17.0	17.2
Smelting and Refining	10.7	10.6	12.3	11.1	11.6
Cement	4.2	3.6	3.6	3.5	4.0
Chemicals	10.8	10.9	11.2	10.3	11.5
Petroleum Refining	20.7	19.5	20.1	20.3	19.5
Other Manufacturing	28.5	26.9	27.4	24.0	24.4
Forestry	0.6	0.5	0.6	0.6	0.6
Construction	4.4	3.8	3.7	3.3	3.5

Sources:

- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
- Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
- Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.
- GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
<b>68.5</b>	<b>73.0</b>	<b>72.4</b>	<b>69.2</b>	<b>70.7</b>	<b>74.7</b>	<b>7.3%</b>
41.4	45.7	43.4	37.8	39.6	42.8	3.6%
14.9	15.3	15.7	16.2	16.1	16.6	9.2%
0.5	0.4	0.4	0.7	0.8	0.5	25.0%
8.9	8.8	9.8	11.0	10.8	11.2	13.1%
6.0	5.9	6.4	7.0	6.8	6.9	-4.2%
2.9	3.0	3.4	3.9	3.9	4.2	55.6%
2.7	2.7	3.0	3.5	3.5	3.6	24.1%
<b>50.4</b>	<b>50.5</b>	<b>53.8</b>	<b>53.9</b>	<b>54.6</b>	<b>59.9</b>	<b>25.3%</b>
26.7	27.7	28.6	24.8	26.0	30.1	28.6%
5.1	5.0	5.1	5.2	5.2	5.6	12.0%
2.4	2.2	2.4	3.7	3.6	2.7	22.7%
3.5	3.4	3.9	4.4	4.3	4.7	27.0%
5.5	5.3	6.0	6.9	6.7	7.3	25.9%
6.7	6.5	7.4	8.5	8.3	9.1	28.2%
0.4	0.4	0.4	0.5	0.4	0.4	-20.0%
<b>143.2</b>	<b>146.8</b>	<b>150.8</b>	<b>152.3</b>	<b>152.1</b>	<b>159.3</b>	<b>12.9%</b>
26.3	27.7	28.5	28.3	28.2	30.3	42.9%
22.1	22.1	23.5	23.7	24.1	24.6	2.1%
17.2	17.3	17.3	17.7	18.1	18.0	13.2%
11.8	12.2	13.0	14.8	14.1	13.7	28.0%
4.1	3.9	4.0	4.2	4.4	4.3	2.4%
12.0	12.1	12.4	12.7	12.6	12.6	16.7%
19.4	20.6	20.1	19.2	18.3	18.9	-8.7%
26.5	26.8	27.9	27.6	27.9	32.3	13.3%
0.6	0.7	0.8	0.9	1.1	1.2	100.0%
3.3	3.3	3.3	3.2	3.3	3.3	-25.0%
<i>continued</i>						

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

	1990	1991	1992	1993	1994
<b>Total Transportation <sup>a,i</sup></b>	<b>135.0</b>	<b>129.8</b>	<b>132.9</b>	<b>134.6</b>	<b>141.5</b>
<b>Passenger Transportation <sup>a,e,f,g,i</sup></b>	<b>81.9</b>	<b>77.9</b>	<b>80.1</b>	<b>81.5</b>	<b>85.1</b>
Cars	48.1	46.6	46.7	46.7	46.7
Light Trucks	15.7	14.9	16.3	18.1	20.6
Motorcycles	0.1	0.1	0.1	0.1	0.1
Bus	4.0	4.0	4.3	4.3	4.9
Rail	0.4	0.3	0.3	0.3	0.2
Air	13.6	12.1	12.5	12.0	12.6
<b>Freight Transportation <sup>a,f,g,h,i</sup></b>	<b>49.4</b>	<b>47.9</b>	<b>48.7</b>	<b>49.0</b>	<b>52.1</b>
Light Trucks	9.5	9.8	10.2	9.9	9.7
Medium Trucks	7.3	7.1	7.5	7.8	8.3
Heavy Trucks	17.7	16.3	16.0	17.3	19.3
Rail	6.7	6.3	6.6	6.6	6.9
Marine	8.1	8.4	8.4	7.4	7.9
<b>Off-Road <sup>a,i</sup></b>	<b>3.8</b>	<b>4.0</b>	<b>4.1</b>	<b>4.2</b>	<b>4.2</b>
<b>Agriculture <sup>a,i</sup></b>	<b>13.7</b>	<b>13.3</b>	<b>13.6</b>	<b>13.3</b>	<b>13.3</b>
<b>Total GHG Emissions</b>	<b>407.2</b>	<b>393.9</b>	<b>410.8</b>	<b>400.8</b>	<b>409.4</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
- g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999.  
Data for 2000 estimated by Natural Resources Canada.
- i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).



*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
144.1	146.8	152.2	156.9	161.1	163.4	21.0%
<i>86.1</i>	<i>87.5</i>	<i>88.9</i>	<i>90.7</i>	<i>91.9</i>	<i>91.5</i>	<i>11.7%</i>
45.1	44.1	43.4	42.3	41.8	40.4	-16.0%
22.0	23.1	24.7	27.1	28.3	28.7	82.8%
0.1	0.1	0.1	0.1	0.1	0.2	100.0%
5.1	4.8	4.9	5.1	4.8	5.2	30.0%
0.2	0.2	0.2	0.2	0.2	0.2	-50.0%
13.5	15.1	15.5	15.9	16.7	16.8	23.5%
<i>53.6</i>	<i>54.8</i>	<i>58.6</i>	<i>61.2</i>	<i>64.0</i>	<i>66.1</i>	<i>33.8%</i>
9.6	10.0	10.5	11.4	11.7	11.6	22.1%
8.6	9.1	9.7	9.8	10.8	11.4	56.2%
21.3	22.0	24.5	25.0	26.7	28.0	58.2%
6.2	6.1	6.2	6.0	6.3	6.5	-3.0%
7.8	7.6	7.7	9.0	8.5	8.6	6.2%
<i>4.4</i>	<i>4.5</i>	<i>4.7</i>	<i>4.9</i>	<i>5.3</i>	<i>5.7</i>	<i>50.0%</i>
14.4	15.2	15.9	15.9	16.2	16.4	19.7%
420.6	432.3	445.1	448.2	454.7	473.7	16.3%

Canada's GHG Emissions — Excluding Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes)

	1990	1991	1992	1993	1994
<b>Residential<sup>a,b,i</sup></b>	<b>43.4</b>	<b>41.8</b>	<b>43.0</b>	<b>45.1</b>	<b>45.8</b>
Space Heating	34.4	32.9	34.0	35.6	35.9
Water Heating	8.8	8.7	8.7	9.2	9.8
Space Cooling	0.0	0.0	0.0	0.0	0.0
Appliances	0.2	0.2	0.2	0.2	0.2
Major Appliances	0.2	0.2	0.2	0.2	0.2
Other	0.0	0.0	0.0	0.0	0.0
Lighting	0.0	0.0	0.0	0.0	0.0
<b>Commercial<sup>a,c,d,i</sup></b>	<b>25.9</b>	<b>26.5</b>	<b>27.1</b>	<b>28.1</b>	<b>27.5</b>
Space Heating	20.5	20.8	21.6	22.6	21.9
Water Heating	4.7	4.8	4.7	4.8	4.8
Space Cooling	0.1	0.2	0.1	0.2	0.2
Auxiliary Equipment	0.6	0.8	0.7	0.6	0.6
Auxiliary Motors	0.0	0.0	0.0	0.0	0.0
Lighting	0.0	0.0	0.0	0.0	0.0
Street Lighting	0.0	0.0	0.0	0.0	0.0
<b>Industrial<sup>a,i</sup></b>	<b>104.2</b>	<b>100.1</b>	<b>100.3</b>	<b>100.8</b>	<b>103.4</b>
Mining	15.4	14.6	15.1	18.5	19.3
Pulp and Paper	14.2	13.5	12.5	12.4	12.2
Iron and Steel	14.2	15.5	15.9	15.5	15.7
Smelting and Refining	3.3	2.6	2.9	2.7	3.3
Cement	3.8	3.3	3.3	3.2	3.6
Chemicals	7.1	7.5	7.5	7.3	8.6
Petroleum Refining	19.6	18.4	18.8	19.2	18.4
Other Manufacturing	21.6	20.5	20.1	18.0	18.3
Forestry	0.6	0.5	0.6	0.6	0.6
Construction	4.4	3.8	3.7	3.3	3.5

**Sources:**

- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
- Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
- Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.
- GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

*End-Use Energy Data Handbook — 1990 to 2000*

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
44.5	49.2	46.2	40.6	42.5	44.7	3.0%
34.7	38.8	35.9	30.4	32.2	34.2	-0.6%
9.6	10.2	10.1	10.0	10.1	10.2	15.9%
0.0	0.0	0.0	0.0	0.0	0.0	–
0.2	0.2	0.2	0.2	0.2	0.2	0.0%
0.2	0.3	0.3	0.3	0.3	0.2	0.0%
0.0	0.0	0.0	0.0	0.0	0.0	–
0.0	0.0	0.0	0.0	0.0	0.0	–
29.0	29.7	30.1	27.4	28.9	32.6	25.9%
23.3	24.0	24.3	21.5	22.9	26.3	28.3%
4.8	4.8	4.8	4.9	4.9	5.2	10.6%
0.2	0.2	0.3	0.4	0.5	0.4	300.0%
0.6	0.6	0.6	0.6	0.6	0.7	16.7%
0.0	0.0	0.0	0.0	0.0	0.0	–
0.0	0.0	0.0	0.0	0.0	0.0	–
0.0	0.0	0.0	0.0	0.0	0.0	–
105.8	110.4	109.7	105.1	105.9	110.4	6.0%
20.6	22.0	22.1	20.8	21.4	23.0	49.4%
11.9	12.4	12.4	11.4	11.4	11.2	-21.1%
15.6	15.7	15.5	15.5	15.9	15.8	11.3%
3.1	3.5	3.3	3.6	3.3	2.8	-15.2%
3.8	3.6	3.6	3.7	4.0	3.9	2.6%
8.5	8.8	8.9	8.6	8.5	8.3	16.9%
18.5	19.7	19.1	18.1	17.2	17.8	-9.2%
20.0	20.5	20.7	19.3	19.9	23.1	6.9%
0.6	0.7	0.8	0.9	1.1	1.2	100.0%
3.3	3.3	3.3	3.2	3.3	3.3	-25.0%

*continued*

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

	1990	1991	1992	1993	1994
<b>Total Transportation <sup>a,i</sup></b>	<b>134.8</b>	<b>129.7</b>	<b>132.7</b>	<b>134.5</b>	<b>141.3</b>
<b>Passenger Transportation <sup>a,e,f,g,i</sup></b>	<b>81.7</b>	<b>77.8</b>	<b>79.9</b>	<b>81.3</b>	<b>84.9</b>
Cars	48.1	46.6	46.7	46.7	46.7
Light Trucks	15.7	14.9	16.3	18.1	20.6
Motorcycles	0.1	0.1	0.1	0.1	0.1
Bus	3.9	3.8	4.1	4.1	4.7
Rail	0.4	0.3	0.3	0.3	0.2
Air	13.6	12.1	12.5	12.0	12.6
<b>Freight Transportation <sup>a,f,g,h,i</sup></b>	<b>49.4</b>	<b>47.9</b>	<b>48.7</b>	<b>49</b>	<b>52.1</b>
Light Trucks	9.5	9.8	10.2	9.9	9.7
Medium Trucks	7.3	7.1	7.5	7.8	8.3
Heavy Trucks	17.7	16.3	16.0	17.3	19.3
Rail	6.7	6.3	6.6	6.6	6.9
Marine	8.1	8.4	8.4	7.4	7.9
<b>Off-Road <sup>a,i</sup></b>	<b>3.8</b>	<b>4</b>	<b>4.1</b>	<b>4.2</b>	<b>4.2</b>
<b>Agriculture <sup>a,i</sup></b>	<b>12</b>	<b>11.5</b>	<b>11.5</b>	<b>11.6</b>	<b>11.6</b>
<b>Total GHG Emissions</b>	<b>320.3</b>	<b>309.6</b>	<b>314.6</b>	<b>320.1</b>	<b>329.6</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
- d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
- f) Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
- g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.
- i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
143.9	146.7	152	156.7	161	163.2	21.1%
<i>86</i>	<i>87.3</i>	<i>88.7</i>	<i>90.6</i>	<i>91.7</i>	<i>91.3</i>	<i>11.8%</i>
45.1	44.1	43.5	42.3	41.8	40.4	-16.0%
22.0	23.1	24.7	27.1	28.3	28.7	82.8%
0.1	0.1	0.1	0.1	0.1	0.2	100.0%
5.0	4.6	4.8	5.0	4.7	5.0	28.2%
0.2	0.2	0.2	0.2	0.2	0.2	-50.0%
13.5	15.1	15.5	15.9	16.7	16.8	23.5%
<i>53.6</i>	<i>54.8</i>	<i>58.6</i>	<i>61.2</i>	<i>64</i>	<i>66.1</i>	<i>33.8%</i>
9.6	10.0	10.5	11.4	11.7	11.6	22.1%
8.6	9.1	9.7	9.8	10.8	11.4	56.2%
21.3	22.0	24.5	25.0	26.7	28.0	58.2%
6.2	6.1	6.2	6.0	6.3	6.5	-3.0%
7.8	7.6	7.7	9.0	8.5	8.6	6.2%
<i>4.4</i>	<i>4.5</i>	<i>4.7</i>	<i>4.9</i>	<i>5.3</i>	<i>5.7</i>	<i>50.0%</i>
12.6	13.5	14	13.8	14.2	14.3	19.2%
335.8	349.5	352.0	343.6	352.5	365.2	14.0%



# Chapter 2 Residential Sector

## The Data Situation

Aggregate data on residential energy use are reported on a quarterly basis in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). Additional data on the characteristics of residential equipment and housing stock are collected in Statistics Canada's *Survey of Household Spending*, which replaced the previous *Household Facilities and Equipment Survey*.

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 aim to collect information on the characteristics of energy-using appliances and equipment, the state of dwellings and the building stock, and the profile of consumers (including consumption habits). Their second goal is to collect data on the annual energy consumption of households. Flow surveys, however, gather information on variables affecting the housing stock, such as the characteristics of new equipment and new housing, and retrofit activities. For more information on the surveys conducted by the NEUD, visit its Web site at: [http://oee.nrcan.gc.ca/neud/dpa/data\\_e/neud\\_publications.cfm](http://oee.nrcan.gc.ca/neud/dpa/data_e/neud_publications.cfm).

Furthermore, the Office of Energy Efficiency (OEE) developed the Residential Energy 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).

Using data on the characteristics of the stock of residential buildings and equipment, the REUM allocates the energy use reported by Statistics Canada in its QRES to five end uses. To estimate the end-use energy use, the model uses annual stock and sales data and couples them with demand loads and unit energy consumption of the equipment stock.





The model estimates the household stock data by building type and vintage, using data found in the *Household Facilities and Equipment Survey* for the pre-1997 period and in the *Survey of Household Spending for 1997* onward. The OEE estimated the floor space data found in the model by using results from those two surveys, as well as the *Building Permits Survey* also conducted by Statistics Canada and from the 1993 and 1997 *Survey of Household Energy Use*, conducted by Statistics Canada on behalf of NRCan. The data on residential equipment stock comes from Statistics Canada's *Survey of Household Spending*, as well as other industry surveys. The data on demand load and unit energy consumption comes from various studies, some conducted at the request of NRCan.

Residential Energy Use by Fuel Type and End-Use

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a,d</sup></b>	<b>1,299.8</b>	<b>1,277.9</b>	<b>1,307.3</b>	<b>1,356.1</b>	<b>1,385.7</b>
<i>Energy Use by Fuel Type (PJ) <sup>a,d</sup></i>					
Electricity	467.4	465.8	476.0	476.7	478.4
Natural Gas	528.4	531.8	553.3	593.5	631.5
Heating Oil	186.4	162.3	166.5	172.5	163.0
Wood	95.8	94.8	91.1	99.5	99.0
Propane	19.9	21.2	18.4	12.1	12.3
Coal and Other	2.0	2.0	2.0	1.8	1.5
<i>Energy Use by End-Use (PJ) <sup>d</sup></i>					
Space Heating	784.7	770.2	801.3	837.1	849.8
Water Heating	279.4	275.6	276.9	283.5	295.3
Appliances	176.8	171.1	173.0	176.6	179.6
Lighting	52.0	51.4	52.7	52.0	53.9
Space Cooling	6.9	9.5	3.5	7.0	7.2
<b>Activity</b>					
Total Floor Space (million m <sup>2</sup> ) <sup>d</sup>	1,253.5	1,300.0	1,326.6	1,359.4	1,393.0
Total Households (thousands) <sup>b,c,d</sup>	9,966	10,255	10,437	10,633	10,793
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>a,d</sup></b>	<b>1.04</b>	<b>0.98</b>	<b>0.99</b>	<b>1.00</b>	<b>0.99</b>
<b>Energy Intensity (GJ/household) <sup>a,b,c,d</sup></b>	<b>130.4</b>	<b>124.6</b>	<b>125.3</b>	<b>127.5</b>	<b>128.4</b>

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
- c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).
- d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
1,354.7	1,451.1	1,404.5	1,272.7	1,323.3	1,388.1	6.8%
473.8	486.9	484.2	465.6	479.8	497.6	6.5%
630.5	696.0	648.1	577.8	609.3	644.8	22.0%
138.0	158.9	147.1	126.1	131.0	132.4	-29.0%
95.5	93.0	109.4	89.2	91.0	100.3	4.7%
14.5	14.2	13.8	12.4	10.5	11.4	-42.7%
2.3	2.3	2.0	1.7	1.7	1.6	-20.0%
824.3	904.5	860.4	729.8	769.8	830.7	5.9%
290.7	302.5	299.0	293.8	298.1	302.4	8.2%
176.6	180.6	181.7	180.5	183.7	186.0	5.2%
53.7	55.6	55.9	56.7	58.7	60.3	16.0%
9.4	7.9	7.6	11.8	13.0	8.6	24.6%
1,420.1	1,433.5	1,431.6	1,448.4	1,458.7	1,484.4	18.4%
10,977	11,148	11,224	11,385	11,553	11,728	17.7%
0.95	1.01	0.98	0.88	0.91	0.94	-9.6%
123.4	130.2	125.1	111.8	114.5	118.4	-9.2%

Residential GHG Emissions by Fuel Type and End-Use

	1990	1991	1992	1993	1994
<b>Total GHG Emissions Including Electricity (Mt) <sup>a,d,i</sup></b>	<b>69.6</b>	<b>66.9</b>	<b>71.9</b>	<b>68.9</b>	<b>69.1</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>a,d,i</sup></i>					
Electricity	26.2	25.0	28.9	23.8	23.3
Natural Gas	26.6	26.7	27.8	29.7	31.2
Heating Oil	13.7	11.9	12.2	12.7	12.0
Wood	1.8	1.7	1.7	1.8	1.8
Propane	1.2	1.2	1.1	0.7	0.7
Coal and Other	0.2	0.2	0.2	0.2	0.1
<i>GHG Emissions by End-Use (Mt) <sup>d,i</sup></i>					
Space Heating	41.3	39.8	42.6	42.6	42.5
Water Heating	15.2	14.6	15.4	14.5	14.9
Appliances	9.9	9.2	10.5	8.8	8.7
Lighting	2.9	2.8	3.2	2.6	2.6
Space Cooling	0.4	0.5	0.2	0.3	0.3
<b>GHG Intensity (tonne/TJ) <sup>a,d,i</sup></b>	<b>53.6</b>	<b>52.3</b>	<b>55.0</b>	<b>50.8</b>	<b>49.8</b>
<b>Total GHG Emissions Excluding Electricity (Mt) <sup>a,d,i</sup></b>	<b>43.4</b>	<b>41.8</b>	<b>43.0</b>	<b>45.1</b>	<b>45.8</b>
<i>GHG Emissions by End-Use (Mt) <sup>d,i</sup></i>					
Space Heating	34.4	32.9	34.0	35.6	35.9
Water Heating	8.8	8.7	8.7	9.2	9.8
Appliances	0.2	0.2	0.2	0.2	0.2
Lighting	0	0	0	0	0
Space Cooling	0	0	0	0	0
<b>GHG Intensity (tonne/TJ) <sup>a,d,i</sup></b>	<b>33.4</b>	<b>32.7</b>	<b>32.9</b>	<b>33.2</b>	<b>33.1</b>

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
- i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
68.5	73.0	72.4	69.2	70.7	74.7	7.3%
24.0	23.8	26.3	28.6	28.2	30.0	14.5%
31.5	34.8	32.3	28.8	30.4	32.3	21.4%
10.1	11.7	10.8	9.2	9.6	9.7	-29.2%
1.8	1.7	2.0	1.6	1.7	1.8	0.0%
0.8	0.8	0.8	0.7	0.6	0.7	-41.7%
0.2	0.2	0.2	0.2	0.2	0.2	0.0%
41.4	45.7	43.4	37.8	39.6	42.8	3.6%
14.9	15.3	15.7	16.2	16.1	16.6	9.2%
8.9	8.8	9.8	11.0	10.8	11.2	13.1%
2.7	2.7	3.0	3.5	3.5	3.6	24.1%
0.5	0.4	0.4	0.7	0.8	0.5	25.0%
50.5	50.3	51.6	54.4	53.4	53.8	0.4%
44.5	49.2	46.2	40.6	42.5	44.7	3.0%
34.7	38.8	35.9	30.4	32.2	34.2	-0.6%
9.6	10.2	10.1	10.0	10.1	10.2	15.9%
0.2	0.2	0.2	0.2	0.2	0.2	0.0%
0	0	0	0	0	0	–
0	0	0	0	0	0	–
32.8	33.9	32.9	31.9	32.1	32.2	-3.6%

## Residential Housing Stock and Floor Space

	1990	1991	1992	1993	1994
<b>Total Housing Stock (thousands) <sup>d</sup></b>	<b>11,026</b>	<b>11,365</b>	<b>11,583</b>	<b>11,813</b>	<b>12,047</b>
<i>Housing Stock by Building Type (thousands) <sup>d</sup></i>					
Single Detached	5,997	6,219	6,267	6,405	6,575
Single Attached	1,014	1,044	1,140	1,179	1,235
Apartments	3,722	3,785	3,840	3,892	3,904
Mobile Homes	293	317	336	338	333
<i>Housing Stock by Vintage (thousands) <sup>d</sup></i>					
before 1946	2,089	2,082	2,072	2,061	2,049
1946–1960	2,098	2,093	2,088	2,081	2,077
1961–1977	3,194	3,190	3,181	3,165	3,155
1978–1983	1,263	1,200	1,190	1,181	1,174
1984–1995	2,382	2,800	3,051	3,325	3,591
1996–2000	0	0	0	0	0
<b>Total Floor Space (million m<sup>2</sup>) <sup>d</sup></b>	<b>1,254</b>	<b>1,300</b>	<b>1,327</b>	<b>1,359</b>	<b>1,393</b>
<i>Floor Space by Building Type (million m<sup>2</sup>) <sup>d</sup></i>					
Single Detached	794	829	837	861	887
Single Attached	115	118	129	134	140
Apartments	317	322	327	332	333
Mobile Homes	28	30	33	33	33
<i>Floor Space by Vintage (million m<sup>2</sup>) <sup>d</sup></i>					
before 1946	239	238	237	236	235
1946–1960	214	213	213	212	212
1961–1977	347	346	345	344	343
1978–1983	154	146	145	144	144
1984–1995	300	356	386	423	460
1996–2000	0	0	0	0	0
<b>Average Size of Housing Unit (m<sup>2</sup>/house) <sup>d</sup></b>	<b>113.7</b>	<b>114.4</b>	<b>114.5</b>	<b>115.1</b>	<b>115.6</b>
<i>By House Type (m<sup>2</sup>/house) <sup>d</sup></i>					
Single Detached	132.4	133.3	133.6	134.4	135
Single Attached	113.2	113.2	113.4	113.3	113.1
Apartments	85	85.1	85.2	85.3	85.4
Mobile Homes	95.2	96.2	97	97.7	97.9
<i>By Vintage (m<sup>2</sup>/house) <sup>d</sup></i>					
before 1946	114.4	114.5	114.5	114.6	114.6
1946–1960	101.9	101.9	101.9	101.9	101.9
1961–1977	108.6	108.6	108.6	108.7	108.7
1978–1983	121.8	122	122.1	122.4	122.4
1984–1995	126	127.1	126.4	127.1	128
1996–2000	0	0	0	0	0

**Sources:**

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
<b>12,278</b>	<b>12,330</b>	<b>12,257</b>	<b>12,324</b>	<b>12,374</b>	<b>12,552</b>	<b>13.8%</b>
6,638	6,696	6,735	6,827	6,856	6,949	15.9%
1,344	1,353	1,321	1,320	1,348	1,355	33.6%
3,972	3,998	3,911	3,876	3,891	3,949	6.1%
324	283	290	301	279	298	1.7%
2,038	2,021	1,998	1,975	1,946	1,935	-7.4%
2,069	2,055	2,029	1,996	1,950	1,933	-7.9%
3,142	3,131	3,080	3,023	2,983	2,973	-6.9%
1,167	1,159	1,132	1,109	1,096	1,090	-13.7%
3,862	3,537	3,373	3,259	3,201	3,161	32.7%
0	428	645	961	1,198	1,460	–
<b>1,420</b>	<b>1,433</b>	<b>1,432</b>	<b>1,448</b>	<b>1,459</b>	<b>1,484</b>	<b>18.3%</b>
897	910	918	936	943	960	20.9%
151	154	151	152	155	157	36.5%
340	342	334	331	333	338	6.6%
32	28	29	30	27	29	3.6%
234	232	229	227	224	222	-7.1%
211	209	207	204	199	197	-7.9%
342	340	335	329	325	324	-6.6%
143	142	139	136	135	134	-13.0%
491	451	432	418	411	407	35.7%
0	59	89	134	165	200	–
<b>115.7</b>	<b>116.3</b>	<b>116.8</b>	<b>117.5</b>	<b>117.9</b>	<b>118.3</b>	<b>4.0%</b>
135.2	136	136.3	137.1	137.6	138.1	4.3%
112.6	113.5	114.3	115	115.3	115.9	2.4%
85.5	85.5	85.4	85.3	85.5	85.6	0.7%
98.2	98	98.2	98.5	98.5	98.7	3.7%
114.7	114.6	114.8	114.8	114.9	114.9	0.4%
101.9	101.9	102	102	102.1	102.1	0.2%
108.7	108.7	108.9	108.9	108.9	108.9	0.3%
122.5	122.6	122.8	122.9	122.9	123	1.0%
127.1	127.6	128	128.4	128.5	128.7	2.1%
0	137.1	137.9	139.4	138	136.9	–

## Residential Lighting and Space Cooling Details

	1990	1991	1992	1993	1994
<b>Total Lighting Energy Use (PJ)*<sup>d</sup></b>	<b>52</b>	<b>51.4</b>	<b>52.7</b>	<b>52</b>	<b>53.9</b>
<b>Activity</b>					
Total Floor Space (million m <sup>2</sup> ) <sup>d</sup>	1,253.5	1,300.0	1,326.6	1,359.4	1,393.0
<b>Energy Intensity (MJ/m<sup>2</sup>)<sup>d</sup></b>	<b>41.5</b>	<b>39.6</b>	<b>39.7</b>	<b>38.3</b>	<b>38.7</b>
<b>Heat Loss (PJ)<sup>d</sup></b>	<b>21.3</b>	<b>21.3</b>	<b>23.1</b>	<b>23.3</b>	<b>23.5</b>
<b>Total Space Cooling Energy Use (PJ)*<sup>d</sup></b>	<b>6.9</b>	<b>9.5</b>	<b>3.5</b>	<b>7</b>	<b>7.2</b>
<i>Energy Use by Cooling-System Type (PJ)<sup>d</sup></i>					
Room	1.4	1.7	0.6	1.1	1.1
Central	5.5	7.8	2.9	5.8	6
<b>Activity</b>					
Floor Space (million m <sup>2</sup> ) <sup>d</sup>	318	342.1	356.9	377.5	394.9
<b>Energy Intensity (MJ/m<sup>2</sup>)<sup>d</sup></b>	<b>21.7</b>	<b>27.8</b>	<b>9.8</b>	<b>18.4</b>	<b>18.1</b>
<b>Cooling Degree-Days Index<sup>d</sup></b>	<b>1.05</b>	<b>1.35</b>	<b>0.54</b>	<b>0.99</b>	<b>0.98</b>
<b>Total Cooling System Stock (thousands)<sup>b,c,d</sup></b>	<b>2,466</b>	<b>2,619</b>	<b>2,721</b>	<b>2,860</b>	<b>2,968</b>
<i>System Stock by Cooling-System Type (thousands)<sup>b,c,d</sup></i>					
Room	1,090	1,091	1,079	1,095	1,104
Central	1,376	1,528	1,642	1,765	1,864
<b>Cooling Systems New Units Efficiencies<sup>d</sup></b>					
Room (EER) <sup>1</sup>	7.1	7.2	8.4	8.4	9.1
Central (SEER) <sup>2</sup>	9.1	9.3	9.6	9.7	10.2
<b>Cooling Systems Stock Efficiencies<sup>d</sup></b>					
Room (EER) <sup>1</sup>	6.8	6.9	6.9	7	7.2
Central (SEER) <sup>2</sup>	8.5	8.7	8.8	8.9	9.1

\* Lighting and space cooling consume only electricity.

1) Energy Efficiency Ratio.

2) Seasonal Energy Efficiency Ratio.

### Sources:

b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).

c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

g) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.



1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
53.7	55.6	55.9	56.7	58.7	60.3	16.0%
1,420.1	1,433.5	1,431.6	1,448.4	1,458.7	1,484.4	18.4%
37.8	38.8	39	39.2	40.3	40.6	-2.2%
23.4	25.3	24.4	21.2	23.1	25.8	21.1%
9.4	7.9	7.6	11.8	13	8.6	24.6%
1.4	1.2	1.2	1.7	1.9	1.2	-14.3%
8	6.7	6.4	10.1	11.1	7.4	34.5%
415.9	440.4	463.2	488.7	501.4	514.9	61.9%
22.7	18	16.3	24.1	25.9	16.7	-23.0%
1.14	0.96	0.89	1.26	1.42	0.86	-18.1%
3,121	3,319	3,516	3,708	3,854	3,941	59.8%
1,158	1,257	1,353	1,405	1,448	1,451	33.1%
1,963	2,061	2,163	2,304	2,406	2,490	81.0%
9.2	9.4	9.4	9.4	9.4	9.4	32.4%
10.2	10.3	10.3	10.3	10.3	10.3	13.2%
7.4	7.6	7.8	7.9	8.1	8.3	22.1%
9.2	9.3	9.4	9.5	9.6	9.7	14.1%

## Residential Appliances Details

	1990	1991	1992	1993	1994
<b>Total Appliances Energy Use (PJ) <sup>d</sup></b>	<b>176.8</b>	<b>171.1</b>	<b>173</b>	<b>176.6</b>	<b>179.6</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Electricity	173.1	167.5	169.6	172.7	175.9
Natural Gas	3.6	3.6	3.4	3.8	3.7
<i>Energy Use by Appliance Type (PJ) <sup>d</sup></i>					
Refrigerator	51.8	49.7	49.3	47.2	46.3
Freezer	21	20.3	20	19.3	19.3
Dishwasher <sup>1</sup>	1.8	1.8	1.8	1.8	1.8
Clothes Washer <sup>1</sup>	2.3	2.2	2.3	2.3	2.3
Clothes Dryer	28.1	27.3	27.5	27	27.4
Range	24.2	23.8	24.3	24.4	25.2
Other*	47.6	46	47.7	54.6	57.4
<b>Activity</b>					
Total Households (thousands) <sup>b,c,d</sup>	9,966	10,255	10,437	10,633	10,793
<b>Energy Intensity (GJ/household) <sup>b,c,d</sup></b>					
	<b>17.7</b>	<b>16.7</b>	<b>16.6</b>	<b>16.6</b>	<b>16.6</b>
<b>Heat Loss by Appliance Type (PJ) <sup>d</sup></b>					
Refrigerator	21.5	20.9	21.9	21.4	20.5
Freezer	8.8	8.6	8.9	8.8	8.6
Dishwasher	0.8	0.8	0.8	0.8	0.8
Clothes Washer	1	0.9	1	1	1
Clothes Dryer	3.3	3.2	3.4	3.4	3.4
Range	10	10	10.8	11.1	11.1
Other*	19.7	19.3	21.2	24.8	25.4
<b>Penetration Rate by Appliance Type (appliances per household) <sup>b,c,d</sup></b>					
Refrigerator	1.18	1.18	1.18	1.19	1.18
Freezer	0.57	0.57	0.57	0.58	0.58
Dishwasher	0.42	0.43	0.44	0.45	0.46
Clothes Washer	0.75	0.74	0.75	0.76	0.76
Clothes Dryer	0.73	0.73	0.73	0.74	0.74
Range	0.98	0.98	0.99	0.99	0.98

\* "Other" includes televisions, video cassette recorders, digital video disc players, radios, computers, toasters, etc.

1) Excludes hot water requirements.

### Sources:

- b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
- c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).
- d) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2002.
- e) Special tabulations from *Energy Consumption of Major Household Appliances Marketed in Canada — Trends for 1990–2000*, Ottawa.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
176.6	180.6	181.7	180.5	183.7	186	5.2%
172.9	176.2	177.4	176.3	179.5	181.7	5.0%
3.7	4.4	4.3	4.3	4.2	4.3	19.4%
43.9	43.9	42.6	40.8	40.8	39.6	-23.6%
18.2	18	17.7	16.7	15.9	15.5	-26.2%
1.8	1.8	1.8	1.8	1.7	1.8	0.0%
2.3	2.3	2.3	2.3	2.3	2.3	0.0%
27.2	27.7	28.3	28.4	28.5	29	3.2%
25.2	26.4	26.4	26.6	27.5	28.3	16.9%
58	60.6	62.6	63.9	66.9	69.6	46.2%
10,977	11,148	11,224	11,385	11,553	11,728	17.7%
16.1	16.2	16.2	15.9	15.9	15.9	-10.2%
19.4	20.2	18.8	15.4	16.2	17.1	-20.5%
8.1	8.4	7.9	6.4	6.4	6.8	-22.7%
0.8	0.8	0.8	0.7	0.7	0.8	0.0%
1	1.1	1	0.9	0.9	1	0.0%
3.4	3.6	3.5	3	3.2	3.5	6.1%
11.1	12.1	11.6	10	10.9	12.2	22.0%
25.7	27.8	27.7	24.2	26.5	30.1	52.8%
1.18	1.20	1.22	1.22	1.24	1.22	3.4%
0.57	0.57	0.59	0.59	0.58	0.58	1.8%
0.47	0.48	0.49	0.51	0.49	0.51	21.4%
0.78	0.78	0.81	0.81	0.80	0.81	8.0%
0.76	0.76	0.80	0.81	0.80	0.81	11.0%
0.99	0.99	0.99	0.99	0.99	0.99	1.0%

*continued*

Residential Appliances Details *continued*

	1990	1991	1992	1993	1994
<b>UEC<sup>2</sup> for New Electric Appliances (kWh/year) <sup>e</sup></b>					
Refrigerator	956	931	902	720	650
Freezer	714	445	449	402	389
Dishwasher <sup>1</sup>	123	115	109	110	93
Clothes Washer <sup>1</sup>	97	96	94	88	79
Clothes Dryer	1,103	1,109	983	928	910
Range	772	778	779	782	774

<b>UEC<sup>2</sup> for New Natural Gas Appliances (kWh/year) <sup>d</sup></b>					
Clothes Dryer	925	912	906	903	896
Range	1,357	1,294	1,283	1,267	1,251

<b>UEC<sup>2</sup> for Stock of Electric Appliances (kWh/year) <sup>d</sup></b>					
Refrigerator	1,525	1,478	1,427	1,363	1,294
Freezer	1,291	1,250	1,206	1,157	1,108
Dishwasher <sup>1</sup>	153	149	144	139	133
Clothes Washer <sup>1</sup>	106	105	103	101	99
Clothes Dryer	1,314	1,293	1,265	1,233	1,200
Range	802	800	798	796	793

<b>UEC<sup>2</sup> for Stock of Natural Gas Appliances (kWh/year) <sup>d</sup></b>					
Clothes Dryer	1,468	1,398	1,314	1,228	1,156
Range	1,534	1,521	1,505	1,481	1,456

\* "Other" includes televisions, video cassette recorders, digital video disc players, radios, computers, toasters, etc.

1) Excludes hot water requirements.

2) Unit energy consumption based on rated efficiency.

**Sources:**

b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).

c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).

d) Natural Resources Canada, *Residential End-Use Model*, Ottawa, February 2002.

e) Special tabulations from *Energy Consumption of Major Household Appliances Marketed in Canada — Trends for 1990–2000*, Ottawa.

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
642	640	657	651	645	640	-33.1%
382	377	376	381	383	391	-45.2%
81	80	78	78	77	76	-38.2%
77	76	74	72	69	67	-30.9%
909	887	887	900	908	910	-17.5%
771	774	772	771	759	760	-1.6%
889	880	880	880	880	880	-4.9%
1,236	1,226	1,226	1,226	1,226	1,226	-9.7%
1,230	1,166	1,105	1,047	993	945	-38.0%
1,057	1,005	949	893	836	782	-39.4%
127	122	116	111	106	101	-34.0%
97	94	92	89	87	84	-20.8%
1,171	1,141	1,112	1,087	1,063	1,042	-20.7%
791	789	787	785	782	780	-2.7%
1,100	1,050	1,010	979	955	938	-36.1%
1,432	1,410	1,387	1,364	1,344	1,326	-13.6%

Residential Space Heating Energy Use and System Stock Share

	1990	1991	1992	1993	1994
<b>Total Space Heating Energy Use (PJ) <sup>d</sup></b>	<b>784.7</b>	<b>770.2</b>	<b>801.3</b>	<b>837.1</b>	<b>849.8</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Electricity	122.5	127.4	140.1	138.7	136.4
Natural Gas	380.4	382.9	401.1	430.6	455.6
Heating Oil	167.5	146.2	151.9	156.7	147.3
Wood	95.5	94.5	90.8	99.1	98.7
Propane	16.9	17.3	15.5	10.3	10.5
Coal and Other	1.9	1.9	1.8	1.7	1.4
<i>Energy Use by Vintage (PJ) <sup>d</sup></i>					
before 1946	226.8	216.4	224.8	230.5	228.4
1946–1960	154.7	147.4	151.4	155.5	154.8
1961–1977	196.7	188.4	191.5	196.7	196.6
1978–1983	85	77.5	78.5	80.4	80.3
1984–1995	121.4	140.5	155.1	174	189.8
1996–2000	0	0	0	0	0
<b>Activity</b>					
Total Floor Space (million m <sup>2</sup> ) <sup>d</sup>	1,253.5	1,300.0	1,326.6	1,359.4	1,393.0
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>d</sup></b>	<b>0.63</b>	<b>0.59</b>	<b>0.6</b>	<b>0.62</b>	<b>0.61</b>
<b>Heat Gains (PJ) <sup>d</sup></b>	<b>91.3</b>	<b>90</b>	<b>96.4</b>	<b>100.1</b>	<b>100</b>
<b>Heating Degree-Days Index <sup>f</sup></b>	<b>0.92</b>	<b>0.93</b>	<b>0.99</b>	<b>1.01</b>	<b>0.99</b>
<b>Heating System Stock Share by System Type (%) <sup>d</sup></b>					
Heating Oil – Normal Efficiency	14	12.8	12	10.6	10.6
Heating Oil – Medium Efficiency	0.2	1.4	1.3	1.2	1.3
Heating Oil – High Efficiency	0	0	0	0	0
Natural Gas – Normal Efficiency	40.4	39.8	39.2	38.6	38
Natural Gas – Medium Efficiency	1.1	1.3	2.5	3.6	4.6
Natural Gas – High Efficiency	2.3	2.5	2.9	3.2	3.7
Electric	28	28.6	29	29.1	27.8
Heat Pump	2.3	2.3	2.5	2.6	2.8
Propane	0.8	0.7	0.8	0.8	1
Wood	1.6	1.6	1.1	1.7	1.9
Coal and Other	0.1	0.2	0.1	0.1	0.1
<i>Duals</i>					
Wood/Electric	5.5	5.2	4.9	4.7	4.6
Wood/Heating Oil	2.6	2.4	2.3	2.3	2.2
Gas/Electric	0.3	0.3	0.3	0.4	0.4
Heating Oil/Electric	0.9	0.9	1	1	1

Sources:

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

f) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.

## End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
824.3	904.5	860.4	729.8	769.8	830.7	5.9%
133.6	142	139.4	120	125.6	141.9	15.8%
455.6	509.8	467.2	399.8	428.1	461	21.2%
125.3	145.3	132.2	111.2	116.1	117.9	-29.6%
95.3	92.7	108.5	87.8	90.3	99.3	4.0%
12.3	12.5	11.1	9.5	8.1	9	-46.7%
2.2	2.1	1.9	1.6	1.6	1.5	-21.1%
216.9	234.7	222.5	179.4	188.4	201.6	-11.1%
148.3	160.9	151	125.1	129.1	136.4	-11.8%
189.2	207.1	192.5	162.7	167.8	178.2	-9.4%
77	84.2	77.7	65.5	67.6	71.9	-15.4%
193	190.8	176.5	145.7	150.7	157.7	29.9%
0	26.9	40.2	51.5	66.2	84.9	–
1,420.1	1,433.5	1,431.6	1,448.4	1,458.7	1,484.4	18.4%
0.58	0.63	0.6	0.5	0.53	0.56	-11.1%
98.5	105.4	101.5	86.7	93	103.1	12.9%
0.99	1.03	0.98	0.85	0.89	0.96	4.3%
9.8	9.2	8.3	8	7.4	7	
1.8	1.9	1.9	2.5	3.5	2.8	
0	0	0	0	0	0	
36.6	35.2	33.1	31.6	30.6	28.4	
5.4	6.1	7.1	8.3	8.9	10.5	
4.1	4.7	5.3	6.2	6.5	7.1	
28.5	29.5	29.4	29.2	28.6	29.5	
2.8	2.7	2.7	2.7	2.7	2.7	
1	0.9	1.1	1	1.1	1.2	
1.3	1.4	2.6	2.2	2.2	2.3	
0.1	0.1	0.3	0.1	0.4	0.3	
5	4.6	4.6	4.6	4.6	4.5	
2.3	2.2	2.2	2.2	2.2	2.2	
0.4	0.4	0.4	0.4	0.4	0.3	
1	1	1	1	1	1	

Residential Water Heating Energy Use and Water Heater Stock Share

	1990	1991	1992	1993	1994
<b>Total Water Heating Energy Use (PJ) <sup>d</sup></b>	<b>279.4</b>	<b>275.6</b>	<b>276.9</b>	<b>283.5</b>	<b>295.3</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Electricity	112.8	109.9	110.1	106.3	105.1
Natural Gas	144.4	145.3	148.8	159.1	172.2
Heating Oil	18.8	16	14.7	15.8	15.8
Wood	0.3	0.3	0.2	0.4	0.3
Propane	3	4	2.9	1.8	1.8
Coal and Other	0.1	0.2	0.2	0.2	0.1
<b>Activity</b>					
Total Households (thousands) <sup>b,c,d</sup>	9,966	10,255	10,437	10,633	10,793
<b>Energy Intensity (GJ/household) <sup>b,c,d</sup></b>					
	<b>28</b>	<b>26.9</b>	<b>26.5</b>	<b>26.7</b>	<b>27.4</b>
<b>Water Heater Stock Market Shares (%) <sup>d</sup></b>					
Electricity	55.7	55.8	55	53.9	52.5
Natural Gas	39.1	39.2	40.5	41.7	42.7
Heating Oil	4.7	4.4	4	3.8	4.1
Wood	0.1	0.1	0.1	0.1	0.1
Propane	0.4	0.5	0.5	0.5	0.6
Coal and Other	0	0.1	0	0	0.1
<b>Heat Loss (PJ) <sup>d</sup></b>					
	<b>5</b>	<b>4.9</b>	<b>5.2</b>	<b>5.5</b>	<b>5.6</b>

Sources:

- b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
- c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990–October 1997, (Cat. No. 64-202).
- d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.



1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
290.7	302.5	299	293.8	298.1	302.4	8.2%
104.3	105.2	103.9	100.8	103	105.1	-6.8%
171.1	181.8	176.5	173.7	177	179.5	24.3%
12.8	13.6	14.8	14.9	14.8	14.5	-22.9%
0.2	0.2	0.9	1.4	0.8	0.9	200.0%
2.1	1.6	2.7	2.9	2.4	2.3	-23.3%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
10,977	11,148	11,224	11,385	11,553	11,728	17.7%
26.5	27.1	26.6	25.8	25.8	25.8	-7.9%
52.7	52.8	52.3	51.1	51.1	51.1	
42.7	42.9	42.7	43.4	43.7	43.6	
3.9	3.7	3.9	4.3	4.1	4.1	
0.1	0.1	0.2	0.4	0.2	0.2	
0.6	0.5	0.8	0.9	0.9	0.9	
0	0	0.1	0	0.1	0.1	
5.5	6.1	5.7	4.9	5.2	5.8	16.0%



# Chapter 3 Commercial/ Institutional Sector

## The Data Situation

Of the five sectors of the economy reviewed in this report, the commercial/institutional sector has the most significant data limitations.

Statistics Canada published the data on aggregate commercial/institutional energy use under the “commercial and other institutional” and “public administration” categories in its *Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). As well, energy use data in the commercial/institutional sector is not quantified through a data collection exercise – it is essentially the residual of energy use not accounted for in the residential, industrial, transportation and agriculture sectors. Another key variable in this sector is floor space, which is used as an approximation for commercial/institutional activity. Since reliable national data on commercial/institutional floor space is non-existent, estimates are based on investment flows and average new construction costs per floor area. In 1997, floor space estimates were benchmarked against provincial data from surveys and audits.

To address the problem of data limitation in the commercial/institutional sector, the Office of Energy Efficiency (OEE), through the National Energy Use Database, funded the *Commercial and Institutional Building Energy Use Survey*. This survey will be the first to provide national data on commercial/institutional floor space and energy use. It is being conducted by Statistics Canada on behalf of Natural Resources Canada (NRCan). Results are expected for summer 2002.



The OEE developed the Commercial Energy Use Model (CEUM) to assess trends in energy use in the Canadian commercial/institutional sector. It uses floor space estimates by region and building type (from Informetrica Limited) and energy intensity estimates by region, building type and end-use (from NRCan) to allocate the energy use reported by Statistics Canada in the QRESD to nine building types and six end-uses.

The model also takes into account the influence of weather in commercial/institutional energy demand. To do so, 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.

Commercial Energy Use by Fuel Type, End-Use and Building Type

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a</sup></b>	<b>867</b>	<b>888.9</b>	<b>901.2</b>	<b>933.1</b>	<b>927.6</b>
<i>Energy Use by Fuel Type (PJ) <sup>a</sup></i>					
Electricity	390.1	398	397.6	408	409.5
Natural Gas	387.1	403.4	416.6	433.1	420.2
Propane	16.1	18.3	18.6	22.8	33.1
Light Fuel Oil and Kerosene	62	58.1	56.9	57.7	52.4
Heavy Fuel Oil	11.4	11	11.5	11.2	11.9
Other	0.4	0.2	0	0.3	0.5
<i>Energy Use by End-Use (PJ) <sup>c,f</sup></i>					
Lighting	127.4	129	130.3	131.8	133.2
Space Cooling	39.8	49.8	29.1	40.4	44.1
Auxiliary Motors	103.8	105.2	106.2	107.3	108
Auxiliary Equipment	65.5	67.3	67.2	67.8	68.6
Space Heating	428.1	434.4	465.6	482	469.4
Water Heating	93.3	94.5	94.3	95.5	96.2
Street Lighting	8.9	8.7	8.4	8.3	8.0
<i>Energy Use by Building Type (PJ) <sup>* c</sup></i>					
Schools	119	121.3	125.6	130	127.6
Health Care Institutions	106.1	107.3	110.3	113.2	112.1
Religious Institutions	11.6	11.5	11.8	11.9	11.6
Other Institutions	33.6	35.3	36	38.2	38.1
Offices	189.8	197.5	203.2	210.7	212.6
Retail Organizations	220.6	224.3	221.6	229	226.3
Hotels and Restaurants	76.8	80.9	79	83	83.8
Recreational Facilities	49	50.6	53.6	56.2	56.6
Warehouses	51.7	51.5	51.8	52.7	50.9

\*Excludes street lighting.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space, 1998 Database Update*, Ottawa, January 2001.
- c) Natural Resources Canada, *Commercial End-Use Model*, Ottawa, February 2002.
- d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.
- e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.
- f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

## End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
960.9	981.5	998.5	944.1	979.2	1,058.8	22.1%
421.2	426.9	436.6	431.3	436.8	453.1	16.1%
427.6	451.2	452.7	418.5	443.8	488.5	26.2%
41.8	34.3	39.3	29.5	34.3	36.1	124.2%
61.2	59.7	57.5	47.6	47	60.4	-2.6%
8.6	9	11.8	16.8	17	19.8	73.7%
0.5	0.4	0.6	0.4	0.3	1	150.0%
133.3	133.7	136.4	139	141.7	151.2	18.7%
47.5	44.7	44.4	61	62.3	46.1	15.8%
108.3	108.5	110	112	114	120.8	16.4%
68.4	68.4	70.2	71.4	73.5	78.5	19.8%
499.6	522.5	532.9	455.3	481	550.8	28.7%
96.2	96.2	97.1	97.9	99.3	104.1	11.6%
7.8	7.5	7.4	7.5	7.4	7.3	-18.0%
133.2	139	140.1	126.6	132.2	147.8	24.2%
115.9	119.2	120.9	113.3	117.7	124.8	17.6%
11.8	12.1	12	10.9	11.4	12	3.4%
40.5	42.5	42.9	39.4	41.4	44	31.0%
222.6	229.8	239.7	224.7	234.6	261.2	37.6%
230.7	229.7	231.9	227.7	234.1	254.4	15.3%
85.5	86.1	87.7	86.3	88.6	90.2	17.4%
60.9	63.5	64.4	59.4	61.3	64.5	31.6%
52.1	52.3	51.4	48.4	50.5	52.6	1.7%
<i>continued</i>						

Commercial Energy Use by Fuel Type, End-Use and Building Type *continued*

	1990	1991	1992	1993	1994
<b>Activity</b>					
Total Floor Space (million m <sup>2</sup> ) <sup>b</sup>	465.9	480.4	491	498.8	503.9
<b>Energy Intensity (GJ/m<sup>2</sup>)*<sup>a,b</sup></b>	<b>1.84</b>	<b>1.83</b>	<b>1.82</b>	<b>1.85</b>	<b>1.83</b>
<b>Heating Degree-Days Index<sup>d</sup></b>	<b>0.92</b>	<b>0.93</b>	<b>0.99</b>	<b>1.01</b>	<b>0.99</b>
<b>Cooling Degree-Days Index<sup>e</sup></b>	<b>1.05</b>	<b>1.35</b>	<b>0.54</b>	<b>0.99</b>	<b>0.98</b>

\*Excludes street lighting.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.
- c) Natural Resources Canada, *Commercial End-Use Model*, Ottawa, February 2002.
- d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.
- e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.
- f) Statistics Canada, *Electric Power Annual Statistics*, 1999, Ottawa, July 2001; (Cat. 57-202).  
Data for 2000 estimated by Natural Resources Canada.



						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
508.8	513.5	520.5	529.4	545.8	578.1	24.1%
1.87	1.9	1.9	1.77	1.78	1.82	-1.1%
0.99	1.03	0.98	0.85	0.89	0.96	4.3%
1.14	0.96	0.89	1.26	1.42	0.86	-18.1%

Commercial Energy Use by Building Type and Fuel Type

	1990	1991	1992	1993	1994
<b>Total Energy Use by Schools (PJ) <sup>c</sup></b>	<b>119</b>	<b>121.3</b>	<b>125.6</b>	<b>130</b>	<b>127.6</b>
<i>Energy Use by Fuel Type (PJ) <sup>c</sup></i>					
Electricity	31.2	31.6	33.5	33.6	33.4
Natural Gas	70.7	73.2	75.5	79.1	75.2
Propane	2.5	2.8	3	3.7	6.1
Light Fuel Oil and Kerosene	12.2	11.5	11.2	11.3	10.2
Heavy Fuel Oil	2.3	2.2	2.3	2.3	2.5
Other	0.1	0	0	0.1	0.1

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	66.88	69.16	70.71	71.97	73.06
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>1.78</b>	<b>1.75</b>	<b>1.78</b>	<b>1.81</b>	<b>1.75</b>

<b>Total Energy Use by Health Care Institutions (PJ) <sup>c</sup></b>	<b>106.1</b>	<b>107.3</b>	<b>110.3</b>	<b>113.2</b>	<b>112.1</b>
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<i>Energy Use by Fuel Type (PJ) <sup>c</sup></i>					
Electricity	33.4	33.4	34.6	34.6	34.6
Natural Gas	57.5	59.8	61.6	63.9	62.1
Propane	1.6	1.7	1.9	2.2	3.5
Light Fuel Oil and Kerosene	11.4	10.5	10.2	10.3	9.4
Heavy Fuel Oil	2.1	1.8	2.1	2.1	2.4
Other	0	0	0	0	0.1

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	32.75	33.15	33.98	34.25	34.83
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>3.24</b>	<b>3.24</b>	<b>3.25</b>	<b>3.3</b>	<b>3.22</b>

<b>Total Energy Use by Religious Institutions (PJ) <sup>c</sup></b>	<b>11.6</b>	<b>11.5</b>	<b>11.8</b>	<b>11.9</b>	<b>11.6</b>
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<i>Energy Use by Fuel Type (PJ) <sup>c</sup></i>					
Electricity	3.2	3.1	3.2	3.1	3
Natural Gas	6.6	6.6	6.8	7	6.8
Propane	0.2	0.2	0.2	0.3	0.4
Light Fuel Oil and Kerosene	1.4	1.3	1.3	1.2	1.1
Heavy Fuel Oil	0.2	0.2	0.2	0.2	0.2
Other	0	0	0	0	0

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	8.85	8.87	8.87	8.83	8.89
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>1.32</b>	<b>1.3</b>	<b>1.33</b>	<b>1.34</b>	<b>1.31</b>

**Sources:**

- b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
133.2	139	140.1	126.6	132.2	147.8	24.2%
34.8	36.2	37.6	34	34.3	36.5	17.0%
74.9	81.6	79.8	73.8	77.5	87.5	23.8%
9.1	7.2	8.4	6	7.4	7.6	204.0%
12.6	12.1	11.8	9.4	9.6	12.2	0.0%
1.6	1.8	2.4	3.3	3.3	3.8	65.2%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
74.32	75.86	77.27	78.16	80.59	85.73	28.2%
1.79	1.83	1.81	1.62	1.64	1.72	-3.4%
115.9	119.2	120.9	113.3	117.7	124.8	17.6%
36.1	36.9	38	36.3	36.7	37.6	12.6%
62.1	66.6	66.1	62.2	65.7	68.5	19.1%
4.8	3.7	4.3	3.1	3.5	3.6	125.0%
11.1	9.9	9.8	8	8.1	11	-3.5%
1.8	2	2.6	3.6	3.7	3.9	85.7%
0	0	0.1	0	0	0.1	–
35.25	35.71	36.35	36.68	37.82	39.15	19.5%
3.29	3.34	3.32	3.09	3.11	3.19	-1.5%
11.8	12.1	12	10.9	11.4	12	3.4%
3.1	3.2	3.3	3	3	3.1	-3.1%
6.8	7.1	6.9	6.2	6.7	7	6.1%
0.5	0.4	0.4	0.3	0.4	0.4	100.0%
1.2	1.2	1.2	1	1	1.2	-14.3%
0.2	0.2	0.3	0.3	0.3	0.4	100.0%
0	0	0	0	0	0	–
8.9	8.9	8.88	8.95	9.23	9.31	5.2%
1.32	1.36	1.35	1.22	1.24	1.29	-2.3%

continued

Commercial Energy Use by Building Type and Fuel Type *continued*

	1990	1991	1992	1993	1994
<b>Total Energy Use by Other Institutions (PJ) <sup>c</sup></b>	<b>33.6</b>	<b>35.3</b>	<b>36</b>	<b>38.2</b>	<b>38.1</b>
<i>Energy Use by Fuel Type (PJ) <sup>c</sup></i>					
Electricity	9.8	10.4	10.5	10.9	11.1
Natural Gas	19.7	20.9	21.4	22.9	22.4
Propane	0.6	0.7	0.8	1	1.5
Light Fuel Oil and Kerosene	3	2.8	2.8	2.9	2.6
Heavy Fuel Oil	0.5	0.4	0.5	0.5	0.5
Other	0	0	0	0	0

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	19.8	20.81	21.52	21.95	22.7
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>1.7</b>	<b>1.69</b>	<b>1.68</b>	<b>1.74</b>	<b>1.68</b>

<b>Total Energy Use by Offices (PJ) <sup>c</sup></b>	<b>189.8</b>	<b>197.5</b>	<b>203.2</b>	<b>210.7</b>	<b>212.6</b>
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*Energy Use by Fuel Type (PJ) <sup>c</sup>*

Electricity	89.1	93.4	93.6	97.4	99.1
Natural Gas	81.8	85.8	90.8	93.1	92.2
Propane	3.5	3.9	4.2	5.2	7
Light Fuel Oil and Kerosene	12.8	12	12.1	12.5	11.6
Heavy Fuel Oil	2.5	2.5	2.4	2.4	2.6
Other	0.1	0	0	0.1	0.1

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	121.11	128.12	133.34	137.13	139.07
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>1.57</b>	<b>1.54</b>	<b>1.52</b>	<b>1.54</b>	<b>1.53</b>

<b>Total Energy Use by Retail Organizations (PJ) <sup>c</sup></b>	<b>220.6</b>	<b>224.3</b>	<b>221.6</b>	<b>229</b>	<b>226.3</b>
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*Energy Use by Fuel Type (PJ) <sup>c</sup>*

Electricity	128.7	130.5	126.2	129.8	129.5
Natural Gas	77.6	79.6	81.4	84.5	80.3
Propane	3	3.4	3.5	4.4	7
Light Fuel Oil and Kerosene	9.3	8.7	8.5	8.4	7.5
Heavy Fuel Oil	1.9	2	2	1.9	1.8
Other	0.1	0	0	0.1	0.1

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	110.31	111.95	112.94	113.73	113.65
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>2</b>	<b>2</b>	<b>1.96</b>	<b>2.01</b>	<b>1.99</b>

**Sources:**

- b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
40.5	42.5	42.9	39.4	41.4	44	31.0%
12	12.4	12.9	12.5	12.5	12.7	29.6%
23.2	25	24.9	22.3	24.1	25.8	31.0%
1.7	1.4	1.5	1.2	1.3	1.4	133.3%
3.1	3.2	3	2.4	2.5	3	0.0%
0.4	0.4	0.6	0.9	1	1	100.0%
0	0	0	0	0	0.1	–
23.59	24.27	24.93	25.2	25.98	26.89	35.8%
1.71	1.75	1.72	1.56	1.59	1.64	-3.5%
222.6	229.8	239.7	224.7	234.6	261.2	37.6%
103.5	106	110.1	108.2	110.3	117.8	32.2%
95.7	100.8	104.8	95.2	102.1	116.9	42.9%
8.8	7.9	9.2	7.2	8.5	9	157.1%
12.5	13.2	12.9	10.6	10.3	13	1.6%
1.9	1.8	2.4	3.4	3.3	4.3	72.0%
0.1	0.1	0.2	0.1	0.1	0.3	200.0%
140.38	141.8	145.31	148.08	152.66	165.87	37.0%
1.59	1.62	1.65	1.52	1.54	1.57	0.0%
230.7	229.7	231.9	227.7	234.1	254.4	15.3%
130.3	129.5	130.9	133.7	135.4	141.6	10.0%
81.3	84.2	84.4	79.1	83.3	93.9	21.0%
8.5	6.7	7.7	6	6.8	7.2	140.0%
9.2	8	7.2	6.3	6	8.2	-11.8%
1.3	1.2	1.6	2.6	2.5	3.2	68.4%
0.1	0.1	0.1	0.1	0.1	0.2	100.0%
112.86	112.43	113.12	115.96	119.56	129.34	17.3%
2.04	2.04	2.05	1.96	1.96	1.97	-1.5%
						<i>continued</i>

Commercial Energy Use by Building Type and Fuel Type *continued*

	1990	1991	1992	1993	1994
<b>Total Energy Use by Hotels and Restaurants (PJ) <sup>c</sup></b>	<b>76.8</b>	<b>80.9</b>	<b>79</b>	<b>83</b>	<b>83.8</b>
<i>Energy Use by Fuel Type (PJ) <sup>c</sup></i>					
Electricity	40.5	41.3	40.6	43.1	43.5
Natural Gas	28.5	30.8	30.7	31.8	31.6
Propane	3.1	4	3.2	3.7	4.4
Light Fuel Oil and Kerosene	4	4	3.7	3.7	3.4
Heavy Fuel Oil	0.7	0.9	0.8	0.8	0.8
Other	0	0	0	0	0

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	26.14	27.13	27.57	28.28	28.61
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>2.94</b>	<b>2.98</b>	<b>2.86</b>	<b>2.94</b>	<b>2.93</b>

<b>Total Energy Use by Recreational Facilities (PJ) <sup>c</sup></b>	<b>49</b>	<b>50.6</b>	<b>53.6</b>	<b>56.2</b>	<b>56.6</b>
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*Energy Use by Fuel Type (PJ) <sup>c</sup>*

Electricity	20.8	21.4	22.9	23.3	23.6
Natural Gas	22.9	24.2	25.5	27.1	27
Propane	0.7	0.7	0.8	1.1	1.6
Light Fuel Oil and Kerosene	4.1	3.8	3.9	4.2	3.8
Heavy Fuel Oil	0.5	0.4	0.5	0.5	0.5
Other	0	0	0	0	0

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	25.91	27.11	28.31	29.37	30.21
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>1.89</b>	<b>1.87</b>	<b>1.89</b>	<b>1.91</b>	<b>1.87</b>

<b>Total Energy Use by Warehouses (PJ) <sup>c</sup></b>	<b>51.7</b>	<b>51.5</b>	<b>51.8</b>	<b>52.7</b>	<b>50.9</b>
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*Energy Use by Fuel Type (PJ) <sup>c</sup>*

Electricity	24.5	24.1	24.1	23.8	23.4
Natural Gas	21.9	22.5	22.7	23.7	22.5
Propane	0.8	0.8	0.9	1.2	1.5
Light Fuel Oil and Kerosene	3.8	3.4	3.3	3.3	2.9
Heavy Fuel Oil	0.7	0.7	0.7	0.7	0.6
Other	0	0	0	0	0

**Activity**

Floor Space (million m <sup>2</sup> ) <sup>b</sup>	54.14	54.1	53.79	53.28	52.84
<b>Energy Intensity (GJ/m<sup>2</sup>) <sup>b,c</sup></b>	<b>0.95</b>	<b>0.95</b>	<b>0.96</b>	<b>0.99</b>	<b>0.96</b>

**Sources:**

- b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.
- c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
85.5	86.1	87.7	86.3	88.6	90.2	17.4%
44.3	45.2	45.7	47.4	47.8	46.5	14.8%
32.1	32.5	32.9	31.4	33	34.8	22.1%
4.8	3.9	4.4	3.1	3.5	3.6	16.1%
3.7	3.8	3.8	3.3	3.1	3.9	-2.5%
0.6	0.6	0.8	1.1	1.1	1.4	100.0%
0	0	0	0	0	0.1	–
28.78	29.14	29.46	29.82	30.74	31.78	21.6%
2.97	2.95	2.98	2.9	2.88	2.84	-3.4%
60.9	63.5	64.4	59.4	61.3	64.5	31.6%
25.4	26.3	27.2	25.9	26.3	26.8	28.8%
28.6	30	30	27.3	28.6	30.3	32.3%
1.9	1.6	1.8	1.4	1.6	1.7	142.9%
4.7	5.1	4.9	4.1	4.1	4.8	17.1%
0.3	0.4	0.5	0.7	0.7	0.8	60.0%
0	0	0	0	0	0.1	–
31.86	32.95	33.52	33.79	34.83	35.16	35.7%
1.91	1.93	1.92	1.76	1.76	1.83	-3.2%
52.1	52.3	51.4	48.4	50.5	52.6	1.7%
23.9	23.7	23.5	22.8	23	23.3	-4.9%
22.9	23.5	22.8	21	22.7	23.8	8.7%
1.7	1.4	1.5	1.2	1.3	1.5	87.5%
3.1	3.2	2.9	2.4	2.4	3	-21.1%
0.5	0.5	0.7	1	1	1	42.9%
0	0	0	0	0	0.1	–
52.85	52.41	51.61	52.78	54.41	54.91	1.4%
0.99	1	1	0.92	0.93	0.96	1.1%

Commercial GHG Emissions by Fuel Type, End-Use and Building Type

	1990	1991	1992	1993	1994
<b>Total GHG Emissions Including Electricity (Mt) <sup>a,g</sup></b>	<b>47.8</b>	<b>47.9</b>	<b>51.2</b>	<b>48.5</b>	<b>47.4</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>a,g</sup></i>					
Electricity	21.9	21.4	24.1	20.4	19.9
Natural Gas	19.5	20.3	20.9	21.7	20.7
Propane	1	1.1	1.1	1.4	2
Light Fuel Oil and Kerosene	4.6	4.3	4.2	4.2	3.9
Heavy Fuel Oil	0.8	0.8	0.9	0.8	0.9
Other	0	0	0	0	0
<i>GHG Emissions by End-Use (Mt) <sup>c,f,g</sup></i>					
Lighting	7.1	6.9	7.9	6.6	6.5
Space Cooling	2.2	2.7	1.7	2	2.1
Auxiliary Motors	5.8	5.7	6.4	5.4	5.3
Auxiliary Equipment	3.7	3.7	4	3.5	3.4
Space Heating	23.4	23.5	25.5	25.6	24.7
Water Heating	5	5	5	5	5
Street Lighting	0.5	0.5	0.5	0.4	0.4
<i>GHG Emissions by Building Type (Mt) <sup>* c,g</sup></i>					
Schools	6.5	6.6	7	6.9	6.6
Health Care Institutions	5.9	5.8	6.2	6	5.8
Religious Institutions	0.6	0.6	0.7	0.6	0.6
Other Institutions	1.8	1.9	2	2	2
Offices	10.5	10.6	11.6	10.9	10.8
Retail Organizations	12.1	12	12.7	11.7	11.4
Hotels and Restaurants	4.2	4.4	4.5	4.3	4.3
Recreational Facilities	2.7	2.7	3	2.9	2.9
Warehouses	2.9	2.8	3	2.7	2.6
<b>GHG Intensity (tonne/TJ) <sup>a,g</sup></b>	<b>55.09</b>	<b>53.87</b>	<b>56.84</b>	<b>51.96</b>	<b>51.09</b>

\* Excludes street lighting.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
- b) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- c) Natural Resources Canada, *Commercial End-Use Model*, Ottawa, February 2002.
- f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- g) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).



End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
50.4	50.5	53.8	53.9	54.6	59.9	25.3%
21.3	20.9	23.7	26.5	25.7	27.3	24.7%
21.4	22.5	22.6	20.9	22.1	24.5	25.6%
2.5	2.1	2.4	1.8	2.1	2.2	120.0%
4.5	4.4	4.2	3.5	3.5	4.4	-4.3%
0.6	0.7	0.9	1.2	1.2	1.4	75.0%
0	0	0	0	0	0.1	–
6.7	6.5	7.4	8.5	8.3	9.1	28.2%
2.4	2.2	2.4	3.7	3.6	2.7	22.7%
5.5	5.3	6	6.9	6.7	7.3	25.9%
3.5	3.4	3.9	4.4	4.3	4.7	27.0%
26.7	27.7	28.6	24.8	26	30.1	28.6%
5.1	5	5.1	5.2	5.2	5.6	12.0%
0.4	0.4	0.4	0.5	0.4	0.4	-20.0%
7.1	7.3	7.6	7.1	7.3	8.2	26.2%
6.2	6.2	6.5	6.4	6.5	7	18.6%
0.6	0.6	0.7	0.6	0.6	0.7	16.7%
2.1	2.2	2.3	2.2	2.3	2.4	33.3%
11.6	11.8	12.9	12.9	13.1	14.8	41.0%
11.9	11.6	12.4	13.2	13.2	14.5	19.8%
4.5	4.4	4.7	5	5	5.2	23.8%
3.2	3.3	3.5	3.4	3.4	3.7	37.0%
2.7	2.7	2.8	2.8	2.8	3	3.4%
52.41	51.47	53.85	57.09	55.78	56.58	2.7%
						<i>continued</i>

Commercial GHG Emissions by Fuel Type, End-Use and Building Type *continued*

	1990	1991	1992	1993	1994
<b>Total GHG Emissions Excluding Electricity (Mt) <sup>a,g</sup></b>	<b>25.9</b>	<b>26.5</b>	<b>27.1</b>	<b>28.1</b>	<b>27.5</b>
<i>GHG Emissions by End-Use (Mt) <sup>c,f,g</sup></i>					
Lighting	0	0	0	0	0
Space Cooling	0.1	0.2	0.1	0.2	0.2
Auxiliary Motors	0	0	0	0	0
Auxiliary Equipment	0.6	0.8	0.7	0.6	0.6
Space Heating	20.5	20.8	21.6	22.6	21.9
Water Heating	4.7	4.8	4.7	4.8	4.8
Street Lighting	0	0	0	0	0
<i>GHG Emissions by Building Type (Mt) <sup>a,c,g</sup></i>					
Schools	4.8	4.9	5	5.2	5
Health Care Institutions	4	4	4.1	4.2	4.1
Religious Institutions	0.5	0.5	0.5	0.5	0.5
Other Institutions	1.3	1.3	1.4	1.5	1.4
Offices	5.5	5.6	5.9	6.1	6
Retail Organizations	4.9	5	5.1	5.2	5.1
Hotels and Restaurants	2	2.1	2.1	2.1	2.1
Recreational Facilities	1.5	1.6	1.7	1.8	1.7
Warehouses	1.5	1.5	1.5	1.5	1.5
<b>GHG Intensity (tonne/TJ) <sup>a,g</sup></b>	<b>29.86</b>	<b>29.81</b>	<b>30.06</b>	<b>30.15</b>	<b>29.63</b>

\* Excludes street lighting.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
- b) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- c) Natural Resources Canada, *Commercial End-Use Model*, Ottawa, February 2002.
- f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
- g) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
29	29.7	30.1	27.4	28.9	32.6	25.9%
0	0	0	0	0	0	–
0.2	0.2	0.3	0.4	0.5	0.4	300.0%
0	0	0	0	0	0	–
0.6	0.6	0.6	0.6	0.6	0.7	16.7%
23.3	24	24.3	21.5	22.9	26.3	28.3%
4.8	4.8	4.8	4.9	4.9	5.2	10.6%
0	0	0	0	0	0	–
5.3	5.5	5.5	5	5.3	6	25.0%
4.3	4.4	4.5	4.1	4.4	4.8	20.0%
0.5	0.5	0.5	0.4	0.5	0.5	0.0%
1.5	1.6	1.6	1.4	1.5	1.7	30.8%
6.4	6.6	6.9	6.2	6.6	7.7	40.0%
5.4	5.3	5.3	5	5.2	6	22.4%
2.2	2.2	2.2	2.1	2.2	2.4	20.0%
1.9	2	2	1.8	1.9	2	33.3%
1.5	1.5	1.5	1.4	1.5	1.6	6.7%
<b>30.22</b>	<b>30.22</b>	<b>30.11</b>	<b>29</b>	<b>29.53</b>	<b>30.77</b>	<b>3.0%</b>



# Chapter 4 Industrial Sector

## The Data Situation

The aggregate energy use data presented in this report are taken from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). The QRES is Canada's official energy supply and demand balance. It is also the basis of Canada's inventory of greenhouse gases that is produced by Environment Canada.

Traditionally, QRES data were estimated from a suite of Statistics Canada surveys of energy distributors and end-users. Up to 1993, most of the data were estimated from supply sources. As of 1994, the *Industrial Consumption of Energy* (ICE) Survey, one of the sources of end-use data for the QRES, has been greatly expanded. The 1995 survey included some 2000 respondents, up from 230 respondents in 1993. As a result of expanding the ICE survey, data are now available for 24 industries at the two-digit level (Standard Industrial Classification code) and for 31 sub-industries at the three- and four-digit levels, rather than the previous 10 industries. Environment Canada is now using these data to produce supplementary emissions estimates for these industries.

Natural Resources Canada's (NRCan's) understanding of how energy is used in Canadian industry has improved, as more information from the ICE survey becomes available. As a result of better data and discussions with Statistics Canada, NRCan has changed the industrial energy use data. For example, own use consumption, which had been reported under the petroleum refining industry, is now reported under both the mining industry and the petroleum refining industry. Changes were made to better reflect demand and non-energy feedstock in the chemical industry between 1990 and 1998. Industrial petroleum coke demand in 1996 also needed a correction.



The expanded ICE survey was also used to derive a more disaggregated set of industrial energy use data for the 1990 to 1994 period. The Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), at Simon Fraser University, has developed a database to track the energy efficiency progress of various industry groups involved in the Canadian Industry Program for Energy Conservation (CIPEC). Because CIPEC required disaggregated data going back to 1990, and the expanded ICE survey is available only since 1994, CIEEDAC has to use a combination of the ICE survey, the *Annual Survey of Manufacturers* data and extensive consultation/work with industries. This database allows NRCan to develop physical measures of activity, when appropriate, and an economic measure of output for the entire 1990 to 2000 period.

The CIEEDAC database contains energy use data by industry and fuel, as well as physical unit of output for some industries. This allows the OEE to expand its database to 53 industries. CIEEDAC energy use data are calibrated to the QRESO energy use data, in NRCan's database.

## Industrial Energy Use and GHG Emissions by Fuel Type

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a</sup></b>	<b>2,754.7</b>	<b>2,701.0</b>	<b>2,723.0</b>	<b>2,748.0</b>	<b>2,911.5</b>
<i>Energy Use by Fuel Type (PJ) <sup>a</sup></i>					
Electricity	658.4	667.6	673.4	694.7	712.7
Natural Gas	837.2	820.7	825.5	824.6	865.6
LPG and Gas Plant NGL	27	28.4	31.9	33.7	30
Coal, Coke and Coke Oven Gas	176.3	183	181.9	172.1	174.2
Heavy Fuel Oil	201.1	179.5	160.7	162.2	160.4
Light Fuel Oil, Diesel Fuel Oil and Kerosene	126.7	118.7	107.8	114.6	127.4
Still Gas and Petroleum Coke	321.7	297.7	331.9	344.5	352.1
Wood Waste and Pulping Liquor	378.3	374.2	385.9	383	462
Other	27.9	31.4	24	18.5	27.1
<b>Activity</b>					
GDP (million \$86) <sup>b</sup>	148,193	139,281	139,142	143,878	153,047
Gross Output (million \$86) <sup>b</sup>	416,145	394,006	396,682	414,252	440,819
<b>Energy Intensity (MJ/\$86 – GDP) <sup>a,b</sup></b>	<b>18.6</b>	<b>19.4</b>	<b>19.6</b>	<b>19.1</b>	<b>19</b>
<b>Energy Intensity (MJ/\$86 – GO) <sup>a,b</sup></b>	<b>6.6</b>	<b>6.9</b>	<b>6.9</b>	<b>6.6</b>	<b>6.6</b>
<b>Total GHG Emissions Including Electricity (Mt) <sup>a,c</sup></b>	<b>141.1</b>	<b>136</b>	<b>141.2</b>	<b>135.5</b>	<b>138.1</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>a,c</sup></i>					
Electricity	36.9	35.9	40.9	34.7	34.6
Natural Gas	42.1	41.3	41.4	41.3	42.7
LPG and Gas Plant NGL	1.6	1.7	1.9	2	1.8
Coal, Coke and Coke Oven Gas	15.1	15.7	15.5	14.7	14.9
Heavy Fuel Oil	15	13.4	12	12.1	12
Light Fuel Oil, Diesel Fuel Oil and Kerosene	9.4	8.8	8	8.5	9.4
Still Gas and Petroleum Coke	20.9	19.3	21.5	22.3	22.7
Wood Waste and Pulping Liquor	0	0	0	0	0
Other	0	0	0	0	0
<b>GHG Intensity (tonne/TJ) <sup>a,c</sup></b>	<b>51.2</b>	<b>50.3</b>	<b>51.9</b>	<b>49.3</b>	<b>47.4</b>
<b>Total GHG Emissions Excluding Electricity (Mt) <sup>a,c</sup></b>	<b>104.2</b>	<b>100.1</b>	<b>100.3</b>	<b>100.8</b>	<b>103.4</b>
<b>GHG Intensity (tonne/TJ) <sup>a,c</sup></b>	<b>37.8</b>	<b>37.1</b>	<b>36.8</b>	<b>36.7</b>	<b>35.5</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
- c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).



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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
2,973.6	3,057.5	3,057.2	3,004.0	3,098.5	3,203.5	16.3%
738.4	745.2	757.6	768.7	783.8	810.8	23.1%
898.9	948.2	953.1	897.3	907.3	966.9	15.5%
34.7	31.3	31.4	31.6	30.2	39.4	45.9%
175.9	177.1	176.8	175.8	180.7	187.1	6.1%
147	154.2	154.4	149.4	140.8	142.9	-28.9%
128.7	148.1	148.2	134.2	136.5	145	14.4%
357.1	363.9	350.5	335.6	349.5	341.6	6.2%
460	457.8	459.1	477.3	531.1	530.9	40.3%
32.9	31.6	26.1	34.2	38.6	38.9	39.4%
156,389	157,836	166,424	171,332	180,944	193,886	30.8%
452,217	459,884	472,930	505,466	541,080	572,084	37.5%
19	19.4	18.4	17.5	17.1	16.5	-11.3%
6.6	6.6	6.5	5.9	5.7	5.6	-15.2%
143.2	146.8	150.8	152.3	152.1	159.3	12.9%
37.4	36.4	41.1	47.3	46.1	48.9	32.5%
44.9	47.3	47.6	44.7	45.3	48.4	15.0%
2	1.8	1.8	1.9	1.8	2.3	43.8%
15	15.1	15.1	15	15.4	15.8	4.6%
11	11.5	11.5	10.9	10.3	10.5	-30.0%
9.5	10.9	10.9	10	10.2	10.8	14.9%
23.4	23.7	22.7	22.6	23	22.6	8.1%
0	0	0	0	0	0	–
0	0	0	0	0	0	–
48.2	48	49.3	50.7	49.1	49.7	-2.9%
105.8	110.4	109.7	105.1	105.9	110.4	6.0%
35.6	36.1	35.9	35	34.2	34.5	-8.7%

## Industrial Energy Use by Industry

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a</sup></b>	<b>2,754.7</b>	<b>2,701.0</b>	<b>2,723.0</b>	<b>2,748.0</b>	<b>2,911.5</b>
<i>Energy Use by Industry (PJ) <sup>a,d</sup></i>					
Gold Mines	13.1	13.1	11.7	11.4	11.3
Copper, Copper-Zinc and Nickel-Copper Mines	27.6	27.4	24.5	23	21
Silver-Lead-Zinc Mines	7.6	7.1	8.1	5	4.6
Iron Mines	36.3	32.6	29.3	28.9	35
Other Metal Mines	9.1	6.5	5.2	4.5	5.3
Peat Industry	0.7	0.8	0.5	0.5	0.7
Gypsum Mines	0.6	0.5	0.5	0.6	0.5
Potash Mines	27.4	27.4	25.8	25.7	31
Salt Mines	2.9	3.1	3.2	3.5	4.2
Other Non-Metal Mines	7.9	7.4	6.5	6.6	6.5
Upstream Mining	210.4	201.3	223.3	297	295.6
Construction	66.9	57.9	57.6	50.7	54
Forestry	7.7	6.5	7.4	7.9	7.5
Pulp Industry	357.2	370.3	373.8	376.6	420.3
Newsprint Industry	263.8	259.9	261.3	253.6	291.6
Paperboard Industry	58	59.2	58.3	60.7	64.8
Building Board Industry	2.5	2.6	3.2	3.3	4.2
Other Paper Industries	103.2	87.2	83.4	88.4	85.2
Primary Production of Aluminum	113.8	133	140.2	156.7	153.3
Other Non-Ferrous Smelting and Refining	69.5	55.5	57.8	54.1	69.4
Petroleum Refining	334.9	314	321.5	325	317.3
Cement Industry	59.3	50.8	50.8	51.1	59.2
Industrial Inorganic Chemicals Industries	74.1	77	71.9	72.5	72.4
Industrial Organic Chemicals Industries	115.6	117.8	111.7	88.3	119.8
Chemical Fertilizers and Fertilizer Materials Industries	33.5	37.7	38.9	50.4	49.9
Iron and Steel	219.4	235	244.9	241.9	250.3
Meat and Poultry Products Industries	15.4	15.5	13.3	14.6	17.9
Fruit and Vegetable Industries	9.5	9.6	8.1	9.4	10.5
Bakery Products Industries	5.7	5.7	5.4	5.6	6.3
Other Food Industries	43.1	40.2	37.7	40.1	47.4
Dairy Products Industries	11.9	11.4	10.8	10.3	12.1
Beverage Industries (excluding breweries)	9	7.4	5.3	7	7

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

## End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
2,973.6	3,057.5	3,057.2	3,004.0	3,098.5	3,203.5	16.3%
12.5	15.1	14.6	11.4	13.2	12	-8.4%
23.2	22.4	21.1	20.3	16.4	19	-31.2%
5.5	6.5	5.8	5.3	4.8	4.4	-42.1%
36.2	36.3	39.5	36	28.8	32.5	-10.5%
5.5	5.5	4.9	4.3	4.2	4.9	-46.2%
0.8	0.8	0.8	0.8	0.9	0.9	28.6%
0.5	0.5	0.6	0.6	0.6	0.6	0.0%
31.8	31.4	32.6	31.6	32.5	22.7	-17.2%
3.4	2.9	2.9	2.7	2.6	2.6	-10.3%
6.2	6.2	6.9	5.8	6.8	6.4	-19.0%
318.2	345.1	344.4	336.4	347.5	384.3	82.7%
48.9	50.5	49.5	48	50.4	49.9	-25.4%
7.9	9.6	11.1	12.3	14.8	16.2	110.4%
443.2	376.7	396.4	393.5	421.1	429.1	20.1%
289	288.3	276.4	262.2	282.8	271.5	2.9%
72.4	73.8	76.3	78.7	81.3	71.6	23.4%
3.4	4.7	5.1	6.2	6.8	8	220.0%
63.4	130.9	128.6	143.7	166.8	181	75.4%
143	151.8	156.8	159.8	166.5	147.7	29.8%
76.9	81.5	74.2	79.9	69.9	78.5	12.9%
308.4	329.5	320.9	294.6	289.3	296.6	-11.4%
61.3	58.5	57.9	63.6	66.8	66.5	12.1%
89.5	85.7	79.9	85	84.8	81.6	10.1%
105.7	113	108.3	91.2	95.4	99.5	-13.9%
58	56.5	57.7	65	60.2	58.3	74.0%
247.9	252.1	251.2	254.7	259.8	257.7	17.5%
13.7	16	15.5	15.8	17.3	18.8	22.1%
9.9	12.1	12.6	13.1	12.5	13.1	37.9%
6.5	6.8	6.2	7	6.7	6.9	21.1%
43	41.6	46.6	39	38.7	42.2	-2.1%
10.8	11.9	11.6	12.2	13.2	11.8	-0.8%
5.4	5.4	5.9	6.7	7.4	6.8	-24.4%
<i>continued</i>						

Industrial Energy Use by Industry *continued*

	1990	1991	1992	1993	1994
<b>Energy Use by Industry (PJ) <sup>a,d</sup> (continued)</b>					
Brewery Products Industries	7.1	6.5	6.8	6.3	6.6
Tobacco Products Industries	1.3	1.1	1.2	1.2	1.2
Rubber Products Industries	9.1	8.7	9.2	9.1	8
Plastic Products Industries	12	11.2	12.8	13.5	14.8
Leather and Allied Products Industries	1.2	1.1	1.2	1.3	1.4
Primary Textile Industries	14.3	15.5	15.7	14.7	22.7
Textile Products Industries	6.7	8.6	8.5	8.9	9.1
Clothing Industries	5.2	4.8	5.5	5.4	5.5
Sawmill and Planing Mill Products Industry	21.1	21.2	23.3	28.2	34.4
Other Wood Industries	16.2	13.2	15	18.4	21.6
Furniture and Fixture Industries	5.2	4.2	5.5	6	6.3
Printing, Publishing and Allied Industries	8.6	8.4	10.1	10.5	11.2
Fabricated Metal Products Industries	27.5	25	29.1	31.7	35.7
Machinery Industries	12.6	11.6	13.6	12.1	12.4
Motor Vehicle Industry	23.5	23.7	26.6	30.5	29.3
Motor Vehicle Parts and Accessories Industries	29	26.7	25.5	27.3	29.9
Electrical and Electronic Products Industries	18.3	15.5	18	16.8	16.9
Glass and Glass Products Industries	12.5	11.3	13.9	14.4	15.4
Lime Industry	14.4	12.5	12.9	13.4	14.7
Plastic and Synthetic Resin Industry	16.1	15.7	14.2	26.5	15.8
Other Manufacturing n.e.c.	175.2	173.4	152.3	76.7	62.1
<b>Activity</b>					
GDP (million \$86) <sup>b</sup>	148,193	139,281	139,142	143,878	153,047
Gross Output (million \$86) <sup>b</sup>	416,145	394,006	396,682	414,252	440,819
Energy Intensity (MJ/\$86 – GDP) <sup>a,b</sup>	18.6	19.4	19.6	19.1	19
Energy Intensity (MJ/\$86 – GO) <sup>a,b</sup>	6.6	6.9	6.9	6.6	6.6

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
6.2	5.7	5.9	5.6	5.8	5.8	-18.3%
1	1.2	1.1	1	1	1	-23.1%
9.1	10.7	10.1	10.8	11.2	11.6	27.5%
13.8	14.5	15.6	16.9	15	16.6	38.3%
1	1.1	1.2	1.2	1.1	1.1	-8.3%
18.2	12.8	14	13.1	13.7	13.7	-4.2%
9.6	9.5	9.1	8.1	8.1	9	34.3%
5.5	4.8	5	5.3	4.8	5.4	3.8%
38	40.2	40.2	40.6	38.9	40.2	90.5%
20.9	21.5	26.2	28.2	29.2	29.1	79.6%
6.6	6	6.3	5.9	6.1	6.8	30.8%
10.9	8.4	9.5	10.5	10.9	11.7	36.0%
38.2	38.9	41.4	39.1	33.8	38.3	39.3%
12.4	13.8	15.2	14.6	13	13.1	4.0%
29.7	31.9	32	28.6	33	33.5	42.6%
30	32.2	31.7	29.2	32.1	35.5	22.4%
15.4	16.7	15.5	15.3	17.3	18.1	-1.1%
13.8	13.4	11	10.4	12	11.5	-8.0%
15.7	15.6	16.1	15.8	16.8	16.2	12.5%
30.7	18.9	20.4	22.3	23.3	26.1	62.1%
95.1	109.9	106.9	93.8	100.5	155.8	-11.1%
156,389	157,836	166,424	171,332	180,944	193,886	30.8%
452,217	459,884	472,930	505,466	541,080	572,084	37.5%
19	19.4	18.4	17.5	17.1	16.5	-11.3%
6.6	6.6	6.5	5.9	5.7	5.6	-15.2%

Industrial GHG Emissions by Industry — Including Electricity-Related Emissions\*

	1990	1991	1992	1993	1994
<b>Total GHG Emissions Including Electricity (Mt) <sup>a,c</sup></b>	<b>141.1</b>	<b>136</b>	<b>141.2</b>	<b>135.5</b>	<b>138.1</b>
<i>GHG Emissions by Industry (Mt) <sup>a,c,d</sup></i>					
Gold Mines	0.8	0.8	0.7	0.6	0.6
Copper, Copper-Zinc and Nickel-Copper Mines	1.6	1.6	1.5	1.3	1.1
Silver-Lead-Zinc Mines	0.5	0.5	0.6	0.3	0.3
Iron Mines	2.5	2.2	2.1	1.9	2.3
Other Metal Mines	0.5	0.4	0.3	0.3	0.3
Peat Industry	0	0	0	0	0
Gypsum Mines	0	0	0	0	0
Potash Mines	1.4	1.4	1.4	1.3	1.6
Salt Mines	0.2	0.2	0.2	0.2	0.2
Other Non-Metal Mines	0.5	0.5	0.4	0.4	0.4
Upstream Mining	13	12.5	14	17.3	17.4
Construction	4.4	3.8	3.7	3.3	3.5
Forestry	0.6	0.5	0.6	0.6	0.6
Pulp Industry	6.4	6.4	6.3	6.2	6.5
Newsprint Industry	11.5	10.7	10.9	9.3	10.4
Paperboard Industry	2	2	2	2.1	2.1
Building Board Industry	0.1	0.1	0.2	0.2	0.2
Other Paper Industries	4	4	3.9	3.9	2.3
Primary Production of Aluminum	6.4	7.2	8.5	7.9	7.6
Other Non-Ferrous Smelting and Refining	4.3	3.4	3.8	3.2	4
Petroleum Refining	20.7	19.5	20.1	20.3	19.5
Cement Industry	4.2	3.6	3.6	3.5	4
Industrial Inorganic Chemicals Industries	3.8	3.7	3.9	3.5	3.5
Industrial Organic Chemicals Industries	5.3	5.2	5.3	4.2	5.6
Chemical Fertilizers and Fertilizer Materials Industries	1.7	1.9	2	2.5	2.5
Iron and Steel	15.9	17	17.7	17	17.2
Meat and Poultry Products Industries	0.8	0.8	0.7	0.7	0.9
Fruit and Vegetable Industries	0.5	0.6	0.5	0.5	0.6
Bakery Products Industries	0.3	0.3	0.3	0.3	0.3
Other Food Industries	2.3	2.1	2.1	2.1	2.4
Dairy Products Industries	0.7	0.6	0.6	0.5	0.6
Beverage Industries (excluding breweries)	0.5	0.4	0.3	0.4	0.4

\*Includes only end-use energy-related GHG emissions.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990-1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999-2000 revisions*, Ottawa, February 2002.
- c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990-1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
143.2	146.8	150.8	152.3	152.1	159.3	12.9%
0.7	0.9	0.9	0.7	0.8	0.8	0.0%
1.3	1.2	1.2	1.3	1	1.2	-25.0%
0.3	0.4	0.4	0.4	0.3	0.3	-40.0%
2.4	2.4	2.7	2.6	2	2.3	-8.0%
0.3	0.3	0.3	0.3	0.3	0.3	-40.0%
0	0	0	0.1	0.1	0.1	–
0	0	0	0	0	0	–
1.6	1.6	1.7	1.7	1.7	1.2	-14.3%
0.2	0.2	0.2	0.2	0.1	0.1	-50.0%
0.4	0.4	0.4	0.4	0.4	0.4	-20.0%
19	20.2	20.6	20.8	21.4	23.6	81.5%
3.3	3.3	3.3	3.2	3.3	3.3	-25.0%
0.6	0.7	0.8	0.9	1.1	1.2	100.0%
6.9	6.1	6.7	6.6	6.8	7.7	20.3%
10.7	10.5	11	11.4	11.5	11	-4.3%
2.3	2.3	2.4	2.6	2.6	2.3	15.0%
0.2	0.2	0.2	0.3	0.3	0.3	200.0%
2.1	2.9	3.1	2.9	2.9	3.3	-17.5%
7.3	7.5	8.5	9.7	9.7	8.9	39.1%
4.5	4.7	4.5	5.1	4.3	4.9	14.0%
19.4	20.6	20.1	19.2	18.3	18.9	-8.7%
4.1	3.9	4	4.2	4.4	4.3	2.4%
4.3	3.9	4.1	4.7	4.6	4.6	21.1%
4.8	5.5	5.4	4.7	4.9	5	-5.7%
2.9	2.8	2.9	3.3	3	2.9	70.6%
17.2	17.3	17.3	17.7	18.1	18	13.2%
0.7	0.8	0.8	0.9	0.9	1	25.0%
0.5	0.7	0.7	0.8	0.7	0.7	40.0%
0.3	0.3	0.3	0.4	0.4	0.4	33.3%
2.2	2	2.4	2	2	2.2	-4.3%
0.6	0.6	0.6	0.7	0.7	0.7	0.0%
0.3	0.3	0.3	0.4	0.4	0.4	-20.0%

*continued*

Industrial GHG Emissions by Industry — Including Electricity-Related Emissions\* *continued*

	1990	1991	1992	1993	1994
<i>GHG Emissions by Industry (Mt) <sup>a,c,d</sup> (continued)</i>					
Brewery Products Industries	0.4	0.3	0.4	0.3	0.3
Tobacco Products Industries	0.1	0.1	0.1	0.1	0.1
Rubber Products Industries	0.5	0.5	0.5	0.5	0.4
Plastic Products Industries	0.6	0.6	0.7	0.7	0.7
Leather and Allied Products Industries	0.1	0.1	0.1	0.1	0.1
Primary Textile Industries	0.8	0.8	0.9	0.8	1.1
Textile Products Industries	0.4	0.5	0.5	0.5	0.5
Clothing Industries	0.3	0.3	0.3	0.3	0.3
Sawmill and Planing Mill Products Industry	1.2	1.1	1.3	1.5	1.7
Other Wood Industries	0.9	0.7	0.8	0.9	1.1
Furniture and Fixture Industries	0.3	0.2	0.3	0.3	0.3
Printing, Publishing and Allied Industries	0.5	0.4	0.6	0.5	0.6
Fabricated Metal Products Industries	1.5	1.3	1.6	1.6	1.8
Machinery Industries	0.7	0.6	0.8	0.6	0.6
Motor Vehicle Industry	1.3	1.2	1.4	1.6	1.5
Motor Vehicle Parts and Accessories Industries	1.6	1.4	1.4	1.4	1.5
Electrical and Electronic Products Industries	1	0.8	1	0.8	0.8
Glass and Glass Products Industries	0.6	0.6	0.7	0.7	0.8
Lime Industry	1	0.8	0.9	0.9	1
Plastic and Synthetic Resin Industry	0.9	0.8	0.8	1.3	0.8
Other Manufacturing n.e.c.	9	8.8	8	4.1	3.3
<b>GHG Intensity (tonne/TJ) <sup>a,c,d</sup></b>	<b>51.2</b>	<b>50.3</b>	<b>51.9</b>	<b>49.3</b>	<b>47.4</b>

\*Includes only end-use energy-related GHG emissions.

**Sources:**

- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).
- Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.



						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
0.3	0.3	0.3	0.3	0.3	0.3	-25.0%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
0.5	0.6	0.6	0.6	0.6	0.7	40.0%
0.7	0.7	0.8	1	0.8	0.9	50.0%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
0.9	0.6	0.6	0.6	0.6	0.7	-12.5%
0.5	0.5	0.5	0.4	0.4	0.5	25.0%
0.3	0.2	0.3	0.3	0.3	0.3	0.0%
2	2.1	2.2	2.4	2.2	2.3	91.7%
1.1	1.1	1.4	1.6	1.6	1.6	77.8%
0.4	0.3	0.3	0.3	0.3	0.4	33.3%
0.5	0.4	0.5	0.6	0.6	0.6	20.0%
1.9	1.9	2.1	2.1	1.8	2.1	40.0%
0.6	0.7	0.8	0.8	0.7	0.7	0.0%
1.5	1.6	1.6	1.5	1.7	1.7	30.8%
1.6	1.6	1.7	1.6	1.7	1.9	18.8%
0.8	0.8	0.8	0.8	0.9	1	0.0%
0.7	0.7	0.6	0.5	0.6	0.6	0.0%
1.1	1.1	1.1	1.1	1.2	1.1	10.0%
1.4	0.8	0.8	0.9	0.9	1.1	22.2%
5.1	5.8	5.6	4.9	5.3	8.2	-8.9%
<b>48.2</b>	<b>48</b>	<b>49.3</b>	<b>50.7</b>	<b>49.1</b>	<b>49.7</b>	<b>-2.9%</b>

Industrial GHG Emissions by Industry — Excluding Electricity-Related Emissions\*

	1990	1991	1992	1993	1994
<b>Total GHG Emissions Excluding Electricity (Mt) <sup>a,c</sup></b>	<b>104.2</b>	<b>100.1</b>	<b>100.3</b>	<b>100.8</b>	<b>103.4</b>
<i>GHG Emissions by Industry (Mt) <sup>a,c,d</sup></i>					
Gold Mines	0.4	0.4	0.3	0.3	0.3
Copper, Copper-Zinc and Nickel-Copper Mines	0.6	0.6	0.5	0.5	0.4
Silver-Lead-Zinc Mines	0.3	0.3	0.4	0.2	0.2
Iron Mines	1.8	1.5	1.3	1.3	1.7
Other Metal Mines	0.3	0.2	0.2	0.2	0.2
Peat Industry	0	0	0	0	0
Gypsum Mines	0	0	0	0	0
Potash Mines	1.1	1.2	1.1	1.1	1.3
Salt Mines	0.1	0.1	0.1	0.2	0.2
Other Non-Metal Mines	0.4	0.4	0.3	0.3	0.3
Upstream Mining	10.3	9.9	10.9	14.5	14.6
Construction	4.4	3.8	3.7	3.3	3.5
Forestry	0.6	0.5	0.6	0.6	0.6
Pulp Industry	4.9	4.9	4.5	4.7	4.4
Newsprint Industry	5.9	5.5	4.9	4.7	4.8
Paperboard Industry	1.5	1.5	1.5	1.5	1.6
Building Board Industry	0.1	0.1	0.1	0.1	0.1
Other Paper Industries	1.8	1.5	1.6	1.4	1.2
Primary Production of Aluminum	0.8	0.8	0.9	0.9	0.9
Other Non-Ferrous Smelting and Refining	2.5	1.8	2	1.9	2.4
Petroleum Refining	19.6	18.4	18.8	19.2	18.4
Cement Industry	3.8	3.3	3.3	3.2	3.6
Industrial Inorganic Chemicals Industries	1.2	1.4	1.3	1.4	1.2
Industrial Organic Chemicals Industries	4.4	4.4	4.4	3.6	5.1
Chemical Fertilizers and Fertilizer Materials Industries	1.5	1.7	1.8	2.3	2.2
Iron and Steel	14.2	15.5	15.9	15.5	15.7
Meat and Poultry Products Industries	0.6	0.6	0.5	0.5	0.7
Fruit and Vegetable Industries	0.5	0.5	0.4	0.4	0.5
Bakery Products Industries	0.2	0.2	0.2	0.2	0.2
Other Food Industries	1.6	1.4	1.5	1.6	1.9
Dairy Products Industries	0.5	0.4	0.4	0.4	0.5
Beverage Industries (excluding breweries)	0.4	0.3	0.2	0.3	0.3

\*Includes only end-use energy-related GHG emissions.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990-1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999-2000 revisions*, Ottawa, February 2002.
- c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990-1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

*End-Use Energy Data Handbook — 1990 to 2000*

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
105.8	110.4	109.7	105.1	105.9	110.4	6.0%
0.3	0.5	0.5	0.3	0.3	0.3	-25.0%
0.5	0.5	0.5	0.5	0.4	0.5	-16.7%
0.2	0.3	0.2	0.2	0.2	0.2	-33.3%
1.7	1.7	1.9	1.7	1.3	1.5	-16.7%
0.2	0.2	0.2	0.2	0.2	0.2	-33.3%
0	0	0	0	0	0	–
0	0	0	0	0	0	–
1.3	1.3	1.4	1.3	1.3	0.9	-18.2%
0.2	0.1	0.1	0.1	0.1	0.1	0.0%
0.3	0.3	0.3	0.3	0.4	0.3	-25.0%
15.7	17	16.9	16.1	17.1	18.9	83.5%
3.3	3.3	3.3	3.2	3.3	3.3	-25.0%
0.6	0.7	0.8	0.9	1.1	1.2	100.0%
4.5	3.8	4	3.7	3.6	3.9	-20.4%
4.7	4.7	4.6	3.9	3.9	3.8	-35.6%
1.7	1.8	1.8	1.8	1.9	1.6	6.7%
0.1	0.1	0.2	0.2	0.2	0.2	100.0%
0.9	2	1.9	1.9	1.8	1.8	0.0%
0.7	0.8	0.8	1	1	0.3	-62.5%
2.5	2.7	2.5	2.6	2.4	2.5	0.0%
18.5	19.7	19.1	18.1	17.2	17.8	-9.2%
3.8	3.6	3.6	3.7	4	3.9	2.6%
1.5	1.4	1.4	1.6	1.5	1.6	33.3%
4.3	4.9	4.9	4.1	4.2	4.2	-4.5%
2.6	2.5	2.6	2.9	2.7	2.5	66.7%
15.6	15.7	15.5	15.5	15.9	15.8	11.3%
0.5	0.5	0.5	0.5	0.6	0.6	0.0%
0.4	0.6	0.6	0.6	0.5	0.6	20.0%
0.2	0.2	0.2	0.2	0.2	0.2	0.0%
1.7	1.5	1.7	1.5	1.5	1.4	-12.5%
0.4	0.5	0.4	0.5	0.5	0.5	0.0%
0.2	0.2	0.3	0.3	0.3	0.3	-25.0%

*continued*

Industrial GHG Emissions by Industry — Excluding  
Electricity-Related Emissions\* *continued*

	1990	1991	1992	1993	1994
<i>GHG Emissions by Industry (Mt) <sup>a,c,d</sup> (continued)</i>					
Brewery Products Industries	0.3	0.3	0.3	0.3	0.3
Tobacco Products Industries	0	0	0	0	0
Rubber Products Industries	0.4	0.3	0.4	0.4	0.3
Plastic Products Industries	0.3	0.3	0.3	0.3	0.3
Leather and Allied Products Industries	0	0	0	0	0
Primary Textile Industries	0.5	0.6	0.6	0.5	0.9
Textile Products Industries	0.3	0.3	0.3	0.3	0.4
Clothing Industries	0.2	0.1	0.2	0.1	0.1
Sawmill and Planing Mill Products Industry	0.5	0.5	0.6	0.8	1
Other Wood Industries	0.6	0.4	0.5	0.6	0.7
Furniture and Fixture Industries	0.2	0.1	0.2	0.2	0.2
Printing, Publishing and Allied Industries	0.2	0.2	0.3	0.3	0.3
Fabricated Metal Products Industries	1	0.9	1	1.1	1.3
Machinery Industries	0.5	0.4	0.4	0.4	0.4
Motor Vehicle Industry	0.9	0.9	1	1.1	1.1
Motor Vehicle Parts and Accessories Industries	0.9	0.9	0.8	0.9	0.9
Electrical and Electronic Products Industries	0.5	0.4	0.4	0.5	0.5
Glass and Glass Products Industries	0.6	0.5	0.6	0.7	0.7
Lime Industry	1	0.8	0.8	0.9	1
Plastic and Synthetic Resin Industry	0.6	0.6	0.5	1	0.5
Other Manufacturing n.e.c.	8.3	8.3	7.8	4.1	3.3
<b>GHG Intensity (tonne/TJ) <sup>a,c,d</sup></b>	<b>37.8</b>	<b>37.1</b>	<b>36.8</b>	<b>36.7</b>	<b>35.5</b>

\*Includes only end-use energy-related GHG emissions.

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
0.3	0.2	0.2	0.2	0.2	0.2	-33.3%
0	0	0	0	0	0	–
0.3	0.4	0.4	0.4	0.4	0.4	0.0%
0.3	0.3	0.3	0.4	0.3	0.3	0.0%
0	0	0	0	0	0	–
0.6	0.4	0.4	0.3	0.4	0.4	-20.0%
0.4	0.4	0.3	0.3	0.3	0.3	0.0%
0.2	0.1	0.1	0.1	0.1	0.1	-50.0%
1.2	1.2	1.4	1.4	1.3	1.1	120.0%
0.7	0.9	0.9	0.9	1	1	66.7%
0.2	0.2	0.2	0.2	0.2	0.2	0.0%
0.3	0.2	0.2	0.3	0.3	0.3	50.0%
1.4	1.4	1.5	1.4	1.2	1.4	40.0%
0.4	0.5	0.6	0.5	0.4	0.4	-20.0%
1.2	1.3	1.2	1	1.2	1.2	33.3%
0.9	1	1	0.9	1	1	11.1%
0.4	0.5	0.4	0.4	0.5	0.5	0.0%
0.6	0.6	0.5	0.5	0.5	0.5	-16.7%
1	1	1.1	1.1	1.1	1.1	10.0%
1	0.4	0.4	0.4	0.5	0.6	0.0%
5.1	5.8	5.6	4.9	5.3	8.2	-1.2%
<b>35.6</b>	<b>36.1</b>	<b>35.9</b>	<b>35</b>	<b>34.2</b>	<b>34.5</b>	<b>-8.7%</b>

Industrial Activity Index by Industry (1990 = 1.0)<sup>b,d</sup>

	1990	1991	1992	1993	1994
Gold Mines*	1	0.97	0.87	0.84	0.94
Copper, Copper-Zinc and Nickel-Copper Mines*	1	0.93	0.89	0.82	0.71
Silver-Lead-Zinc Mines*	1	1.01	1.05	0.63	0.59
Iron Mines*	1	1.03	0.90	0.83	1.00
Other Metal Mines*	1	0.84	0.69	0.65	0.64
Peat Industry*	1	1.16	1.04	1.13	1.38
Gypsum Mines*	1	0.78	0.85	0.90	1.05
Potash Mines*	1	1.06	1.04	0.98	1.17
Salt Mines*	1	1.13	1.04	1.04	1.21
Other Non-Metal Mines*	1	0.91	0.89	0.87	0.92
Upstream Mining	1	1.01	1.04	1.14	1.23
Construction	1	0.93	0.88	0.86	0.88
Forestry	1	0.88	0.88	0.94	0.96
Pulp Industry*	1	1.07	1.02	0.96	1.10
Newsprint Industry*	1	0.99	0.98	1.04	1.07
Paperboard Industry*	1	1.06	1.09	1.11	1.23
Building Board Industry*	1	0.85	1.05	1.34	1.44
Other Paper Industries*	1	1.01	1.03	1.13	1.18
Primary Production of Aluminum*	1	1.16	1.26	1.47	1.44
Other Non-Ferrous Smelting and Refining	1	1.01	1.04	1.04	0.96
Petroleum Refining*	1	0.97	0.95	0.97	0.99
Cement Industry*	1	0.82	0.82	0.84	0.99
Industrial Inorganic Chemicals Industries*	1	0.92	0.94	0.96	0.99
Industrial Organic Chemicals Industries**	1	0.85	0.88	0.81	0.89
Chemical Fertilizers and Fertilizer Materials Industries*	1	1.00	1.02	0.96	0.98
Iron and Steel*	1	0.97	1.06	1.15	1.16
Meat and Poultry Products Industries*	1	0.98	1.03	1.03	1.09
Fruit and Vegetable Industries**	1	1.00	0.98	1.06	1.06
Bakery Products Industries**	1	1.00	1.03	1.04	1.10
Other Food Industries**	1	1.02	1.05	1.05	1.10
Dairy Products Industries*	1	0.99	0.94	0.92	0.96
Beverage Industries (excluding breweries)**	1	0.94	1.09	1.11	0.99

\* Physical units of production is used as the measure of activity for these sub-sectors.

\*\* Gross output (in 1986 dollars) is used as the measure of activity for these sub-sectors.  
For the remaining sub-sectors, gross domestic product (in 1986 dollars) is used.

Sources:

- b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
- d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

1995	1996	1997	1998	1999	2000
1.06	1.26	1.32	1.47	1.84	1.74
0.90	0.74	0.70	0.78	0.54	0.68
0.76	0.94	0.75	0.69	0.61	0.55
1.02	1.00	1.01	1.04	0.91	1.07
0.66	0.60	0.55	0.57	0.50	0.54
1.55	1.27	1.47	1.67	2.04	1.80
0.97	0.97	1.04	1.02	1.12	1.03
1.30	1.14	1.29	1.32	1.19	1.35
1.00	1.18	1.35	1.34	1.25	1.16
0.91	0.88	0.89	0.69	2.08	2.13
1.27	1.32	1.37	1.34	1.30	1.39
0.84	0.82	0.86	0.86	0.90	0.90
0.98	0.95	0.96	0.94	1.03	1.04
1.14	1.07	1.09	0.99	1.06	1.13
1.09	1.05	1.09	1.05	1.15	1.19
1.22	1.27	1.30	1.35	1.43	1.40
1.70	2.13	2.53	2.74	3.21	3.28
1.27	1.30	1.33	1.35	1.41	1.47
1.39	1.46	1.48	1.51	1.52	1.51
1.18	1.14	1.09	1.20	1.16	1.27
0.99	1.04	1.07	1.07	1.08	1.11
1.12	1.06	1.14	1.15	1.20	1.24
1.04	1.04	1.01	1.02	1.03	1.00
0.93	0.92	0.99	1.02	1.04	1.12
1.05	1.06	1.06	1.06	1.09	1.10
1.15	1.22	1.25	1.22	1.29	1.29
1.12	1.14	1.19	1.29	1.40	1.44
1.07	1.08	1.16	1.22	1.25	1.23
1.03	1.08	1.09	1.12	1.13	1.19
1.13	1.18	1.17	1.22	1.23	1.28
0.98	0.98	1.01	1.01	1.02	1.01
1.09	1.09	1.14	1.20	1.27	1.29

*continued*

Industrial Activity Index by Industry (1990 = 1.0)<sup>b,d</sup> *continued*

	1990	1991	1992	1993	1994
Brewery Products Industries*	1	0.95	0.92	0.98	1.02
Tobacco Products Industries**	1	0.98	0.94	0.95	1.09
Rubber Products Industries*	1	0.83	0.97	1.12	1.25
Plastic Products Industries**	1	0.95	1.00	1.07	1.19
Leather and Allied Products Industries**	1	0.81	0.78	0.81	0.83
Primary Textile Industries**	1	0.96	0.96	0.99	1.10
Textile Products Industries**	1	0.89	0.83	0.85	0.93
Clothing Industries**	1	0.89	0.85	0.86	0.88
Sawmill and Planing Mill Products Industry*	1	1.03	1.12	1.16	1.19
Other Wood Industries**	1	0.86	0.90	0.96	1.00
Furniture and Fixture Industries**	1	0.84	0.83	0.86	0.97
Printing, Publishing and Allied Industries**	1	0.92	0.87	0.84	0.83
Fabricated Metal Products Industries**	1	0.89	0.85	0.86	0.96
Machinery Industries**	1	0.83	0.80	0.90	1.02
Motor Vehicle Industry*	1	0.96	1.03	1.15	1.20
Motor Vehicle Parts and Accessories Industries**	1	0.92	0.99	1.17	1.33
Electrical and Electronic Products Industries**	1	1.02	1.09	1.12	1.40
Glass and Glass Products Industries**	1	0.91	0.95	1.04	1.09
Lime Industry*	1	0.99	1.00	1.02	1.06
Plastic and Synthetic Resin Industry*	1	1.01	1.09	1.12	1.20
Other Manufacturing n.e.c.	1	0.92	0.90	0.91	0.95

\* Physical units of production is used as the measure of activity for these sub-sectors.

\*\* Gross output (in 1986 dollars) is used as the measure of activity for these sub-sectors.  
For the remaining sub-sectors, gross domestic product (in 1986 dollars) is used.

**Sources:**

b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.



*continued*

1995	1996	1997	1998	1999	2000
1.03	1.00	0.99	1.02	1.03	1.02
1.01	1.00	0.98	1.01	0.97	0.94
1.36	1.83	2.05	2.23	2.17	2.17
1.18	1.29	1.38	1.45	1.65	1.66
0.83	0.73	0.73	0.67	0.60	0.49
1.08	1.13	1.23	1.24	1.23	1.21
0.95	0.92	1.00	1.01	1.02	1.02
0.89	0.83	0.89	0.89	0.87	0.88
1.15	1.21	1.24	1.25	1.36	1.39
0.99	1.05	1.24	1.26	1.36	1.29
1.06	1.13	1.31	1.56	1.70	1.88
0.79	0.78	0.80	0.80	0.77	0.79
0.99	1.01	1.05	1.08	1.14	1.18
1.12	1.11	1.23	1.19	1.10	1.14
1.23	1.25	1.38	1.35	1.57	1.53
1.39	1.43	1.65	1.72	1.96	2.01
1.68	1.63	1.89	2.35	2.82	4.14
1.06	1.13	1.23	1.50	1.67	1.88
1.19	1.18	1.25	1.25	1.29	1.28
1.30	1.38	1.37	1.43	1.57	1.66
0.97	1.02	1.04	1.16	1.25	1.45



# Chapter 5 Transportation Sector

## The Data Situation

The aggregate transportation energy use data presented in this report are published in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). Additional information needed to perform analysis on the transportation sector, such as the stock, the efficiencies and the distance travelled, comes from various sources.

Previously, the vehicle stock data were based on Statistics Canada's *Road Motor Vehicles Registrations* (Cat. No. 53-219), which provided data by vehicle type and provinces. The Office of Energy Efficiency (OEE) is now using the vehicle stock data and the new vehicle registrations data from the *Canadian Vehicles in Operation Census* (CVIOC) produced by DesRosiers Automotive Consultants and the *Truck Industry Profile* (TIP) from R.L. Polk & Co. These data, disaggregated by weight class, fuel type and model year, have greatly improved the OEE's analytical capacity. The stock of buses and motorcycles are based on several Statistics Canada publications, such as *Passenger Bus and Urban Transit Statistics* and the *Canadian Vehicle Survey*.

Other sources, such as Statistics Canada's *National Private Vehicle Use Survey* and the Transport Canada database *Vehicle Fuel Economy Information System* (VFEIS), are used to assess the fuel efficiency and distance travelled for some vehicles.

The Transportation Energy Demand Model is an energy demand model developed by the OEE. This model estimates the annual fuel use for each province and vehicle category, using vehicle stock characteristics and usages, the average distance travelled by vehicle age and the vehicle fuel economy. The annual fuel use estimates are calibrated to the energy demand data reported in Statistics Canada's QRES.

Transportation Energy Use by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a</sup></b>	<b>1,877.9</b>	<b>1,807.3</b>	<b>1,850.1</b>	<b>1,873.2</b>	<b>1,967.8</b>
Total Passenger Transportation <sup>d</sup>	1,149.0	1,094.9	1,125.2	1,143.6	1,193.8
Total Freight Transportation <sup>d</sup>	675.3	655.9	666.3	669.9	713.6
Off-Road <sup>d</sup>	53.6	56.5	58.6	59.7	60.4
<b>Energy Use by Fuel Type (PJ) <sup>a</sup></b>					
Motor Gasoline	1,120.4	1,089.2	1,112.8	1,143.3	1,179.2
Propane	35.4	36.7	42.5	31.6	29.7
Natural Gas	1.7	2.1	2.3	2.4	2.5
Aviation Gasoline	5.5	4.2	3.8	3.7	3.7
Aviation Turbo Fuel	181.9	163.3	169	161.7	170.8
Diesel Fuel Oil	469.8	442.4	451	471.8	519.1
Heavy Fuel Oil	60.1	66.4	65.8	55.8	59.9
Light Fuel Oil and Kerosene	0	0	0	0	0
Electricity	3.1	3.1	2.9	2.9	2.9
Coal	0	0	0	0	0
<b>Energy Use by Transportation Mode (PJ) <sup>a,b,c,d</sup></b>					
Small Cars	352.8	347.4	352.8	359.1	362.1
Large Cars	327.5	311.8	307.9	301.2	297.8
Light Trucks	351.5	345.4	370.2	390.9	421.9
Medium Trucks	101.3	98.4	103.4	107.5	114.9
Heavy Trucks	248.2	228.3	225	242.5	270.9
Motorcycles	1.7	1.6	1.7	1.8	2
School Bus	13	12.8	12.5	12.7	16.8
Urban Transit	35.9	35.6	40	41.3	45.1
Inter-City Bus	9	8.6	9	7.9	8.3
Air	187.4	167.5	172.8	165.4	174.5
Rail	89.5	82.9	86.7	86.4	89.3
Marine	106.5	110.6	109.7	96.8	103.9
Off-Road	53.6	56.5	58.6	59.7	60.4
<b>Activity</b>					
Passenger-Kilometres (million) <sup>d</sup>	508,722	493,841	516,634	521,707	547,266
Tonne-Kilometres (million) <sup>d</sup>	540,500	532,683	511,294	530,073	591,942
<b>Passenger Transportation Energy Intensity (MJ/passenger-kilometre) <sup>a,d</sup></b>	<b>2.18</b>	<b>2.15</b>	<b>2.12</b>	<b>2.14</b>	<b>2.13</b>
<b>Freight Transportation Energy Intensity (MJ/tonne-kilometre) <sup>a,d</sup></b>	<b>1.25</b>	<b>1.23</b>	<b>1.3</b>	<b>1.26</b>	<b>1.21</b>

\*Passenger transportation energy intensity excludes non-commercial aviation.

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215).  
 Data for 1999 estimated by Natural Resources Canada.  
 Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
 Data for 2000 estimated by Natural Resources Canada.
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.

## End-Use Energy Data Handbook — 1990 to 2000

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
2,004.9	2,043.0	2,117.2	2,194.5	2,252.8	2,282.1	21.5%
1,207.8	1,226.4	1,245.2	1,285.1	1,301.1	1,294.3	12.6%
734.7	752.9	805.1	839.3	876.3	905.5	34.1%
62.4	63.7	66.9	70.1	75.5	82.3	53.5%
1,174.6	1,186.6	1,213.1	1,261.4	1,293.4	1,295.1	15.6%
32.8	30.9	28.3	27	22.6	15.9	-55.1%
2.4	2.2	2.6	2.5	2.2	2.4	41.2%
4.1	3.9	3.7	3.9	3.6	3.6	-34.5%
183.2	205.5	210.9	222.8	233.9	235.9	29.7%
548.4	556	599	599.1	628.2	658.3	40.1%
56.6	54.9	56.7	74.8	65.9	67.8	12.8%
0	0	0	0	0	0	–
3	3	3	2.9	3	3.1	0.0%
0	0	0	0	0	0	–
351.5	345.8	342.5	338	334.5	324.3	-8.1%
286.6	277.9	272	265.7	261.4	251.5	-23.2%
441.3	462	489.4	539	560.1	564.8	60.7%
119.8	126	135	136.6	149.7	158.1	56.1%
298.3	308.5	344	347.8	371	389	56.7%
1.8	1.8	1.9	2	2.1	2.3	35.3%
16.8	14.2	13.2	16	14.8	15.1	16.2%
49	47.1	50.5	48.9	46.5	50.3	40.1%
7.5	7.4	6.9	8	7.4	7.8	-13.3%
187.3	209.4	214.6	226.7	237.5	239.5	27.8%
80.9	79.1	80.2	76.5	81.1	83.1	-7.2%
101.7	99.9	100.1	119.2	111.5	114	7.0%
62.4	63.7	66.9	70.1	75.5	82.3	53.5%
548,561	557,953	570,956	582,022	584,428	583,326	14.7%
610,109	625,689	667,174	672,525	719,953	741,188	37.1%
2.14	2.14	2.13	2.15	2.18	2.17	-0.5%
1.2	1.2	1.21	1.25	1.22	1.22	-2.4%

Transportation GHG Emissions by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
<b>Total GHG Emissions (Mt) <sup>a,k</sup></b>	<b>135</b>	<b>129.8</b>	<b>132.9</b>	<b>134.6</b>	<b>141.5</b>
Total Passenger Transportation <sup>dk</sup>	81.9	77.9	80.1	81.5	85.1
Total Freight Transportation <sup>dk</sup>	49.4	47.9	48.7	49	52.1
Off-Road <sup>dk</sup>	3.8	4	4.1	4.2	4.2
<b>GHG Emissions by Fuel Type (Mt) <sup>a,k</sup></b>					
Motor Gasoline	80	77.8	79.5	81.7	84.3
Propane	2.1	2.2	2.5	1.9	1.8
Natural Gas	0.1	0.1	0.1	0.1	0.1
Aviation Gasoline	0.4	0.3	0.3	0.3	0.3
Aviation Turbo Fuel	13.2	11.8	12.2	11.7	12.3
Diesel Fuel Oil	34.6	32.5	33.2	34.7	38.1
Heavy Fuel Oil	4.5	5	4.9	4.2	4.5
Light Fuel Oil and Kerosene	0	0	0	0	0
Electricity	0.2	0.2	0.2	0.1	0.1
Coal	0	0	0	0	0
<b>GHG Emissions by Transportation Mode (Mt) <sup>a,b,c,d,k</sup></b>					
Small Cars	25	24.6	25	25.5	25.7
Large Cars	23.1	22	21.7	21.2	21
Light Trucks	25.2	24.7	26.5	28	30.3
Medium Trucks	7.3	7.1	7.5	7.8	8.3
Heavy Trucks	17.7	16.3	16	17.3	19.3
Motorcycles	0.1	0.1	0.1	0.1	0.1
School Bus	0.9	0.9	0.8	0.9	1.1
Urban Transit	2.5	2.5	2.8	2.9	3.1
Inter-City Bus	0.6	0.6	0.6	0.6	0.6
Air	13.6	12.1	12.5	12	12.6
Rail	7.1	6.6	6.9	6.9	7.1
Marine	8.1	8.4	8.4	7.4	7.9
Off-Road	3.8	4	4.1	4.2	4.2
<b>GHG Intensity (tonne/TJ) <sup>a,k</sup></b>	<b>71.9</b>	<b>71.8</b>	<b>71.8</b>	<b>71.9</b>	<b>71.9</b>
<b>GHG Emissions related to Electricity (Mt) <sup>a,k</sup></b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>

Sources:

- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
Data for 2000 estimated by Natural Resources Canada.
- Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

*End-Use Energy Data Handbook — 1990 to 2000*

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
144.1	146.8	152.2	156.9	161.1	163.4	21.0%
86.1	87.5	88.9	90.7	91.9	91.5	11.7%
53.6	54.8	58.6	61.2	64	66.1	33.8%
4.4	4.5	4.7	4.9	5.3	5.7	50.0%
84	84.9	86.8	89.4	91.7	91.8	14.8%
2	1.8	1.7	1.6	1.4	1	-52.4%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
0.3	0.3	0.3	0.3	0.3	0.3	-25.0%
13.2	14.9	15.2	15.7	16.4	16.6	25.8%
40.1	40.6	43.7	44.1	46.2	48.4	39.9%
4.2	4.1	4.2	5.5	4.8	5	11.1%
0	0	0	0	0	0	–
0.2	0.1	0.2	0.2	0.2	0.2	0.0%
0	0	0	0	0	0	–
24.9	24.5	24.3	23.7	23.5	22.8	-8.8%
20.2	19.6	19.2	18.6	18.3	17.6	-23.8%
31.7	33.2	35.2	38.4	40	40.4	60.3%
8.6	9.1	9.7	9.8	10.8	11.4	56.2%
21.3	22	24.5	25	26.7	28	58.2%
0.1	0.1	0.1	0.1	0.1	0.2	100.0%
1.2	1	0.9	1.1	1	1	11.1%
3.4	3.3	3.5	3.5	3.3	3.6	44.0%
0.5	0.5	0.5	0.6	0.5	0.6	0.0%
13.5	15.1	15.5	15.9	16.7	16.8	23.5%
6.4	6.3	6.4	6.1	6.5	6.7	-5.6%
7.8	7.6	7.7	9	8.5	8.6	6.2%
4.4	4.5	4.7	4.9	5.3	5.7	50.0%
71.9	71.9	71.9	71.5	71.5	71.6	-0.4%
0.2	0.1	0.2	0.2	0.2	0.2	0.0%

## Passenger Transportation Energy Use by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
<b>Passenger Transportation Energy Use (PJ) <sup>d</sup></b>	<b>1,149.0</b>	<b>1,094.9</b>	<b>1,125.2</b>	<b>1,143.6</b>	<b>1,193.8</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Motor Gasoline	884	849.6	866.9	895	929.9
Propane	15.5	16.7	18.5	14.6	13.8
Natural Gas	1.6	2	2.2	2.3	2.4
Aviation Gasoline	5.5	4.2	3.8	3.7	3.7
Aviation Turbo Fuel	181.9	163.3	169	161.7	170.8
Diesel Fuel Oil	57.4	56.1	61.9	63.4	70.2
Electricity	3.1	3.1	2.9	2.9	2.9
<i>Energy Use by Transportation Mode (PJ) <sup>a,b,c,d</sup></i>					
Small Cars	352.8	347.4	352.8	359.1	362.1
Large Cars	327.5	311.8	307.9	301.2	297.8
Light Trucks	216.5	206.3	225.5	250.7	284.4
Motorcycles	1.7	1.6	1.7	1.8	2
School Bus	13	12.8	12.5	12.7	16.8
Urban Transit	35.9	35.6	40	41.3	45.1
Inter-City Bus	9	8.6	9	7.9	8.3
Air	187.4	167.5	172.8	165.4	174.5
Rail	5.1	3.3	3.2	3.4	2.9
<b>Activity</b>					
<b>Total Passenger-Kilometres (million) <sup>d</sup></b>	<b>508,722</b>	<b>493,841</b>	<b>516,634</b>	<b>521,707</b>	<b>547,266</b>
<i>Passenger-Kilometres by Transportation Mode (million)</i>					
Small Cars <sup>d</sup>	202,688	200,707	207,616	209,239	210,992
Large Cars <sup>d</sup>	132,833	130,749	134,007	131,995	132,111
Light Trucks <sup>d</sup>	64,800	62,798	69,270	76,147	85,525
Motorcycles <sup>d</sup>	985	960	990	1,037	1,111
School Bus <sup>b</sup>	10,245	11,839	12,579	10,440	15,523
Urban Transit <sup>b</sup>	18,183	17,776	19,001	20,448	22,239
Inter-City Bus <sup>b</sup>	10,208	9,580	9,549	9,891	12,586
Air <sup>g,h</sup>	66,776	58,007	62,183	61,098	65,739
Rail <sup>c</sup>	2,004	1,426	1,439	1,413	1,440
<b>Energy Intensity (MJ/passenger-kilometre)* <sup>d</sup></b>	<b>2.18</b>	<b>2.15</b>	<b>2.12</b>	<b>2.14</b>	<b>2.13</b>

\*Passenger transportation energy intensity excludes non-commercial aviation.

**Sources:**

- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001. (CANSIM).  
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
Data for 2000 estimated by Natural Resources Canada.
- Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- Statistics Canada, *Aviation Statistics Centre: Service Bulletin*, Ottawa, 1990–1996; 22(1)–28(12), (Cat. No. 51-004).
- Statistics Canada, *Canadian Civil Aviation 1995–1998*, Ottawa, 1996–2000, (Cat. No. 51-206).  
Data for 1999–2000 estimated by Natural Resources Canada.



*End-Use Energy Data Handbook — 1990 to 2000*

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
1,207.8	1,226.4	1,245.2	1,285.1	1,301.1	1,294.3	12.6%
926.9	927.6	939.3	966.8	977.3	966.1	9.3%
14.7	13.2	12.6	12.3	10.3	7.9	-49.0%
2.3	2.1	2.5	2.5	2.2	2.3	43.8%
4.1	3.9	3.7	3.9	3.6	3.6	-34.5%
183.2	205.5	210.9	222.8	233.9	235.9	29.7%
73.7	70.9	73.3	73.9	70.8	75.3	31.2%
3	3	3	2.9	3	3.1	0.0%
351.5	345.8	342.5	338	334.5	324.3	-8.1%
286.6	277.9	272	265.7	261.4	251.5	-23.2%
304.9	320.1	341.3	377.7	394.5	401	85.2%
1.8	1.8	1.9	2	2.1	2.3	35.3%
16.8	14.2	13.2	16	14.8	15.1	16.2%
49	47.1	50.5	48.9	46.5	50.3	40.1%
7.5	7.4	6.9	8	7.4	7.8	-13.3%
187.3	209.4	214.6	226.7	237.5	239.5	27.8%
2.4	2.5	2.3	2.2	2.5	2.5	-51.0%
548,561	557,953	570,956	582,022	584,428	583,326	14.7%
204,121	203,452	201,182	200,301	198,308	195,456	-3.6%
127,962	126,084	124,002	122,664	121,020	118,682	-10.7%
90,717	96,010	101,161	111,435	115,381	117,886	81.9%
1,011	1,023	1,065	1,126	1,154	1,313	33.3%
15,367	14,368	15,418	16,949	15,899	15,739	53.6%
23,066	23,070	24,308	22,971	21,832	22,657	24.6%
11,346	10,311	10,448	10,651	10,309	10,220	0.1%
73,499	82,120	91,859	94,467	98,983	99,790	49.4%
1,473	1,513	1,515	1,458	1,544	1,582	-21.1%
2.14	2.14	2.13	2.15	2.18	2.17	-0.5%

Passenger Transportation GHG Emissions by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
Passenger Transportation GHG Emissions (Mt) <sup>a,d,k</sup>	81.9	77.9	80.1	81.5	85.1
<i>GHG Emissions by Fuel Type (Mt) <sup>a,d,k</sup></i>					
Motor Gasoline	63	60.5	61.8	63.8	66.3
Propane	0.9	1	1.1	0.9	0.8
Natural Gas	0.1	0.1	0.1	0.1	0.1
Aviation Gasoline	0.4	0.3	0.3	0.3	0.3
Aviation Turbo Fuel	13.2	11.8	12.2	11.7	12.3
Diesel Fuel Oil	4.1	4.0	4.4	4.6	5.0
Electricity	0.2	0.2	0.2	0.1	0.1
<i>GHG Emissions by Transportation Mode (Mt) <sup>a,b,c,d,k</sup></i>					
Small Cars	25	24.6	25	25.5	25.7
Large Cars	23.1	22	21.7	21.2	21
Light Trucks	15.7	14.9	16.3	18.1	20.6
Motorcycles	0.1	0.1	0.1	0.1	0.1
School Bus	0.9	0.9	0.8	0.9	1.1
Urban Transit	2.5	2.5	2.8	2.9	3.1
Inter-City Bus	0.6	0.6	0.6	0.6	0.6
Air	13.6	12.1	12.5	12	12.6
Rail	0.4	0.3	0.3	0.3	0.2
GHG Intensity (tonne/TJ) <sup>d,k</sup>	71.2	71.2	71.2	71.2	71.3
GHG Emissions related to Electricity (Mt) <sup>d,k</sup>	0.2	0.2	0.2	0.1	0.1

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.  
 Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
 Data for 2000 estimated by Natural Resources Canada.
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
86.1	87.5	88.9	90.7	91.9	91.5	11.7%
66.2	66.2	67.1	68.4	69.2	68.4	8.6%
0.9	0.8	0.7	0.7	0.6	0.5	-44.4%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
0.3	0.3	0.3	0.3	0.3	0.3	-25.0%
13.2	14.9	15.2	15.7	16.4	16.6	25.8%
5.3	5.1	5.2	5.3	5.1	5.4	31.7%
0.2	0.1	0.2	0.2	0.2	0.2	0.0%
24.9	24.5	24.3	23.7	23.5	22.8	-8.8%
20.2	19.6	19.2	18.6	18.3	17.6	-23.8%
22	23.1	24.7	27.1	28.3	28.7	82.8%
0.1	0.1	0.1	0.1	0.1	0.2	100.0%
1.2	1	0.9	1.1	1	1	11.1%
3.4	3.3	3.5	3.5	3.3	3.6	44.0%
0.5	0.5	0.5	0.6	0.5	0.6	0.0%
13.5	15.1	15.5	15.9	16.7	16.8	23.5%
0.2	0.2	0.2	0.2	0.2	0.2	-50.0%
71.3	71.3	71.4	70.6	70.6	70.7	-0.7%
0.2	0.1	0.2	0.2	0.2	0.2	0.0%

Freight Transportation Energy Use by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
<b>Freight Transportation Energy Use (PJ) <sup>a,d</sup></b>	<b>675.3</b>	<b>655.9</b>	<b>666.3</b>	<b>669.9</b>	<b>713.6</b>
<i>Energy Use by Fuel Type (PJ) <sup>a,d</sup></i>					
Motor Gasoline	182.8	183.2	187.3	188.5	188.9
Propane	19.9	20.1	24	17	15.9
Natural Gas	0.1	0.1	0.1	0.1	0.1
Diesel Fuel Oil	412.4	386.2	389.1	408.4	448.8
Heavy Fuel Oil	60.1	66.4	65.8	55.8	59.9
Light Fuel Oil and Kerosene	0	0	0	0	0
Coal	0	0	0	0	0
<i>Energy Use by Transportation Mode (PJ) <sup>a,c,d,i</sup></i>					
Light Trucks	134.9	139	144.8	140.1	137.5
Medium Trucks	101.3	98.4	103.4	107.5	114.9
Heavy Trucks	248.2	228.3	225	242.5	270.9
Rail	84.4	79.6	83.5	83	86.4
Marine	106.5	110.6	109.7	96.8	103.9
<b>Activity</b>					
<b>Total Tonne-Kilometres (million) <sup>d</sup></b>	<b>540,500</b>	<b>532,683</b>	<b>511,294</b>	<b>530,073</b>	<b>591,942</b>
<i>Tonne-Kilometres by Transportation Mode (million)</i>					
Light Trucks <sup>d</sup>	13,281	13,821	14,347	13,940	13,556
Medium Trucks <sup>d,e,j</sup>	13,468	13,215	14,040	14,811	15,996
Heavy Trucks <sup>d,e,j</sup>	77,800	70,600	72,900	84,600	102,000
Rail <sup>c</sup>	248,371	260,537	250,607	256,338	288,432
Marine <sup>i</sup>	187,580	174,510	159,400	160,384	171,958
<b>Energy Intensity (MJ/tonne-kilometre) <sup>d</sup></b>	<b>1.25</b>	<b>1.23</b>	<b>1.30</b>	<b>1.26</b>	<b>1.21</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).  
 Data for 2000 estimated by Natural Resources Canada.
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- e) Royal Commission on National Passenger Transportation, *Direction: The Final Report of the Royal Commission on National Passenger Transportation*, Ottawa, 1992: 2.
- i) Transport Canada, *Surface and Marine Statistics and Forecasts Division*, December 1999.  
 Data for 2000 estimated by Natural Resources Canada.
- j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222).  
 Data for 2000 estimated by Natural Resources Canada.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
734.7	752.9	805.1	839.3	876.3	905.5	34.1%
185.3	195.2	206.9	224.5	240.6	246.6	34.9%
18.1	17.6	15.7	14.7	12.3	8	-59.8%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
474.7	485	525.7	525.2	557.4	583	41.4%
56.6	54.9	56.7	74.8	65.9	67.8	12.8%
0	0	0	0	0	0	–
0	0	0	0	0	0	–
136.4	141.9	148.2	161.4	165.6	163.8	21.4%
119.8	126	135	136.6	149.7	158.1	56.1%
298.3	308.5	344	347.8	371	389	56.7%
78.5	76.6	77.9	74.4	78.6	80.5	-4.6%
101.7	99.9	100.1	119.2	111.5	114	7.0%
<b>610,109</b>	<b>625,689</b>	<b>667,174</b>	<b>672,525</b>	<b>719,953</b>	<b>741,188</b>	<b>37.1%</b>
13,321	13,813	14,309	15,447	15,789	15,627	17.7%
16,886	17,883	19,287	19,607	21,532	22,829	69.5%
110,000	120,000	130,141	137,552	158,104	164,720	111.7%
280,474	282,482	306,943	299,508	317,146	325,049	30.9%
189,428	191,511	196,494	200,411	207,382	212,963	13.5%
1.20	1.20	1.21	1.25	1.22	1.22	-2.4%

Freight Transportation GHG Emissions by Fuel Type and Transportation Mode

	1990	1991	1992	1993	1994
<b>Freight Transportation GHG Emissions (Mt) <sup>a,d,k</sup></b>	<b>49.4</b>	<b>47.9</b>	<b>48.7</b>	<b>49</b>	<b>52.1</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>a,d,k</sup></i>					
Motor Gasoline	13.2	13.3	13.6	13.7	13.7
Propane	1.2	1.2	1.4	1	0.9
Natural Gas	0	0	0	0	0
Diesel Fuel Oil	30.4	28.5	28.7	30.1	33
Heavy Fuel Oil	4.5	5	4.9	4.2	4.5
Light Fuel Oil and Kerosene	0	0	0	0	0
Coal	0	0	0	0	0
<i>GHG Emissions by Transportation Mode (Mt) <sup>a,c,d,i,k</sup></i>					
Light Trucks	9.5	9.8	10.2	9.9	9.7
Medium Trucks	7.3	7.1	7.5	7.8	8.3
Heavy Trucks	17.7	16.3	16	17.3	19.3
Rail	6.7	6.3	6.6	6.6	6.9
Marine	8.1	8.4	8.4	7.4	7.9
<b>GHG Intensity (tonne/TJ) <sup>d,k</sup></b>	<b>73.1</b>	<b>73.1</b>	<b>73</b>	<b>73.1</b>	<b>73.1</b>

Sources:

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990-1998 revisions*, Ottawa, January 2001, (CANSIM).
- Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999-2000 revisions*, Ottawa, February 2002.
- c) Statistics Canada, *Rail in Canada 1990-1999*, Ottawa, July 1992-April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- i) Transport Canada, *Surface and Marine Statistics and Forecasts Division*, December 1999. Data for 2000 estimated by Natural Resources Canada.
- k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990-1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
53.6	54.8	58.6	61.2	64	66.1	33.8%
13.4	14.1	15	16.1	17.3	17.7	34.1%
1.1	1.1	0.9	0.9	0.7	0.5	-58.3%
0	0	0	0	0	0	–
34.8	35.5	38.4	38.8	41.1	43	41.4%
4.2	4.1	4.2	5.5	4.8	5	11.1%
0	0	0	0	0	0	–
0	0	0	0	0	0	–
9.6	10	10.5	11.4	11.7	11.6	22.1%
8.6	9.1	9.7	9.8	10.8	11.4	56.2%
21.3	22	24.5	25	26.7	28	58.2%
6.2	6.1	6.2	6	6.3	6.5	-3.0%
7.8	7.6	7.7	9	8.5	8.6	6.2%
72.9	72.8	72.8	73	73	73	-0.1%

Passenger and Freight Road Transportation Energy Use and GHG Emissions by Fuel Type

	1990	1991	1992	1993	1994
<b>Passenger Road Transportation Energy Use (PJ) <sup>d</sup></b>	<b>956.5</b>	<b>924.1</b>	<b>949.3</b>	<b>974.8</b>	<b>1,016.4</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Motor Gasoline	884.0	849.6	866.9	895.0	929.9
Propane	15.5	16.7	18.5	14.6	13.8
Natural Gas	1.6	2	2.2	2.3	2.4
Diesel Fuel Oil	52.3	52.8	58.7	60	67.3
Electricity	3.1	3.1	2.9	2.9	2.9
<b>Activity</b>					
Passenger-Kilometres (million) <sup>d</sup>	439,942	434,408	453,012	459,196	480,087
<b>Energy Intensity (MJ/passenger-kilometre) <sup>d</sup></b>	<b>2.17</b>	<b>2.13</b>	<b>2.10</b>	<b>2.12</b>	<b>2.12</b>
<b>Passenger Road Transportation GHG Emissions (Mt) <sup>d,k</sup></b>	<b>67.9</b>	<b>65.6</b>	<b>67.4</b>	<b>69.2</b>	<b>72.2</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>d,k</sup></i>					
Motor Gasoline	63	60.5	61.8	63.8	66.3
Propane	0.9	1	1.1	0.9	0.8
Natural Gas	0.1	0.1	0.1	0.1	0.1
Diesel Fuel Oil	3.7	3.8	4.2	4.3	4.8
Electricity	0.2	0.2	0.2	0.1	0.1
<b>GHG Intensity (tonne/TJ) <sup>d,k</sup></b>	<b>71</b>	<b>70.9</b>	<b>71</b>	<b>71</b>	<b>71.1</b>
<b>Freight Road Transportation Energy Use (PJ) <sup>d</sup></b>	<b>484.4</b>	<b>465.8</b>	<b>473.1</b>	<b>490.1</b>	<b>523.3</b>
<i>Energy Use by Fuel Type (PJ) <sup>d</sup></i>					
Motor Gasoline	182.8	183.2	187.3	188.5	188.9
Propane	19.9	20.1	24	17	15.9
Natural Gas	0	0	0	0	0
Diesel Fuel Oil	281.7	262.4	261.7	284.5	318.3
<b>Activity</b>					
Tonne-Kilometres (million) <sup>d</sup>	104,549	97,636	101,287	113,351	131,552
<b>Energy Intensity (MJ/tonne-kilometre) <sup>d</sup></b>	<b>4.63</b>	<b>4.77</b>	<b>4.67</b>	<b>4.32</b>	<b>3.98</b>
<b>Freight Road Transportation GHG Emissions (Mt) <sup>d,k</sup></b>	<b>34.5</b>	<b>33.2</b>	<b>33.7</b>	<b>35</b>	<b>37.3</b>
<i>GHG Emissions by Fuel Type (Mt) <sup>d,k</sup></i>					
Motor Gasoline	13.2	13.3	13.6	13.7	13.7
Propane	1.2	1.2	1.4	1	0.9
Natural Gas	0	0	0	0	0
Diesel Fuel Oil	20.1	18.7	18.7	20.3	22.7
<b>GHG Intensity (tonne/TJ) <sup>d,k</sup></b>	<b>71.2</b>	<b>71.2</b>	<b>71.1</b>	<b>71.3</b>	<b>71.3</b>

Sources:

- d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
- k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).



1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
1,018.0	1,014.4	1,028.2	1,056.2	1,061.1	1,052.3	10.0%
926.9	927.6	939.3	966.8	977.3	966.1	9.3%
14.7	13.2	12.6	12.3	10.3	7.9	-49.0%
2.3	2.1	2.5	2.5	2.2	2.3	43.8%
71.3	68.4	70.9	71.8	68.3	72.8	39.2%
3	3	3	2.9	3	3.1	0.0%
473,589	474,319	477,583	486,097	483,902	481,954	9.5%
2.15	2.14	2.15	2.17	2.19	2.18	0.5%
72.4	72.2	73.2	74.6	75	74.4	9.6%
66.2	66.2	67.1	68.4	69.2	68.4	8.6%
0.9	0.8	0.7	0.7	0.6	0.5	-44.4%
0.1	0.1	0.1	0.1	0.1	0.1	0.0%
5.1	4.9	5.1	5.2	4.9	5.2	40.5%
0.2	0.1	0.2	0.2	0.2	0.2	0.0%
71.1	71.1	71.2	70.7	70.7	70.7	-0.4%
554.5	576.3	627.1	645.7	686.2	711	46.8%
185.3	195.2	206.9	224.5	240.6	246.6	34.9%
18.1	17.6	15.7	14.7	12.3	8	-59.8%
0	0	0	0	0	0	0.0%
351	363.4	404.4	406.5	433.2	456.3	62.0%
140,207	151,696	163,737	172,606	195,425	203,176	94.3%
3.96	3.8	3.83	3.74	3.51	3.5	-24.4%
39.5	41.1	44.8	46.3	49.2	51	47.8%
13.4	14.1	15	16.1	17.3	17.7	34.1%
1.1	1.1	0.9	0.9	0.7	0.5	-58.3%
0	0	0	0	0	0	–
25	25.9	28.8	29.3	31.2	32.9	63.7%
71.3	71.3	71.4	71.6	71.7	71.8	0.8%

Transportation Explanatory Variables

	1990	1991	1992	1993	1994
<b>Cars</b>					
<i>Car Sales (thousands) <sup>d</sup></i>					
Small Cars	584	530	497	461	463
Large Cars	300	343	301	278	285
<i>Car Stock (thousands) <sup>d</sup></i>					
Small Cars	6,652	6,772	6,759	6,802	6,759
Large Cars	4,449	4,450	4,340	4,323	4,270
<i>Average Car Distance Travelled Per Year (km) <sup>d</sup></i>					
Small Cars	16,215	16,035	15,921	15,714	15,567
Large Cars	15,875	15,786	15,788	15,575	15,452
<i>Average Small Car Fuel Consumption (L/100 km) <sup>d</sup></i>					
Motor Gasoline	9.4	9.1	9.4	9.6	9.8
<i>Average Large Car Fuel Consumption (L/100 km) <sup>d</sup></i>					
Motor Gasoline	13.2	12.6	12.6	12.7	12.9

**Motorcycles**

<i>Motorcycle Stock (thousands) <sup>i</sup></i>	285	278	269	268	264
<i>Average Motorcycle Distance Travelled Per Year (km) <sup>d</sup></i>	3,661	3,553	3,893	4,165	4,646
<i>Average Motorcycle Fuel Consumption (L/100 km) <sup>d</sup></i>	4.6	4.6	4.6	4.6	4.6

**Buses**

<i>Bus Stock (thousands) <sup>d</sup></i>					
School Bus	36	36	36	36	40
Urban Transit	40	40	41	42	42
Inter-City Bus	5	5	5	4	5
<i>Average Bus Distance Travelled Per Year (km) <sup>b,d</sup></i>					
School Bus	17,094	19,612	20,752	17,101	23,114
Urban Transit	43,625	41,817	44,218	46,192	50,048
Inter-City Bus	106,708	98,059	96,282	108,337	124,114

**Sources:**

- b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
- c) Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222). Data for 2000 estimated by Natural Resources Canada.
- l) Statistics Canada, *Road Motor Vehicles Registrations 1976–1998*, (Cat. No. 53-219).
- m) Statistics Canada, *Cansim II*, Statistics Canada's online statistical database, table 405–4004, 1999–2000.

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1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
409	417	466	468	508	534	-8.6%
261	243	272	273	299	315	4.8%
6,726	6,621	6,625	6,462	6,473	6,425	-3.4%
4,210	4,131	4,115	4,002	3,991	3,938	-11.5%
15,393	15,244	15,131	15,134	15,114	15,138	-6.6%
15,354	15,161	15,012	15,004	14,982	15,012	-5.4%
9.7	9.8	9.8	9.9	9.8	9.5	1.1%
12.6	12.6	12.5	12.6	12.4	12.1	-8.3%
258	253	259	271	274	311	9.2%
4,283	4,496	4,535	4,638	4,662	4,622	26.2%
4.6	4.6	4.6	4.6	4.6	4.6	0.0%
40	40	40	42	39	40	11.1%
43	43	43	44	41	43	8.9%
4	4	4	4	4	4	-12.6%
22,977	21,431	23,108	24,062	24,457	23,528	37.6%
51,326	50,433	53,042	49,763	50,617	49,698	13.9%
126,861	127,319	121,597	122,588	126,370	121,602	14.0%
						<i>continued</i>

Transportation Explanatory Variables *continued*

	1990	1991	1992	1993	1994
<b>Trucks</b>					
<i>Truck Sales (thousands) <sup>d</sup></i>					
Light Trucks	388	377	348	365	400
Medium Trucks	44	37	58	66	74
Heavy Trucks	15	9	12	19	24
<i>Truck Stock (thousands) <sup>d,j</sup></i>					
Light Trucks	3,444	3,494	3,623	3,923	4,186
Medium Trucks	619	625	640	645	650
Heavy Trucks	257	256	259	258	260
<i>Average Truck Distance Travelled Per Year (km) <sup>d,j</sup></i>					
Light Trucks	19,004	18,936	18,663	18,326	17,949
Medium Trucks	18,953	18,776	18,837	18,927	19,216
Heavy Trucks	74,023	70,767	67,652	67,105	68,498
<i>Average Light Truck Fuel Consumption (L/100 km) <sup>d</sup></i>					
Motor Gasoline	15.4	15.1	15	15	15
Diesel Fuel Oil	16.9	16.1	15.8	15.6	15.5
<i>Average Medium Truck Fuel Consumption (L/100 km) <sup>d</sup></i>					
Motor Gasoline	28.1	27.9	27.6	27.3	26.9
Diesel Fuel Oil	23.5	23.3	23.1	22.9	22.6
<i>Average Large Truck Fuel Consumption (L/100 km) <sup>d</sup></i>					
Diesel Fuel Oil	46.8	46.6	46.4	46.1	45.6

**Sources:**

- b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
- c) Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
- d) Natural Resources Canada, *Transportation Energy Demand Model*, Ottawa, February 2002.
- j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222). Data for 2000 estimated by Natural Resources Canada.
- l) Statistics Canada, *Road Motor Vehicles Registrations 1976–1998*, (Cat. No. 53-219).
- m) Statistics Canada, *Cansim II*, Statistics Canada's online statistical database, table 405–4004, 1999–2000.

*End-Use Energy Data Handbook — 1990 to 2000*

						<i>continued</i>
1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
372	426	549	563	572	585	50.8%
79	85	88	102	116	114	158.2%
25	22	28	28	33	29	96.2%
4,476	4,730	4,984	5,422	5,636	5,779	67.8%
657	692	728	722	803	839	35.5%
265	284	303	304	330	329	27.9%
17,453	17,141	17,183	17,013	17,085	17,150	-9.8%
19,676	19,916	20,135	20,737	20,620	20,864	10.1%
71,311	71,326	72,516	75,429	76,199	78,036	5.4%
15.2	15.2	15.3	15.4	15.5	15.5	0.6%
15.5	15.6	15.5	15.5	15.5	15.6	-7.7%
26.6	26.3	26.1	25.8	25.7	25.6	-8.9%
22.4	22.2	22.1	21.9	21.8	21.7	-7.7%
45.1	44.7	44.1	43.3	42.8	42.2	-9.8%



# Chapter 6 Agriculture Sector

## The Data Situation

The energy use data used in this sector come from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRES) (Cat. No. 57-003). Informetrica Limited provided the gross domestic product (GDP) data.

The *Farm Energy Use Survey*, conducted in 1997 by Statistics Canada, also provides aggregate energy use data. Prior to this survey, however, a 16-year gap existed because Statistics Canada had conducted its previous survey of farm energy use in Canada in 1981. As a result, Natural Resources Canada, along with Agriculture and Agri-Food Canada and Environment Canada, co-sponsored the 1997 *Farm Energy Use Survey*.

Information on the energy-using activities on Canadian farms is available only at an aggregate level. The agricultural GDP reported by Statistics Canada incorporates all agricultural activities, including both livestock and field crop productions, in its measure.

Agriculture Energy Use and GHG Emissions by Fuel Type and End-Use

	1990	1991	1992	1993	1994
<b>Total Energy Use (PJ) <sup>a</sup></b>	<b>199.2</b>	<b>195.2</b>	<b>196.9</b>	<b>198.8</b>	<b>195.8</b>
<i>Energy Use by End-Use (PJ) <sup>a</sup></i>					
Non-Motive Energy Use	71.6	79.7	87.6	86.3	77.9
Motive Energy Use	127.6	115.6	109.2	112.5	117.9
<i>Energy Use by Fuel Type (PJ) <sup>a</sup></i>					
Natural Gas	23.2	23.3	25.1	31.2	23.6
Propane	5	5.3	9	6.7	6.5
Kerosene	1	1.7	2.5	1.6	1.5
Light Fuel Oil	10.8	14.7	16.6	11.9	10.8
Heavy Fuel Oil	0.6	0.6	0.7	0.8	0.8
Motor Gasoline	56.1	48.4	40.7	35.9	33.4
Diesel Fuel Oil	71.5	67.2	68.5	76.6	84.5
Electricity	31.1	34	33.7	33.9	34.5
Steam	0	0.2	0.1	0.2	0.1
<b>Activity</b>					
GDP (million \$86) <sup>b</sup>	10,838	10,712	10,030	10,726	11,195
Energy Intensity (MJ/\$86) <sup>a,b</sup>	<b>18.4</b>	<b>18.2</b>	<b>19.6</b>	<b>18.5</b>	<b>17.5</b>
<b>Total GHG Emissions Including Electricity (Mt) <sup>a,c</sup></b>	<b>13.7</b>	<b>13.3</b>	<b>13.6</b>	<b>13.3</b>	<b>13.3</b>
<i>GHG Emissions by End-Use (Mt) <sup>a,c</sup></i>					
Non-Motive GHG Emissions	4.1	4.6	5.3	4.7	4.2
Motive GHG Emissions	9.6	8.7	8.3	8.6	9.1
<i>GHG Emissions by Fuel Type (Mt) <sup>a,c</sup></i>					
Natural Gas	1.2	1.2	1.3	1.6	1.2
Propane	0.3	0.3	0.5	0.4	0.4
Kerosene	0.1	0.1	0.2	0.1	0.1
Light Fuel Oil	0.8	1.1	1.2	0.9	0.8
Heavy Fuel Oil	0	0	0.1	0.1	0.1
Motor Gasoline	3.9	3.4	2.9	2.5	2.3
Diesel Fuel Oil	5.7	5.3	5.4	6.1	6.7
Electricity	1.7	1.8	2	1.7	1.7
Steam	0	0	0	0	0
<b>GHG Intensity (tonne/TJ) <sup>a,c</sup></b>	<b>68.9</b>	<b>68.1</b>	<b>69</b>	<b>66.9</b>	<b>67.7</b>
<b>Total GHG Emissions Excluding Electricity (Mt) <sup>a,c</sup></b>	<b>12</b>	<b>11.5</b>	<b>11.5</b>	<b>11.6</b>	<b>11.6</b>
<i>GHG Emissions by End-Use (Mt) <sup>a,c</sup></i>					
Non-Motive GHG Emissions	2.4	2.7	3.2	3	2.5
Motive GHG Emissions	9.6	8.7	8.3	8.6	9.1
<b>GHG Intensity (tonne/TJ) <sup>a,c</sup></b>	<b>60.2</b>	<b>58.7</b>	<b>58.7</b>	<b>58.4</b>	<b>59.1</b>

**Sources:**

- a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).  
 Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
- b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
- c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).



*End-Use Energy Data Handbook — 1990 to 2000*

1995	1996	1997	1998	1999	2000	Total Growth 1990–2000
209.2	222.9	230	224.7	229.9	231.9	16.4%
80.2	84.6	84.7	78.4	79.9	78.3	9.4%
129	138.3	145.3	146.3	150	153.6	20.4%
22.9	26.9	26.3	23.7	24.1	27.3	17.7%
7.4	6.4	7	4.9	5.4	5.4	8.0%
1.5	1.7	1.5	1.2	1.1	0.6	-40.0%
14	13.8	13.8	13	13.5	9.5	-12.0%
0.5	0.5	0.3	0.3	0.5	1	66.7%
40.4	43.7	44.9	46.4	47.3	46.8	-16.6%
88.7	94.6	100.5	99.9	102.7	106.8	49.4%
33.8	35.4	35.7	35.1	35.2	34.6	11.3%
0.1	0.1	0	0.1	0.1	0	–
11,441	11,878	11,318	11,947	12,922	12,511	15.4%
18.3	18.8	20.3	18.8	17.8	18.5	0.5%
14.4	15.2	15.9	15.9	16.2	16.4	19.7%
4.5	4.6	4.8	4.7	4.7	4.6	12.2%
9.9	10.6	11.1	11.2	11.5	11.8	22.9%
1.1	1.3	1.3	1.2	1.2	1.4	16.7%
0.4	0.4	0.4	0.3	0.3	0.3	0.0%
0.1	0.1	0.1	0.1	0.1	0	–
1	1	1	0.9	1	0.7	-12.5%
0	0	0	0	0	0.1	–
2.8	3.1	3.1	3.2	3.3	3.3	-15.4%
7	7.5	8	8	8.2	8.6	50.9%
1.7	1.7	1.9	2.2	2.1	2.1	23.5%
0	0	0	0	0	0	–
68.6	68.2	69.3	70.9	70.6	70.7	2.6%
12.6	13.5	14	13.8	14.2	14.3	19.2%
2.8	2.9	2.9	2.5	2.6	2.5	4.2%
9.9	10.6	11.1	11.2	11.5	11.8	22.9%
60.4	60.5	60.9	61.3	61.6	61.7	2.5%

# Appendix A Reconciliation of Data

## Reconciliation of Data on Energy Use Found in This Report With Data in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* — 2000

Sector	Revised QRES D data	Fuel Wood	Commercial & Public Admin. Diesel	Commercial & Public Admin. Aviation Fuels
Residential	1,288	100		
Commercial/Institutional	1,294		(141)	(29)
Industrial	2,282			
Transportation	2,280		141	29
Agriculture	232			
<b>Final Demand</b>	<b>7,376</b>	<b>100</b>	<b>0</b>	<b>0</b>
Non Energy	789			
Producer Consumption	1,259			
<b>Net Supply</b>	<b>9,423</b>	<b>100</b>	<b>0</b>	<b>0</b>
Conversion losses *	1,696			
<b>Total primary</b>	<b>11,119</b>	<b>100</b>	<b>0</b>	<b>0</b>

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

**Residential:** Base data taken from revised QRES D (Table 1B, line 44) plus fuel wood use (estimated from NRCan's Residential End-use Model).

**Commercial/institutional:** Base data taken from revised QRES D (line 45 plus line 46) less commercial and public administration motor gasoline (Table 1D, motor gasoline column, line 45 plus line 46) less commercial and public administration diesel (Table 1D, diesel column, line 45 plus line 46) less commercial and public administration aviation gasoline (Table 1D, aviation gasoline column, line 45 plus line 46) less commercial and public administration aviation turbo fuel (Table 1D, aviation turbo fuel column, line 45 plus line 46).

**Industrial:** Base data taken from revised QRES D (Table 1B, line 31) plus solid wood waste and pulping liquor (Table 20) plus producer consumption by refinery and mining industries of still gas, diesel, heavy fuel oil, light fuel oil, kerosene, petroleum coke and refinery LPG (Table 1D, 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 Center).

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

**Agriculture:** Base data taken from revised QRES D (Table 1B, line 43).

\* Electricity conversion rates: Hydro-electricity converted at a rate of 3.6 megajoules per kilowatt-hour; nuclear electricity converted at a rate of 11.564 megajoules per kilowatt-hour.

Commercial & Public Admin. Motor Gasoline	Pipeline Fuels	Wood Waste & Pulping Liquor	Waste Fuels Used in Cement Industry	Re-allocation of Producer Consumption by Refining and Mining Industries	Data Presented in this Report
					1,388
(65)					1,059
		531	6	384	3,204
65	(233)				2,282
					232
0	(233)	531	6	384	8,164
					789
	233			(384)	1,107
0	0	531	6	0	10,060
					1,696
0	0	531	6	0	11,756



# Appendix B Reconciliation of Definition

## Reconciliation of Definition of Estimated Greenhouse Gas Emissions Found in This Report With Environment Canada's *Canada's Greenhouse Gas Inventory: 1990–1999*

### Introduction

In this report, the data on greenhouse gases, particularly the data on carbon dioxide 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: 1990–1999* (CGGI-1999). Both Natural Resources Canada (NRCan) and EC use the energy demand data from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRES) 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 a mapping that is most suited to energy end-use analysis.

The objective of this appendix is to help you understand the similarities and differences between CGGI-1999 and NRCan sectoral emissions estimates for the five end-use sectors covered in this report.

## Residential Sector

NRCan and CGGI-1999 differ in their definitions of residential emissions.

- First, NRCan residential emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-1999.
- Second, the wood energy use differs (EC's estimate is larger than NRCan's). Hence the GHG emissions related to wood energy use that are presented here are smaller than those in CGGI-1999.

## Commercial/Institutional Sector

There is only one difference between the NRCan and CGGI-1999 definitions of commercial/institutional emissions.

- NRCan commercial emissions include end-use electricity-related emissions, which CGGI-1999 includes under power generation.

## Industrial Sector

The industrial sector contains many differences between the definitions described in CGGI-1999 and in this report.

- First, CGGI-1999 reallocates industrial diesel fuel use from the industrial sector to the transportation sector.
- Second, this report reallocates 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-1999 reports this consumption under fossil fuels.
- Third, CGGI-1999 reallocates industrial coke use from energy use in the industrial sector to non-energy use in industrial processes.
- Fourth, NRCan industrial emissions include end-use electricity-related emissions. CGGI-1999 reports them under power generation.
- Fifth, CGGI-1999 includes producers' consumption of non-fossil fuels in the fossil fuel categories. NRCan does not report this consumption. CGGI-1999 also reallocates estimates of emissions from upstream oil and gas flaring to the fugitive emissions from the fossil fuel sector.

## **Transportation Sector**

Differences to the boundary of the transportation sector relate to CGGI-1999 reallocating or excluding QRES data from its inventory, while NRCan allocates end-use electricity-related emissions to the end-use sectors.

- First, CGGI-1999 reallocates industrial diesel, farm diesel and motor gasoline to the transportation sector
- Second, EC's inventory excludes emissions resulting from the use of energy in the foreign aviation sub-sectors.
- Third, NRCan transportation emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-1999.

## **Agriculture Sector**

There are differences in the agriculture sector.

- CGGI-1999 reclassifies all farm diesel and motor gasoline in the transportation sector, while NRCan leaves this consumption in agriculture (as does the QRES).
- NRCan includes end-use electricity-related emissions in agriculture, while CGGI-1999 reports them under power generation.





## Appendix C Glossary of Terms

**Activity:** Term used to characterize major drivers of energy use in a sector (e.g., number of households in the residential sector).

**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, gas ovens, electric stoves, electric ovens, microwave ovens and propane or gas grills); cooling appliances (evaporative coolers, attic fans, window or ceiling fans, portable or table fans); and refrigerator, 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.

**Carbon Dioxide:** A compound of carbon and oxygen formed whenever carbon is burned. Chemical formula: CO<sub>2</sub>. Carbon dioxide is a colourless gas that absorbs infrared radiation, mostly at wavelengths between 12 and 18 microns. It behaves as a one-way filter, allowing incoming, visible light to pass through in one direction, while preventing outgoing infrared radiation from passing in the opposite direction. The one-way filtering effect of carbon dioxide causes an excess of the infrared radiation to be trapped in the atmosphere; thus it acts as a greenhouse and has the potential to increase the surface temperature of the planet.

**Cooling Degree-Days (CDDs):** A measure of how hot a location was over a period of time, relative to a base temperature. In this report, the base temperature is 18.0°C; the period of time is one year. The cooling degree-days for a single day is the difference between that day's average temperature and 18.0°C, if the daily average exceeds the base temperature. It is zero if the daily average is less than, or equal to, the base temperature. The cooling degree-days for a longer period of time is the sum of the daily cooling degree-days from the days in the period.

**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, 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 or constant dollar value of gross domestic product by industry).

**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 Area (space):** The area enclosed by exterior walls of a building. In the residential sector, it excludes parking areas, basements or other floors below ground level, while they are included in the commercial sector. It is measured in square metres.

**Fossil Fuel:** Any naturally occurring organic fuel, such as petroleum, coal and natural gas.

**Furnace:** Space-heating equipment consisting of an enclosed chamber where fuel is burned or electrical resistance is used to heat air directly, without using steam or hot water. The warm air is for heating and is distributed throughout the house, typically by air ducts.

**Gigajoule (GJ):** One gigajoule equals  $1 \times 10^9$  joules. A joule is the international unit of measure of energy — the energy produced by a 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<sub>2</sub>), methane (CH<sub>4</sub>), chlorofluorocarbons (CFCs) and nitrous oxide (N<sub>2</sub>O). By far the most abundant greenhouse gas is CO<sub>2</sub>, accounting for 70 percent of the greenhouse gas effect (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 by the nation's economy before the deduction of depreciation charges and other allowances for capital consumption, labour and property located in Canada. It includes the total output of goods and services by private consumers and governments, gross private domestic capital investment and net foreign trade. GDP figures are reported in real 1986 dollars.

**Gross Output:** The total value of goods and services produced by an industry. A sum of the industry's shipments plus the change in value due to labour and capital investment.

**Gross Vehicle Weight:** The weight of the empty vehicle plus the maximum anticipated load weight.

**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 report, the base temperature is 18.0°C; the period of time is one year. The heating degree-days for a single day is the difference between that day's average temperature and 18.0°C, if the daily average is below the base temperature. It is zero if the daily average exceeds or equals the base temperature. The heating degree-days for a longer period of time is the sum of the daily heating degree-days for the days in that period.

**Heavy Trucks:** Trucks with a gross vehicle weight that is more than, or equal to, 14,970 kg (33,001 lb.).

**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.

**Household Size:** The number of persons per household.

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

**Large Cars:** Cars weighing 1,182 kg (2,601 lb.) or more.

**Light Trucks:** Trucks of up to 3,855 kg (8,500 lb.) of gross vehicle weight.

**Medium Trucks:** Trucks with a gross weight ranging from 3,856 to 14,969 kg (8,501 to 33,000 lb.).

**Megajoule (MJ):** One megajoule equals  $1 \times 10^6$  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.

**Passenger-Kilometre:** The transport of one passenger over a distance of one kilometre.

**Penetration Rate:** The rate at which a technology infiltrated the stock of buildings (e.g., number of refrigerators per household at a specified time).

**Petajoule (PJ):** One petajoule equals  $1 \times 10^{15}$  joules (see Gigajoule).

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

**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.).

**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. Includes both the principal space heating and the supplementary equipment.

**Tonne-Kilometre:** The transport of one tonne over a distance of one kilometre.

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

**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).



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