

2004



Commercial and Institutional Consumption of Energy Survey



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Natural Resources Canada's Office of Energy Efficiency

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

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Introduction

In 2005, Statistics Canada undertook, on behalf of the Office of Energy Efficiency (OEE) of Natural Resources Canada, the second *Commercial and Institutional Consumption of Energy Survey* (CICES), based on 2004 data. This CICES ties in directly with the OEE's mandate to strengthen and expand Canada's commitment to energy efficiency in order to help address the challenges of climate change.

While the first survey, conducted in 2004 (then entitled Consumption of Energy Survey), covered only universities, colleges and hospitals, the new one has been broadened to include the entire commercial and institutional sector.

The primary objective of this survey was to gather 2004 energy consumption data for commercial and institutional establishments. The data gathered through this survey will deepen our knowledge of the various aspects of energy consumption in this sector. The data will also enable Natural Resources Canada to develop and fine-tune its programs, designed to support institutions and enterprises as they seek to achieve greater energy efficiency and reduce their greenhouse gas emissions.

If you would like to learn more about this publication or the OEE's services, contact us by e-mail at euc.cec@nrcan.gc.ca.

This detailed report was prepared by Vincent Fecteau of the Demand Policy and Analysis Division of the OEE, Natural Resources Canada. Indrani Hulan supervised the project, and David McNabb was the project director.

To learn more about the survey or any other topic touched on in this document, please contact:

Vincent Fecteau
Economist
Office of Energy Efficiency
Natural Resources Canada
580 Booth Street
Ottawa ON K1A 0E4

Tel.: (613) 943-9228
Fax: (613) 947-0535
E-mail: euc.cec@nrcan.gc.ca

Previous surveys in the commercial/institutional sector

Since 2000, the OEE has completed a variety of initiatives designed to gather data on energy use in the commercial/institutional sector.

- The **Commercial and Institutional Building Energy Use Survey (CIBEUS)** was carried out using 2000 data. This survey – the first of its kind in Canada – gathered data on energy consumption, energy intensity and the physical and energy-efficient characteristics of commercial and institutional buildings. The target population for CIBEUS included buildings with a surface area of at least 92 m². The buildings had to be in a large Canadian city, that is, a census metropolitan area or a census agglomeration of at least 175 000 residents. (The latter threshold was lowered to 50 000 residents for the Atlantic provinces.) Overall, the energy intensity of the buildings in the CIBEUS target population was 1.59 GJ/m² in 2000.
- In 2004, the first **Consumption of Energy Survey (CES)** was completed based on 2003 data, and its target population included only universities, colleges and hospitals. This survey constituted a census of each of these three sectors in Canada. Contrary to CIBEUS, no census agglomeration was excluded from the survey design. CES was based on the North American Industry Classification System (NAICS), while CIBEUS defined its own building categories. In 2003, the energy intensity of universities was 2.04 GJ/m², that of colleges was 1.48 GJ/m², and that of hospitals was 2.65 GJ/m².
- Every year the OEE publishes an **Energy Use Data Handbook**. It provides, among other things, energy consumption data by type of activity for the commercial and institutional sector, and data on different indicators that affect energy consumption. These data are gathered from various information sources and surveys, most notably from Statistics Canada and Natural Resources Canada.
- The OEE has also published sectoral studies based on comparative analyses, through the **Energy Innovators Initiative** of its **Buildings Division**. This initiative has recently been renamed EnerGuide for Existing Buildings (EEB). The studies have centred on, amongst others, the hospitality sector, the retail trade sector and shopping malls. Owners of commercial buildings can use the studies to compare their facility's energy consumption with that of similar facilities. To learn more about how you can call on the OEE's services and financial incentives to reduce your energy consumption, please consult the following Web site: oee.nrcan.gc.ca/commercial.

The Office of Energy Efficiency provides tools, services and financial incentives to help commercial and institutional organizations reduce their energy consumption.

To learn more, visit its website at oee.NRCcan.gc.ca/commercial.

All these surveys, handbooks and studies are fundamentally different in that there are important conceptual differences among them. Caution must therefore be exercised when directly comparing data from these sources.

Data sharing

Certain measures were taken to ensure that the CICES estimates are reliable enough for publication. The letters used in the tables in this report indicate the degree of sampling error, represented by a coefficient of variation of the estimate. The letter “A” indicates that the estimate has a very low coefficient of variation; the letter “B” indicates a somewhat higher coefficient of variation, and so on. Estimates graded “A” or “B” are considered precise enough for most uses. Estimates where the coefficient of variation is higher – graded “C” or “D” – are precise enough for a few uses, but should be used

with caution. The letter “F” means that the coefficient of variation was too high for the estimate to be shared. These estimates are not published because they may present too great a sampling error.

The classification of commercial and institutional establishments covered by the survey is provided in Appendix A. The survey methodology is described in detail in Appendix B, a glossary is provided in Appendix C, and the survey questions are in Appendix D.

Abstract

- *In 2005, Statistics Canada again undertook, on behalf of Natural Resources Canada, the Commercial and Institutional Consumption of Energy Survey (CICES). This survey was conducted for the first time in 2004, but it targeted only universities, colleges and hospitals. CICES is the same survey, but broadened to cover the entire commercial and institutional sector, using 2004 as the base year.*
- *This survey gathered data on the energy consumption and the energy intensity of commercial and institutional establishments. The data are also published by energy source and by region, provided the quality of the estimates satisfies the distribution criteria of the Statistics Act.*
- *In 2004, commercial and institutional establishments consumed nearly 945 million gigajoules (GJ).*
- *The survey data can be used to calculate energy intensity expressed as energy use per square metre. The overall energy intensity was 1.60 GJ/m². The office sector had the lowest energy intensity (1.23 GJ/m²), and the education sector was second lowest (1.27 GJ/m²). At the other end of the spectrum, the accommodation and food services sector had the greatest energy intensity (2.21 GJ/m²).*
- *The Atlantic region (1.29 GJ/m²) and British Columbia (1.30 GJ/m²) had the lowest energy intensities of all the regions of Canada. At the other end of the scale, the Prairies (1.93 GJ/m²) had the highest energy intensity.*

A For the purposes of this survey, the commercial and institutional sector has been defined using categories taken from the North American Industry Classification System (NAICS). A complete list of the activity sectors making up the commercial and institutional sector is provided in Appendix A.

Table 1 shows all of the survey results for each activity sector: number of establishments, energy consumption (expressed in gigajoules [GJ]), floor area (expressed in square metres [m²]) and energy intensity (expressed in gigajoules per square metre [GJ/m²]).

Table 1

Number of establishments, energy consumption, floor area and energy intensity, 2004

| Sector or subsector | Number of establishments | | Energy consumption (GJ) | | Floor area (m ²) | | Energy intensity (GJ/m ²) | |
|--|--------------------------|----------|-------------------------|----------|------------------------------|----------|---------------------------------------|----------|
| Wholesale and warehousing | 38 887 | B | 157 194 620 | B | 72 052 176 | A | 2.18 | A |
| Retail trade | 96 911 | A | 107 143 833 | A | 75 623 857 | A | 1.42 | A |
| • Non-food retail | 82 772 | A | 85 461 095 | B | 64 100 371 | A | 1.33 | A |
| • Food retail | 14 139 | B | 21 682 738 | B | 11 523 486 | B | 1.88 | B |
| Information and cultural industries | 6 510 | A | 11 299 637 | B | 8 523 401 | A | 1.33 | A |
| Office^a | 82 029 | A | 132 193 423 | A | 107 733 234 | B | 1.23 | A |
| Education | 15 808 | A | 153 540 138 | A | 120 866 456 | A | 1.27 | A |
| • Elementary and secondary schools | 15 473 | A | 103 788 616 | A | 92 597 507 | A | 1.12 | A |
| • Colleges and cégeps | 217 | A | 14 471 605 | A | 10 993 183 | A | 1.32 | A |
| • Universities | 118 | A | 35 279 917 | A | 17 275 766 | A | 2.04 | A |
| Health care | 33 384 | A | 104 610 995 | A | 68 112 296 | A | 1.54 | A |
| • Non-hospital health care | 32 654 | A | 40 758 566 | A | 43 525 877 | B | 0.94 | A |
| • Hospitals | 730 | A | 63 852 430 | A | 24 586 419 | A | 2.60 | A |
| Accommodation and food services | 38 306 | A | 64 267 000 | A | 29 034 773 | A | 2.21 | A |
| Other (Commercial/institutional) | 68 096 | D | 214 737 596 | D | 109 018 114 | D | 1.97 | D |
| TOTAL | 379 930 | A | 944 987 242 | A | 590 964 306 | A | 1.60 | A |

^a The *Office* sector includes the activities of finance and insurance; real estate, rental and leasing; professional, scientific and technical services; and public administration.

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Number of establishments and floor area

Based on CICES data, there were an estimated 379 930 commercial and institutional establishments in Canada in 2004. Of these, retail trade accounted for the largest share, with 26 percent of all establishments, followed by offices, with 22 percent.

Survey data also indicate that commercial and institutional establishments in Canada covered nearly 591 square kilometres in 2004, an area larger than Montreal Island. Education accounted for the largest share of floor area, with 20 percent of the total floor area, followed by the office sector, with 18 percent. Floor area is the total floor area of all the establishments in a sector, excluding indoor parking and mechanical rooms.

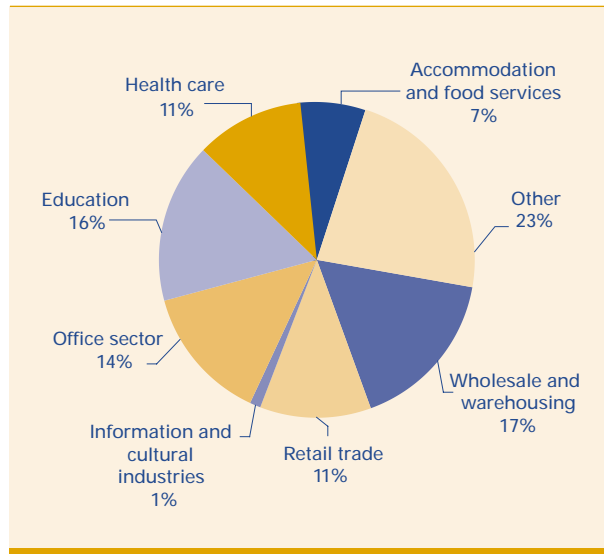
Energy consumption

Total energy consumption equals the sum of the use of electricity, natural gas, diesel, propane, heavy fuel oil, other middle distillates, steam and wood. It is measured in gigajoules (GJ)¹.

In 2004, commercial and institutional establishments consumed nearly 945 million GJ. This is equivalent to the average annual consumption of approximately 7.9 million Canadian households, and is nearly five times the amount of energy used by all private dwellings in a city like Toronto².

Chart 1

Energy consumption (%), by activity sector, 2004



The wholesale trade and warehousing sector used the most energy (not counting the residual sector *Other*). It alone accounted for 17 percent of all commercial and institutional energy use, even though it had only 10 percent of the total number of establishments and 12 percent of total floor area. The education sector (16 percent) and the office sector (14 percent) also accounted for a significant share of total energy use.

¹ A joule is the amount of energy required to send a one-ampere electric current through a one-ohm resistance for one second. A billion joules make one GJ. One GJ is released when one million wood matches are burned simultaneously. One GJ of energy can keep a 60-watt electric light bulb burning for six months. One GJ of energy can cook more than 2500 hamburgers on a natural gas barbecue. In 2003, an average Canadian home consumed 119.3 GJ. To convert kWh to GJ, multiply by 0.0036. To convert GJ to kWh, multiply by 277.8.

² Expressing energy use in terms of number of households involves a calculation using the energy intensity of households (GJ/household) as determined by the Office of Energy Efficiency for 2003 – the most recent year – in its *Energy Use Data Handbook, June 2005*. The number of households is taken from Statistic Canada's 2001 Canadian census.

Energy intensity

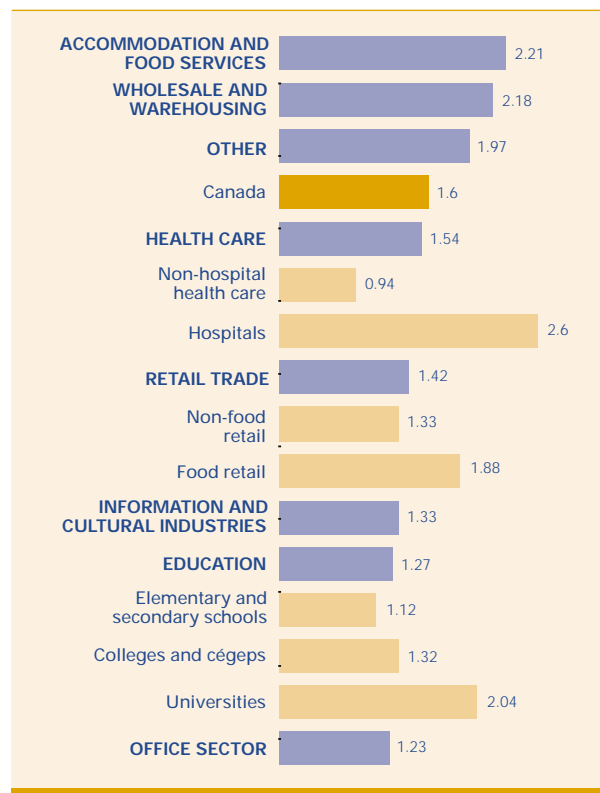
The data obtained on each establishment's energy consumption and floor area are used to calculate its energy-intensity ratio.³ Many factors affect energy intensity. For example, weather conditions, which vary among Canada's regions, affect the amount of energy used: since the Prairies are relatively cooler than southern Ontario, they use more energy for heating.

Energy intensity also depends on the age of the building, the energy source,⁴ the equipment used, the physical characteristics of the building, the floor area, the energy-saving measures in use, and so forth. Each factor affects the establishment's energy intensity independently and in its own complex way. In this study, the effect of each individual factor is not analyzed.⁵ Moreover, none of these factors can alone explain the variations among the energy intensities of the Canadian regions, as described in the following sections.

The overall energy intensity of all commercial and institutional establishments in Canada was 1.60 GJ/m² for 2004. The office sector ranked lowest, using energy at a rate of 1.23 GJ/m². At the other end of the scale, accommodation and food services sector had the highest energy intensity, consuming energy at a rate of 2.21 GJ/m². Although a subsector, non-hospital health care ranked even lower than the office

Chart 2

Energy intensity (GJ/m²), by activity sector, 2004



sector, with an energy intensity of 0.94 GJ/m². However, the hospital subsector was the most energy intensive, all sectors and subsectors combined, consuming 2.60 GJ/m².

³ For the purposes of the CICES, we consider only gross energy intensity, which is the total energy use divided by the total floor surface. The average intensity of each establishment, used for comparing one establishment against another, is not analyzed in this report.

⁴ For example, establishments using natural gas or heavy fuel oil are by nature more energy intensive than those that use electricity. The energy losses for these fuels are included in the CICES data, while energy losses for electricity are accounted for at the primary level and, accordingly, do not appear in this report. Canadian regions using mainly natural gas (e.g. the Prairies) will therefore tend to present higher levels of energy intensity than those using mainly electricity.

⁵ Each year the OEE publishes *Energy Efficiency Trends in Canada*. It describes how energy use is affected by the level of activity, weather, structure, level of service and energy efficiency. In addition, for 2000, the Commercial and Institutional Building Energy Use Survey, conducted in Canada's largest cities, gathered specific data on the energy-use characteristics of buildings. The summary report for this survey outlines its key findings. Both publications can be consulted on the Internet at oee.nrcan.gc.ca/statistics.

2

Energy consumption and energy intensity, by region

Table 2

Number of establishments, energy consumption, floor area and energy intensity, by region, 2004

| Region | Number of establishments | | Energy consumption (GJ) | | Floor area (m ²) | | Energy intensity (GJ/m ²) | |
|------------------|--------------------------|----------|-------------------------|----------|------------------------------|----------|---------------------------------------|----------|
| Atlantic | 25 585 | C | 78 000 840 | C | 60 568 187 | C | 1.29 | A |
| Quebec | 89 854 | A | 151 156 791 | A | 109 761 317 | A | 1.38 | A |
| Ontario | 126 988 | A | 305 020 153 | A | 185 431 023 | A | 1.64 | A |
| Prairies | 86 070 | B | 322 337 358 | B | 167 387 880 | B | 1.93 | A |
| British Columbia | 51 434 | B | 88 472 101 | B | 67 815 899 | A | 1.30 | A |
| Canada | 379 930 | A | 944 987 242 | A | 590 964 306 | A | 1.60 | A |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Table 2 presents the number of establishments, energy consumption, floor area and energy intensity for each region.

According to CICES data, Canada's commercial and institutional establishments were distributed regionally, as follows: 33 percent in Ontario, 24 percent in Quebec, 23 percent in the Prairies, 14 percent in British Columbia, and 7 percent in the Atlantic region.

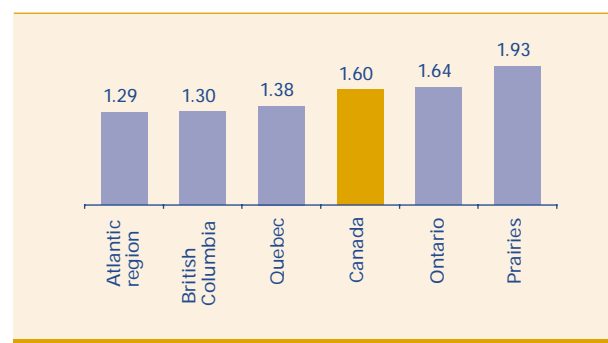
As for floor area, Ontario accounted for 31 percent of the total surface area, compared with 28 percent in the Prairies, 19 percent in Quebec, 11 percent in British Columbia, and 10 percent in the Atlantic region. More than a third of all commercial and institutional energy use occurred in the Prairies, even though this region accounted for less than a quarter of all establishments in Canada. In comparison, the establishments in Quebec accounted for only 16 percent of all commercial and institutional energy consumption in Canada, even though

they represented nearly a quarter of the establishments covered by this survey.

The Atlantic region (1.29 GJ/m²) and British Columbia (1.30 GJ/m²) had the lowest energy intensity of all regions. The energy intensity of establishments in Quebec was 1.38 GJ/m², while the energy intensity of Ontario (1.64 GJ/m²) and the Prairies (1.93 GJ/m²) exceeded the intensity for Canada.

Chart 3

Energy intensity (GJ/m²), by region, 2004



3

Energy consumption, by energy source

Table 3

Energy consumption, by energy source, 2004

| Energy source | Energy consumption (GJ) | |
|--------------------------|-------------------------|----------|
| Electricity | 405 571 641 | A |
| Natural gas | 366 065 742 | A |
| Diesel | 25 725 944 | D |
| Propane | 31 302 613 | C |
| Other middle distillates | 18 443 699 | A |
| Steam | 17 246 227 | A |
| Other | | F |
| TOTAL | 944 987 242 | A |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Table 3 presents the amount of energy consumed by all commercial and institutional establishments in Canada in 2004 for each energy source.

Nearly 406 million GJ were consumed through the use of electricity, which represents 43 percent of total energy consumption. Natural gas usage reached 366 million GJ, or 39 percent of the total. Diesel use and propane use ranked more marginally, representing only 3 percent of all energy consumption, compared with 2 percent for other middle distillates and steam.

For some sectors, CICES data are sufficiently precise to support a detailed analysis by region and by energy source. These sectors are retail trade, education, health care, and accommodation and food services. This section describes, for each activity sector, its energy consumption for each of the main energy sources, its floor area, and its energy intensity, by region.

It should be noted that the estimates marked with an “F” in the following tables have been suppressed, as they do not meet Statistics Canada’s quality standards. They are suppressed more frequently here, mainly because these tables go into greater detail. In addition, the following categories have not been analyzed by source of energy or by region, as the quality of the data at this level of detail is too poor: wholesale trade and warehousing; culture, arts and recreation; office sector; and the residual category *Other*.⁶

⁶ The *Other* category corresponds with NAICS codes 71 and 81. It includes an assortment of dissimilar establishments, namely religious organizations, professional and labour associations, museums, automotive repair and maintenance, and so forth.

4.1 Retail trade

Table 4.1

Energy consumption, floor area and energy intensity of the retail trade sector, by region, 2004

| RETAIL TRADE | | | | | | |
|---------------------------------------|-------------|--------------|--------------|--------------|--------------|---------------|
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 2 225 924 B | 23 341 614 A | 22 021 842 D | 16 931 347 C | 10 445 975 C | 74 966 702 A |
| Natural gas (GJ) | F | 4 628 497 D | F | 13 316 606 C | 4 874 591 D | 27 922 809 B |
| Total energy use (GJ)* | 2 478 327 B | 28 473 977 A | 28 300 016 D | 32 278 914 C | 15 612 600 C | 107 143 833 A |
| Floor area (m ²) | 2 606 844 B | 18 492 883 B | 20 921 364 C | 21 275 678 C | F | 75 623 857 A |
| Energy intensity (GJ/m ²) | 0.95 A | 1.54 A | 1.35 C | 1.52 C | 1.27 B | 1.42 A |
| Non-food retail | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 1 311 944 C | 16 153 087 B | 19 358 680 D | 13 435 505 C | 8 700 442 C | 58 959 659 A |
| Natural gas (GJ) | F | F | F | F | 4 275 606 D | 22 486 417 B |
| Total energy use (GJ)* | 1 492 195 C | 20 274 174 B | 25 317 210 D | 25 276 584 C | 13 100 931 D | 85 461 095 B |
| Floor area (m ²) | 2 005 068 C | 13 188 160 B | 18 241 523 D | 19 407 953 C | F | 64 100 371 A |
| Energy intensity (GJ/m ²) | 0.74 A | 1.54 A | 1.39 C | 1.30 C | 1.16 B | 1.33 A |
| Food retail | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 913 980 D | 7 188 526 B | 2 663 161 C | 3 495 843 D | 1 745 533 A | 16 007 043 A |
| Natural gas (GJ) | F | 1 011 276 C | 319 644 C | 3 506 487 C | 598 985 D | 5 436 392 B |
| Total energy use (GJ)* | 986 132 D | 8 199 803 B | 2 982 805 C | 7 002 330 C | 2 511 669 B | 21 682 738 A |
| Floor area (m ²) | 601 776 C | 5 304 723 D | 2 679 840 C | 1 867 726 C | 1 069 421 A | 11 523 486 B |
| Energy intensity (GJ/m ²) | 1.64 B | 1.55 D | 1.11 C | 3.75 A | 2.35 A | 1.88 B |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

* Total energy use includes all energy sources: electricity, natural gas, diesel, propane, other middle distillates, heavy fuel oil and wood.

Table 4.1 presents data on energy consumption, floor area and energy intensity, by region, for the retail trade sector and each of its subsectors. With 96 911 establishments, this sector was the largest of all the CICES sectors. Regionally, this sector had 5355 establishments in the Atlantic region, 24 740 in Quebec, 36 337 in Ontario, 18 796 in the Prairies, and 11 682 in British Columbia.

With an average floor area of 780 square metres, these establishments had the smallest

floor area among the eight categories of establishments covered by the CICES. The average for all commercial and institutional establishments was twice that number, at 1555 square metres.

In 2004, all retail trade establishments consumed more than 107 million GJ, which is equivalent to the annual energy consumption of 900 000 Canadian households, or more than twice the consumption of all private dwellings of an urban area like Ottawa-Gatineau. The retail

trade sector used electricity for nearly 70 percent of its energy requirements, and natural gas for 26 percent.

The energy intensity of the retail trade sector was 1.42 GJ/m². Regionally, the Atlantic region had the lowest energy intensity of all Canadian regions, at 0.95 GJ/m², while Quebec had the highest, at 1.54 GJ/m².

4.1.1 Non-food retail

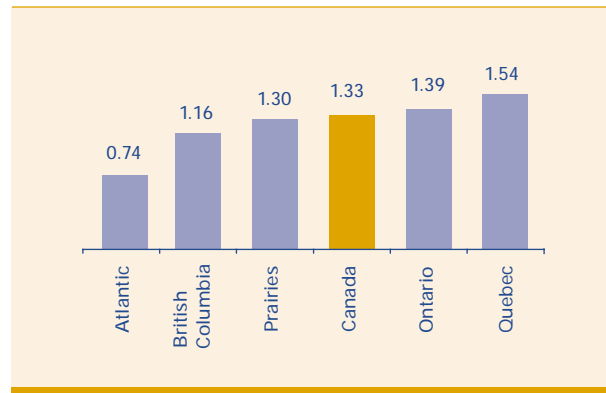
The non-food retail subsector corresponds with NAICS codes 441 to 444 and 446 to 454, and includes businesses like furniture stores, motor vehicle dealerships and electronic appliance stores. At the time of the survey, there were 82 772 non-food retail establishments in Canada: 3891 in the Atlantic region, 19 788 in Quebec, 32 278 in Ontario, 16 075 in the Prairies, and 10 739 in British Columbia.

In 2004, non-food retail establishments consumed more than 85 million GJ, with an average consumption per establishment of 1032 GJ. They used electricity for more than two thirds – the major share – of their total energy requirements, and natural gas for 26 percent.

The energy intensity of non-food retail establishments was 1.33 GJ/m². The Atlantic region was by far the region with the lowest intensity, at 0.74 GJ/m². British Columbia (1.16 GJ/m²) and the Prairies (1.30 GJ/m²) also ranked below the Canadian intensity, while Ontario (1.39 GJ/m²) and Quebec (1.54 GJ/m²) ranked above.

Chart 4

Energy intensity (GJ/m²) of non-food retail establishments, by region, 2004



4.1.2 Food retail

The food retail subsector corresponds with NAICS code 445. This category includes establishments like grocery stores or specialty food stores (wine and liquor, etc.). At the time of the survey, there were 14 139 establishments in this sector in Canada: 1464 in the Atlantic region, 4952 in Quebec, 4059 in Ontario, 2721 in the Prairies, and 943 in British Columbia.

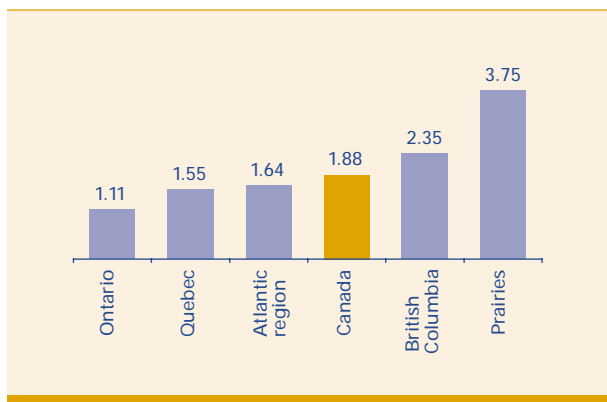
In 2004, these establishments consumed more than 21 million GJ, with an average consumption per establishment of 1533 GJ. Electricity use represented 74 percent of total energy use, compared with 25 percent for natural gas and 1 percent for other energy sources.

With an energy intensity of 1.88 GJ/m², the food retail sector ranked higher than the non-food retail sector, partly because it uses equipment that is more energy intensive (refrigerators, ovens, etc.). Viewed regionally, the gaps are relatively pronounced. Ontario was the region with the lowest energy

intensity, using it at a rate of 1.11 GJ/m². Quebec (1.55 GJ/m²) and the Atlantic region (1.64 GJ/m²) also rank below the Canadian intensity. British Columbia's energy intensity was 2.35 GJ/m², and the Prairies had the highest energy intensity of all the regions, at 3.75 GJ/m², which was three times higher than that of Ontario.

Chart 5

Energy intensity (GJ/m²) of food retail establishments, by region, 2004



4.2 Education

Table 4.2

Energy consumption, floor area and energy intensity of the education sector, by region, 2004

| EDUCATION | | | | | | |
|---------------------------------------|-------------|--------------|--------------|--------------|--------------|---------------|
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C.. | CANADA |
| Electricity (GJ) | F | 10 050 135 A | 19 594 088 A | 8 617 045 A | 3 924 577 B | 49 083 588 A |
| Natural gas (GJ) | F | 8 534 032 B | 32 798 293 A | 23 253 009 A | 7 847 649 B | 72 481 008 A |
| Other middle distillates (GJ) | 1 386 386 B | 1 498 333 D | F | 5 115 D | 21 389 B | 5 391 139 C |
| Other (GJ) | F | 934 307 D | F | F | 71 825 A | F |
| Total energy use (GJ) | F | 21 016 807 A | 56 317 825 A | 32 834 174 A | 11 865 440 B | 153 540 138 A |
| Floor area (m ²) | F | 20 939 493 A | 41 601 088 A | 18 924 283 A | 16 642 067 C | 120 866 456 A |
| Energy intensity (GJ/m ²) | 1.38 A | 1.00 A | 1.35 A | 1.74 A | 0.71 A | 1.27 A |
| Colleges and cégeps | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C.. | CANADA |
| Electricity (GJ) | 498 402 A | 1 524 128 A | 1 736 568 A | 1 237 901 B | 767 386 C | 5 764 386 A |
| Natural gas (GJ) | F | 805 226 B | 1 746 689 A | 1 966 010 B | 899 704 B | 5 465 276 A |
| Other middle distillates (GJ) | 247 033 A | F | F | F | F | 583 860 D |
| Other (GJ) | 896 659 B | F | F | F | F | 2 658 083 D |
| Total energy use (GJ) | 1 689 741 A | 2 785 342 A | 4 902 683 B | 3 415 141 A | 1 678 698 B | 14 471 605 A |
| Floor area (m ²) | 1 071 672 A | 3 020 205 A | 2 907 200 A | 2 533 171 A | 1 460 935 B | 10 993 183 A |
| Energy intensity (GJ/m ²) | 1.58 A | 0.92 A | 1.69 A | 1.35 A | 1.15 A | 1.32 A |
| Universities | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C.. | CANADA |
| Electricity (GJ) | 1 060 974 A | 3 490 424 A | 2 861 806 C | 2 795 111 B | 1 069 428 A | 11 277 743 A |
| Natural gas (GJ) | F | 3 581 670 B | 5 706 789 D | 7 441 468 B | 2 065 344 A | 18 795 648 A |
| Other middle distillates (GJ) | 90 118 A | 27 950 C | F | 1 700 C | 21 389 B | F |
| Heavy fuel oil (GJ) | 1 264 214 A | F | F | F | 51 706 B | 2 044 224 B |
| Other (GJ) | 405 829 B | 69 133 C | 36 283 D | 33 610 D | 8 511 A | 553 367 A |
| Total energy use (GJ) | 2 821 512 A | 7 895 524 B | 11 074 613 C | 10 271 890 B | 3 216 378 A | 35 279 917 A |
| Floor area (m ²) | 1 701 437 A | 4 184 525 A | 4 747 203 B | 4 656 297 B | 1 986 305 A | 17 275 766 A |
| Energy intensity (GJ/m ²) | 1.66 A | 1.89 A | 2.33 B | 2.21 A | 1.62 A | 2.04 A |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Table 4.2 presents the energy consumption, floor area and energy intensity, by region, of the education sector and its subsectors: colleges and cégeps (NAICS 6112) and universities (NAICS 6113). The establishments in the elementary and secondary school subsector (NAICS 6111) are not analyzed by region, as the quality of the data is too low for this kind of analysis.⁷

The survey covered 15 808 establishments in the education sector: 1359 in the Atlantic region, 3575 in Quebec, 5744 in Ontario, 3576 in the Prairies and 1554 in British Columbia.

With an average floor area of 7600 square metres, educational establishments had the largest average floor area of the eight categories of establishments covered in this survey. However, these establishments accounted for only 4 percent of all commercial and institutional establishments in Canada.

In 2004, the establishments in the educational services sector consumed more than 153 million GJ. This equates to the average annual consumption of approximately 1.3 million Canadian households, or three times the consumption of all private dwellings of an urban area like Ottawa-Gatineau. Natural gas represents 47 percent of the total energy sources of educational establishments, compared with electricity at 32 percent and other middle distillates at 4 percent.

The energy intensity of educational establishments was 1.27 GJ/m², which is considerably lower than the Canadian intensity of 1.60 GJ/m² for all commercial and institutional establishments. British Columbia was the Canadian region with the lowest energy intensity, at 0.71 GJ/m², while the Prairies had the highest energy intensity, at 1.74 GJ/m².

4.2.1 Colleges and cégeps

For the purposes of this survey, colleges and cégeps are analyzed using the campus as the statistical unit. Only establishments with 20 or more employees were included in the analysis in order to exclude associations and entities that may have the NAICS code of a college but not the same mandate or mission (for example, a Board of Directors).

Based on survey data, there were 217 campuses in Canada: 38 in the Atlantic region, 76 in Quebec, 44 in Ontario, 31 in the Prairies, and 28 in British Columbia. It should be noted that the colleges in Quebec, also known as cégeps, have a more extensive mandate than those in the other regions, as they offer both pre-university and trades programs. The fact that graduation from a cégep is a requirement for university entrance – which is not the case in the other Canadian regions – explains the large number of campuses in Quebec, which account for more than one third of the campuses surveyed.

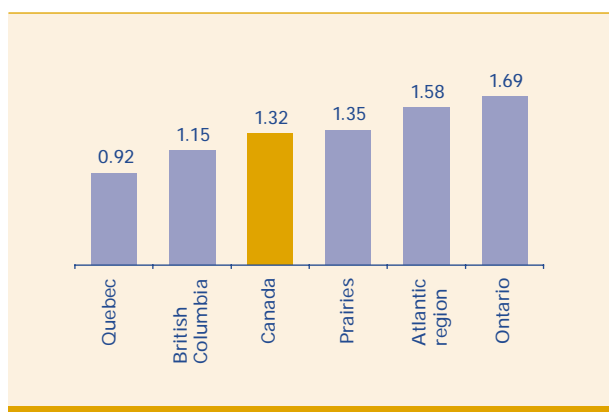
In 2004, colleges and cégeps consumed more than 14 million GJ, with an average consumption of nearly 67 000 GJ per establishment. Electricity represented nearly 40 percent of this subsector's total energy sources, compared with natural gas at 38 percent, and, to a lesser degree, other middle distillates at 4 percent. Regionally, natural gas represented 58 percent of total energy sources in the Prairies, compared with 54 percent in British Columbia, and 36 percent in Ontario. For Quebec, electricity was the main energy source, representing 55 percent of energy consumption.

⁷ NAICS codes 6114 to 6117, which include language schools, fine-arts schools, secretarial schools and trade schools, are not covered by the survey.

The overall energy intensity of colleges and cégeps in Canada was 1.32 GJ/m². Ontario had the highest energy intensity of all Canadian regions, at 1.69 GJ/m², ahead of British Columbia (1.15 GJ/m²), the Prairies (1.35 GJ/m²) and the Atlantic region (1.58 GJ/m²). In comparison, Quebec's cégeps had the lowest energy intensity, at 0.92 GJ/m².

Chart 6

Energy intensity (GJ/m²) of colleges and cégeps, by region, 2004



4.2.2 Universities

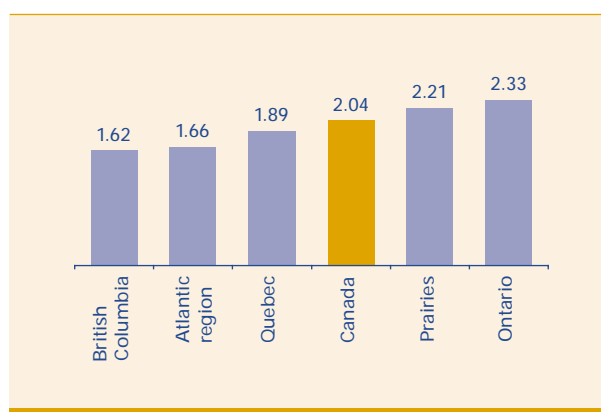
The survey covered 118 campuses across Canada: 22 in the Atlantic region, 20 in Quebec, 37 in Ontario, 29 in the Prairies, and 10 in British Columbia.

In 2004, university establishments consumed more than 35 million GJ, with an average consumption per establishment of nearly 300 000 GJ. Natural gas use accounted for the largest share (53 percent) of the total energy use of universities, while electricity use accounted for 32 percent. Natural gas was also the main energy source for all regions, with the exception of the Atlantic region, where the use of heavy fuel oil accounted for the greatest share of energy consumption.

The overall energy intensity of university establishments was 2.04 GJ/m², which was somewhat higher than that of colleges, at 1.32 GJ/m². This gap stems mainly from their dissimilar vocations: colleges focus mainly on teaching, while universities are also involved in research. The facilities and equipment therefore differ significantly between these sectors. British Columbia (1.62 GJ/m²) and the Atlantic region (1.66 GJ/m²) were the least energy intensive of all regions. Quebec universities used energy at a rate of 1.89 GJ/m², compared with rates of 2.21 GJ/m² for the Prairies and 2.33 GJ/m² for Ontario.

Chart 7

Energy intensity (GJ/m²) of universities, by region, 2004



4.3 Health care

Table 4.3

Energy consumption, floor area and energy intensity of the health care sector, by region, 2004

| HEALTH CARE | | | | | | |
|---------------------------------------|--------------|--------------|--------------|--------------|-------------|---------------|
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 4 582 969 A | 12 345 681 A | 14 973 957 B | 4 713 447 A | 3 392 772 B | 40 008 825 A |
| Natural gas (GJ) | F | 12 517 042 B | 15 757 977 A | 11 737 062 A | 6 262 730 C | 46 773 636 A |
| Other middle distillates (GJ) | 3 171 600 B | 793 350 C | F | F | F | 4 465 868 B |
| Total energy use (GJ)* | 13 385 689 B | 30 256 034 A | 33 145 982 A | 17 882 615 A | 9 940 675 C | 104 610 995 A |
| Floor area (m ²) | 5 316 644 A | 20 897 879 B | 27 720 009 B | 8 699 293 A | 5 478 471 B | 68 112 296 A |
| Energy intensity (GJ/m ²) | 2.52 A | 1.45 B | 1.20 A | 2.06 A | 1.81 A | 1.54 A |
| Non-hospital health care | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 1 707 996 B | 5 455 818 B | 8 959 013 C | 2 459 193 B | 1 507 204 B | 20 089 224 A |
| Natural gas (GJ) | F | 4 517 395 D | 6 127 921 B | 4 413 595 B | 2 294 684 C | 17 409 081 A |
| Other middle distillates (GJ) | 1 389 779 D | F | F | F | F | 2 142 499 C |
| Total energy use (GJ)* | 3 266 861 C | 10 439 254 C | 15 092 521 B | 7 966 374 A | 3 993 555 B | 40 758 566 A |
| Floor area (m ²) | 2 385 402 A | 13 394 194 D | 20 374 606 C | 4 880 633 A | 2 491 043 B | 43 525 877 B |
| Energy intensity (GJ/m ²) | 1.37 A | 0.78 A | 0.74 B | 1.63 A | 1.60 A | 0.94 A |
| Hospitals | | | | | | |
| | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
| Electricity (GJ) | 2 874 973 B | 6 889 864 B | 6 014 943 B | 2 254 253 B | 1 885 568 D | 19 919 601 A |
| Natural gas (GJ) | F | 7 999 648 B | 9 630 056 A | 7 323 467 B | F | 29 364 555 A |
| Other middle distillates (GJ) | 1 781 821 A | 527 570 D | F | F | F | 2 323 369 A |
| Total energy use (GJ)* | 10 118 828 B | 19 816 780 B | 18 053 461 B | 9 916 241 B | F | 63 852 430 A |
| Floor area (m ²) | 2 931 242 B | 7 503 686 A | 7 345 403 B | 3 818 660 B | 2 987 428 D | 24 586 419 A |
| Energy intensity (GJ/m ²) | 3.45 A | 2.64 A | 2.46 A | 2.60 A | 1.99 A | 2.60 A |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

* Total energy use includes all energy sources: electricity, natural gas, diesel, propane, other middle distillates, heavy fuel oil and wood.

The health care sector corresponds with NAICS code 62 (health care and social assistance). Table 4.3 shows the energy consumption, floor area and energy intensity, by region, for the health care sector and each of its subsectors, namely non-hospital health care and hospitals.

The survey covered 33 384 establishments across Canada: 3293 in the Atlantic region, 6613 in Quebec, 13 180 in Ontario, 6593 in the Prairies, and 3706 in British Columbia.

In 2004, health care establishments consumed nearly 105 million GJ, which is the equivalent of the average annual consumption of approximately 875 000 Canadian households, or twice the energy used by all the private dwellings of an urban area like Ottawa-Gatineau. Natural gas represented the major share of total energy sources, at 45 percent, compared with electricity at 38 percent and other middle distillates at 4 percent.

The energy intensity of health care establishments was 1.54 GJ/m². Ontario had the lowest intensity of all regions, using energy at a rate of 1.20 GJ/m², while the Atlantic region had the highest energy intensity, at 2.52 GJ/m².

The CICES data for the health care sector can also be analyzed by its two subsectors, hospital-based care and care provided by non-hospital establishments.

4.3.1 Non-hospital health care

The non-hospital health care subsector corresponds with NAICS codes 621, 623 and 624. It includes, among others, the offices of physicians and dentists, residential-care facilities, and social assistance establishments (community food services, child day-care services, etc.).

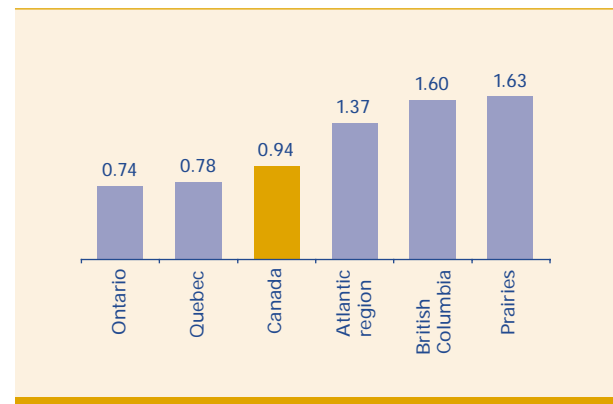
According to CICES data, Canada has 32 654 non-hospital health care establishments: 3211 in the Atlantic region, 6448 in Quebec, 12 977 in Ontario, 6394 in the Prairies, and 3625 in British Columbia.

In 2004, these establishments consumed nearly 41 million GJ, averaging nearly 1250 GJ per establishment. Electricity represented nearly half of the energy sources for these establishments, compared with natural gas at 43 percent and other middle distillates at 5 percent.

The energy intensity of non-hospital health care establishments was 0.94 GJ/m² for all of Canada. Regionally, Ontario (0.74 GJ/m²) and Quebec (0.78 GJ/m²) had the lowest energy intensity. British Columbia (1.60 GJ/m²) and the Prairies (1.63 GJ/m²) had the highest levels of energy intensity, followed by the Atlantic region (1.37 GJ/m²).

Chart 8

Energy intensity (GJ/m²) of non-hospital health care establishments, by region, 2004



4.3.2 Hospitals

The hospitals subsector corresponds with NAICS code 622 and includes general medical hospitals, psychiatric hospitals, hospitals for the treatment of substance abuse, and specialty hospitals. Only hospitals with 50 or more employees were included in the analysis in order to exclude entities and associations that may have the NAICS code of a hospital but not the same mandate or mission (for example, a Board of Directors).

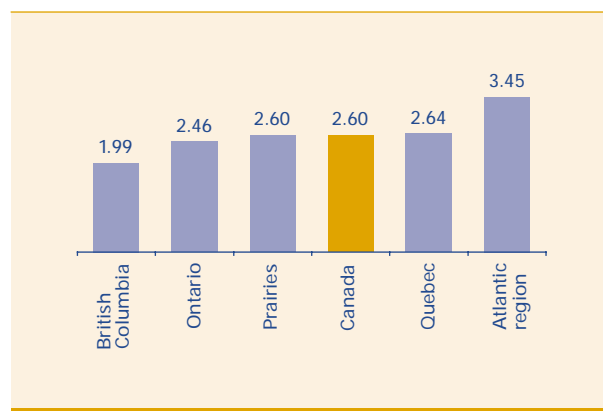
According to CICES data, Canada had 730 hospitals: 82 in the Atlantic region, 165 in Quebec, 203 in Ontario, 199 in the Prairies, and 81 in British Columbia.

In 2004, hospitals consumed nearly 64 million GJ. Natural gas represented 46 percent of their total energy sources, compared with electricity at 31 percent and other middle distillates at nearly 4 percent.

The energy intensity of hospitals in Canada was 2.60 GJ/m². This is the highest rate of all the sectors and subsectors covered by the survey. The high energy intensity of hospitals is probably due to their nearly constant use of lighting and numerous types of medical equipment. Regionally, British Columbia had the lowest intensity (1.99 GJ/m²), followed by Ontario (2.46 GJ/m²) and the Prairies (2.60 GJ/m²). Quebec's level is very nearly that of the value for all of Canada, whereas the hospitals in the Atlantic region had a much higher intensity (3.45 GJ/m²).

Chart 9

Energy intensity (GJ/m²) of hospitals, by region, 2004



4.4 Accommodation and food services

Table 4.4

Energy consumption, floor area and energy intensity of the accommodation and food services sector, by region, 2004

| Accommodation and food services | | ATLANTIC | QUEBEC | ONTARIO | PRAIRIES | B.C. | CANADA |
|---------------------------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------|
| Electricity (GJ) | 2 952 938 C | 4 612 643 B | 5 360 928 B | 5 855 349 B | 2 472 206 C | 21 254 063 A | |
| Natural gas (GJ) | F | 4 329 040 C | 13 527 726 D | 11 065 454 C | 2 799 732 D | 31 743 613 B | |
| Total energy use (GJ)* | 5 685 342 B | 11 225 536 B | 19 417 818 C | 16 929 335 B | 11 008 968 D | 64 267 000 A | |
| Floor area (m ²) | 2 213 688 B | 5 126 218 A | 9 234 298 C | 7 400 754 A | 5 059 814 D | 29 034 773 A | |
| Energy intensity (GJ/m ²) | 2.57 A | 2.19 B | 2.10 B | 2.29 C | 2.18 A | 2.21 A | |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

*Total energy use includes all energy sources: electricity, natural gas, diesel, propane, other middle distillates, heavy fuel oil and wood.

Table 4.4 presents the energy consumption, floor area and energy intensity, by region, for the accommodation and food services sector. This sector corresponds with NAICS code 72 and includes establishments such as hotels, motels, restaurants and drinking establishments.

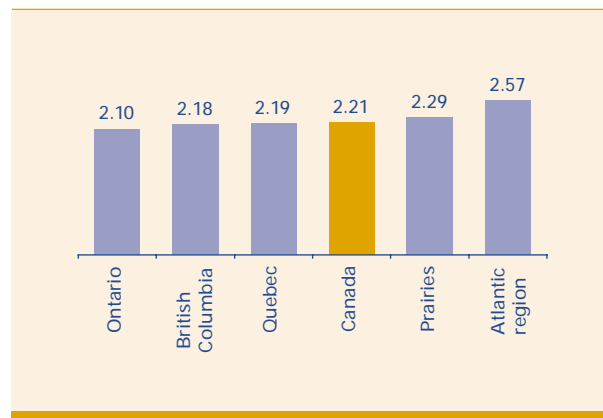
CICES data indicates that there were 38 306 establishments in the accommodation and food services sector in Canada: 3105 in the Atlantic region, 11 328 in Quebec, 11 647 in Ontario, 8023 in the Prairies, and 4202 in British Columbia.

In 2004, these establishments consumed more than 64 million GJ of energy. Natural gas represented the major share of their energy sources, at nearly half, compared with electricity, which represented a third of their energy sources.

The accommodation and food services sector had an energy intensity of 2.21 GJ/m², which is the highest of all eight sectors covered by this survey (excluding the subsectors). Regionally, Ontario had the lowest energy intensity, using energy at a rate of 2.10 GJ/m². British Columbia (2.18 GJ/m²) and Quebec (2.19 GJ/m²) were also below the Canadian average for this sector. The Atlantic region (2.57 GJ/m²) and the Prairies (2.29 GJ/m²) had the highest levels of energy intensity.

Chart 10

Energy intensity (GJ/m²) of establishments in the accommodation and food services sector, by region, 2004



The energy-use data collected for this sector can be analyzed in greater detail. As shown in Table 4.4.1, the energy intensity of accommodation establishments (NAICS code 721) was 1.70 GJ/m², much lower than that of food services establishments (NAICS code 722), where the energy intensity was 3.55 GJ/m².

This sector's high level of energy consumption stems mainly – in the case of accommodation establishments – from the type of equipment used, the nature of the facilities (swimming pools, restaurants, etc.) and more extensive use of lighting. The relatively high energy intensity of food service establishments stems from, among other things, longer business hours and the type of equipment used (ovens, air-conditioning units, etc.).

Table 4.4.1

Energy consumption, floor area and energy intensity of accommodation services and food services, by energy source, 2004

| | Accommodation services | | Food services | |
|---------------------------------------|------------------------|---|---------------|---|
| Electricity (GJ) | 12 737 667 | A | 8 516 397 | A |
| Natural gas (GJ) | 14 809 760 | C | 16 933 853 | C |
| Diesel (GJ) | 383 021 | D | | F |
| Total energy use (GJ)* | 36 147 769 | A | 28 119 231 | B |
| Floor area (m ²) | 21 121 600 | A | 7 913 173 | B |
| Energy intensity (GJ/m ²) | 1.70 | A | 3.55 | B |

The letter to the right of each estimate indicates its quality, as follows: A – excellent, B – good, C – acceptable, D – use with caution, F – too unreliable to be published.

Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

* *Total energy use* includes all energy sources: electricity, natural gas, diesel, propane, other middle distillates, heavy fuel oil and wood.

For the purposes of the survey, the establishments are classified in accordance with the North American Industry Classification System (NAICS).

WHOLESALE TRADE AND WAREHOUSING AND STORAGE (NAICS 41 and 493)

- Farm product wholesaler-distributors; petroleum product wholesaler-distributors; food, beverage and tobacco wholesaler-distributors; personal and household goods wholesaler-distributors; motor vehicle and parts wholesaler-distributors; building material and supplies wholesaler-distributors; machinery, equipment and supplies wholesaler-distributors; miscellaneous wholesaler-distributors; wholesale agents and brokers.
- Warehousing and storage.

RETAIL TRADE (NAICS 44-45)

Food retail (NAICS 445)

- Grocery stores; specialty food stores; beer, wine and liquor stores.

Non-food retail (NAICS 441 to 444; 446 to 454)

- Motor vehicle and parts dealers; furniture and home furnishings stores; electronics and appliance stores; building material and garden equipment and supplies dealers; health and personal care stores.

INFORMATION AND CULTURAL INDUSTRIES (NAICS 51)

- Publishing industries (except Internet); motion picture and sound recording industries; broadcasting (except Internet); Internet publishing and broadcasting; telecommunications; Internet service providers, Web search portals, and data processing services; other information services.

OFFICE SECTOR (NAICS 52, 53, 54, 91)

Finance and insurance (NAICS 52)

- Monetary authorities – central bank; credit intermediation and related activities; securities, commodity contracts, and other financial investment and related activities; insurance carriers and related activities; funds and other financial vehicles.

Real estate and rental and leasing (NAICS 53)

- Real estate; rental and leasing services; lessors of non-financial intangible assets (except copyrighted works).

Professional, scientific and technical services (NAICS 54)

- Legal services; accounting, tax preparation, bookkeeping and payroll services; architectural, engineering and related services; specialized design services; computer systems design and related services; management, scientific and technical consulting services; scientific research and development services; advertising and related services; other professional, scientific and technical services.

Public administration (NAICS 91)

- Federal government public administration; provincial and territorial public administration; local, municipal and regional public administration; Aboriginal public administration.

EDUCATIONAL SERVICES (NAICS 61)

Elementary and secondary schools (NAICS 6111)

Community colleges and cégeps (NAICS 6112)

Universities (NAICS 6113)

HEALTH CARE (NAICS 62)

Non-hospital health care (NAICS 621, 623, 624)

- Offices of physicians; offices of dentists; offices of other health practitioners; out-patient care centres; medical and diagnostic laboratories; home health care services; other ambulatory health care services; nursing care facilities; residential developmental handicap, mental health and substance abuse facilities; community care facilities for the elderly; other residential care facilities; individual and family services; community food and housing, and emergency and other relief services; vocational rehabilitation services; child day-care services.

Hospitals (NAICS 622)

- General medical and surgical hospitals; psychiatric and substance abuse hospitals; specialty hospitals (except psychiatric and substance abuse hospitals).

ACCOMMODATION AND FOOD SERVICES (NAICS 72)

- Traveller accommodation; (recreational vehicle) parks and recreational camps; rooming and boarding houses.
- Full-service restaurants; limited-service eating facilities; special food services; drinking establishments (alcohol).

OTHER (NAICS 71, 81)

- Performing arts, spectator sports and related industries; heritage institutions; amusement, gambling and recreation industries.
- Repair and maintenance; personal and laundry services; religious organizations, foundations, citizens groups and professional and similar organizations; private households.

This appendix offers a summary of the methodology used for the *Commercial and Institutional Consumption of Energy Survey* for 2004, conducted by Statistics Canada on behalf of the Office of Energy Efficiency.

Purpose of the survey

This survey's main objective was to obtain information on energy demand in Canada.

It was designed to gather up-to-date statistical data on the energy consumption trends of establishments and enterprises in Canada.

Target population

Table 1 lists the 18 industries initially included in the survey.

Table 1

Description of frame size

| Number of the industry within the frame size | Industry | NAICS Codes |
|--|---|-----------------------|
| 1 | Warehousing and storage – wholesale trade | 41 and 49 |
| 2 | Retail trade | 44-45 (excluding 445) |
| 3 | Food retail | 445 |
| 4 | Information and cultural industries | 51 |
| 5 | Finance and insurance; real estate and rental and leasing services; professional, scientific and technical services | 52, 53 and 54 |
| 6 | Ambulatory health care services | 621 |
| 7 | Nursing and residential care facilities | 623 |
| 8 | Social assistance | 624 |
| 9 | Arts, entertainment and recreation | 71 |
| 10 | Accommodation services | 721 |
| 11 | Food services and drinking places | 722 |
| 12 | Other services (excluding public administration) | 81 (excluding 813110) |
| 13 | Public administration | 91 |
| 14 | Colleges and cégeps | 6112 |
| 15 | Universities | 6113 |
| 16 | Hospitals | 622 |
| 17 | Elementary and secondary schools | 6111 |
| 18 | Religious organizations | 813110 |

The database was created using elements from three mutually exclusive lists. The first list, taken from the Consumption of Energy Survey, 2003, includes universities, colleges and cégeps, and hospitals. The second, taken from the Business Register, includes establishments whose North American Industry Classification System (NAICS) codes match the industries numbered 1 to 13 and 18 in Table 1. The third, taken from a list provide by Statistics Canada's Division of Culture, Tourism and Centre for Education Statistics, includes elementary and secondary schools.

For the list of hospitals, only those with 50 or more employees were included in the survey in order to exclude entities and associations that may have the NAICS code of a hospital but not the same mandate or mission (for example, a Board of Directors). For the same reason, only colleges and cégeps with 20 or more employees were considered in this survey.

Table 2 shows the distribution of the target population, by industry.

Table 2

Size of population, by industry

| Number of the industry within the frame size | Industry | Population |
|--|---|----------------|
| 1 | Warehousing and storage – wholesale trade | 64 404 |
| 2 | Retail trade | 102 732 |
| 3 | Food retail | 23 305 |
| 4 | Information and cultural industries | 12 741 |
| 5 | Finance and insurance; real estate and rental and leasing services; professional, scientific and technical services | 182 317 |
| 6 | Ambulatory health care services | 56 162 |
| 7 | Nursing and residential care facilities | 6 383 |
| 8 | Social assistance | 16 818 |
| 9 | Arts, entertainment and recreation | 17 874 |
| 10 | Accommodation services | 10 859 |
| 11 | Food services and drinking places | 60 730 |
| 12 | Other services (excluding public administration) | 80 156 |
| 13 | Public administration | 7 006 |
| 14 | Colleges and cégeps | 222 |
| 15 | Universities | 126 |
| 16 | Hospitals | 736 |
| 17 | Elementary and secondary schools | 16 696 |
| 18 | Religious organizations | 14 923 |
| | Total | 674 190 |

Survey design

The previous edition of the Consumption of Energy Survey was limited to universities, colleges and hospitals. In fact, that survey constituted a census of these categories. Given the broader scope of the 2004 survey – which covers all the industries of the commercial and institutional sector – a census was not feasible. Accordingly, the 2004 edition of CICES constitutes a sample survey.

Statistics Canada used a stratified sampling plan, for which the stratus was the region, in the case of all industries, and the number of

employees, in the case of all industries excluding numbers 14 to 17. Tables 3 and 4 describe the *Region* and *Size* strata.

The sample size for each domain – for each industry in this survey – was determined in such a way that the quality for each stratum (region and/or size) is equal. The final sample size was 7349 units.⁸ Table 5 shows the size of the sample for each domain (industry).

Table 3

Description of the *Region* stratum

| Region | Province |
|------------------|---|
| Atlantic | New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador |
| Quebec | Quebec |
| Ontario | Ontario |
| Prairies | Manitoba, Saskatchewan, Alberta |
| British Columbia | British Columbia |

Table 4

Description of the *Size* stratum

| Size | Description |
|------|---|
| 1 | Number of employees > 0, and number of employees < 21 |
| 2 | Number of employees > 20, and number of employees < 251 |
| 3 | Number of employees > 250 |

⁸ By way of comparison, the sample size for this survey is more than 40 percent larger than that of the similar Commercial and Institutional Building Energy Use Survey, 2000. This approach, based on the creation of a huge sample, was selected mainly because there had been no preliminary contact with each of the sample units. The various strata were thus oversampled in order to compensate for a foreseeably larger number of ineligible units.

Table 5**Size of sample, by industry**

| Number of the industry | Industry | Sample size |
|------------------------|---|-------------|
| 1 | Warehousing and storage – wholesale trade | 532 |
| 2 | Retail trade | 566 |
| 3 | Food retail | 452 |
| 4 | Information and cultural industries | 481 |
| 5 | Finance and insurance; real estate and rental and leasing services; professional, scientific and technical services | 610 |
| 6 | Ambulatory health care services | 550 |
| 7 | Nursing and residential care facilities | 399 |
| 8 | Social assistance | 426 |
| 9 | Arts, entertainment and recreation | 455 |
| 10 | Accommodation services | 368 |
| 11 | Food services and drinking places | 445 |
| 12 | Other services (excluding public administration) | 529 |
| 13 | Public administration | 384 |
| 14 | Colleges and cégeps | 151 |
| 15 | Universities | 114 |
| 16 | Hospitals | 201 |
| 17 | Elementary and secondary schools | 250 |
| 18 | Religious organizations | 436 |
| | Total | 7349 |

Data collection, validation and imputation

Survey responses were collected from January to March, 2005. Respondents were given three follow-up calls to encourage them to complete the questionnaire. Table 6 shows a distribution of the sample based on type of response.

Table 6

Distribution of sample, by type of response

| Type of response | Distribution |
|------------------|--------------|
| Complete | 1009 |
| Void (duplicate) | 22 |
| Out of business | 141 |
| Out of scope | 442 |
| Partial | 687 |
| Refusal | 646 |
| No response | 4135 |
| Unable to locate | 267 |
| Total | 7349 |

The response rate is calculated as follows:

$$\text{Response rate} = \frac{\text{Number of responding units (complete and partial)}}{\text{Number of resolved cases surveyed} + \text{Number of unresolved cases}}$$

The overall response rate is thus calculated as follows:

$$\text{Response rate} = \frac{1009 + 22 + 687}{4135 + 646 + 267 + 1009 + 22 + 687}$$

The response rate is therefore 25.4 percent. Table 7 shows the response rate for each of the 18 industries initially included in the survey.

Table 7

Response rate, by industry

| Number of the industry | Industry | Response rate |
|------------------------|---|---------------|
| 1 | Warehousing and storage – wholesale trade | 21.8% |
| 2 | Retail trade | 16.5% |
| 3 | Food retail | 16.3% |
| 4 | Information and cultural industries | 21.4% |
| 5 | Finance and insurance; real estate and rental and leasing services; professional, scientific and technical services | 19.4% |
| 6 | Ambulatory health care services | 19.2% |
| 7 | Nursing and residential care facilities | 33.7% |
| 8 | Social assistance | 26.8% |
| 9 | Arts, entertainment and recreation | 21.8% |
| 10 | Accommodation services | 20.6% |
| 11 | Food services and drinking places | 11.9% |
| 12 | Other services (excluding public administration) | 21.4% |
| 13 | Public administration | 31.7% |
| 14 | Colleges and cégeps | 59.1% |
| 15 | Universities | 66.4% |
| 16 | Hospitals | 57.0% |
| 17 | Elementary and secondary schools | 34.7% |
| 18 | Religious organizations | 34.9% |
| | Total | 25.4% |

Control rules ensured the validity and internal consistency of responses. The data were reviewed manually.

The situation in which a respondent fails to answer certain questions is called a partial response. In such cases, the missing data were imputed using a hierarchical hot-deck technique. The criteria for matching a data donor were: type of industry, type of energy, category of number of employees (based on data in the Business Register), region, and number of employees/students/beds. In addition, 50 records were imputed manually.

The estimates are based on the principle that each establishment in the sample could represent a certain number of establishments in the target population. Consequently, each respondent establishment was assigned a weighting coefficient indicating how many establishments within the population are represented by this one establishment.

Data suppression

For some industries, the response rate was too low to permit disclosure of data, as the resulting estimates did not meet Statistics Canada's quality standards. Accordingly, some categories were merged to improve the quality of the estimates. In order to publish the survey results, the 18 industries initially included in CICES 2004 were compressed into 8 categories and 7 subcategories. Table 8 shows how the activity sectors were categorized.

Table 8

Correspondence of the CICES 2004 categories with the industries in the survey design

| Number of the industry | Industry | Categories established for publication purposes |
|------------------------|---|---|
| 1 | Warehousing and storage – wholesale trade | Wholesale trade and warehousing |
| 2 | Retail trade | Non-food retail trade |
| 3 | Food retail | Food retail trade |
| 4 | Information and cultural industries | Information and cultural industries |
| 5 | Finance and insurance; real estate and rental and leasing services; professional, scientific and technical services | Office sector |
| 6 | Ambulatory health care services | Non-hospital health care |
| 7 | Nursing and residential care facilities | Non-hospital health care |
| 8 | Social assistance | Non-hospital health care |
| 9 | Arts, entertainment and recreation | Other |
| 10 | Accommodation services | Accommodation and food services |
| 11 | Food services and drinking places | Accommodation and food services |
| 12 | Other services (excluding public administration) | Other |
| 13 | Public administration | Office sector |
| 14 | Colleges and cégeps | Colleges and cégeps |
| 15 | Universities | Universities |
| 16 | Hospitals | Hospitals |
| 17 | Elementary and secondary schools | Elementary and secondary schools |
| 18 | Religious organizations | Other |

The coefficient of variation, which indicates the reliability of the data, is used to determine which estimates may be published. Estimates where the coefficient of variation exceeds 50 percent are not reliable enough for publication. In addition, it is important to keep in mind that the calculation of the coefficients of variation does not take into account the fact that some data were imputed. Table 9 shows the various quality indicators associated with the coefficients of variation.

Table 9

Indicators associated with the coefficients of variation

| Coefficient of variation | Indicator | Quality of estimate |
|--------------------------|-----------|--------------------------------|
| Less than 20% | A | Excellent |
| From 20% to 29% | B | Good |
| From 30% to 39% | C | Acceptable |
| From 40% to 49% | D | Use with caution |
| 50% or more | F | Too unreliable to be published |

Estimates graded "A" or "B" are considered precise enough for most uses. Data where the coefficient of variation is higher – graded "C" or "D" – are precise enough for a few uses, but should be used with caution.

Diesel: All grades of low-sulphur (lower than 0.05 percent) distillate fuel used for diesel engines.

Electricity: A form of energy emanating from electric charges at rest or in movement.

Energy intensity: Total amount of energy used by a group of establishments, divided by the total floor area of the same group.

Energy source: Type of energy source or fuel used by an establishment. For the purposes of this survey, data were collected on the use of electricity, natural gas, heavy fuel oil, diesel, other middle distillates, propane, steam and wood.

Establishment: The establishment is the statistical unit used for survey purposes. In the case of colleges and universities, the establishment is the campus. In the case of hospitals, it is the entire set of facilities of the hospital complex. For all other activity sectors, it is the enterprise. An establishment may include more than one building.

Floor area: Total floor area, excluding indoor parking and mechanical rooms of all buildings of an establishment, indicated in square metres.

Gigajoule (GJ): One gigajoule equals 1×10^9 joules. A joule is the international unit for measuring energy and corresponds to the energy produced by a power of one watt flowing for one second.

Heavy fuel oil: All grades of residual type fuels, including low-sulphur fuels, used mainly for steam and electric power generation and diesel motors. Includes fuel oil grade nos. 4, 5 and 6.

Natural gas: A mixture of hydrocarbons containing mainly methane with small quantities of various gaseous hydrocarbons or hydrocarbons dissolved in crude oil, found in underground deposits.

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

Other middle distillates: Includes light fuel oil (nos. 1, 2 and 3), kerosene, mineral lamp oil, home fuel, gas oils and light industrial fuel.

Private dwelling: A structurally separate set of living premises with a private entrance from outside the building or from a common hallway or stairway inside, such as a single-family house or apartment.

Propane: A normally gaseous straight-chain hydrocarbon extracted from natural gas or refinery gas streams. It can also take a liquid form.

Steam: A gas resulting from the vaporization of a liquid or the sublimation of a solid, generated by condensing or non-condensing turbines.

Wood: Includes round wood (sold by the cord), lignin, wood scraps (chips) from furniture and window frame manufacturing, bark, sawdust, forestry residues, charcoal and pulp waste.

| Energy form | Please specify the energy unit measure | As fuel | To produce steam for sale | To produce electricity | For non-fuel use |
|--|--|---------|---------------------------|------------------------|------------------|
| Electricity (in kilowatt hours) | | | | | |
| Natural gas (in cubic metres or gigajoules) | | | | | |
| Propane (in cubic metres) | | | | | |
| Diesel (in cubic metres) | | | | | |
| Other middle distillates – light fuel oil, kerosene, etc. (in cubic metres) | | | | | |
| Heavy (residual) fuel oil, Canadian (in cubic metres) | | | | | |
| Heavy (residual) fuel oil, foreign (in cubic metres) | | | | | |
| Wood – hog fuel, wastewood, bark, etc. (in metric tonnes) | | | | | |
| Spent pulping liquor (in metric tonnes) | | | | | |
| Steam purchased (in gigajoules) (please specify steam supplier below) | | | | | |
| Other (please specify type and unit of measure below) | | | | | |
| Total number of employees/students/beds (please respond below) | | | | | |
| In December 2004, what was the total floor area that was used for productive activity (excludes indoor parking and mechanical areas) of all buildings within this business or institution? (please specify the area and unit of measure below) | | | | | |

