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Commercial and Institutional Consumption of Energy Survey

Summary Report – June 2007

2005



Canada

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

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Foreword

In 2006, Statistics Canada conducted a third Commercial and Institutional Consumption of Energy Survey (CICES) for the Office of Energy Efficiency (OEE), Natural Resources Canada (NRCan). The results of this survey are based on data gathered in 2005. This CICES is directly in line with the OEE's mandate to strengthen and expand Canada's commitment to energy efficiency.

The first survey in this series, conducted for 2003 and entitled Consumption of Energy Survey, covered only universities, colleges and hospitals. The next survey, conducted in 2004, covered nearly all commercial and institutional sectors. CICES 2005 maintained the scope of the 2004 survey and has expanded its questionnaire.

The primary objective for the current survey, CICES 2005, was to gather data on the energy consumption of commercial and institutional sector establishments. These data will deepen our knowledge of the various aspects of energy consumption in this sector. They will also enable NRCan to develop and fine-tune its programs, which are designed to support institutions and enterprises as they seek to achieve greater energy efficiency and reduce their greenhouse gas emissions. For example, ecoENERGY for Buildings and Houses encourages the construction and retrofit of more energy-efficient buildings and houses.

This detailed report on the survey's findings was prepared by Vincent Fecteau of the Demand Policy and Analysis Division of the OEE. Indrani Hulan supervised the project, and David McNabb was the project director.

For more information on this publication or the OEE's services, please visit the Web site at oee.nrcan.gc.ca. You can also contact the OEE by e-mail at euc.cec@nrcan.gc.ca or by writing to

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Other Office of Energy Efficiency Surveys and Publications

Over the past few years, the OEE has implemented several initiatives to collect energy data and estimate energy consumption in the commercial and institutional sector.

- The **Commercial and Institutional Building Energy Use Survey (CIBEUS)** was the first survey of its kind in Canada. Conducted in 2000, this survey gathered data on energy consumption, energy intensity and the physical and energy-efficient characteristics of commercial and institutional buildings located in Canada's major urban centres. In 2000, the overall energy intensity of all the buildings included in CIBEUS's target population was 1.59 gigajoules per square metre (GJ/m²).
- As stated in the Foreword, the first **Consumption of Energy Survey (CES)** was based on 2003 data. This survey focused exclusively on Canada's universities, colleges and hospitals. Unlike CIBEUS 2000, which surveyed only major urban centres, CES 2003 covered all ten Canadian provinces. Moreover, CES 2003 was based on the North American Industry Classification System (NAICS), while CIBEUS 2000 defined its own building categories based on their usage and physical characteristics. CES 2003 estimated the energy intensity for universities to be 2.04 GJ/m², for colleges to be 1.48 GJ/m² and for hospitals to be 2.65 GJ/m².
- For the 2004 survey, CES's scope was increased to cover a much broader cross section of the commercial and institutional sector. To reflect this change, the survey was renamed the **Commercial and Institutional Consumption of Energy Survey (CICES)**. The total energy intensity for all the institutions included in the 2004 survey was 1.60 GJ/m².
- Each year, the OEE publishes the **Energy Use Data Handbook**. This handbook provides, among other items, data on energy consumption by activity type for the commercial and institutional sector, as well as various indicators that reflect energy use. This database is built using various sources of information, including the *Report on Energy Supply-demand in Canada* (described on page 3). For 2004, the Handbook estimated that the total energy consumed in the commercial and institutional sector was 1,171 million GJ and the energy intensity was 2.01 GJ/m². The most recent version of the Handbook is available on the OEE Web site at oee.nrcan.gc.ca/statistics.

- Through various other programs, the OEE has also published sectoral studies based on comparative analyses. These studies have centred on, among other subjects, the hospitality sector, the retail sector and shopping centres. Owners of commercial buildings can use these studies to compare their facility's energy consumption with that of similar facilities. These publications are available from the OEE's Web site (oee.nrcan.gc.ca).

Every year, Statistics Canada publishes the *Report on Energy Supply-demand in Canada* (RES-D), which also includes data on the commercial and institutional sector. The RES-D presents data on the production, sale, interprovincial/interterritorial transfer and consumption of energy by sector. For a number of reasons, the estimates in the present document vary from those published in the RES-D. Basically, the two

initiatives define the commercial and institutional sector differently, with the RES-D's definition being somewhat broader. Furthermore, there are several differences in methodology. The data published in the Report are drawn from annual surveys on energy availability (energy sales and distribution information reported by suppliers), as well as from many other data sources. The Report estimates Canada's energy supply and demand figures by using detailed supply and distribution models. For 2005, the Report estimated the commercial and institutional sector's energy consumption at 1468 million GJ.

All these surveys, handbooks and studies have important conceptual differences among them. Caution must therefore be exercised when directly comparing data from these sources.

Data Sharing

Certain rules established by Statistics Canada ensure the reliability of CICES 2005 estimates for purposes of publication. The letters used in the tables of this report indicate the quality of each estimate based on the degree of sampling error, as represented by the coefficient of variation. The letter *A* indicates a relatively low coefficient of variation; the letter *B*, a slightly higher coefficient; and so on.

An estimate that has been graded *F* cannot be shared since its sampling error is too high. Further detail on how the coefficient of variation is used to determine data quality is given in Appendix B, which describes the methodology used to conduct this survey.

Limits on the analysis of these results

It is important to note that CICES is a survey, not a census of commercial and institutional sector establishments. Despite the best efforts of Statistics Canada to maintain a high level of quality for each of the survey's various phases, the estimates produced are inevitably subject to some degree of error, as is the case with any survey.

Therefore, the data sets presented in this report are estimates. The real values are within the confidence interval of the survey's estimate. The methodology used to calculate estimates, as well as to collect data, is summarized in Appendix B.

Abstract

- In 2006, Statistics Canada conducted a *Commercial and Institutional Consumption of Energy Survey (CICES)* for Natural Resources Canada, collecting 2005 data.
- This survey gathered data on the energy consumption and energy intensity of businesses and institutions. In 2005, these establishments consumed 1.04 billion gigajoules (GJ), nearly twice the annual consumption of all private households in Ontario. The total energy intensity was 1.54 GJ per square metre (m²).
- Social assistance establishments had the lowest energy intensity ratings (0.83 GJ/m²), followed by elementary and secondary schools (1.01 GJ/m²). Food services and drinking places had the highest energy intensity rating (3.06 GJ/m²), followed by hospitals (2.83 GJ/m²).
- The Atlantic region and Quebec had the lowest intensity levels, with rates of 1.14 GJ/m² and 1.26 GJ/m², respectively. Conversely, the Prairies had the highest intensity rate at 1.74 GJ/m².
- The CICES also gathered data on the age of establishments; on the energy sources used for space heating, space cooling and water heating; on establishment spending on energy consumption; and on the use of auxiliary equipment. This report contains an in-depth analysis of each of these variables.

Energy Consumption and Energy Intensity in Canada



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).¹ A complete list of the activity sectors making up the commercial and institutional sector is provided in Appendix A.

Table 1 (on page 8) shows the main survey results for 2005 by activity sector: number of establishments, energy consumption (expressed in gigajoules [GJ]²), floor area (expressed in square metres [m²]) and energy intensity (expressed in gigajoules per square metre [GJ/m²]).

1.1 Number of establishments and floor area

Based on CICES data, there were an estimated 440 863 establishments³ in the commercial and institutional sector in Canada in 2005.⁴ Offices and non-food retail were the largest categories, accounting for 20 percent and 18 percent of the total estimated number of establishments. Survey data also indicate that commercial and institutional establishments in Canada used over 671 square kilometres (km²) of floor space for productive ends. Elementary and secondary schools accounted for the largest share of floor area, with 17 percent of the total floor area, followed by the office sector, with 15 percent.

¹ The only NAICS categories excluded from the survey are *Management of Companies and Enterprises* (NAICS 55), *Administrative and Support, Waste Management and Remediation Services* (NAICS 56), *Business Schools and Computer and Management Training* (NAICS 6114), *Technical and Trade Schools* (NAICS 6115), *Other Schools and Instruction* (NAICS 6116) and *Educational Support Services* (NAICS 6117).

² A GJ is a billion joules. A joule is the amount of energy required to send a one-ampere electric current through a one-ohm resistance for one second. A GJ is equal to 277.8 kilowatt hours (kWh). A million GJ is approximately the amount of energy required to supply the Montréal Metro each year. In 2004, the average Canadian home consumed 114.8 GJ of energy. To convert kWh to GJ, multiply by 0.0036. To convert GJ to kWh, multiply by 277.8.

³ 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 or institution. An establishment may include more than one building (e.g. a university campus). Conversely, a building may house more than one establishment (e.g. a shopping centre).

⁴ The number of institutions for 2005 is relatively higher than the number estimated in our previous report (2004). Appendix B summarizes the methods used and details the conceptual reasons for the increased number of eligible units in 2005. One of these reasons is the increased scope of the survey in certain sectors (specifically, community colleges / CEGEPs and universities) and changes in certain admissibility rules.

1.2 Energy consumption

CICES estimates that commercial and institutional establishments in Canada consumed over 1036 million GJ. This total corresponds to the annual consumption of some 9 million Canadian households, or the equivalent of nearly twice the energy consumption of all private households in Ontario.⁵

The office sector consumes the greatest amount of energy – 13 percent of total consumption – and has the greatest number of establishments, with 20 percent of the total number of establishments included in the survey. The wholesale and warehousing sector and the elementary and secondary schools sector also consumed significant amounts of energy, with each accounting for 11 percent of total consumption.

Table 1

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

Sector or subsector	Number of establishments		Energy consumption (GJ)		Floor area (m ²)		Energy intensity (GJ/m ²)	
Wholesale and warehousing	45 868	A	114 162 037	C	73 462 291	A	1.55	B
Retail trade	97 265	A	146 861 780	A	84 568 645	A	1.74	A
• Non-food retail	80 383	A	110 542 345	B	71 506 001	B	1.55	A
• Food retail	16 881	A	36 319 436	A	13 062 643	A	2.78	A
Information and cultural industries	8 429	A	25 589 044	B	16 822 634	C	1.52	B
Offices (excluding public administration)	86 531	A	139 826 874	C	98 417 673	B	1.42	A
Public administration	6 329	A	35 305 615	A	28 927 539	A	1.22	A
Education¹	16 512	A	212 807 311	A	158 044 023	B	1.35	A
• Elementary and secondary schools	14 587	A	114 789 224	B	113 207 778	B	1.01	A
• Community colleges and CEGEPs	1 686	A	21 945 276	B	15 488 872	A	1.42	A
• Universities	239	A	76 072 812	A	29 347 374	A	2.59	A
Health care¹	47 001	A	101 035 185	A	57 596 579	A	1.75	A
• Ambulatory health care services	31 238	A	24 815 948	B	16 925 082	A	1.47	A
• Hospitals	703	A	51 035 328	A	18 061 710	A	2.83	A
• Nursing and residential care facilities	4 649	A	17 976 487	A	13 894 201	A	1.29	A
• Social assistance	10 410	A	7 207 421	A	8 715 586	A	0.83	A
Accommodation services	5 887	A	45 843 413	B	24 391 987	A	1.88	A
Food services and drinking places	37 932	A	42 222 892	A	13 777 378	A	3.06	A
Religious organizations²	24 451	A	50 605 742	B	46 687 141	A	1.08	A
Other³	64 658	A	122 518 056	B	68 982 813	B	1.78	A
TOTAL	440 863	A	1 036 777 949	A	671 678 701	A	1.54	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

¹ The scopes of certain subsectors within the Education and Health Care sectors were modified from the preceding survey. Refer to the summary report at Appendix B for further details on the methodology.

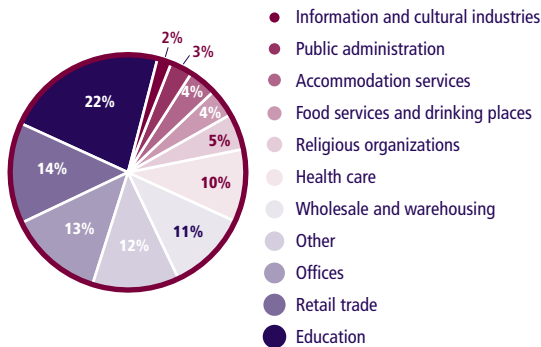
² Care must be exercised in interpreting data concerning Religious Organizations. See Appendix B for further details on this subject.

³ The residual category Other includes the categories Arts, Entertainment and Recreation (NAICS 71) and Other services excluding public administration (religious organizations not included) (NAICS 81, except 813110).

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

⁵ 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 2004 – the most recent year – in the *Energy Use Data Handbook*, published in August 2006. The number of households is taken from Statistics Canada's 2001 Canadian census.

Chart 1
Energy consumption by activity sector (%)



1.3 Energy intensity

The CICES 2005 data allowed us to calculate each sector’s gross energy consumption and total floor area, which were then used to calculate the energy-intensity ratio. Energy intensity is expressed in gigajoules per square metre (GJ/m²). For the purposes of the CICES, we considered only gross energy intensity, which is the total energy used divided by the total floor area. The average of the intensity of each establishment, used for comparing one establishment with another, is not analysed in this report.

Energy intensity depends on many factors, including the sector of activity, the age of buildings, the type of equipment used, the physical characteristics of buildings, the occupants’ habits and behaviour, the type of energy used,⁶ the hours of operation and

the energy-saving measures in place. Although cumulative, each factor affects the establishment’s energy intensity independently and in its own complex way. However, this report does not intend to examine these effects individually.⁷

The overall energy intensity of all commercial and institutional establishments in Canada was 1.54 GJ/m² for 2005. Chart 2 (on page 10) presents the total energy intensity per activity sector for all establishments.

The social assistance sector is the least energy-intensive, with a ratio of 0.83 GJ/m². Next are the elementary and secondary school sector (1.01 GJ/m²), the religious organizations sector (1.08 GJ/m²) and the public administration sector (1.22 GJ/m²).

The establishments with the lowest intensity ratios are generally those with more limited operating hours (such as religious organizations), those that rarely open outside normal business hours or those that operate on an irregular or seasonal basis (such as many elementary and secondary schools). These establishments also rarely have energy-intensive equipment, and their space cooling rates are generally lower than average than those for commercial and institutional establishments.

Conversely, the food services and drinking places sector has the most intensive rate, at 3.06 GJ/m². Hospitals, with a ratio of 2.83 GJ/m², are also among the more energy-intensive sectors, followed by food retail (2.78 GJ/m²).

⁶ For example, natural gas, fuel oil and heavy fuel oil have a higher intensity than electricity. The energy losses for the 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.

⁷ Each year, the OEE publishes *Energy Efficiency Trends in Canada*, the most recent of which spans 1990 to 2004. This publication describes how energy use is affected by the level of activity, weather, structure, level of service and energy efficiency. It is available on the OEE’s Web site at oee.mcan.gc.ca/statistics.

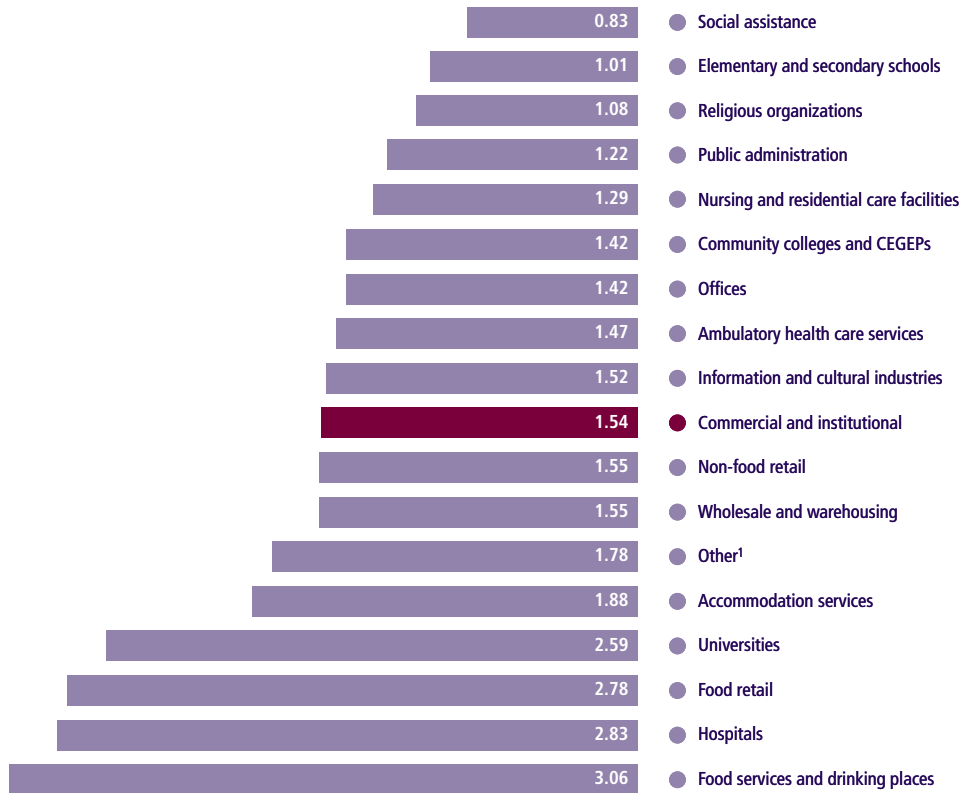
The more energy-intensive establishments are most often those that, like hospitals, rely on specialized or sophisticated equipment. Moreover, certain high-intensity establishments, such as hospitals or some food services, have extended business hours.

In the retail trades, food retail establishments (2.78 GJ/m²) are more intensive than other retail establishments (1.55 GJ/m²), due chiefly to the use of high-energy appliances, such as freezers, refrigerators and stoves.

In terms of educational services, universities (2.59 GJ/m²) are more intensive than community colleges and CEGEPs (1.42 GJ/m²). This difference may be due to several factors; namely, the difference in operating hours for each type of establishment or the levels of activity and student enrollment, which are greater for university campuses. To a lesser extent, the differences may also be due to the specific mandates of these two types of institutions: community colleges may focus primarily on teaching, while universities may expend more energy on research.

Chart 2

Total energy intensity by activity sector (GJ/m²)



¹ The residual category Other includes the categories Arts, Entertainment and Recreation (NAICS 71) and Other services excluding public administration (religious organizations not included) (NAICS 81).

Energy Consumption and Intensity, by Region



2.1 Main regional differences

This section highlights the survey's overall regional results. Table 2 presents the number of establishments, energy consumption, floor area and energy intensity for each region.

According to the survey results, 38 percent of commercial and institutional establishments are located in Ontario, 22 percent in Quebec, 19 percent in the Prairies, 13 percent in British Columbia and 7 percent in the Atlantic region. Energy consumption and floor area are relatively proportional to the distribution of establishments per province.

The Atlantic and Quebec regions have the lowest energy intensity ratios, at 1.14 GJ/m² and 1.26 GJ/m², respectively. British Columbia is slightly above the Canadian intensity average, at 1.56 GJ/m², while Ontario (1.71 GJ/m²) and the Prairies (1.74 GJ/m²) have the highest intensity ratios.

The underlying causes of these regional differences are numerous and complex. Among the main causes are each region's distinct climate,⁸ as well as the form of energy used.

Table 2

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

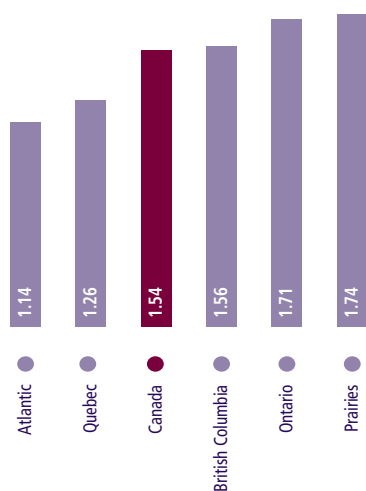
Region	Number of establishments		Energy consumption (GJ)		Floor area (m ²)		Energy intensity (GJ/m ²)	
Atlantic	32 987	A	55 019 228	A	48 159 323	A	1.14	A
Quebec	95 947	A	223 099 154	A	176 422 988	A	1.26	A
Ontario	168 143	A	442 096 442	A	259 213 367	A	1.71	A
Prairies	85 435	A	225 716 405	A	129 792 376	A	1.74	A
British Columbia	58 351	A	90 846 720	A	58 090 647	A	1.56	A
Canada	440 863	A	1 036 777 949	A	671 678 701	A	1.54	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

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.

⁸ The energy consumption database (a complement to the *Energy Use Data Handbook* available from the OEE Web site at oeenrcan.gc.ca) allows us to distinguish certain regional climatic differences by measuring the cold or warmth of Canada's regions in relation to a base temperature. For example, the Prairie region is relatively colder than British Columbia or the Atlantic region. Climate factors contribute to increasing energy intensity in the coldest regions.

Chart 3
Energy intensity by region (GJ/m²)



2.2 Analysis of energy intensity by activity sector

CICES 2005's estimates were sufficiently precise to support an analysis of the energy intensity by the activity sector for each region. Table 3 presents these data.

An analysis of the energy intensity for each sector and subsector by region allows us to highlight certain differences. For example, the intensity ratio for food services and drinking places varies greatly from one region to the next, ranging from 2.32 GJ/m² in the Atlantic region to 4.14 GJ/m² in Ontario, which has the highest ratio of all those evaluated within the scope of this CICES.

Table 3
Energy intensity by activity sector, by region (GJ/m²)

Sector or subsector	Atlantic		Quebec		Ontario		Prairies		British Columbia		Canada	
Wholesale and warehousing	0.85	B	1.41	B	1.99	C	1.11	A	0.87	A	1.55	B
Retail trade	1.42	B	1.45	A	1.51	A	2.28	C	1.32	A	1.74	A
• Non-food retail	1.32	C	0.91	A	1.28	A	2.22	C	0.89	A	1.55	A
• Food retail	1.84	A	3.00	A	2.70	A	2.95	A	3.00	A	2.78	A
Information and cultural industries	1.64	A	1.65	B	1.61	C	1.77	A	0.78	B	1.52	B
Offices (excluding public administration)	1.00	A	0.90	A	1.54	A	1.28	A	1.61	A	1.42	A
Public administration	–	F	1.45	A	1.72	C	2.07	A	0.93	A	1.22	A
Education	1.19	A	1.05	A	1.64	A	1.81	A	1.02	A	1.35	A
• Elementary and secondary schools	0.87	B	0.98	A	0.98	A	1.47	A	0.81	A	1.01	A
• Community colleges and CEGEPs	0.84	A	0.92	A	1.55	A	2.07	A	1.31	B	1.42	A
• Universities	2.28	A	2.13	A	3.12	A	2.19	A	1.59	A	2.59	A
Health care	2.33	A	1.30	A	1.89	A	2.18	A	1.64	A	1.75	A
• Ambulatory health care services	1.27	A	1.75	B	1.59	A	0.93	C	1.90	B	1.47	A
• Hospitals	3.36	A	2.09	A	2.60	A	3.56	A	2.22	A	2.83	A
• Nursing and residential care facilities	1.86	A	0.73	A	1.87	B	1.90	A	1.13	A	1.29	A
• Social assistance	1.14	A	0.68	A	0.94	A	0.95	B	0.93	A	0.83	A
Accommodation services	1.17	A	1.19	B	1.38	B	2.48	A	2.95	B	1.88	A
Food services and drinking places	2.32	B	2.69	A	4.14	A	2.56	B	3.66	A	3.06	A
Religious organizations	0.83	A	1.50	B	0.98	A	0.74	A	0.88	B	1.08	A
Other¹	0.92	A	1.39	A	2.30	A	1.12	B	2.84	B	1.78	A
TOTAL	1.14	A	1.26	A	1.71	A	1.74	A	1.56	A	1.54	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

¹ The residual category Other includes the Arts, Entertainment and Recreation (NAICS 71) category and Other services excluding public administration (religious organizations not included) (NAICS 81).

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.

In the case of community colleges and CEGEPs, the intensity is less than 1 GJ/m² in the Atlantic and Quebec regions, yet it is double this figure in the Prairies. With respect to universities, Ontario has the highest ratio at 3.12 GJ/m², while the ratio for British Columbia is approximately half that value.

In the food retail sector, the Atlantic region has a much lower ratio than any other region, with an intensity of 1.84 GJ/m², while that of other regions reaches nearly 3 GJ/m². Thus there are many regional differences, some of which are significant for certain sectors.

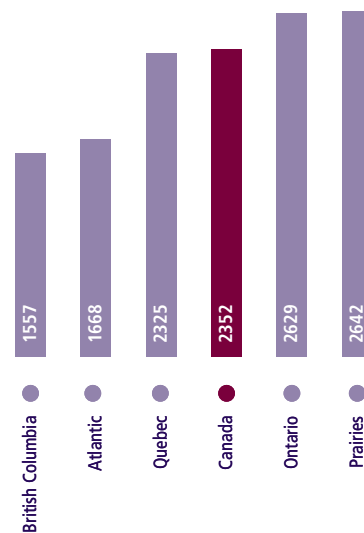
2.3 Average energy consumption by region

Chart 4 illustrates the average energy consumption of establishments for each region, obtained by dividing total establishment consumption by the number of establishments. The average consumption for Canada is 2352 GJ per establishment. British Columbia and the Atlantic region have significantly lower consumption rates, at 1557 GJ and 1668 GJ per establishment, respectively. Quebec, at 2325 GJ per establishment, is slightly lower than the Canadian average. Ontario and the Prairies have the highest consumption, with each having an average greater than 2600 GJ per establishment.

The reasons for such differences are varied, but the average establishment size in each region is a significant factor. Indeed, the average surface area estimates for the Prairies and Ontario (1519 m² and 1541 m², respectively) are greater than those of British Columbia and the Atlantic region (996 m² and 1460 m², respectively).

Chart 4

Average energy consumption per establishment, by region (GJ)



Energy Consumption, by Energy Source

3

Table 4 presents the amount of energy consumed by commercial and institutional establishments in Canada in 2005 for each energy source, by region.

Natural gas accounts for the greatest portion of energy consumed, with 44 percent of all the energy consumed in Canada, while electricity represents 42 percent (as shown in Chart 4 on page 13). At the other end of the range, steam power represents 5 percent of energy consumed, followed by heating oil and other middle distillates at 3 percent.

From a regional standpoint, electricity represents a significant portion of total energy consumption in Eastern Canada, accounting for 61 percent in Quebec and 44 percent in the Atlantic region. Natural gas dominates in all other regions, accounting for 54 percent in Ontario, 53 percent in the Prairies and 43 percent in British Columbia.

Table 4

Energy consumption by energy source, by region (GJ)

	Atlantic		Quebec		Ontario		Prairies		British Columbia		Canada	
Electricity	24 008 707	A	137 039 349	B	164 658 915	A	70 986 485	A	37 246 604	A	433 940 059	A
Natural gas	–	F	56 077 648	A	236 771 531	A	120 650 263	A	38 962 885	A	456 116 282	A
Steam	1 809 639	B	6 141 630	C	–	F	–	F	–	F	48 144 122	B
Heating oil and other middle distillates	12 906 734	B	14 172 157	C	929 881	B	3 403 366	C	–	F	31 669 549	A
Propane	2 781 962	B	2 793 555	B	–	F	5 061 404	C	–	F	21 082 288	B
Heavy fuel oil	6 120 764	A	3 498 771	B	–	F	–	F	–	F	12 021 655	A
Diesel	478 649	C	–	F	–	F	1 488 770	B	–	F	7 627 163	B
Other ¹	3 258 818	B	–	F	–	F	3 828 382	C	–	F	26 176 831	C
TOTAL	55 019 228	A	223 099 154	A	442 096 442	A	225 716 405	A	90 846 720	A	1 036 777 949	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

¹ The residual category Other includes wood and wood residues and, to a limited extent, coal, solar panels that use solar energy to heat fluids and all other forms of energy used.

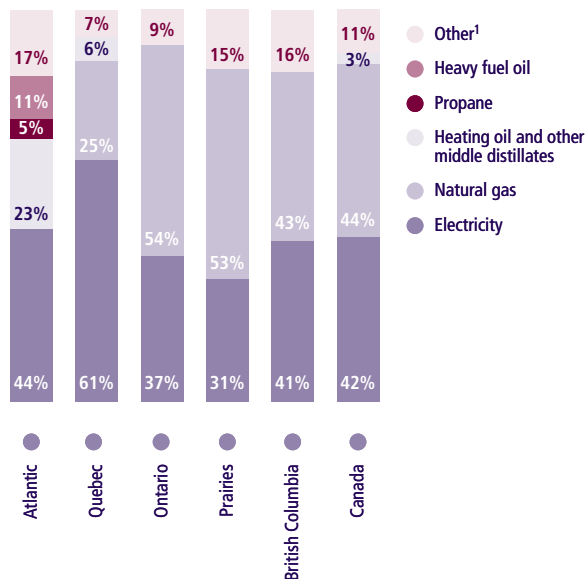
Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Heating oil and other middle distillates are used mainly in the Atlantic region, where they represent 23 percent of total energy consumption, but also in Quebec, where they account for 6 percent of energy consumed. Heavy fuel oil consumption remains low in Canada; only 1 percent of all commercial and institutional establishments use it. The Atlantic and Quebec regions consume 80 percent of the heavy fuel oil used in Canada, with universities and hospitals being the primary consumers.

Chart 5

Principal sources of energy used by region (%)

Due to rounding, the numbers may not add up to 100%.



¹ The residual category Other includes wood and wood residues, diesel and steam and, to a limited extent, coal, solar panels that use solar energy to heat fluids and all other forms of energy used.

4

Floor Area

The data gathered by CICES 2005 allows us to analyse establishments by floor area category. Table 5 (on page 17) illustrates the main characteristics of commercial and institutional establishments for each category.

Two thirds of establishments (Chart 6) are relatively small and make use of less than 465 m² for productive purposes. Although this category has the largest number of establishments, it accounts for only 8 percent of the total energy consumed (Chart 7) and only 7 percent of the total surface area. Most small institutions fall within the office, retail sales, food service and drinking places sectors, or within the residual category of Other.

Conversely, the largest establishments with surface areas greater than 9290 m² represent only 2 percent of the total number of establishments in Canada. However, these large establishments consume 54 percent of the total energy used and comprise half the floor area. They are mainly found within the education, hospital and office sectors but may also belong to the retail sales or the wholesale and warehousing sectors.

Chart 6
Distribution of establishments by floor area (%)

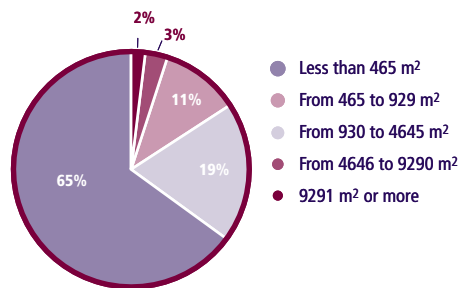


Chart 7
Energy consumption by floor area (%)

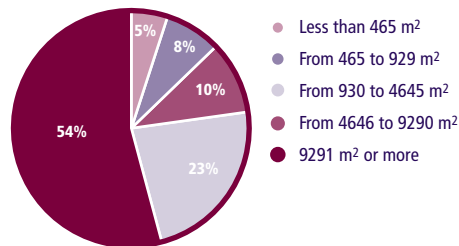


Table 5

Main characteristics of establishments by floor area and by region

	Less than 465 m ²		From 465 to 929 m ²		From 930 to 4645 m ²		From 4646 to 9290 m ²		9291 m ² or greater	
Atlantic										
Number of establishments	20 983	A	4 012	A	6,014	A	1 328	B	650	A
Energy consumption (GJ)	5 715 550	A	3 699 569	A	14 760 421	A	7 328 022	B	23 515 667	A
Floor area (m ²)	4 194 803	A	2 569 924	A	12 970 927	A	8 346 133	B	20 077 537	B
Energy intensity (GJ/m ²)	1.36	A	1.44	A	1.14	A	0.88	A	1.17	B
Quebec										
Number of establishments	63 365	A	12 349	A	15 334	A	2 088	B	2 811	A
Energy consumption (GJ)	18 200 373	A	11 895 717	B	37 387 890	A	18 712 499	B	136 902 676	B
Floor area (m ²)	11 790 049	A	8 251 043	A	30 305 858	A	13 422 165	B	112 653 873	B
Energy intensity (GJ/m ²)	1.54	A	1.44	A	1.23	A	1.39	A	1.22	A
Ontario										
Number of establishments	112 170	A	12,824	A	35 516	A	4,224	A	3 409	B
Energy consumption (GJ)	32 158 203	A	12 180 254	A	103 921 983	B	39 471 482	B	254 364 520	B
Floor area (m ²)	18 109 646	A	8 662 328	A	79 091 599	A	28 577 802	A	124 771 991	B
Energy intensity (GJ/m ²)	1.78	A	1.41	A	1.31	A	1.38	A	2.04	A
Prairies										
Number of establishments	48 121	A	12 561	A	20 219	A	2,712	A	1 822	B
Energy consumption (GJ)	15 534 876	A	16 558 380	B	67 344 889	B	28 877 794	A	97 400 466	B
Floor area (m ²)	9 071 833	A	8 628 688	A	42 054 152	A	17 506 028	A	52 531 675	B
Energy intensity (GJ/m ²)	1.71	A	1.92	A	1.60	A	1.65	A	1.85	A
British Columbia										
Number of establishments	40 519	A	8 513	A	6 847	A	1 478	A	993	B
Energy consumption (GJ)	12 658 669	A	8 590 393	B	17 425 698	A	13 674 781	C	38 497 179	B
Floor area (m ²)	7 111 313	A	5 236 916	A	13 520 489	A	9 133 446	A	23 088 483	B
Energy intensity (GJ/m ²)	1.78	A	1.64	A	1.29	A	1.50	C	1.67	A
Canada										
Number of establishments	285 159	A	50 258	A	83 931	A	11 830	A	9 685	A
Energy consumption (GJ)	84 267 671	A	52 924 312	A	240 840 881	A	108 064 578	A	550 680 508	A
Floor area (m ²)	50 277 644	A	33 348 900	A	177 943 024	A	76 985 574	A	333 123 560	A
Energy intensity (GJ/m ²)	1.68	A	1.59	A	1.35	A	1.40	A	1.65	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

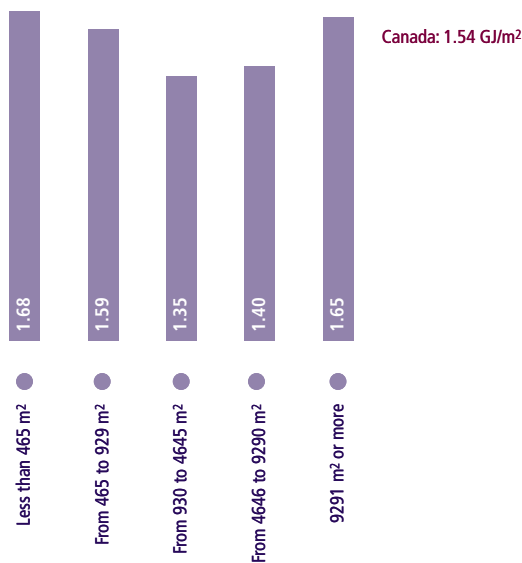
Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Chart 8 illustrates the energy intensity of commercial and institutional establishments as a function of floor area. The least-intensive establishments are those with a floor area between 930 m² and 4645 m², with an intensity of 1.35 GJ/m². Several of these establishments belong to the office, non-food retail,

religious organizations or wholesale and warehousing sectors. Establishments between 4646 m² and 9290 m² have a slightly greater intensity ratio, at 1.40 GJ/m². Elementary and secondary schools, offices and public administration are among the main activity sectors in this category.

The categories with the highest intensity ratios are at either end of the classification spectrum. The smallest establishments (less than 465 m²) have an intensity ratio of 1.68 GJ/m², which is only slightly greater than that of the largest establishments (greater than 9290 m²), with a ratio of 1.65 GJ/m². As previously mentioned, the category that includes the largest establishments is chiefly composed of energy-intensive activity sectors, such as universities and hospitals. The smallest establishments include mainly restaurants, grocery stores and certain health care-related services. Such high intensity may be due, among other factors, to their use of high-energy appliances, such as refrigerators and ovens in grocery stores.

Chart 8
Energy intensity as a function of surface area (GJ/m²)



A similar analysis on a regional basis sometimes yields slightly different conclusions. For example, in Quebec the very large establishments are the least energy intensive, yet the opposite is true in Ontario, where this category has the highest energy intensity ratio. As mentioned above, it is difficult to draw simple conclusions based on physical factors, such as the size of establishments, given the range of energy-saving, climate and occupant behavioural factors that also affect energy consumption.

For example, when we reduce the target population for a regional analysis, the effect of the activity sector, among others, seems to play a more significant role in the establishment's energy intensity than size. Moreover, the correlation between the two variables of sector and energy intensity is often strong: university campuses and hospitals, with high intensity, also have a large floor area. Conversely, high-intensity small establishments, such as restaurants or bars, often have a much smaller surface area. These observations support the polarization of relatively high intensities at each end of the category spectrum.

5

Establishment Age

This edition of CICES gathered data on the year that establishments were built. In the case of establishments comprising several buildings or units (e.g. a university campus or hospital complex), the OEE selected the year in which the majority of buildings comprising the company or institution were built.

As shown in Chart 9, the average year of construction for Canadian establishments is estimated at 1975. There are relatively few regional differences, except that establishments in the Atlantic region tend to be older (1971) and those in British Columbia tend to be younger (1980).

Chart 9

Average year of construction and age, by region

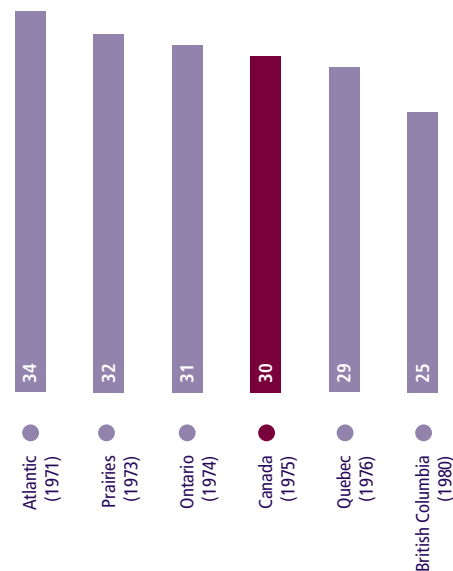


Table 6

Principal characteristics of establishments, based on year of construction

Construction period	Number of establishments		Energy consumption (GJ)		Floor area (m ²)		Energy intensity (GJ/m ²)	
Prior to 1920	20 584	A	33 527 522	B	24 194 636	A	1.39	A
From 1920 to 1959	53 715	A	133 956 378	B	84 743 212	A	1.58	A
From 1960 to 1969	53 231	A	173 568 127	B	96 475 167	A	1.80	A
From 1970 to 1979	85 408	A	269 760 130	A	176 948 729	B	1.52	A
From 1980 to 1989	92 860	A	157 461 130	A	94 454 615	A	1.67	A
From 1990 to 1999	83 125	A	190 888 013	A	135 301 511	A	1.41	A
From 2000 to 2004	51 939	A	77 616 649	A	59 560 832	A	1.30	A
TOTAL	440 863	A	1 036 777 949	A	671 678 701	A	1.54	A

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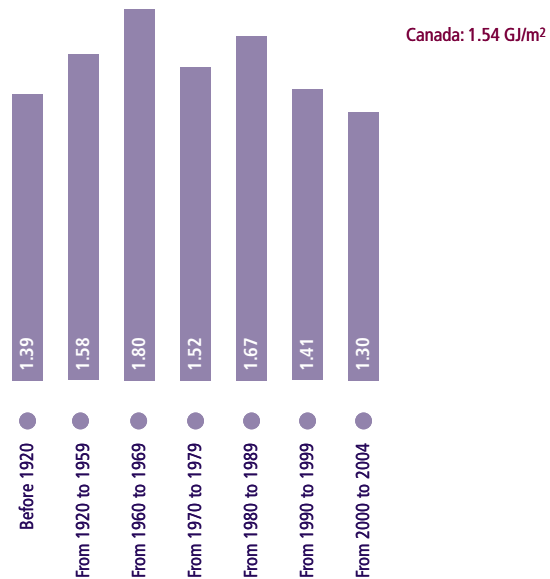
Table 6 (on page 19) presents the principal characteristics of commercial and institutional establishments, based on the year they were built. These data are presented for Canada as a whole, since the quality of regional estimates did not permit a more detailed analysis.

More than half of these establishments were built after 1980. Only 5 percent of these establishments were built before 1920, while nearly 12 percent are very recent, having been built after 2000. The period between 1980 and 1989 saw the greatest number of these buildings being built, namely 21 percent.

The data gathered through this survey allowed the OEE to compare an establishment's year of construction with its energy intensity. Chart 10 details the energy intensity for each construction period. The least-intensive establishments can be found at either end of the spectrum. Establishments built after 2000 had the lowest energy intensity, at 1.30 GJ/m², a ratio that is slightly less than that of those built in the preceding decade (1.41 GJ/m²). Establishments built before 1920, with an energy intensity of 1.39 GJ/m², ranked second.

However, it is important to examine the relative impact of the construction period on energy intensity in a larger context. For example, the establishment's activity sector plays a fundamental role in its energy intensity. This survey has demonstrated that universities and hospitals are among the most intensive (as seen in Chart 2 on page 10). Moreover, nearly three quarters of Canada's universities and half of Canada's hospitals were built before 1980. The relatively low intensity of younger establishments could be due to their activity distribution: certain establishments that are inherently intensive, due to their activity sector, are found in greater numbers during certain construction periods.

Chart 10
Energy intensity by year of construction (GJ/m²)



Furthermore, new buildings tend to be built to increasingly rigorous standards and equipped with energy-efficient technology and materials, while the oldest establishments may have undergone extensive renovations to improve their energy performance. These factors could partially explain why the oldest establishments are among the least energy intensive.

Energy Sources Used for Space Heating, Space Cooling and Water Heating

6

In 2005, for the first time, the OEE collected data on the type of energy used for space heating, space cooling and water heating. In the case of space heating and cooling, the CICES also allowed the OEE to differentiate between primary and secondary energy sources.

Table 7 shows the number of establishments that use a given energy source for space heating, by region. The first half of the table focuses on the primary energy source, while the second half addresses all energy sources (primary and secondary).

6.1 Space heating

Almost all commercial and institutional establishments (over 98 percent) are at least partially space-heated. This percentage is almost identical over all regions and establishment categories.

Overall, natural gas is the primary energy source for over half of Canada's establishments. Electricity use is also significant; 39 percent of establishments use it as primary energy source.

Table 7

Use of primary and secondary energy sources (number of establishments) for space heating, by region

	Atlantic		Quebec		Ontario		Prairies		British Columbia		Canada	
Principal energy source												
Electricity	19 129	A	64 368	A	47 084	A	14 751	A	24 478	A	169 810	A
Natural gas	860	B	18 059	A	109 104	A	66 586	A	27 951	A	222 559	A
Heating oil and other middle distillates	7 970	A	4 789	B	–	F	–	F	–	F	13 718	A
Propane	1 137	C	3 801	C	–	F	–	F	–	F	9 861	B
Heavy fuel oil	1 939	B	3 499	C	–	F	–	F	–	F	6 685	B
Steam	–	F	–	F	856	C	–	F	–	F	2 532	C
Other	–	F	–	F	–	F	–	F	–	F	–	F
Not heated	–	F	–	F	–	F	–	F	–	F	7 729	C
Primary and secondary energy source (possibility of more than one source per establishment)												
Electricity	22 828	A	77 160	A	77 903	A	28 534	A	35 756	A	242 180	A
Natural gas	935	B	23 307	A	113 100	A	71 160	A	31 918	A	240 421	A
Heating oil and other middle distillates	8 680	A	7 290	A	–	F	–	F	–	F	18 644	A
Propane	2 495	B	4 695	C	–	F	1 724	C	2 609	C	17 121	A
Heavy fuel oil	2 369	B	4 587	B	–	F	–	F	–	F	8 340	B
Steam	–	F	–	F	944	C	992	B	–	F	3 708	B
Other	–	F	–	F	–	F	–	F	–	F	–	F
Not heated	–	F	–	F	–	F	–	F	–	F	7 729	C

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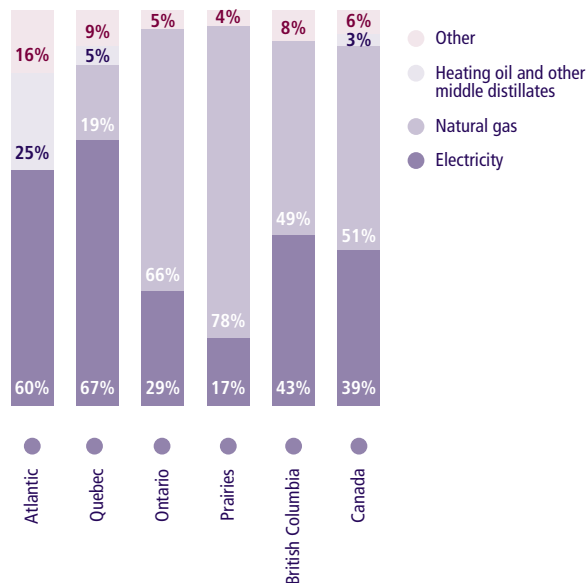
Due to rounding, the numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

From a regional perspective, electricity is an important energy source for Quebec and the Atlantic region, where 67 percent and 60 percent of establishments, respectively, use it as their primary heating energy (as shown in Chart 11). Natural gas is the primary energy source of choice for the Prairies, Ontario and British Columbia, with usage rates of 78 percent, 66 percent and 49 percent, respectively. Use of other energy sources as the primary energy for space heating is relatively marginal, except for heating oil and other middle distillates, which are used in one quarter of all establishments in the Atlantic region.

In total, in 2005, 105 795 establishments used two or more secondary energy sources, accounting for 24 percent of establishments. Considering all energy sources (primary and secondary), establishments use electricity and natural gas almost equally, with a usage rate of 56 percent in both cases. Heating oil and other middle distillates were used by 4 percent of establishments, a slightly higher percentage than that for propane use.

Chart 11
Primary energy sources used for space heating, by region (%)

Due to rounding, the numbers may not add up to 100 percent.



6.2 Space cooling

According to the CICES, 377 943, or 86 percent of all commercial and institutional establishments were at least partly air-conditioned in 2005. The space-cooling rate varies from one region to another: Quebec and the Prairies have rates that are similar to the Canadian average, while the Atlantic region has a lower rate, with only 71 percent of its establishments having space cooling. The rate in British Columbia is 79 percent, while Ontario has the highest rate, at 91 percent of establishments.

Differences are also noticeable between various sectors. Elementary and secondary schools have the lowest space-cooling rate, at 67 percent, followed by religious organizations at 72 percent (excluding the residual category Other). Certain sectors have high space-cooling rates, most notably hospitals (98 percent), non-hospital health care services (97 percent) and universities (94 percent).

Table 8 (on page 23) illustrates the number of establishments using a given energy source for space cooling, by region. The first part of the table focuses only on the primary energy source used for space cooling, while the second part includes all energy sources (primary and secondary).

As seen in Chart 12 (on page 23), more than 89 percent of Canadian establishments that have at least partial space cooling use electricity as their primary energy source for space cooling, versus 9 percent that use natural gas. Electricity is the most significant primary energy source for all regions in Canada, with its share ranging between 81 percent in British Columbia and 96 percent in Quebec. Natural gas also accounts for a significant portion, especially in the Prairies and British Columbia.

In 2005, 10 030 establishments used more than one energy source for space cooling, which accounts for only 3 percent of all air-conditioned establishments. Considering all energy sources (primary and secondary), 91 percent of establishments used electricity for space cooling in Canada. Electricity use is significant in Quebec (98 percent of space-cooled establishments) and in the Atlantic region (95 percent) but lower in the Prairies and British Columbia (83 percent for each).

Only one establishment in 10 uses natural gas as a primary or secondary energy source for space cooling. Overall use of natural gas for space cooling is low in Quebec (4 percent) but relatively widespread in the Prairies (19 percent) and British Columbia (13 percent).

Chart 12

Primary energy source used for space cooling, by region (%)

Due to rounding, the numbers may not add up to 100 percent.

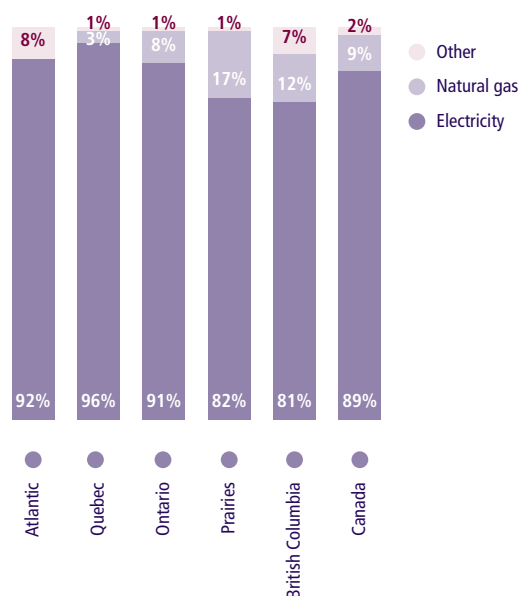


Table 8

Primary and secondary energy sources used for space cooling, by region (number of establishments)

	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
Primary energy source						
Electricity	21 571 A	78 531 A	139 797 A	60 526 A	37 488 A	337 914 A
Natural gas	– F	2 533 B	12 254 B	12 668 A	5 318 B	32 816 A
Heating oil and other middle distillates	– F	– F	– F	– F	– F	– F
Propane	– F	– F	– F	– F	– F	887 C
Other	– F	– F	– F	– F	– F	– F
No space cooling	9 619 A	14 370 A	15 167 B	11 646 A	12 119 A	62 920 A
Primary and secondary energy sources (possibility of more than one source per establishment)						
Electricity	22 212 A	80 041 A	141 426 A	60 987 A	38 206 A	342 871 A
Natural gas	– F	3 558 B	13 294 B	14 042 A	6 188 B	37 127 A
Heating oil and other middle distillates	– F	– F	– F	– F	– F	887 C
Propane	– F	– F	– F	– F	– F	1 096 C
Other	– F	– F	– F	– F	– F	– F
No space cooling	9 619 A	14 370 A	15 167 B	11 646 A	12 119 A	62 920 A

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6.3 Water heating

According to the CICES, nearly 95 percent of all commercial and institutional establishments heat water. This rate is similar across all regions in Canada and all activity sectors.

Table 9 illustrates, by region, the various energy sources used by establishments to heat water.

For Canada, electricity is the primary energy source used for water heating in 59 percent of commercial and institutional establishments that heat water (as shown in Chart 13). Natural gas is the primary energy source for 37 percent of these establishments, versus only 1 percent for propane and heating oil, including other middle distillates.

From a regional perspective, electricity is the primary energy source for the Atlantic region (77 percent of establishments), as it is in Quebec (87 percent), Ontario (53 percent) and British Columbia (60 percent). Only in the Prairies is natural gas used as the primary energy source to heat water. There, it is used in 60 percent of establishments.

Chart 13

Primary energy source used for water heating, by region (%)

Due to rounding, the numbers may not add up to 100 percent.

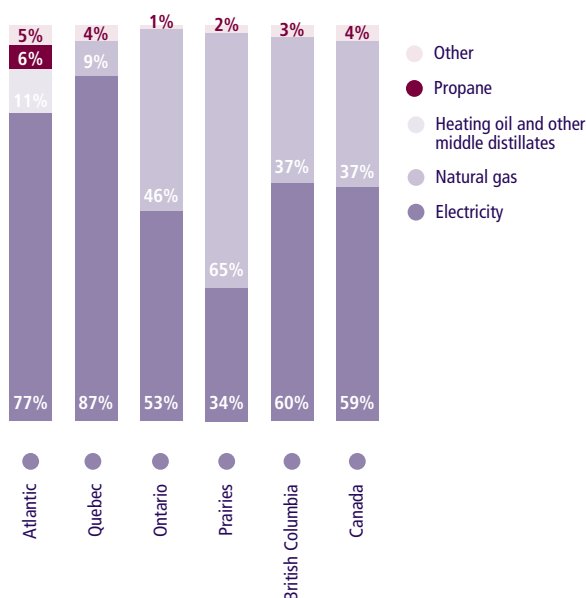


Table 9

Primary and secondary energy sources used for water heating, by region (number of establishments)

	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
Primary energy source						
Electricity	23 234 A	78 942 A	83 615 A	27 888 A	34 496 A	248 175 A
Natural gas	– F	8 483 A	72 855 A	53 205 A	21 119 A	155 861 A
Heating oil and other middle distillates	3 375 A	664 C	– F	– F	– F	4 599 A
Propane	1 911 B	– F	411 C	– F	581 C	5 378 B
Heavy fuel oil	980 B	– F	– F	– F	– F	2 125 C
Other	– F	– F	– F	– F	– F	– F
No hot water	3 006 B	5 002 C	– F	– F	– F	22 171 B

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Use of Auxilliary Equipment



In 2005, for the first time, the CICES looked at the use of auxiliary equipment. In some sectors, use of this equipment represents a significant portion of total energy consumption.

Auxiliary equipment comprises appliances that are plugged directly into an electrical outlet and, for the purposes of this survey, include computers, printers, photocopiers, fax machines, stoves, microwave ovens, refrigerators, freezers, vending machines and automated tellers. Computers include any electronic machine equipped with a microprocessor (such as a cash register) but exclude hand-held computers. As well, freezers include free-standing freezers and deep-freezers but exclude the freezer compartment of a refrigerator.

According to the annual *Energy Use Data Handbook*, auxiliary equipment use represented 14 percent of the energy used by the commercial and institutional sector in 2004.⁹ It ranked second in the end-use categories after space heating (52 percent), and energy use for auxiliary equipment was greater than that used for lighting (10 percent) or heating water (9 percent).

Table 10 (on page 26) illustrates the number of equipment units used per activity sector. The definition of auxiliary equipment is wide, and only some types were included within this survey. The equipment types were chosen specifically because they are not exclusive to any sector in particular but are found across all sectors.

According to the survey, the number of auxiliary equipment units (as previously defined) is greater than 14 million. At 55 percent, computers account for the greatest proportion of auxiliary equipment surveyed. They are followed by printers, photocopiers and fax machines (20 percent); refrigerators (10 percent); and microwave ovens (6 percent).

⁹ *Energy Use Data Handbook*, Natural Resources Canada, Office of Energy Efficiency, August 2006.

Table 10

Use of auxiliary equipment by activity sector

Activity sector	Computers		Printers, photocopiers and/or fax machines		Stoves		Microwave ovens	
Wholesale and warehousing	548 034	A	306 653	A	6 614	B	60 052	A
Retail trade	688 960	B	318 794	A	16 402	A	96 874	A
• Non-food retail	619 833	B	275 694	A	7 220	C	77 626	A
• Food retail	69 127	A	43 100	A	9 181	A	19 247	A
Information and cultural industries	436 766	A	99 767	A	1 245	B	13 635	A
Offices (excluding public administration)	2 325 056	B	694 795	A	–	F	118 540	B
Public administration	330 285	A	129 165	A	5 054	A	18 366	A
Education	2 112 428	A	470 207	A	73 810	A	150 721	A
• Elementary and secondary schools	1 322 058	A	258 462	A	51 665	A	98 271	A
• Community colleges and CEGEPs	359 522	B	48 396	A	6 400	C	14 565	B
• Universities	430 848	A	163 348	A	15 746	B	37 885	A
Health services	668 403	A	333 889	A	77 617	C	123 109	B
• Non-hospital health care services	286 628	A	164 996	A	–	F	36 796	A
• Hospitals	234 766	A	98 065	A	4 046	A	14 930	A
• Nursing and residential care facilities	52 640	A	24 849	A	–	F	–	F
• Social assistance	94 369	A	45 979	A	11 463	A	19 284	A
Accommodation services	42 384	A	28 341	A	37 175	B	55 510	A
Food services and drinking places	143 754	A	93 306	B	81 964	A	57 144	A
Religious organizations	198 395	B	121 624	A	43 936	A	43 568	A
Other	474 120	A	244 250	A	36 946	B	82 356	A
TOTAL	7 968 584	A	2 840 792	A	603 155	C	819 874	A

(Table continued on page 27)

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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.

	Refrigerators		Freezers		Vending machines		Automated tellers		Total	
	64 316	A	13 894	B	–	F	–	F	1 140 612	A
	188 401	A	102 442	A	38 222	A	29 456	B	1 479 548	A
	100 991	A	29 158	C	28 193	B	23 619	C	1 162 334	A
	87 410	A	73 284	A	10 028	A	5 837	A	317 215	A
	16 304	A	–	F	4 552	A	–	F	572 970	A
	–	F	–	F	19 680	B	19 048	B	3 769 176	B
	21 772	A	2 015	C	4 818	A	807	C	512 282	A
	139 487	A	31 696	A	45 867	A	1 336	A	3 025 552	A
	72 127	A	17 706	A	29 518	A	–	F	1 850 211	A
	15 898	B	3 970	C	8 124	B	502	B	457 377	B
	51 462	A	10 021	B	8 225	A	430	A	717 964	A
	170 303	A	32 895	A	13 936	A	7 676	B	1 427 828	A
	57 224	A	5 158	B	–	F	7 089	C	573 783	A
	25 415	A	7 750	A	5 684	A	402	A	391 059	A
	–	F	11 467	A	2 578	A	–	F	258 651	C
	22 949	A	8 519	A	1 594	C	–	F	204 336	A
	142 463	A	13 594	A	9 991	A	2 721	B	332 178	A
	152 468	A	90 752	A	11 324	C	–	F	647 345	A
	62 580	A	24 375	A	4 295	A	–	F	498 892	A
	106 357	A	26 596	A	28 733	B	10 567	A	1 009 926	A
	1 406 544	A	366 331	A	320 076	C	90 954	A	14 416 309	A

8

Spending on Energy Use

The 2005 CICES is the first survey conducted by the Office of Energy Efficiency for which information on commercial and institutional establishment spending on energy consumption was gathered. The amounts presented in this section include taxes.

According to the survey, Canadian establishments spent nearly \$18 billion on energy in 2005. Table 11 presents the main results by region.

This data allowed the OEE to calculate ratios to establish a link between the cost of energy and the quantity of energy consumed. Chart 14 illustrates the cost of energy per gigajoule of energy consumed, by region. This ratio provides a valid estimate of the amount spent on energy consumption.

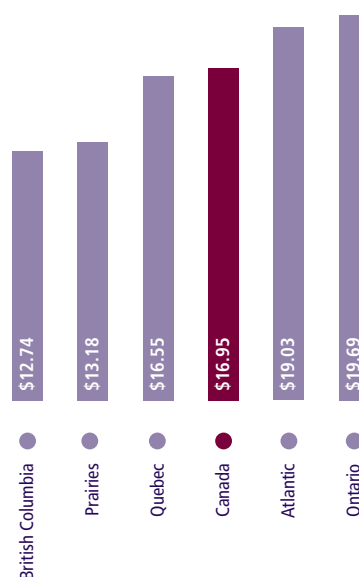
The CICES estimated that \$16.95 per gigajoule of energy is used by the commercial and institutional sector in Canada in 2005. Establishment owners and occupants in British Columbia and the Prairies reported the lowest amount spent on energy consumption, spending \$12.74 and \$13.18 per gigajoule, respectively. Quebec owners were also below the Canadian average, spending \$16.55 per gigajoule. Those paying the highest price for a gigajoule of energy were in Ontario (\$19.69) and in the Atlantic region (\$19.03).

Table 11
Spending on energy consumption, by region

Region	Amount (millions \$)	
Atlantic	1,047	A
Quebec	3,691	A
Ontario	8,706	A
Prairies	2,975	A
British Columbia	1,157	A
Canada (total)	17,577	A

The letter to the right of each estimate indicates its quality, as follows: A – Very good, B – Acceptable, C – Use with caution, F – Too unreliable to be published or eliminated for reasons of confidentiality.

Chart 14
Amount spent per gigajoule of energy used, by region



Production of Electricity and Useful Thermal Energy



In this survey, the OEE sought to measure cogeneration of energy (simultaneous production of electricity and useful thermal energy [e.g. steam] using the same process and the same fuel), as well as the production of electricity or steam by commercial and institutional establishments.

Cogeneration and the production of either electricity or steam are rare in the commercial and institutional sector. According to the CICES, only 120 establishments used these processes in 2005. Most of these are large establishments (e.g. hospital complexes, university campuses and large institutions).

Establishments that answered affirmatively in the main questionnaire when asked about cogeneration, or production of electricity or steam, were sent a second questionnaire dealing exclusively with this process. This second questionnaire aimed at, most notably, determining the production centre's energy-generating capacity and measuring, firstly, the energy produced and, secondly, the energy either consumed by the establishment or sold to another establishment.

Given the limited number of units that qualified for this second questionnaire, the OEE cannot publish the estimates, either for reasons of confidentiality or because the data do not satisfy the quality standards established by Statistics Canada.

Appendix A – Classification of Commercial and Institutional Establishments

For the purposes of the OEE's survey, the establishments were classified in accordance with the North America Industry Classification System (NAICS).

Wholesale Trade and Warehousing and Storage (NAICS 41, 493)

- Farm Product Wholesalers-Distributors; Petroleum Product Wholesalers-Distributors; Food, Beverage and Tobacco Wholesalers-Distributors; Personal and Household Goods Wholesalers-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 Trade (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; Gasoline Stations; Clothing and Clothing Accessories Stores; Sporting Goods, Hobby, Book and Music Stores; General Merchandise Stores; Miscellaneous Store Retailers; Non-Store Retailers

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

Offices, except Public Administration (NAICS 52, 53, 54)

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

Educational Services (NAICS 6111 – 6113)

Elementary and Secondary Schools (NAICS 6111)

Community Colleges and CEGEPs (NAICS 6112)

Universities (NAICS 6113)

Health Care and Social Assistance (NAICS 62)

Ambulatory (Non-hospital) Health Care Services (NAICS 621)

- 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

Hospitals (NAICS 622)

- General Medical and Surgical Hospitals; Psychiatric and Substance Abuse Hospitals; Specialty (except Psychiatric and Substance Abuse) Hospitals

Nursing and Residential Care Facilities (NAICS 623)

- Nursing Care Facilities; Residential Developmental Handicap, Mental Health and Substance Abuse Facilities; Community Care Facilities for the Elderly; Other Residential Care Facilities

Social Assistance (NAICS 624)

- Individual and Family Services; Community Food and Housing, and Emergency and Other Relief Services; Vocational Rehabilitation Services; Child Day-Care Services

Accommodation Services (NAICS 721)

- Traveller Accommodation; RV (Recreational Vehicle) Parks and Recreational Camps; Rooming and Boarding Houses

Food Services and Drinking Places (NAICS 722)

- Full-Service Restaurants; Limited-Service Eating Places; Special Food Services; Drinking Places (Alcoholic Beverages)

Other (NAICS 71, 81, [except 8131])

- Performing Arts, Spectator Sports and Related Industries; Heritage Institutions; Amusement, Gambling and Recreation Industries
- Repair and Maintenance; Personal and Laundry Services; Grant-Making, Civic, and Professional and Similar Organizations; Private Households

Religious Organizations (NAICS 8131)

Public Administration (NAICS 91)

- Federal Government Public Administration; Provincial and Territorial Public Administration; Local, Municipal and Regional Public Administration; Aboriginal Public Administration

Appendix B – Summary Report on Methodology

This appendix summarizes the methodology used for the 2005 Commercial and Institutional Consumption of Energy Survey (CICES) conducted by Statistics Canada on behalf of the Office of Energy Efficiency.

Purpose of the survey

The main purpose of CICES 2005 is to gather information on energy demand in Canada. It provides statistical data on the energy consumption trends of establishments and enterprises in Canada.

Target population

The survey's target population for the commercial and institutional sector includes all establishments that have at least one employee, are not located in a private dwelling and belong to the NAICS categories as defined in Table 1 (on page 34). These are industries 1 through 14, and 19.

The target population for institutions includes hospitals and schools (elementary and secondary schools, community colleges and universities). For community colleges and universities, institutions belonging to the following categories were excluded from the population studied: First Nation and Métis, Direct Government, Consortia and adult education school boards. For elementary and secondary schools, the establishments within the following categories were excluded: Aboriginal schools, distance education (online/correspondence schools). These institutions correspond to industries 15 through 18 in Table 1 (on page 34).

Table 1

Description of the survey frame

Number of the industry within the frame size	Industry	NAICS Code
1	Wholesalers	41
2	Postal services, courier and messenger services, warehousing and storage	49
3	Non-food retail	44 (except 445) and 45
4	Food retail	445
5	Information and cultural industries	51
6	Finance and insurance services; real estate and rental and leasing services; professional, scientific and technical services	52, 53 and 54
7	Ambulatory health care services	621
8	Nursing and residential care facilities	623
9	Social assistance	624
10	Arts, entertainment and recreation	71
11	Accommodation services	721
12	Food services and drinking places	722
13	Other services excluding public administration (religious organizations not included)	81 (except 813110)
14	Public administration	91
15	Community colleges and CEGEPs	6112
16	Universities	6113
17	Hospitals	622
18	Elementary and secondary schools	6111
19	Religious organizations	813110

Survey frame

The survey frame was created from four mutually exclusive lists. The first list comprises community colleges, CEGEPs, and universities. The second list includes hospitals. The third list comprises elementary and secondary schools (private and public). The fourth list is taken from the Business Register (BR) and is based on a NAICS list that includes industries 1 through 14, and 19, from Table 1.

Table 2 (on page 35) 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 size
1	Wholesalers	63 380
2	Postal services, courier and messenger services, warehousing and storage	4 492
3	Non-food retail trade	109 774
4	Food retail	24 391
5	Information and cultural industries	13 631
6	Finance and insurance services, real estate and rental and leasing services; professional, scientific and technical services	194 372
7	Ambulatory health care services	57 114
8	Nursing and residential care facilities	7 002
9	Social assistance	17 479
10	Arts, entertainment and recreation	18 229
11	Accommodation services	11 052
12	Food services and drinking places	62 783
13	Other services excluding public administration (religious organizations not included)	81 632
14	Public administration	7 621
15	Community colleges and CEGEPs	2 484
16	Universities	259
17	Hospitals	733
18	Elementary and secondary schools	16 407
19	Religious organizations	14 394
	TOTAL	707 232

Survey design

CICES 2005 is a sample survey. Statistics Canada used a stratified sampling plan; the final sample size was 9510 units. Table 3 (on page 36) presents the size of the sample for each industry.

Table 3
Sample size by industry

Number of the industry within the frame size	Industry	Population size
1	Wholesalers	621
2	Postal services, courier and messenger services, warehousing and storage	436
3	Non-food retail	608
4	Food retail	607
5	Information and cultural industries	597
6	Finance and insurance services, real estate, rental and leasing services; professional, scientific and technical services	706
7	Ambulatory health care services	617
8	Nursing and residential care facilities	388
9	Social assistance	564
10	Arts, entertainment and recreation	582
11	Accommodation services	507
12	Food services and drinking places	619
13	Other services excluding public administration (religious organizations not included)	592
14	Public administration	404
15	Community colleges and CEGEPs	287
16	Universities	188
17	Hospitals	329
18	Elementary and secondary schools	317
19	Religious organizations	541
	TOTAL	9510

Data collection, validation and imputation

The data were collected from January to April 2006. Each respondent was contacted before the survey to confirm specific information (especially his or her contact information) and to explain the purpose of the survey and the data collection procedure. The questionnaire was then mailed to the respondents. Follow-up calls were made during the data collection period to encourage respondents to complete the questionnaire or to check some of the data received.

Table 4 (on page 37) shows a distribution of the samples based on the type of response.

Table 4

Distribution of sample by type of response

Response	Distribution
Questionnaire completed	3158
Combined report	29
Partial answers to questions	450
Temporarily inactive	272
Respondent refusal	1498
No response by the closing date of the data collection period	1809
Too late to mail the questionnaire	1
Unable to contact the respondent	571
Out of business	235
Unable to locate respondent	862
Change of ownership	44
Merger	14
Duplicate questionnaire received	26
Out of scope of survey	541
TOTAL	9510

Response rate

The response rate is calculated as follows:

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

The overall response rate is 48.1 percent. Table 5 (on page 38) shows the response rate for each of the industries included in the survey.

Table 5

Response rate, by industry

Number of the industry within the frame size	Industry	Response rate (percent)
1	Wholesalers	49.6
2	Postal services, courier and messenger services, warehousing and storage	38.6
3	Non-food retail trade	43.9
4	Food retail	47.1
5	Information and cultural industries	39.5
6	Finance and insurance services, real estate and rental and leasing services; professional, scientific and technical services	39.0
7	Ambulatory health care services	37.4
8	Nursing and residential care facilities	50.3
9	Social assistance	51.1
10	Arts, entertainment and recreation	43.5
11	Accommodation services	40.9
12	Food services and drinking places	32.0
13	Other services excluding public administration (religious organizations not included)	46.1
14	Public administration	40.7
15	Community colleges and CEGEPs	57.1
16	Universities	63.6
17	Hospitals	70.5
18	Elementary and secondary schools	60.0
19	Religious organizations	53.7
	TOTAL	48.1

For the purposes of this survey, the OEE grouped together the first two categories, namely Wholesalers and Postal services, courier and messenger services, warehousing and storage. The category Arts, entertainment and recreation was also grouped together with the category Other services (excluding public administration) to create the residual category Other.

Data validation and imputation

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

In situations in which a respondent only partially answered certain questions, the missing data were imputed using a stochastic method known as “hot deck,” in which the missing data are replaced by a randomly chosen sample from respondents meeting the donor criteria. In such cases, the donor criteria were type of industry, type of energy, category of number of employees (based on data in the BR) and region, as well as the types of energy used for space heating, space cooling and water heating.

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 responding establishment was assigned a weighting coefficient that indicates how many establishments within the population are represented by this one establishment.

Estimate quality indicators

Coefficients of variation, which indicate the reliability of data, are used to determine which estimates may be published. Estimates with a coefficient of variation exceeding 40 percent are deemed too unreliable to be published. Moreover, it is important to note that coefficients of variation do not take into account that some data were imputed. Table 6 shows the various indicators used to assess estimate quality.

Table 6

Indicators associated with the coefficients of variation

Coefficient of variation	Indicator	Quality of estimate
Less than 20 percent	A	Very good
From 20 to 29 percent	B	Acceptable
From 30 to 39 percent	C	Use with caution
40 percent or more	F	Too unreliable to be published

Previous surveys, conceptual differences and important factors

The CICES was first conducted for 2003. The survey was then entitled the Consumption of Energy Survey (CES), and its scope was limited to universities, community colleges and hospitals. The scope was broadened so that CICES 2004 covered nearly all commercial and institutional sectors. For CICES 2005, the survey was reorganized and several questions were added to the questionnaire. This section describes the main conceptual differences between the scopes of each of these surveys, differences that can lead to significant variations in data between versions.

Number of employees

In previous versions, the survey defined a minimum threshold in terms of the number of employees for certain establishments. In the case of hospitals, surveys for 2003 and 2004 only considered establishments with 50 employees or more, in order to eliminate any entity or association that might have been assigned a NAICS code for hospital, but which lacked a hospital's mandate (e.g. an executive committee). Similarly, only universities and community colleges/CEGEPs with at least 20 employees were included in the survey.

These restrictions were lifted for the current survey. CICES 2005 analyses all establishments having at least one employee. Consequently, a higher number of establishments qualified for the survey, which partially explains why certain sectors have relatively higher results in 2005.

Religious organizations

It has been difficult to target all the religious organizations in Canada. For example, some churches often appear individually in the BR, while others are listed within a larger grouping (such as a diocese). Similarly, several churches do not meet the minimum criteria of at least one employee, since priests are often not employed directly by a parish but rather by the diocese to which the parish belongs. Consequently, data for religious organizations must be interpreted cautiously, since a number of units were not included in the scope of this survey.

Education sector

In this survey, Statistics Canada has used new lists to form the target population for the education sector. While previous editions included basically all public or government-financed institutions, the new list is more complete and includes all institutions that grant diplomas. For example, the new list includes more private and religious schools. These new rules partially explain some of the changes in certain variables from 2004 to 2005.

Appendix C – Glossary

Auxiliary equipment:

Auxiliary equipment comprises computers, printers, photocopiers and/or faxes, stoves, microwave ovens, refrigerators, freezers, vending machines and automated tellers. Computers also include other electronic equipment having a microprocessor (e.g. cash registers) but exclude hand-held computers. Freezers include free-standing freezers and deep-freezers but exclude the freezer compartment of a refrigerator.

Cogeneration:

The simultaneous generation of electricity and useful thermal energy (e.g. steam) in one process and from the same fuel source. Types of co-generation units/systems include condensing steam turbines and combined cycle gas turbines.

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.

Electricity generation:

Electricity generation is the production of electricity in an establishment using a generator, solar panels, fuel cells, aerogenerators, etc.

Energy intensity:

The total amount of energy used by a group of establishments, divided by the total floor area of the same group. Therefore, for the purposes of the CICES, the OEE deals with the gross energy intensity rather than the average energy intensity (the average of all the establishments' intensities).

Energy source:

The 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, heating oil and 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 or institution. An establishment may include more than one building (e.g. a university campus). Conversely, a building may house more than one establishment (e.g. a shopping centre).

Floor area:

The total floor area, excluding indoor parking and mechanical rooms of all buildings of an establishment, indicated in square metres.

Gigajoule (GJ):

A unit of measure corresponding to one billion 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.

Heating oil and other middle distillates:

This category includes home fuel, light fuel oil (numbers 1, 2 and 3), kerosene, mineral lamp oil, gas oils and light industrial fuel.

Heavy fuel oil:

All grades of residual type fuels, including low-sulphur fuels, used mainly for steam and electric power generation and diesel motors. The term includes fuel oil grade numbers 4, 5 and 6.

Imputation:

A statistical process that aims to replace datum missing from a unit of analysis with a plausible replacement given the other information provided about the unit concerned.

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 system, was developed by the statistical agencies of Canada, the United States and Mexico. This classification for the commercial and institutional sector can be found in Appendix A.

Propane:

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

Space cooling:

The conditioning of room air for human comfort by a refrigeration unit (e.g. an air conditioner or a heat pump) or by the circulation of chilled water through a central- or district-cooling system. The use of fans or venting only, without air or water cooling, is excluded.

Space heating:

The use of mechanical equipment to heat all or part of a building.

Steam:

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

Useful thermal energy:

Includes high-pressure steam (greater than 30 pounds per square inch [psi]), low-pressure steam (less than 30 psi), high-temperature water (greater than 80°C), and low-temperature water (less than 80°C). Useful thermal energy can be used for heating or cooling.

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.

Wood:

The term 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.

Year of construction:

The year in which the major portion of an establishment was completed.

Appendix D – Primary Questionnaire

1. For December 2005, list the total floor area of this enterprise or all buildings in the complex used for productive activity (excluding indoor parking and mechanical areas).
2. In December 2005:
 - a) What was the total number of students attending this institution? *or*
 - b) What was the total number of employees of this business? *or*
 - c) What was the total number of beds in this institution?
3. For each of the following types of equipment, please indicate the number of units that were in use in this business in December 2005.

Equipment	Number of units
Computers (including other electronic devices with a microprocessor (e.g. cash registers) but <u>excluding</u> hand-held computers)	
Printers, photocopiers and/or fax machines	
Stoves	
Microwave ovens	
Refrigerators	
Freezers (including stand alone freezers/deep-freezers but <u>excluding</u> the freezer portion of a refrigerator)	
Vending machines	
Automated teller machines (ATMs or bank machines)	
TOTAL	

4. In 2005, who paid the energy bills for the energy consumed by this business?
 - This company or institution paid the energy provider(s) directly for all energy bills.
 - This company or institution paid for some bills directly, and the landlord or property manager paid for some.
 - The landlord or property manager paid the energy provider(s) directly for all energy consumption.
 - Other arrangement (*please specify*).

5. In which year was construction completed for the largest portion or majority of the building(s) occupied by this business?

Year: _____

or

- | | |
|--|--|
| <input type="checkbox"/> Before 1920 | <input type="checkbox"/> Between 1980 and 1984 |
| <input type="checkbox"/> Between 1920 and 1959 | <input type="checkbox"/> Between 1985 and 1989 |
| <input type="checkbox"/> Between 1960 and 1964 | <input type="checkbox"/> Between 1990 and 1994 |
| <input type="checkbox"/> Between 1965 and 1969 | <input type="checkbox"/> Between 1995 and 1999 |
| <input type="checkbox"/> Between 1970 and 1974 | <input type="checkbox"/> 2000 or later |
| <input type="checkbox"/> Between 1975 and 1979 | <input type="checkbox"/> Don't know |

6. For the 2005 calendar year, please indicate the total quantity and the unit of measure for each form of energy consumed by your enterprise or institution. Please indicate only the types of energy consumed at the building level or physical location of your establishment.

Form of energy	Quantity consumed	Energy unit of measure (please check one)
Electricity purchased (Please exclude electricity generated by your establishment.)		<input type="checkbox"/> KWh <input type="checkbox"/> GJ <input type="checkbox"/> MWh <input type="checkbox"/> Other (please specify)
Natural gas		<input type="checkbox"/> m ³ <input type="checkbox"/> GJ <input type="checkbox"/> L <input type="checkbox"/> Other (please specify) <input type="checkbox"/> pi ³
Propane		<input type="checkbox"/> m ³ <input type="checkbox"/> GJ <input type="checkbox"/> L <input type="checkbox"/> Other (please specify) <input type="checkbox"/> pi ³
Diesel		<input type="checkbox"/> m ³ <input type="checkbox"/> GJ <input type="checkbox"/> L <input type="checkbox"/> Other (please specify) <input type="checkbox"/> pi ³
Heavy fuel oil		<input type="checkbox"/> m ³ <input type="checkbox"/> GJ <input type="checkbox"/> L <input type="checkbox"/> Other (please specify) <input type="checkbox"/> pi ³
Other middle distillates (light fuel oil, kerosene, etc.)		<input type="checkbox"/> m ³ <input type="checkbox"/> GJ <input type="checkbox"/> L <input type="checkbox"/> Other (please specify) <input type="checkbox"/> pi ³
Wood and wood by-products (hog fuel, wastewood, bark, pellets, etc.)		<input type="checkbox"/> tonnes (metric) <input type="checkbox"/> cords <input type="checkbox"/> lb (pounds) <input type="checkbox"/> Other (please specify)
Steam purchased (Please exclude steam generated by your establishment.) Please specify the name of your steam supplier:		<input type="checkbox"/> KWh <input type="checkbox"/> GJ <input type="checkbox"/> MWh <input type="checkbox"/> Other (please specify)
Other (please specify type)		<i>Please specify unit of measure:</i>

7. For the 2005 calendar year, please indicate the main energy form used for space heating, as well as any alternate forms used.

Form of energy	Main energy form for space heating (check only <u>one</u>)	Alternate types of energy for space heating (check <u>all</u> that apply)
Electricity	<input type="checkbox"/>	<input type="checkbox"/>
Natural gas	<input type="checkbox"/>	<input type="checkbox"/>
Propane	<input type="checkbox"/>	<input type="checkbox"/>
Diesel	<input type="checkbox"/>	<input type="checkbox"/>
Heavy fuel oil	<input type="checkbox"/>	<input type="checkbox"/>
Other middle distillates (light fuel oil, kerosene, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
Wood and wood by-products (hog fuel, wastewood, bark, pellets, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
Steam	<input type="checkbox"/>	<input type="checkbox"/>
Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>
Not applicable	<input type="checkbox"/>	<input type="checkbox"/>

8. For the 2005 calendar year, please indicate the main energy form used for space cooling, as well as any alternate forms used.

Form of energy	Main energy form for space cooling (check only <u>one</u>)	Alternate types of energy for space cooling (check <u>all</u> that apply)
Electricity	<input type="checkbox"/>	<input type="checkbox"/>
Natural gas	<input type="checkbox"/>	<input type="checkbox"/>
Propane	<input type="checkbox"/>	<input type="checkbox"/>
Diesel	<input type="checkbox"/>	<input type="checkbox"/>
Heavy fuel oil	<input type="checkbox"/>	<input type="checkbox"/>
Other middle distillates (light fuel oil, kerosene, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
Wood and wood by-products (hog fuel, wastewood, bark, pellets, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
Steam	<input type="checkbox"/>	<input type="checkbox"/>
Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>
Not applicable	<input type="checkbox"/>	<input type="checkbox"/>

9. For the 2005 calendar year, please indicate the main energy form used for water heating.

Form of energy	Main energy form for water heating (Check only <u>one</u>)
Electricity	<input type="checkbox"/>
Natural gas	<input type="checkbox"/>
Propane	<input type="checkbox"/>
Diesel	<input type="checkbox"/>
Heavy fuel oil	<input type="checkbox"/>
Other middle distillates (light fuel oil, kerosene, etc.)	<input type="checkbox"/>
Wood and wood by-products (hog fuel, wastewood, bark, pellets, etc.)	<input type="checkbox"/>
Steam	<input type="checkbox"/>
Others (please specify)	<input type="checkbox"/>
Not applicable	<input type="checkbox"/>

10. For the 2005 calendar year, please indicate the total dollar amount spent on energy consumed by this business (for space heating, space cooling, operating appliances, etc.).

11. Did this business generate electricity or useful thermal energy (e.g. steam) in 2005?