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SURVEY OF COMMERCIAL AND INSTITUTIONAL ENERGY USE: ESTABLISHMENTS 2009

SUMMARY REPORT

AUGUST, 2013

Canada

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Foreword

In 2011, Statistics Canada conducted the first Survey of Commercial and Institutional Energy Use (SCIEU) for the Office of Energy Efficiency (OEE) of Natural Resources Canada (NRCan). This report presents the results of this survey, which are based on data gathered for reference year 2009. The SCIEU delivers on the OEE's mandate to strengthen and expand Canada's commitment to energy efficiency by improving our understanding of how and where energy is used, which in turn helps to identify energy efficiency opportunities and progress toward a more energy-efficient economy.

The SCIEU was designed to collect information on establishments (SCIEU-Establishments) and buildings (SCIEU-Buildings) simultaneously. The two surveys differed in how they measure floor space. The establishment-based survey focuses on the floor space of the commercial activity of an establishment, while the building-based survey focuses on the whole structure, including non-commercial floor space such as common areas, indoor parking, lobbies, hallways, etc. Since the building survey included these additional areas, it was expected that the total floor space of the buildings would be larger than that of the establishments. SCIEU-Buildings and SCIEU-Establishments are designed to be standalone surveys to provide data at different levels of operation and, while there is overlap, they should not be compared.

Although this is the first version of the SCIEU survey series, the SCIEU builds upon previous surveys, amalgamating components from the Consumption of Energy Survey (CES), the Commercial and Institutional Consumption of Energy Survey (CICES) and the Commercial and Industrial Building Energy Survey (CIBEUS). While the SCIEU survey was designed to collect information at the building and establishment levels, this summary report focuses exclusively on the establishment component.

The original CES covered only universities, colleges and hospitals for 2003. The original CICES survey, which collected data for 2004, covered nearly all segments of the Commercial and Institutional (C&I) sector. CICES 2005, 2007 and 2008 maintained the scope of the CICES 2004, but added questions on the type of equipment used, the age of the building occupied by the establishment and the type of energy used for space heating, space cooling and water heating. The CIBEUS 2000 was the first survey of its kind in Canada and gathered data on energy consumption, energy intensity and the physical and energy-efficient characteristics of C&I buildings.

Similarly, the SCIEU 2009 was designed to gather data on the energy consumption of C&I sector establishments. The difference between the establishment side of the SCIEU 2009 and earlier versions of CICES is that the former included three economic activities not previously surveyed by the CICES, namely NAICS codes 48, 55 and 56. The data collection method was also upgraded from mail-back paper questionnaires to computer-assisted personal interviews, with worksheet(s) mailed to respondents prior to the interview to help with completing the SCIEU questionnaire.

As a cautionary note – the SCIEU was not designed as a longitudinal survey that would provide an efficient basis for comparison with previous surveys. A number of methodological changes (target population, collection method and questionnaire) were introduced for the 2009 survey, which affect comparability of the results with previous surveys and make it difficult to draw conclusions on real changes in the establishment population by using comparisons of establishment-based estimates from the SCIEU 2009 and CICES 2008.

The data collected are used to monitor energy consumption in the C&I sector and to assist in the development and assessment of NRCan's energy consumption reduction programs designed to support institutions and businesses. An example of such a program is the ecoENERGY for Buildings initiative, which encourages the construction of more energy-efficient buildings and retrofits to improve the efficiency of existing buildings.

This summary report on the SCIEU 2009 (Establishments) survey was prepared by James Wildsmith. The project manager was Samuel Blais, and overall direction was provided by Andrew Kormylo of the Demand Policy and Analysis Division of the OEE. The Buildings Division of the OEE provided invaluable advice and expertise on the subject matter. An electronic version of the publication is available on the OEE Web site at **oee.nrcan.gc.ca/statistics**.

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

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Other Office of Energy Efficiency surveys and publications

Over the past several years, the OEE has implemented various initiatives to collect energy data and to estimate energy consumption in the C&I sector.

Buildings-based surveys

- The **Survey of Commercial and Institutional Energy Use: Buildings 2009** (**SCIEU-Buildings**). This survey gathered year 2009 data on the energy consumption, energy intensity and physical characteristics of C&I buildings in Canada by climate zone.
- The **Survey of Commercial and Institutional Energy Use – Buildings, 2009 Detailed Statistical Report**. This report contains detailed statistical information on building characteristics and energy consumption estimates by building type and by climate zone.
- The **Commercial and Institutional Building Energy Use Survey (CIBEUS)** was the first survey of its kind in Canada. This survey gathered year 2000 data on energy consumption, energy intensity and the physical and energy-efficient characteristics of C&I buildings located in Canada's major urban centres.

Establishments-based surveys

- 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 Canadian provinces. Moreover, CES 2003 was based on establishments as defined by the North American Industry Classification System (NAICS), while the CIBEUS 2000 defined its own building categories based on their usage and physical characteristics.
- For the 2004 survey, the scope of the CES was increased to cover a much broader cross-section of the C&I sector. To reflect this change, the survey was renamed the **Commercial and Institutional Consumption of Energy Survey (CICES)**. The CICES survey was updated in 2005, 2007 and 2008.

Other reports

- Each year, the OEE publishes its *Energy Use Data Handbook*. This handbook provides, among other items, data on energy consumption and related greenhouse gas emissions by activity type for the C&I sector, as well as various indicators that impact energy use. This database is built by using various sources of information, including the above-mentioned surveys and the *Report on Energy Supply and Demand in Canada* (RESD) (described below).
- The annual *Energy Efficiency Trends in Canada* publication presents an analysis based on data from the *Energy Use Data Handbook*. This report provides an overview of trends in energy use, energy efficiency and related greenhouse gas emissions in the C&I sector. In addition to providing detailed information about current energy intensity and energy efficiency, this report also analyses trends starting from 1990.
- Through various other programs, the OEE has also published sectoral studies based on comparative analyses. These studies have centred on the hospitality sector, the retail sector and schools, among others. Owners of commercial buildings can use these studies to compare their facility's energy consumption with that of similar facilities.

All of the above-mentioned publications are available on the OEE's Web site (**oee.nrcan.gc.ca**). Hard copies of the reports can also be requested from the OEE's Web site.

Statistics Canada also includes energy data from the C&I sector in its annual RESD. This publication presents data on the production, sale, interprovincial transfer and consumption of energy by sector. The estimates in the present document vary from those published in the RESD, as the two initiatives define the C&I sector differently, with the RESD's definition being somewhat broader. Furthermore, there are several differences in methodology as the RESD estimates Canada's energy supply and demand figures by using supply and distribution models based on data from several annual surveys on energy availability (energy sales and distribution information reported by suppliers), as well as from many other data sources.

Note: All these surveys, handbooks and studies are fundamentally different in that there are important conceptual and methodological differences among them. Therefore, exercise caution when you compare data from these sources.

Highlights

- In 2009, the SCIEU estimated the energy consumption of C&I establishments at slightly fewer than 850 petajoules (PJ). This total amount is equivalent to the annual energy consumption of slightly more than 8 million Canadian households,[1] which is roughly equivalent to 62 percent of the Canadian housing sector.[2]
- The SCIEU found the average energy intensity of establishments in the C&I sector was 1.28 gigajoules (GJ) per square metre (m^2) of floor area.
- Based on establishments at the subactivity grouping level, Religious Organizations had the lowest energy intensity (0.66 GJ/m^2) followed by Social Assistance for which the energy intensity was 0.76 GJ/m^2. Food Services and Drinking Places had the highest energy intensity (3.04 GJ/m^2) followed by Food and Beverage Industries (2.58 GJ/m^2) and Hospitals (2.55 GJ/m^2).
- A regional comparison revealed that British Columbia had the lowest energy intensity level among C&I establishments, at 1.05 GJ/m^2. Conversely, the Prairie region had the highest intensity at 1.53 GJ/m^2.
- Electricity (48.6 percent) and natural gas (47.3 percent) combined make up roughly 96 percent of the nearly 850 petajoules consumed by the C&I sector in 2009.
- The most widely-used primary energy source for space heating was natural gas, used by 57 percent of establishments. Electricity was the primary energy source used for space cooling (86 percent of space-cooled establishments) and water heating (53 percent of establishments).
- The majority of establishments, 64 percent, occupy 93 m^2 or less (5000 square feet [sq. ft.] or less).
- Energy intensity by year of construction has generally increased over time, from 0.84 GJ/m^2 in the 1920–1959 period to 1.38 GJ/m^2 in the period 2000 and later.

1 Natural Resources Canada, *2007 Survey of Household Energy Use*, Section 11 – Energy consumption and intensity, Table 11.2 – Total energy intensity, p.162. **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/sheu07/sheu_047_1.cfm?attr=0**

2 Calculated with data from *2007 Survey of Household Energy Use*, Section 1 – Characteristics of households, Table 1.1 – General characteristics, p.2. **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/sheu07/sheu_001_1.cfm?attr=0**

Data quality

This report presents representative data estimates from the SCIEU 2009 for C&I establishments in all Canadian regions except the territories.

Certain rules established by Statistics Canada ensure the reliability of the SCIEU 2009 data estimates for purposes of publication. The letters used in the tables of this report indicate the quality of each data estimate based on the degree of sampling error, as represented by the coefficient of variation.

The letter coding is as follows:

- **A** – Very good
- **B** – Acceptable
- **C** – Use with caution
- **F** – Too unreliable to be published
- **X** – Suppressed to meet the confidentiality requirements of the *Statistics Act*

Further detail on how the coefficient of variation is used to determine data quality can be found in Appendix B, which describes the methodology used to conduct this survey.

Limits on the analysis of these results

Survey versus census results

It is important to note that the SCIEU is a survey – not a census – of C&I 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 data estimates produced are inevitably subject to variance in the level of confidence, as is the case with any survey.

The data presented in this report are estimates. The real values differ from the estimates by less than two times the coefficient of variation 19 times out of 20. The methodology used to calculate estimates, as well as to collect data, is summarized in Appendix B.

STATISTICS ON THE COMMERCIAL AND INSTITUTIONAL SECTOR IN CANADA

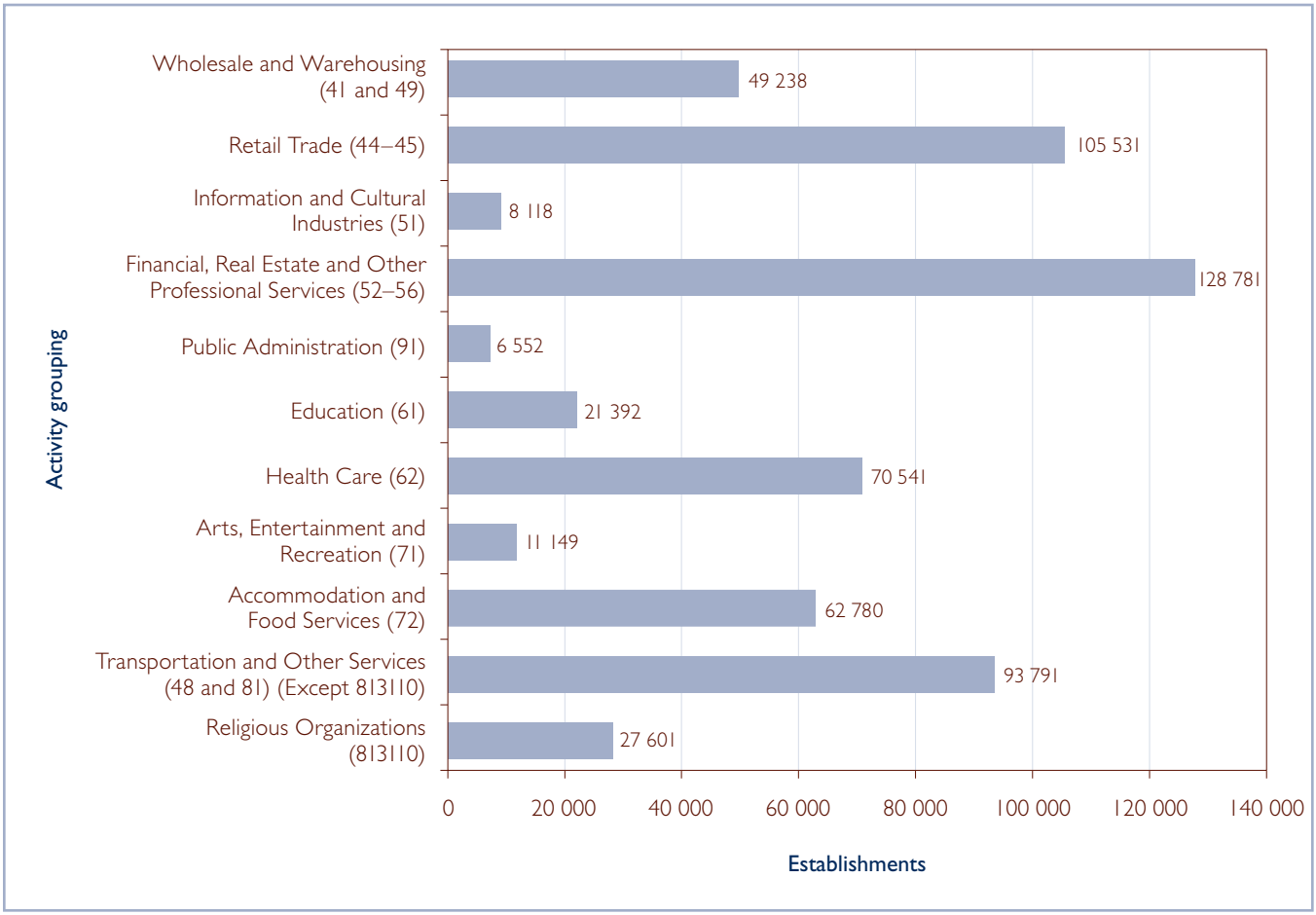
For the purposes of this survey, the C&I sector has been defined as a set of the North American Industry Classification System (NAICS) codes.[3] In this report, *Activity grouping* will refer to an establishment within a group of related sectors, subsectors or industry groupings based on the NAICS.[4] Table 1.1 shows the main survey results for the SCIEU 2009 by these C&I activity groupings.

1.1 Number of establishments and floor area

1.1.1 Number of establishments

The SCIEU 2009 estimated that the Canadian C&I sector was composed of more than 585 000 establishments. Financial, Real Estate and Other Professional Services accounted for more than one fifth of the total number of establishments, making it the largest activity grouping in the C&I sector (see Figure 1.1).

Figure 1.1 – Share of establishments in the C&I sector, by activity grouping, 2009



3 Refer to Appendix A.

4 Refer to Appendix B.

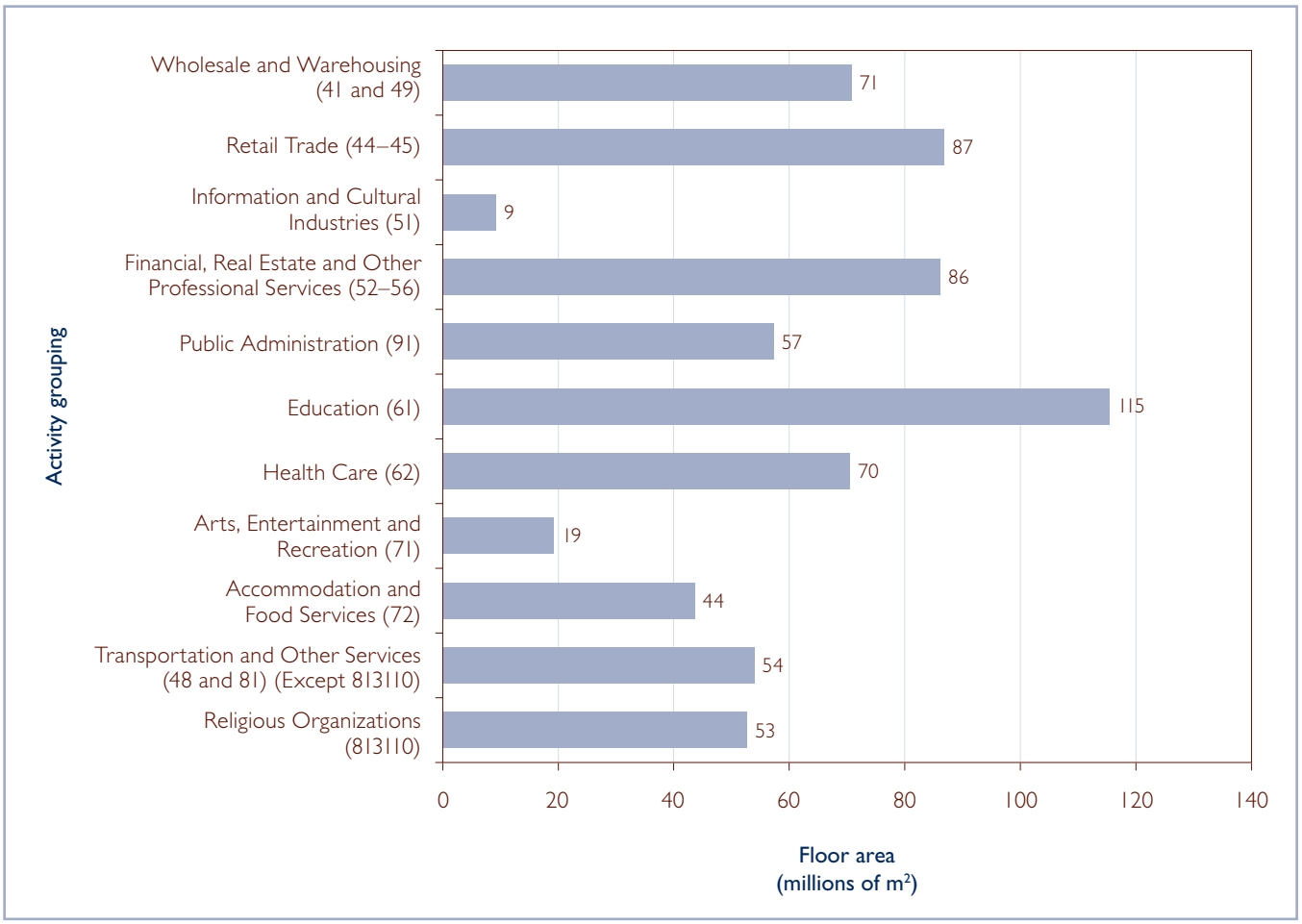
Table 1.1 – Summary of the SCIEU 2009 results

Activity grouping (NAICS)	Establishments			Energy consumption (PJ)			Floor area (million m^2)			Average floor area per establishment (m^2)		Energy intensity (GJ/m^2)	
Wholesale and Warehousing (41 and 49)	49 238	(8%)	A	57.1	(7%)	A	70.8	(11%)	A	1 437	A	0.81	A
Wholesale Trade (41)	44 072	(8%)	A	44.7	(5%)	A	55.2	(8%)	A	1 254	A	0.81	A
Postal Service (49)	.		F	12.4	(1%)	A	15.5	(2%)	A	.	F	0.80	A
Retail Trade (44–45)	105 531	(18%)	A	110.7	(13%)	A	86.8	(13%)	A	822	A	1.28	A
Retail Trade (44–45, excluding 445)	85 408	(15%)	A	63.7	(7%)	A	68.6	(10%)	A	803	A	0.93	A
Food and Beverage Industries (445)	20 123	(3%)	A	47.1	(6%)	A	18.2	(3%)	A	906	A	2.58	A
Information and Cultural Industries (51)	8 118	(1%)	A	15.4	(2%)	C	9.2	(1%)	B	1 132	B	1.68	A
Financial, Real Estate and Other Professional Services (52–56)	128 781	(22%)	A	132.6	(16%)	A	86.1	(13%)	A	669	A	1.54	A
Public Administration (91)	6 552	(1%)	A	87.1	(10%)	B	57.2	(9%)	C	8 738	C	1.52	A
Education (61)	21 392	(4%)	A	134.7	(16%)	A	115.4	(17%)	A	5 394	A	1.17	A
Primary and Secondary Schools (6111)	14 695	(3%)	A	52.0	(6%)	A	63.7	(10%)	A	4 336	A	0.82	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	6 420	(1%)	A	18.3	(2%)	B	15.6	(2%)	A	2 435	A	1.17	A
Universities (6113)	278	(0%)	B	64.4	(8%)	A	36.0	(5%)	A	129 725	B	1.79	A
Health (62)	70 541	(12%)	A	103.5	(12%)	A	70.5	(11%)	A	999	A	1.47	A
Ambulatory Health Care Services (621)	48 568	(8%)	A	20.0	(2%)	A	16.4	(2%)	A	337	A	1.22	A
Hospitals (622)	633	(0%)	A	40.2	(5%)	A	15.8	(2%)	A	24 919	A	2.55	A
Nursing and Residential Care Facilities (623)	7 888	(1%)	A	32.7	(4%)	B	24.4	(4%)	B	3 096	A	1.34	A
Social Assistance (624)	13 452	(2%)	A	10.6	(1%)	B	13.9	(2%)	C	1 032	C	0.76	A
Arts, Entertainment and Recreation (71)	11 149	(2%)	A	21.8	(3%)	A	19.2	(3%)	A	1 718	A	1.14	A
Accommodation and Food Services (72)	62 780	(11%)	A	95.3	(11%)	A	43.6	(7%)	A	695	A	2.19	A
Accommodation Services (721)	7 897	(1%)	A	29.0	(3%)	A	21.8	(3%)	A	2 755	A	1.33	A
Food Services and Drinking Places (722)	54 884	(9%)	A	66.4	(8%)	A	21.9	(3%)	A	398	A	3.04	A
Transportation and Other Services (48 and 81) (Except 813110)	93 791	(16%)	A	56.3	(7%)	A	53.9	(8%)	A	575	A	1.05	A
Religious Organizations (813110)	27 601	(5%)	A	34.9	(4%)	A	52.7	(8%)	A	1 908	A	0.66	A
Canadian C&I sector	**585 475**	**(100%)**	**A**	**849.6**	**(100%)**	**A**	**665.3**	**(100%)**	**A**	**1 136**	**A**	**1.28**	**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, X – Suppressed for reasons of confidentiality.

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

Figure 1.2 – Share of floor area in the C&I sector, by activity grouping, 2009



This particular result is not surprising since the Financial, Real Estate and Other Professional Services activity grouping is composed of five different NAICS sectors: 1) Finance and Insurance; 2) Real Estate and Rental Leasing; 3) Professional, Scientific and Technical Services; 4) Management of Companies and Enterprises; and 5) Administrative and Support, Waste Management and Remediation Services. Retail Trade is the second largest activity grouping accounting for just under one fifth of the C&I sector. Retail Trade is a very diverse portfolio of establishments including motor vehicle dealers, furniture stores, health and personal care stores, grocery stores, and clothing stores among others,[5] found all across Canada, even in the smallest cities. The third largest activity grouping in 2009 was Transportation and Other Services (16 percent).

Public Administration, Information and Cultural Industries as well as Arts, Entertainment and Recreation establishments represented the smallest shares of the C&I sector in 2009 (1.1 percent, 1.4 percent and 1.9 percent, respectively).

1.1.2 Floor area

In 2009, establishments in the C&I sector occupied over 665 million m^2. The activity accounting for the largest proportion of the sector's floor area was Education. This was due in large part to Primary and Secondary Schools, which averaged almost four times the average establishment's floor area and were numerous across Canada. To a lesser extent, Education was aided by Universities, which had the largest average floor area per establishment in any grouping and was significantly larger than the second largest activity, but were far less numerous, and therefore did not contribute as much to the total area.

5 Refer to Appendix A.

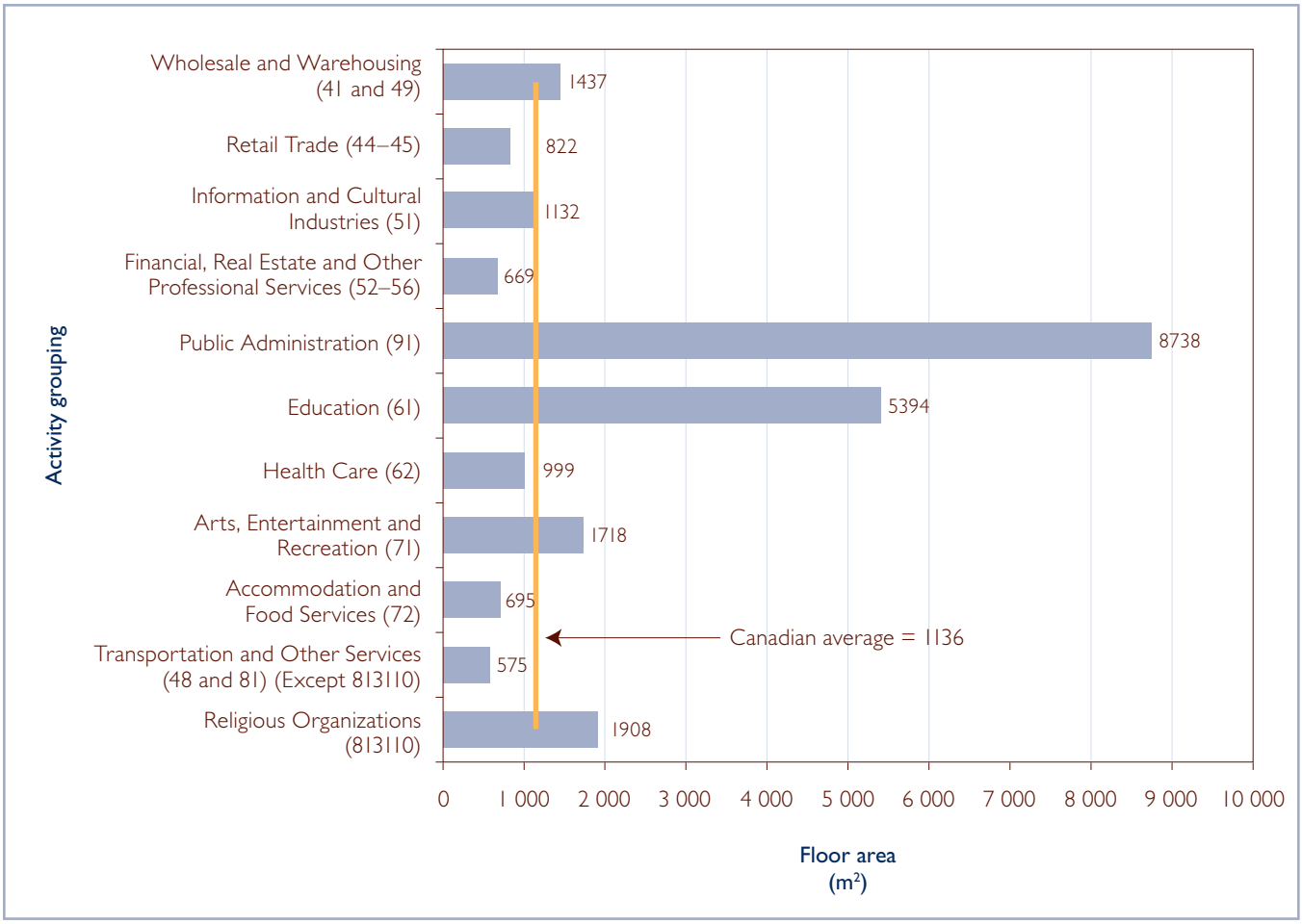
Additional activities contributing large amounts to the total floor area in the C&I sector were Retail Trade and Financial, Real Estate and Other Professional Services. These activity groupings were below average in size but were abundant. On the other hand, the Arts, Entertainment and Recreation and Information and Cultural Industries activity groupings had the smallest total floor space among activity groupings in the C&I sector, accounting for only 2.9 percent and 1.4 percent of the floor area across Canada, respectively.

1.1.3 Average floor area per establishment

The SCIEU 2009 found that the average floor area of a C&I sector establishment was 1136 m^2. The activity grouping with the largest average floor area per establishment was Public Administration, with 8738 m^2 (see Table 1.1). Education was second with 5394 m^2. The figure for Public Administration can be partly attributed to the centralized nature of governments in capital cities and complexes, especially in the federal government. The figure for Education should not come as a surprise since this category includes university campuses, which are usually quite large. Although Hospitals were large on average (almost 25 000 m^2), the Health Care activity grouping had an average floor area per establishment of only 999 m^2 due to the large number of small establishments in Ambulatory Health Care Services (almost 50 000 establishments with an average floor area of 337 m^2, the smallest of all subactivities).

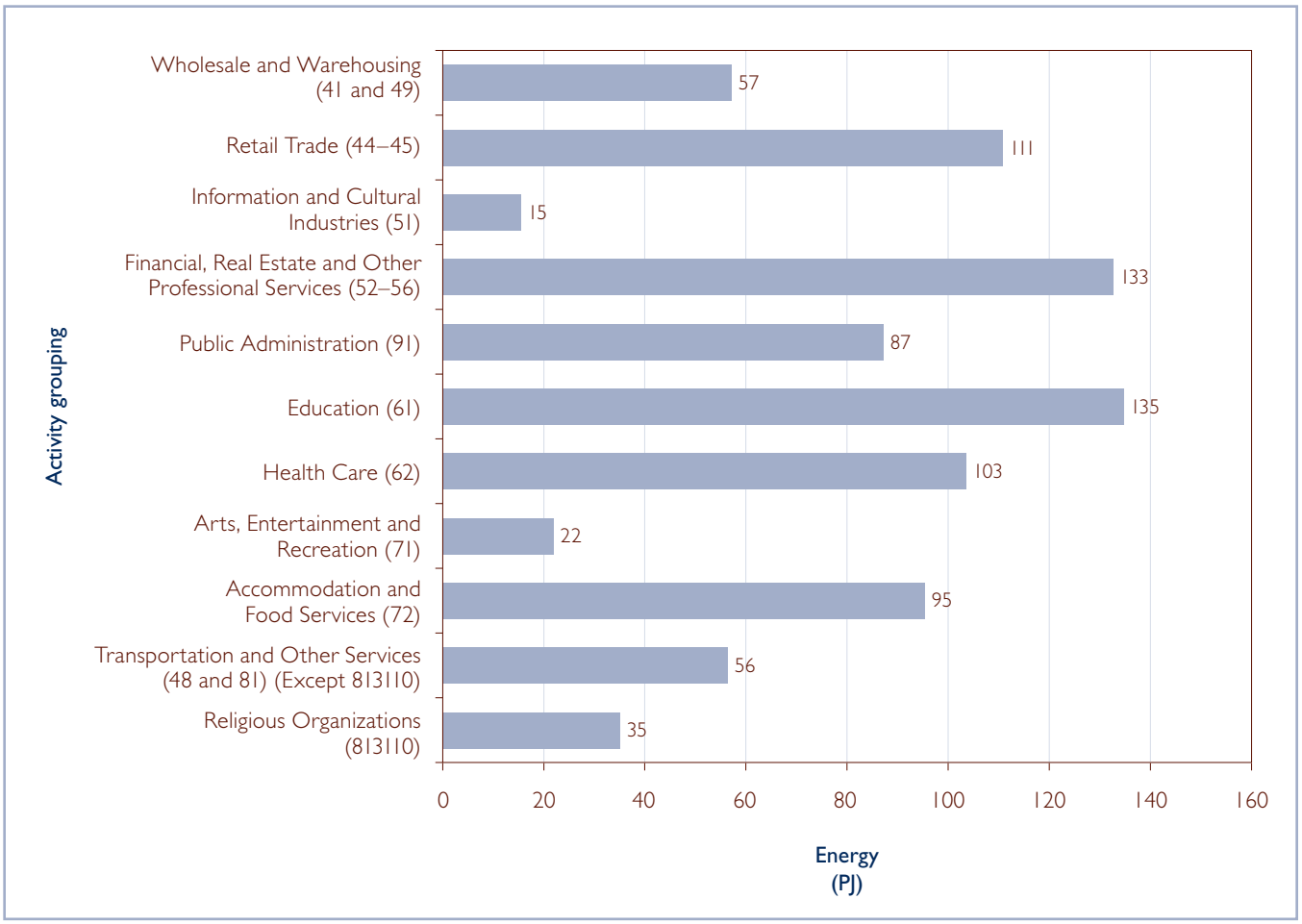
The Transportation and Other Services grouping had the smallest average floor space of all activity groupings, with an average of 575 m^2 (see Figure 1.3).

Figure 1.3 – Average floor area (m^2) by activity grouping, 2009



Financial, Real Estate and Other Professional Services and Public Administration were merged together to produce a reliable data estimate.

Figure 1.4 – Share of energy consumption in the C&I sector, by activity grouping, 2009



This grouping contains many small and privately owned businesses such as taxi companies and various types of repair services (clothes, electronics, etc.).[6] In the transportation industry, a small establishment size is desirable as income is generated away from the establishment. The Financial, Real Estate and Other Professional Services grouping had the second smallest-sized establishments, with an average floor space of 669 m^2. This is a diverse grouping made up of four different primary industries. The small size of this activity grouping may be attributed, in part, to the many Professional, Scientific and Technical Services establishments that are "primarily engaged in activities in which human capital is the major input." In most of these industries, equipment and materials are not of major importance.[7] Equipment and materials would tend to increase the space requirements. Finally, Accommodation and Food Services were also very small (695 m^2) on average. This activity grouping included limited-service eating places (food bar, counter, take-out restaurants) food service contractors (schools and company cafeterias) and mobile food services.

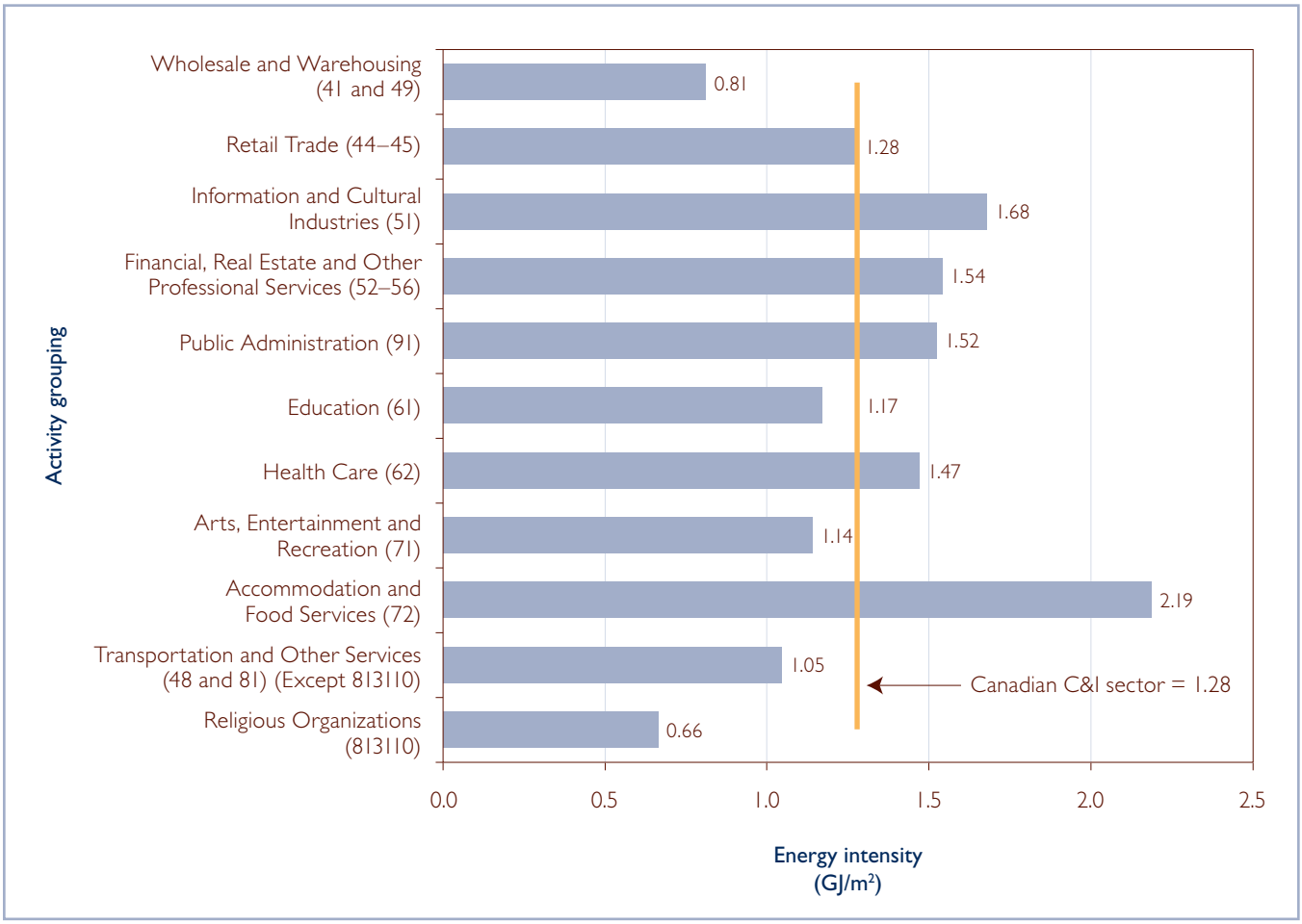
1.2 Energy consumption

The SCIEU 2009 estimated that C&I establishments in Canada consumed just under 850 PJ of energy.

6 NAICS, 2007: Transportation Services, **http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=48-49** and Other Services, **http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=81**

7 NAICS, 2007: Professional, Scientific and Technical Services definition, **http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=54**

Figure 1.5 – Energy intensity (GJ/m^2) by main activity grouping, 2009



This total amount is equivalent to the annual energy consumption of slightly more than 8 million Canadian households,[8] which is close to two thirds of the Canadian housing sector.[9]

In 2009, the Education activity grouping consumed the most energy at 134.7 PJ, or 16 percent of the total C&I industry energy consumption (see Figure 1.4). Financial, Real Estate and Other Professional Services establishments consumed the second highest amount of energy at 132.6 PJ, or 16 percent of the total energy consumption of the C&I sector. Other major energy consumers included Retail Trade (110.7 PJ and 14 percent), Health Care (103.5 PJ and 13 percent) and Accommodation and Food Services (95.3 PJ and 12 percent).

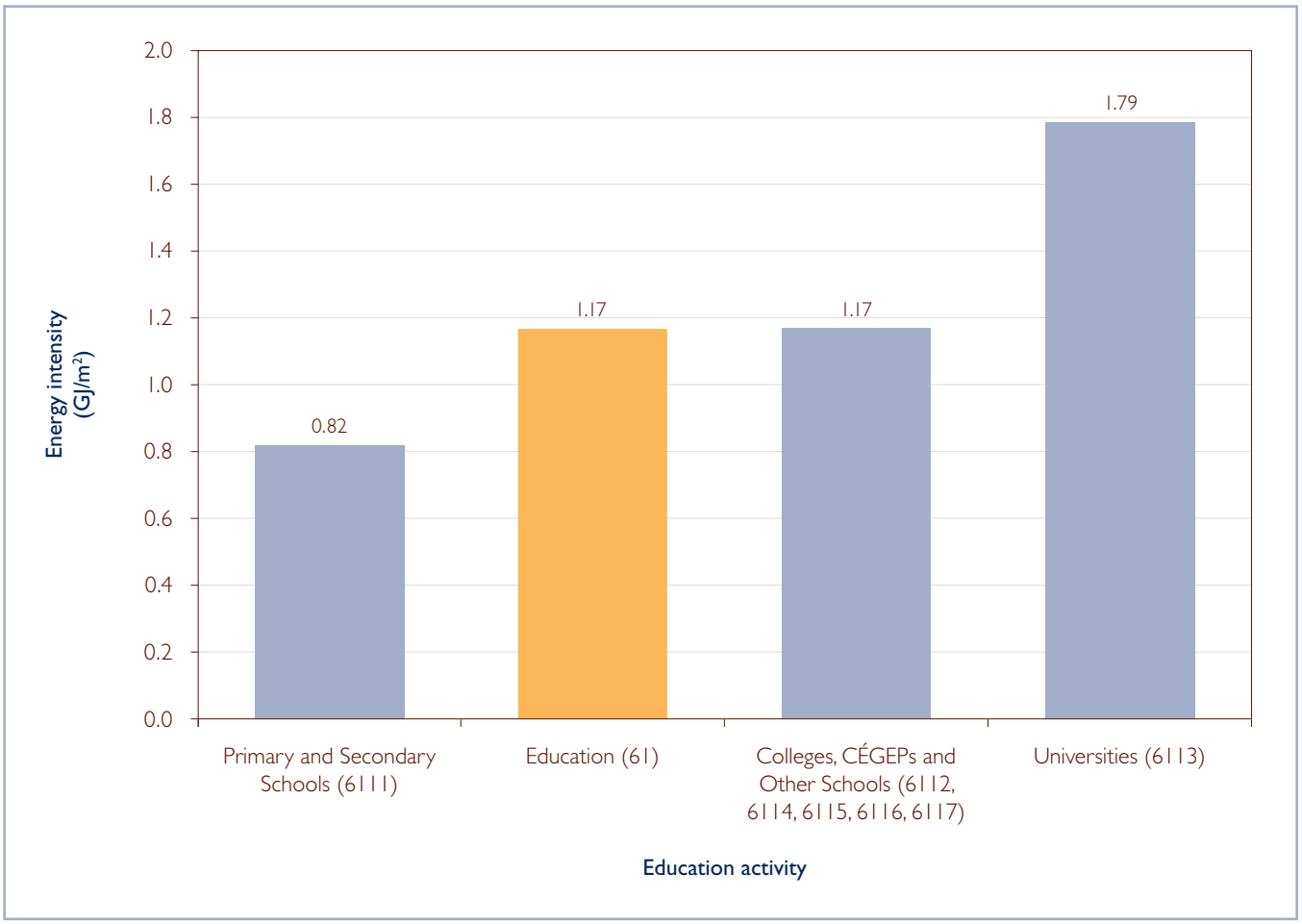
1.3 Energy intensity

Energy intensity, defined as total energy consumed divided by total floor area (in square metres), is influenced by factors such as, but not limited to, the sector of activity (see Figure 1.5), geographical location (Section 2.2), the size of buildings (Section 4.3), hours of operation, the age of the building (Section 5), the type of equipment used, the occupants' habits and behaviour, the energy-saving measures in place and the type of energy used (Section 3).

8 Natural Resources Canada, *2007 Survey of Household Energy Use*, Section 11 – Energy consumption and intensity, Table 11.2 – Total energy intensity, p.162. **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/sheu07/sheu_047_1.cfm?attr=0**

9 Calculated with data from the *2007 Survey of Household Energy Use*, Section 1 – Characteristics of households, Table 1.1 – General characteristics, p.2. **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/sheu07/sheu_001_1.cfm?attr=0**

Figure 1.6 – Energy intensity (GJ/m²) in the Education activity grouping, 2009



Although cumulative, each factor affecting an establishment's energy intensity acts independently and in its own complex way. For further details on the effects of individual factors on energy intensity, refer to *Energy Efficiency Trends in Canada*, which describes how energy use is affected by the level of activity, weather, structure of the industry, level of service and energy efficiency.[10]

Figure 1.5 presents the energy intensity for the main activity groupings as well as the entire C&I sector in Canada (1.28 GJ/m²).

1.3.1 Low energy intensity activities

As illustrated by Figure 1.5, energy intensities among activity groupings ranged from 0.66 GJ/m² in Religious Organizations to 2.19 GJ/m² in the Accommodations and Food Services activity groupings. Wholesale and Warehousing, with an intensity of 0.81 GJ/m², was the only activity grouping aside from Religious Organizations with an energy intensity under 1 GJ/m². Numerous subactivities also had an energy intensity under 1 GJ/m².

10 *Energy Efficiency Trends in Canada* is available on the OEE's Web site at **oee.nrcan.gc.ca**.

Education is one of the five activity groupings below the Canadian C&I average. Figure 1.6 divides the Education category into its subactivities to examine how the energy intensity varies with the type of education provided by the establishment. As expected, Figure 1.6 shows that energy intensities within the Education activity varied considerably. Colleges, CÉGEPs and Other Schools and Universities were much more energy-intensive than Primary and Secondary Schools. Several factors account for these differences, including operating hours and student enrolment, which are greater for university campuses. In addition, certain energy-intensive services such as cafeterias and sports facilities (arenas or stadiums) are common in Universities and not in Primary Schools. Furthermore, the use of more specialized equipment such as computers, computer servers, laboratory equipment etc., tends to be more prevalent in Universities and Colleges, CÉGEPs and Other Schools.

In general, establishments with the lowest intensity ratios are those with limited operating hours (such as Religious Organizations), those that rarely open outside normal business hours (9 a.m. to 5 p.m.), or those that operate on an irregular or seasonal basis (such as many Primary and Secondary Schools). Moreover, these establishments do not tend to operate energy-intensive equipment such as cooking and refrigeration appliances or specialized equipment.

1.3.2 High energy intensity activities

The most energy-intensive activity grouping was Accommodation and Food Services (2.19 GJ/m^2). This activity grouping is comprised of two subactivity groupings: Accommodation Services, and Food Services and Drinking Places. The high energy intensity level of this activity grouping is driven by Food Services and Drinking Places with an energy intensity of 3.04 GJ/m^2. Establishments in this subactivity tend to be open seven days a week and operate energy-intensive equipment like dishwashers and cooking and refrigeration equipment. In addition, this equipment tends to be operated in a relatively small establishment, the second smallest average size of all activity groupings.

The Information and Cultural Industries activity grouping, which includes establishments involved in broadcasting and telecommunications, had the second highest energy intensity (1.68 GJ/m^2). This could be due in part to the intensive utilization of electronics for broadcasting and telecommunication operations, coupled with longer hours of operation.

Financial, Real Estate and Other Professional Services, followed closely by Public Administration, were the third and fourth most energy-intensive activity groupings (1.54 and 1.52 GJ/m^2, respectively). The Financial, Real Estate and Other Professional Services activity grouping is characterized by being computer equipment-intensive, having the third largest number of computers per 1000 m^2, the most computer servers per 1000 m^2 and the most printing equipment per 1000 m^2. A standard computer server is estimated to consume in excess of 1200 kilowatt-hours (kWh) per year.[11] This is the equivalent energy use of at least 2.8 standard household refrigerators, which consumes on average 425 kWh annually.[12]

The Food and Beverage Industries subgroup had the second highest energy intensity (2.58 GJ/m^2) among subgroups, behind Food Services and Drinking Places, mentioned above. The Food and Beverage subgrouping includes grocery stores and other business that would require the use of refrigeration equipment, in particular open-door refrigeration, which is less efficient. Despite the Food and Beverage subgroup's high energy intensity, the activity grouping it is in, Retail Trade, did not have a high energy intensity. The Retail Trade activity grouping included many businesses that do not use many, if any, auxiliary equipment. Auxiliary equipment accounted for the second largest end-use of energy in the C&I sector in 2009 behind space heating.[13]

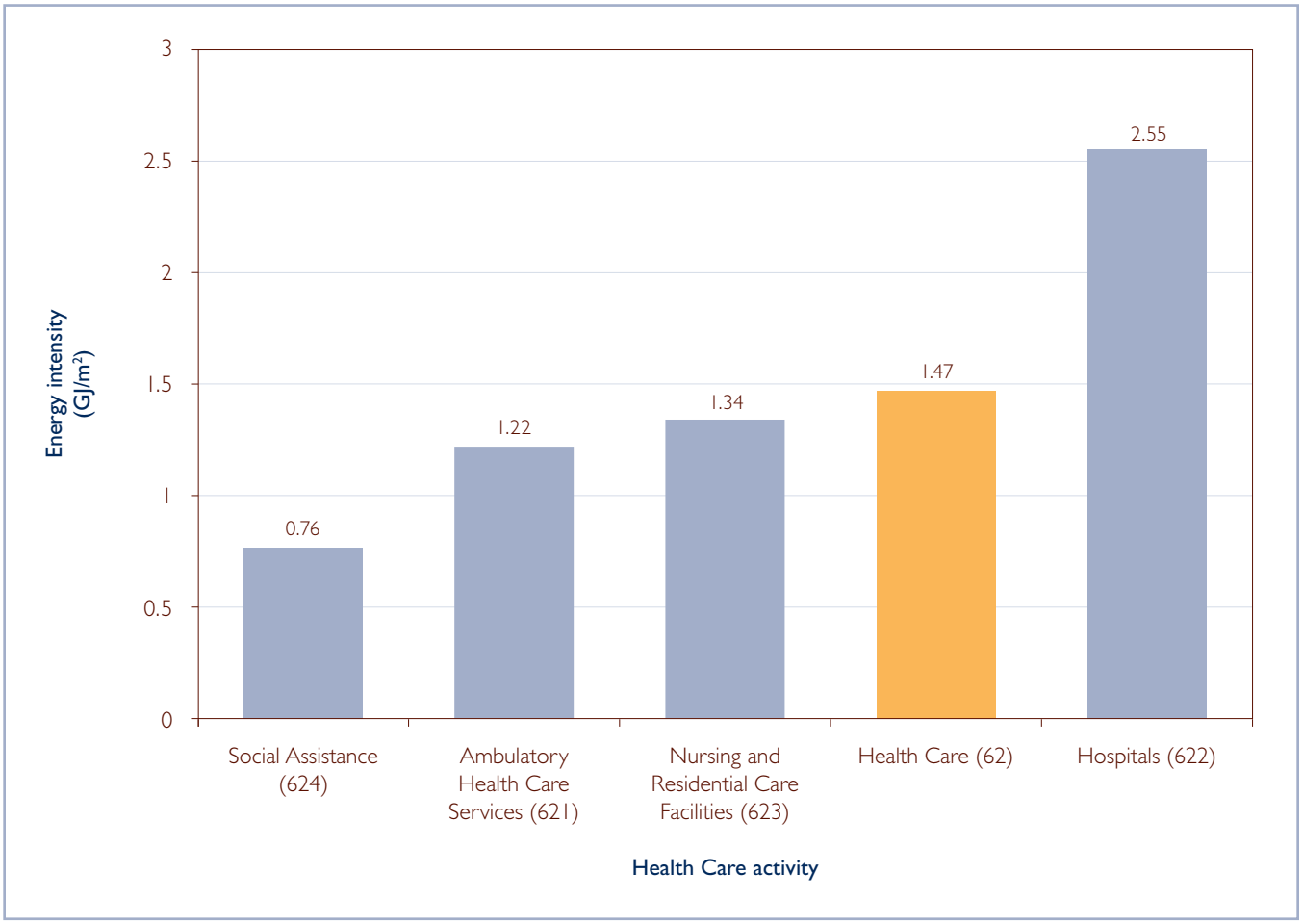
11 *ENERGY STAR® Qualified Office Equipment: Computer Servers* Version 1.0 – **oee.nrcan.gc.ca/commercial/equipment/10220**

12 *Energy Consumption of Major Household Appliances Shipped in Canada, Trends for 1990–2010* – **oee.nrcan.gc.ca/publications/statistics/cama12/cama12.pdf**

13 Natural Resources Canada, *Comprehensive Energy Use Database*, 1990–2010 **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablestrends2/com_ca_4_e_4.cfm?attr=0**

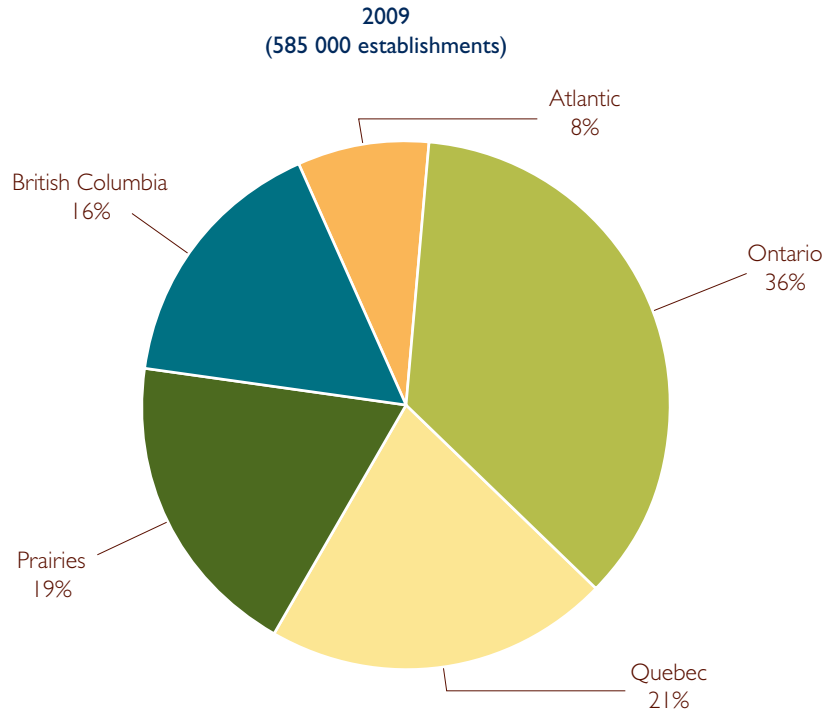
Hospitals were the third most energy-intensive subactivity grouping and contributed to the Health Care activity grouping (1.47 GJ/m^2) being more energy-intensive than the Canadian average. Figure 1.7 disaggregates the Health Care activity grouping into its subactivities. This figure shows that the very high energy intensity of Hospitals (2.55 GJ/m^2) pulled the energy intensity of the entire Health Care activity grouping upward largely because of the concentration of medical equipment and extended business hours required to service patients around the clock.

Figure 1.7 – Energy intensity (GJ/m^2) in the Health Care activity grouping, 2009



2 ENERGY CONSUMPTION AND ENERGY INTENSITY IN THE REGIONS

Figure 2.1 – Share of establishments in the C&I sector, by region, 2009



This section examines the survey's overall regional results. The number of establishments, energy consumption, floor area and energy intensity are all influenced by regional characteristics. This report breaks down the regional results by activity grouping.

2.1 Number of establishments

According to the 2009 survey results, 36 percent of the C&I establishments were located in Ontario, 21 percent in Quebec, 19 percent in the Prairies, 16 percent in British Columbia and 8 percent in Atlantic Canada (see Figure 2.1). These regional results are very similar to the proportions of the Canadian population living in each region (see Appendix E).[14] The probable explanation for this similarity is that the number of C&I establishments in a region is generally related to the regional population.

The SCIEU 2009 found that the prevalence of some activities were higher in some regions than others. An example of this is Public Administration where 28 percent of establishments were located in the Prairies even though this region only represents 19 percent of all C&I establishments and 18 percent of the Canadian population. One potential explanation is that this region represents three separate provinces (Manitoba, Saskatchewan and Alberta), with each government having their own provincial Public Administration establishments (i.e. provincial governments) along with a federal presence.

A similar situation can be observed within the Atlantic region (which represents four provincial jurisdictions), which had only 8 percent of the C&I sector establishments in Canada and 7 percent of the population, but 1120 (17 percent) of the Public Administration establishments. It follows that this was not the case in the single jurisdiction regions of Ontario, Quebec and British Columbia. Ontario, for example, where 36 percent of the C&I establishments in Canada were located, had only marginally more Public Administration establishments (1380 establishments or 21 percent) than Atlantic Canada, despite being home to a large portion of the federal administration and a provincial government.

14 Statistics Canada. *Quarterly population estimates, national perspective – population*, Catalogue No. 91-002-X

Table 2.1 – Number of establishments by activity grouping, by region, 2009

Activity grouping (NAICS)	Establishments																	
	Canada		Atlantic			Quebec			Ontario			Prairies			British Columbia		
Wholesale and Warehousing (41 and 49)	49 238	A	2 599	(5%)	A	7 872	(16%)	A	20 825	(42%)	A	9 802	(20%)	A	8 141	(17%)	A
Wholesale Trade (41)	44 072	A	2 419	(5%)	A	7 562	(17%)	A	17 360	(39%)	A	9 030	(20%)	A	7 701	(17%)	A
Postal Service (49)		F	180		A	310		B			F	772		A	440		A
Retail Trade (44–45)	105 531	A	10 479	(10%)	A	23 395	(22%)	A	39 804	(38%)	A	14 998	(14%)	A	16 854	(16%)	A
Retail Trade (44–45, excluding 445)	85 408	A	8 682	(10%)	A	17 553	(21%)	A	33 019	(39%)	A	11 787	(14%)	A	14 367	(17%)	A
Food and Beverage Industries (445)	20 123	A	1 797	(9%)	A	5 843	(29%)	A	6 785	(34%)	A	3 212	(16%)	A	2 486	(12%)	A
Information and Cultural Industries (51)	8 118	A	600	(7%)	A	1 932	(24%)	A	3 125	(38%)	A	1 276	(16%)	A	1 185	(15%)	B
Financial, Real Estate and Other Professional Services (52–56)	128 781	A	6 142	(5%)	B	22 551	(18%)	B	49 745	(39%)	A	26 366	(20%)	A	23 978	(19%)	B
Public Administration (91)	6 552	A	1 120	(17%)	A	1 542	(24%)	A	1 380	(21%)	B	1 838	(28%)	A	672	(10%)	A
Education (61)	21 392	A	1 608	(8%)	A	4 238	(20%)	A	8 133	(38%)	A	4 002	(19%)	A	3 412	(16%)	A
Primary and Secondary Schools (6111)	14 695	A	1 204	(8%)	A	2 793	(19%)	A	5 986	(41%)	A	2 802	(19%)	A	1 909	(13%)	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	6 420	A	375	(6%)	A	1 414	(22%)	A	2 080	(32%)	A	1 074	(17%)	A	1 477	(23%)	A
Universities (6113)	278	B	29	(11%)	A	30	(11%)	A	67	(24%)	B			F	26	(9%)	A
Health (62)	70 541	A	5 966	(8%)	A	13 547	(19%)	A	24 742	(35%)	A	15 378	(22%)	A	10 909	(15%)	A
Ambulatory Health Care Services (621)	48 568	A	3 797	(8%)	A	7 338	(15%)	A	18 565	(38%)	A	11 098	(23%)	A	7 771	(16%)	A
Hospitals (622)	633	A	99	(16%)	A	90	(14%)	A	132	(21%)	A	231	(37%)	A	81	(13%)	A
Nursing and Residential Care Facilities (623)	7 888	A	832	(11%)	A	1 987	(25%)	A	2 389	(30%)	A	1 527	(19%)	A	1 152	(15%)	A
Social Assistance (624)	13 452	A	1 238	(9%)	A	4 131	(31%)	A	3 656	(27%)	A	2 522	(19%)	A	1 905	(14%)	A
Arts, Entertainment and Recreation (71)	11 149	A	1 127	(10%)	A	2 810	(25%)	A	3 472	(31%)	A	1 665	(15%)	A	2 076	(19%)	A
Accommodation and Food Services (72)	62 780	A	4 968	(8%)	A	15 080	(24%)	A	22 237	(35%)	A	10 550	(17%)	A	9 946	(16%)	A
Accommodation Services (721)	7 897	A	1 053	(13%)	A	1 499	(19%)	A	1 828	(23%)	A	1 825	(23%)	A	1 691	(21%)	A
Food Services and Drinking Places (722)	54 884	A	3 915	(7%)	A	13 581	(25%)	A	20 409	(37%)	A	8 725	(16%)	A	8 254	(15%)	A
Transportation and Other Services (48 and 81) (Except 813110)	93 791	A	6 107	(7%)	A	26 659	(28%)	A	32 898	(35%)	A	17 022	(18%)	A	11 105	(12%)	B
Religious Organizations (813110)	27 601	A	3 800	(14%)	A	3 382	(12%)	A	10 677	(39%)	A	6 670	(24%)	A	3 072	(11%)	A
Canadian C&I sector	**585 475**	**A**	**44 515**	**(8%)**	**A**	**123 008**	**(21%)**	**A**	**217 037**	**(37%)**	**A**	**109 566**	**(19%)**	**A**	**91 349**	**(16%)**	**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, X – Suppressed for reasons of confidentiality.

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

Although Health Care establishments were evenly distributed across the regions, it was not the case for the subactivities associated with this activity grouping. For instance, Quebec, which had 19 percent of all Health Care establishments in Canada, was home to 25 percent of the Nursing and Residential Care establishments and 31 percent of the Social Assistance establishments. The Prairie region was home to most hospitals, more than one third (37 percent) of all Canadian hospitals, while the Atlantic region had the third highest number (16 percent) of hospitals, despite the relatively small population in both regions. Again, one explanation for this is that Atlantic and Prairie regions consisted of multiple distinct and geographically large jurisdictions. This hypothesis is corroborated by the SCIEU finding that the average floor space for a hospital in the Prairies and Atlantic Canada was the smallest (7455 and 17 329 m^2) in the activity grouping.

Floor area

In 2009, the Canadian C&I sector occupied more than 665 million m^2 of floor area. Figure 2.2 illustrates the regional distribution of floor area in 2009.

As was the case with the number of establishments, the share of floor space roughly follows the distribution of population across the country.

Table 2.2 presents information on floor area by activity grouping in the C&I sector.

The SCIEU found that for certain activities, the proportion of regional floor space differed by category. In Ontario for example, the floor area of Information and Cultural Industries establishments represented 64 percent of the grouping's total, yet Ontario made up only 42 percent of the floor area in the C&I sector. This result was somewhat surprising, as this province is home to only 38 percent of the Information and Cultural Industries establishments. Conversely, in the Prairies region, the Information and Cultural Industries sector had a disproportionally smaller percentage of the national floor space (6 percent) than the number of establishments (16 percent). Establishments in this sector are primarily engaged in producing and distributing information and cultural products (print publishing, software publishing, motion picture and sound recording, broadcasting, and telecommunications), many of which have national-level businesses located in Ontario.

Figure 2.2 – Share of floor area in the C&I sector, by region, 2009

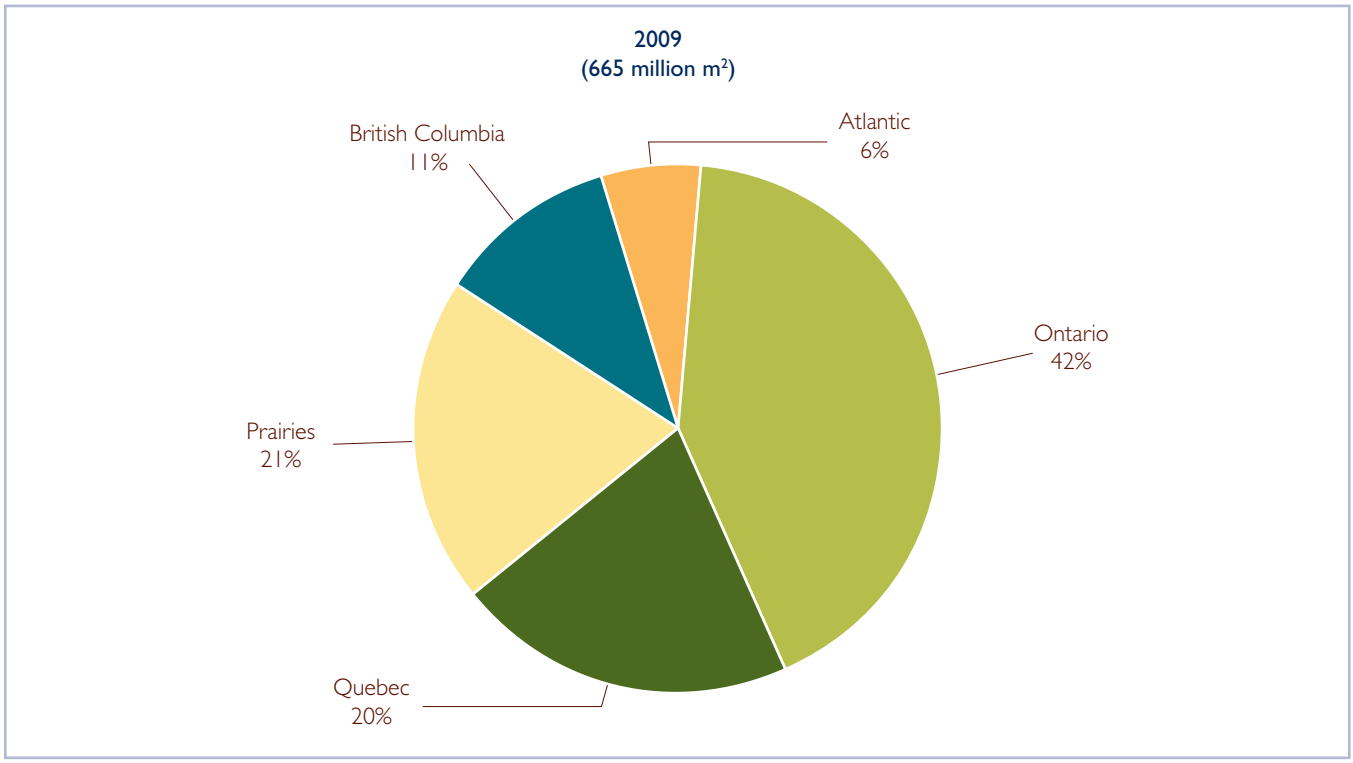


Table 2.2 – Floor area of establishments by activity grouping, by region, 2009

Activity grouping (NAICS)	Floor space (millions of m²)																	
	Canada		Atlantic			Quebec			Ontario			Prairies			British Columbia		
Wholesale and Warehousing (41 and 49)	70.8	A	2.7	(4%)	B	13.3	(19%)	C	29.5	(42%)	B	16.3	(23%)	A	9.0	(13%)	B
Wholesale Trade (41)	55.2	A	2.0	(4%)	B			F	21.2	(38%)	C	13.1	(24%)	A	7.9	(14%)	B
Postal Service (49)	15.5	A	0.7	(4%)	C	2.2	(14%)	C	8.3	(54%)	B	3.2	(21%)	B	1.1	(7%)	B
Retail Trade (44–45)	86.8	A	9.5	(11%)	B	14.9	(17%)	A	28.2	(33%)	B	18.9	(22%)	A	15.2	(18%)	B
Retail Trade (44–45, excluding 445)	68.6	A	7.6	(11%)	C	11.1	(16%)	B	20.6	(30%)	B	15.6	(23%)	B	13.6	(20%)	B
Food and Beverage Industries (445)	18.2	A	1.9	(10%)	B	3.8	(21%)	A	7.6	(42%)	B	3.3	(18%)	B	1.7	(9%)	A
Information and Cultural Industries (51)	9.2	B	0.4	(5%)	B	1.6	(17%)	B	5.9	(64%)	C	0.6	(6%)	A	0.7	(8%)	C
Financial, Real Estate and Other Professional Services (52–56)	86.1	A	2.4	(3%)	B	19.0	(22%)	C	33.7	(39%)	B	26.4	(31%)	C	4.6	(5%)	B
Public Administration (91)	57.2	C			F	2.1	(4%)	B			F			F			F
Education (61)	115.4	A	9.2	(8%)	A	22.3	(19%)	A	38.0	(33%)	A	30.3	(26%)	A	15.6	(13%)	A
Primary and Secondary Schools (6111)	63.7	A	5.6	(9%)	B	11.8	(18%)	A	23.5	(37%)	A	15.0	(24%)	B	7.9	(12%)	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	15.6	A	1.0	(6%)	B	5.1	(32%)	C			F	3.8	(24%)	C	1.9	(12%)	C
Universities (6113)	36.0	A	2.6	(7%)	B	5.5	(15%)	C	10.6	(29%)	B	11.5	(32%)	B	5.8	(16%)	C
Health (62)	70.5	A	4.5	(6%)	A	17.2	(24%)	A	31.7	(45%)	B	9.4	(13%)	A	7.7	(11%)	A
Ambulatory Health Care Services (621)	16.4	A	1.1	(6%)	A	2.9	(18%)	B	6.7	(41%)	C	2.9	(18%)	A	2.8	(17%)	B
Hospitals (622)	15.8	A	1.7	(11%)	A	5.2	(33%)	A	5.7	(36%)	B	1.7	(11%)	A	1.4	(9%)	A
Nursing and Residential Care Facilities (623)	24.4	B	1.2	(5%)	A	6.0	(25%)	B	12.0	(49%)	C	3.5	(14%)	B	1.7	(7%)	A
Social Assistance (624)	13.9	C	0.5	(4%)	B	3.1	(22%)	B			F	1.2	(9%)	C	1.8	(13%)	C
Arts, Entertainment and Recreation (71)	19.2	A	1.6	(8%)	B	4.2	(22%)	C	9.3	(48%)	C	2.1	(11%)	B	2.0	(11%)	B
Accommodation and Food Services (72)	43.6	A	3.0	(7%)	A	11.8	(27%)	B	12.7	(29%)	A	7.5	(17%)	A	8.6	(20%)	A
Accommodation Services (721)	21.8	A	2.0	(9%)	A	4.1	(19%)	B	6.3	(29%)	A	5.0	(23%)	B	4.4	(20%)	B
Food Services and Drinking Places (722)	21.9	A	1.1	(5%)	A	7.7	(35%)	B	6.4	(29%)	A	2.4	(11%)	A	4.2	(19%)	B
Transportation and Other Services (48 and 81) (Except 813110)	53.9	A	2.5	(5%)	B	9.5	(18%)	B	30.8	(57%)	C	8.4	(16%)	B	2.8	(5%)	B
Religious Organizations (813110)	52.7	A	3.8	(7%)	A			F	20.5	(39%)	B	8.7	(16%)	A	3.4	(6%)	A
Canadian C&I sector	**665.3**	**A**	**41.8**	**(6%)**	**A**	**131.9**	**(20%)**	**A**	**280.0**	**(42%)**	**A**	**138.3**	**(21%)**	**A**	**73.3**	**(11%)**	**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, X – Suppressed for reasons of confidentiality.

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

The Colleges, CÉGEPs and Other Schools (32 percent), Hospitals (33 percent) and Food Service and Drinking Places (35 percent) activity groupings had disproportionately large shares of floor area in Quebec, where 20 percent of the Canadian C&I establishments reside and 23 percent of the Canadian population lives.

2.2 Energy consumption

In 2009, the Canadian C&I sector consumed just under 850 million GJ of energy. Figure 2.3 illustrates how energy consumption was distributed among provinces in 2009. The distribution of energy consumption is roughly consistent with other regional proportions such as population, floor space and establishments. The largest deviation from this axiom in 2009 was in the Prairies where C&I establishments accounted for 25 percent of total energy consumption of the sector while having 18 percent of the population, 19 percent of the establishments and 21 percent of the floor area. The larger proportional energy consumption may be attributed to climatic variations. The three Prairie provinces have the largest heating requirements, as measured by heating degree-days (HDDs) (see Appendix F).

Table 2.3 illustrates the energy consumption by activity grouping in 2009. For many activity groupings, the data are not publishable due to quality issues, which makes comparisons across regions difficult.

Education establishments located in the Prairies accounted for 35 percent of the energy consumed by this activity grouping in Canada. This is despite the fact that the region only had 26 percent of this activity grouping's floor area and 19 percent of its establishments.

In part due to its significantly larger population, every activity group and subgroup in Ontario led all regions in energy consumption for that particular sector (for which data is of acceptable quality) with the exception of Universities (second to the Prairies).

Figure 2.3 – Share of energy consumption in the C&I sector, by region, 2009

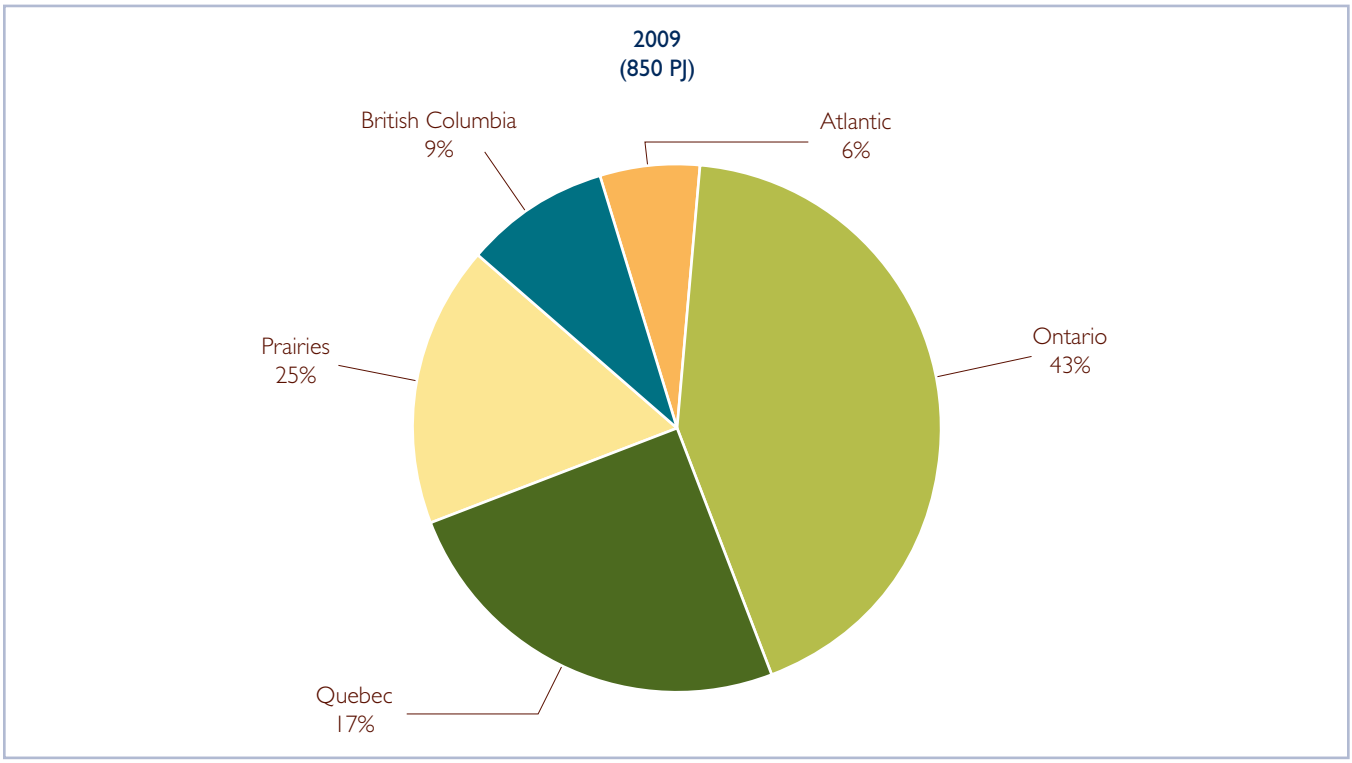


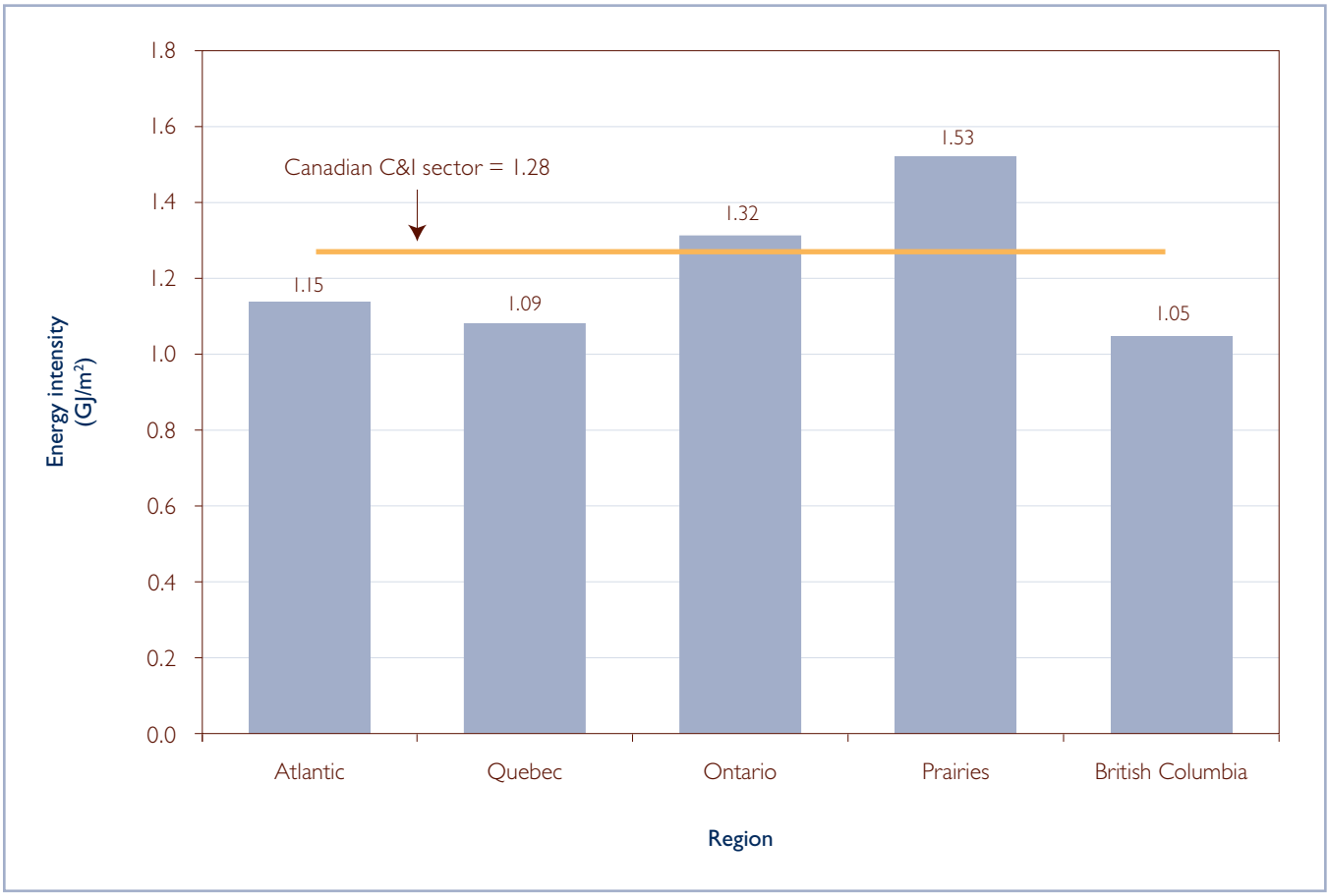
Table 2.3 – Energy consumption of establishments by activity grouping, by region, 2009

Activity grouping (NAICS)	Energy consumption (PJ)																	
	Canada		Atlantic			Quebec			Ontario			Prairies			British Columbia		
Wholesale and Warehousing (41 and 49)	57.1	A	1.4	(2%)	A	10.3	(18%)	B	21.7	(38%)	A	16.6	(29%)	A	7.1	(12%)	B
Wholesale Trade (41)	44.7	A	1.0	(2%)	A	7.8	(17%)	C	17.4	(39%)	B	12.4	(28%)	B	6.2	(14%)	B
Postal Service (49)	12.4	A	0.4	(3%)	B	.		F	4.3	(35%)	C	4.2	(34%)	B	0.9	(8%)	B
Retail Trade (44–45)	110.7	A	9.9	(9%)	A	20.0	(18%)	A	42.5	(38%)	B	24.6	(22%)	A	13.7	(12%)	A
Retail Trade (44–45, excluding 445)	63.7	A	6.3	(10%)	B	11.1	(18%)	B	19.0	(30%)	B	17.7	(28%)	B	9.6	(15%)	B
Food and Beverage Industries (445)	47.1	A	3.7	(8%)	B	8.9	(19%)	A	23.5	(50%)	C	7.0	(15%)	A	4.1	(9%)	A
Information and Cultural Industries (51)	15.4	C	0.4	(3%)	B	2.0	(13%)	C			F	0.9	(6%)	B	0.6	(4%)	B
Financial, Real Estate and Other Professional Services (52–56)	132.6	A			F	24.8	(19%)	C	51.1	(39%)	B			F	5.6	(4%)	B
Public Administration (91)	87.1	B			F	3.1	(4%)	B	63.4	(73%)	C			F	4.6	(5%)	B
Education (61)	134.7	A	9.1	(7%)	A	22.3	(17%)	B	42.5	(32%)	A	46.9	(35%)	A	13.9	(10%)	B
Primary and Secondary Schools (6111)	52.0	A	3.6	(7%)	A	9.0	(17%)	B	20.8	(40%)	A	13.5	(26%)	A	5.2	(10%)	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	18.3	B	1.3	(7%)	C	3.7	(20%)	C			F			F	1.4	(8%)	C
Universities (6113)	64.4	A	4.2	(7%)	C			F	18.9	(29%)	C	24.3	(38%)	C			F
Health (62)	103.5	A	8.0	(8%)	A	22.0	(21%)	A	48.8	(47%)	A	15.8	(15%)	A	8.9	(9%)	A
Ambulatory Health Care Services (621)	20.0	A	1.1	(5%)	B	3.6	(18%)	B			F	4.0	(20%)	B	2.6	(13%)	B
Hospitals (622)	40.2	A	4.6	(11%)	A	11.3	(28%)	A	16.6	(41%)	B	4.7	(12%)	B	3.0	(7%)	A
Nursing and Residential Care Facilities (623)	32.7	B	1.8	(6%)	B	5.2	(16%)	B	18.1	(55%)	C	5.5	(17%)	B	2.2	(7%)	A
Social Assistance (624)	10.6	B	0.5	(5%)	C	1.8	(17%)	B			F	1.6	(15%)	C			F
Arts, Entertainment and Recreation (71)	21.8	A	1.2	(5%)	B	3.4	(16%)	B	10.7	(49%)	C	3.3	(15%)	B	3.2	(15%)	C
Accommodation and Food Services (72)	95.3	A	5.4	(6%)	A	16.9	(18%)	A	39.8	(42%)	A	19.9	(21%)	A	13.3	(14%)	A
Accommodation Services (721)	29.0	A	1.9	(7%)	A	4.1	(14%)	A	9.2	(32%)	A	8.1	(28%)	B	5.6	(19%)	A
Food Services and Drinking Places (722)	66.4	A	3.5	(5%)	A	12.8	(19%)	A	30.6	(46%)	B	11.8	(18%)	B	7.7	(12%)	B
Transportation and Other Services (48 and 81) (Except 813110)	56.3	A	4.2	(8%)	C	10.4	(19%)	B	22.2	(39%)	B	15.9	(28%)	B	3.5	(6%)	C
Religious Organizations (813110)	34.9	A	2.5	(7%)	A	8.2	(24%)	B	15.5	(44%)	B	5.9	(17%)	A	2.8	(8%)	B
Canadian C&I sector	**849.6**	**A**	**47.9**	**(6%)**	**A**	**143.5**	**(17%)**	**A**	**369.7**	**(44%)**	**A**	**211.4**	**(25%)**	**A**	**77.2**	**(9%)**	**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, X – Suppressed for reasons of confidentiality.

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

Figure 2.4 – Energy intensity (GJ/m^2) by region, 2009



2.3 Energy intensity

Figure 2.4 illustrates the energy intensity in Canada and the regions for 2009. The energy intensity in the C&I sector was 1.28 GJ/m^2 in 2009. The lowest energy intensity was in British Columbia (1.05 GJ/m^2). As Table 2.4 illustrates, this seems to be the result of lower energy intensities across most activities, rather than by one or two specific activities, as British Columbia is below the national average for all but three activity groupings and one subactivity. British Columbia is the least intensive in two of the top four most energy consuming industries (Public Administration and Health Care) and is the second least intensive in the activity grouping that consumes the most energy (Financial, Real Estate and Other Professional Services).

There are numerous and often complex factors that can influence energy intensities among regions. The interplay between these factors has a significant impact on the energy intensities at the regional level. Regional climatic differences and primary energy sources are two of the key factors affecting energy intensity. The climate in British Columbia is generally more moderate than the rest of Canada (fewer cooling degree-days [CDDs] and HDDs than the Canadian average) thereby reducing heating and cooling loads. The Prairies, on the other hand, have a significantly higher heating requirement, as the three provinces in the region have the highest HDDs in Canada (see Appendix F). Space heating is the single largest end-use of energy in the C&I sector.[15]

An analysis of the energy intensity for each activity grouping by region highlights certain regional differences.

15 Natural Resources Canada, *Comprehensive Energy Use Database*, 1990–2010 **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablestrends2/com_ca_4_e_4.cfm?attr=0**

The Prairies was the region with the largest energy intensity in 5 of the 11 activity groupings and 9 of the 13 subactivities. The highest energy intensity recorded in the SCIEU 2009 by region was in the Food Services and Drinking Places in the Prairies, at a level of 4.81 GJ/m^2. This is not unexpected because it is the most energy-intensive subactivity in a region with a relatively heavier reliance on fossil fuels and a historically colder climate[16] when compared with the other regions.

Table 2.4 – Energy intensity of establishments by activity grouping, by region, 2009

Activity grouping (NAICS)	Energy intensity (GJ/m^2)											
	Canada		Atlantic		Quebec		Ontario		Prairies		British Columbia	
Wholesale and Warehousing (41 and 49)	0.81	A	0.53	A	0.77	A	0.74	A	1.02	A	0.79	B
Wholesale Trade (41)	0.81	A	0.49	A	0.71	A	0.82	A	0.94	A	0.78	B
Postal Service (49)	0.80	A	0.64	A	1.12	C	0.52	A	1.32	A	0.83	A
Retail Trade (44–45)	1.28	A	1.04	A	1.35	A	1.50	A	1.30	A	0.90	A
Retail Trade (44–45, excluding 445)	0.93	A	0.82	A	1.00	A	0.92	B	1.13	A	0.71	A
Food and Beverage Industries (445)	2.58	A	1.92	A	2.36	A	3.09	A	2.11	A	2.45	A
Information and Cultural Industries (51)	1.68	A	0.92	A	1.26	A	1.95	A	1.64	A	0.89	A
Financial, Real Estate and Other Professional Services (52–56)	1.54	A	1.04	B	1.31	A	1.52	A	1.84	A	1.22	B
Public Administration (91)	1.52	A	1.49	B	1.50	B	1.60	A	1.32	C	1.29	B
Education (61)	1.17	A	0.98	A	1.00	A	1.12	A	1.55	A	0.89	A
Primary and Secondary Schools (6111)	0.82	A	0.64	A	0.76	A	0.88	A	0.90	A	0.66	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	1.17	A	1.32	A	0.72	A	0.71	B	2.42	A	0.73	A
Universities (6113)	1.79	A	1.61	A	1.75	A	1.78	A	2.11	A	1.26	A
Health (62)	1.47	A	1.79	A	1.28	A	1.54	A	1.68	A	1.15	A
Ambulatory Health Care Services (621)	1.22	A	1.00	A	1.25	A	1.29	A	1.36	A	0.93	A
Hospitals (622)	2.55	A	2.70	A	2.16	A	2.94	A	2.70	A	2.09	A
Nursing and Residential Care Facilities (623)	1.34	A	1.55	A	0.86	A	1.51	A	1.56	B	1.24	A
Social Assistance (624)	0.76	A	0.98	C	0.60	B	0.75	B	1.34	A	0.65	A
Arts, Entertainment and Recreation (71)	1.14	A	0.74	A	0.81	A	1.16	A	1.62	A	1.58	B
Accommodation and Food Services (72)	2.19	A	1.78	A	1.44	A	3.13	A	2.66	A	1.55	B
Accommodation Services (721)	1.33	A	1.00	A	1.01	B	1.46	A	1.61	A	1.26	A
Food Services and Drinking Places (722)	3.04	A	3.20	A	1.67	B	4.76	A	4.81	A	1.85	C
Transportation and Other Services (48 and 81) (Except 813110)	1.05	A	1.72	B	1.10	A	0.72	B	1.89	A	1.25	A
Religious Organizations (813110)	0.66	A	0.66	A	0.51	C	0.75	A	0.68	A	0.81	A
Canadian C&I sector	1.28	A	1.15	A	1.09	A	1.32	A	1.53	A	1.05	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, X – Suppressed for reasons of confidentiality.

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

16 Natural Resources Canada, Office of Energy Efficiency, Energy End-Use Model database.

3 ENERGY CONSUMPTION BY ENERGY SOURCE

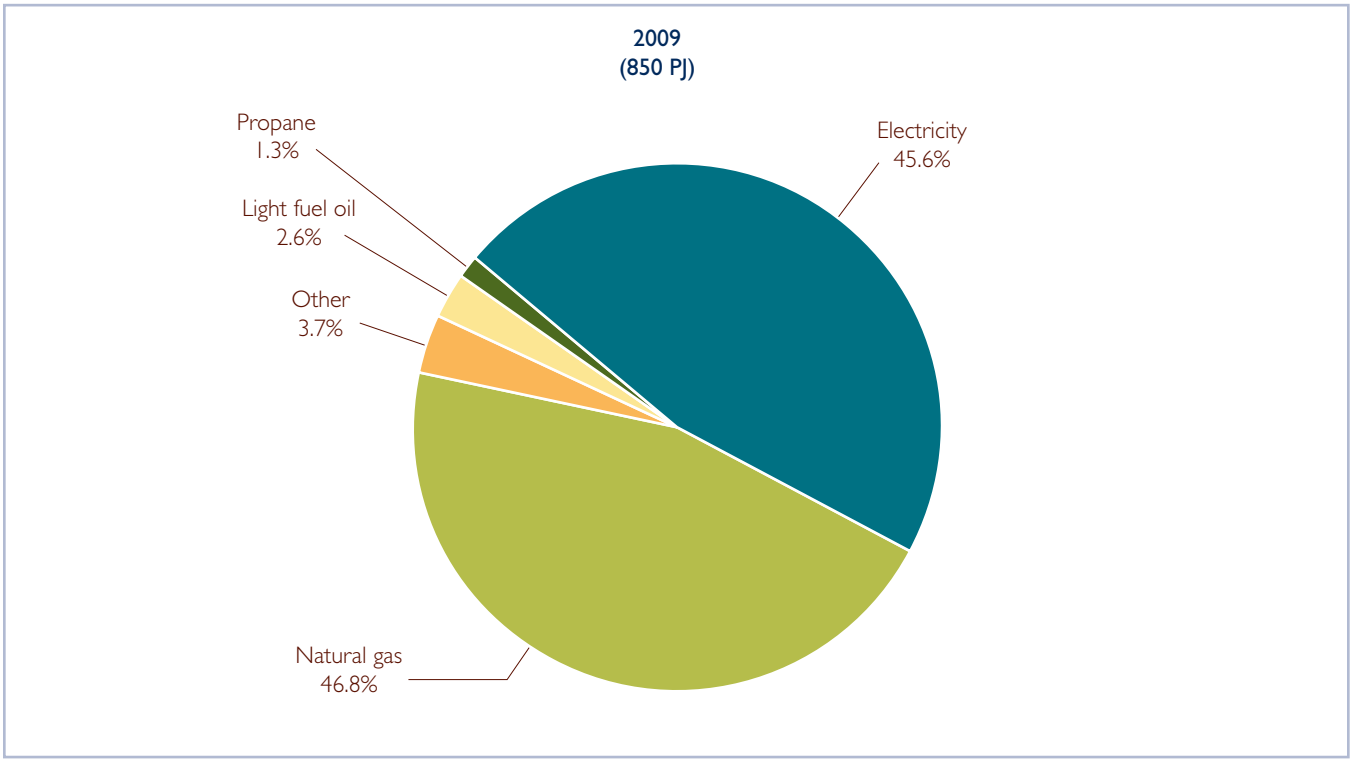
The SCIEU 2009 gathered data on the energy consumption of C&I establishments according to specific energy sources consumed.

In 2009, natural gas and electricity were the most-used sources of energy, accounting for 47 percent and 46 percent of the sector's energy use, respectively (see Figure 3.1). The remaining 7.6 percent of the sector's energy use was distributed between light fuel oil (2.6 percent), propane (1.3 percent) and other fuels[17] (3.7 percent).

Electricity, the second most consumed fuel, can be used for a variety of end-use energy services such as lighting, space heating and cooling, water heating, auxiliary motors and equipment. However, combustible fuels (such as natural gas and other fuels) are, to a large extent, used to provide a few major end-use energy services such as space and water heating. It should be noted that, unlike using electricity, the use of combustible fuel will result in combustion losses at the building site, which will vary depending on the fuel and technology used (equipment that uses natural gas tends to have less combustion loss and be more efficient than oil, for example). Therefore, the energy intensity of establishments using combustible fuels is inflated by these combustion losses, particularly in the case of oil. Conversely, the energy intensity of establishments primarily using electricity for space and water heating will be relatively lower as it generates no combustion losses at the building site (losses take place at the generator and during transmission).

From a regional standpoint (see Table 3.1), electricity represented the majority of total energy consumption in Atlantic Canada, Quebec and British Columbia. Electricity accounted for 62 percent of the total energy consumption in Quebec, 57 percent in Atlantic Canada and 53 percent in British Columbia. One reason for the result in Quebec might be the relatively low electricity rates in the province.[18]

Figure 3.1 – Share of energy consumption in the C&I sector, by energy source, 2009



Other fuels category includes kerosene, district steam, district hot water and district chilled water, wood and on-site electricity generation.

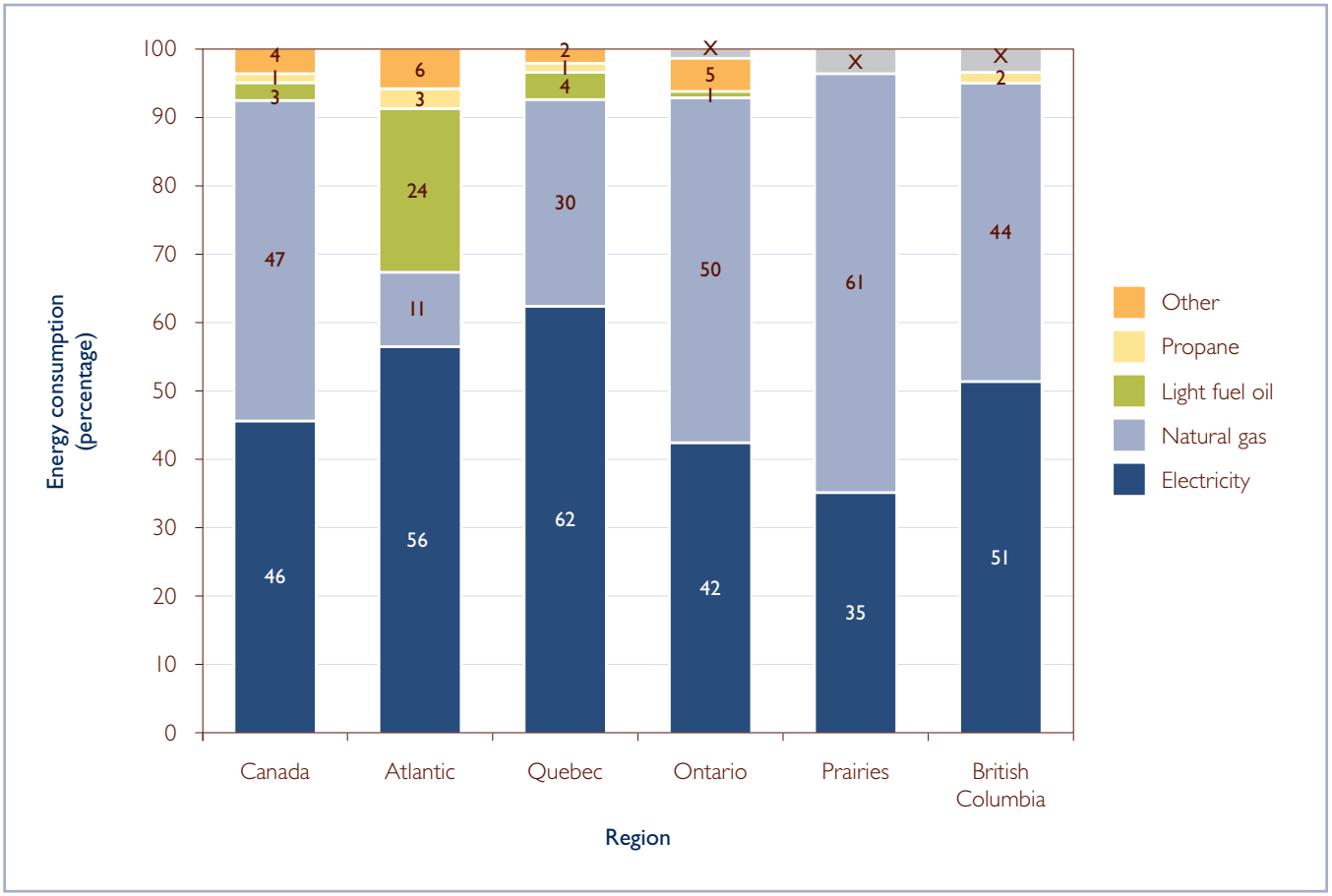
17 Other fuels category includes kerosene, district steam, district hot water and district chilled water, wood and on-site electricity generation.

18 Hydro Quebec, *2009 Comparison of Electricity Prices in Major North American Cities*, **www.hydroquebec.com/publications/en/comparison_prices/pdf/comp_2009_en.pdf**

Natural gas was the primary energy source in the Prairies and Ontario, accounting for 61 percent and 50 percent of total energy use, respectively. Electricity use in Ontario and the Prairies accounted for 43 percent and 35 percent of total energy use, respectively. Ontario's remaining energy was supplied by other fuel sources (7.5 percent). The SCIEU 2009 shows that, because of its relative size, Ontario accounted for 47 percent of the C&I sector's consumption of natural gas and 40 percent of its electricity, respectively.

Within the C&I sector, Atlantic Canada consumed 52 percent of all light fuel oil in the country. That being said, light fuel oil represented only 24 percent of the region's energy consumption. Natural gas, which has limited availability in the region, only accounted for 11 percent of the region's energy consumption, the lowest of all of the regions, while electricity accounted for the majority (56.5 percent) of the region's energy consumption. The Atlantic region also consumed the highest percentage of propane and other fuels.

Figure 3.2 – Share of energy consumption in the C&I sector by energy source, by region, 2009



X: data in this category are either confidential or too unreliable to be reported and can be a combination of any listed fuel type.

Other fuels category includes diesel, kerosene, district steam, district hot water and district chilled water, wood and on-site electricity generation.

Table 3.1 – Energy consumption of C&I establishments by energy source, by region, 2009

Energy source	Energy consumption (PJ)															
	Canada		Atlantic			Quebec			Ontario			Prairies			British Columbia		
Electricity	387.3	A	27.0	(7%)	A	89.5	(23%)	A	156.8	(40%)	A	74.3	(19%)	A	39.7	(10%)	A
Natural gas	397.4	A	5.2	(1%)	B	43.3	(11%)	A	186.1	(47%)	A	129.2	(33%)	A	33.6	(8%)	A
Light fuel oil	22.1	A	11.4	(52%)	A	5.7	(26%)	B	3.5	(16%)	C			F			F
Propane	11.3	C	1.4	(12%)	A	1.9	(17%)	B			F			F	1.3	(11%)	C
Other	31.4	B	2.8	(9%)	A	3.1	(10%)	C	17.8	(57%)	C			F			F
Total energy	**849.6**	**A**	**47.9**	**(6%)**	**A**	**143.5**	**(17%)**	**A**	**369.7**	**(44%)**	**A**	**211.4**	**(25%)**	**A**	**77.2**	**(9%)**	**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, X – Suppressed for reasons of confidentiality

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

Other fuels category includes diesel, kerosene, district steam, district hot water and district chilled water, and wood and wood by-products.

4 FLOOR AREA

Figure 4.1 – Share of establishments, energy consumption and floor area in the C&I sector, by floor area category, 2009

The data gathered by the SCIEU 2009 allows for the analysis of the relationship between floor area and key variables such as the number of establishments, energy consumption and energy intensity.

To analyse the C&I sector's composition of establishments by floor area, establishments have been divided into five categories based on the establishment's occupied floor area:

- very small – less than 465 m^2 (approximately less than 5000 sq. ft.)
- small – 466 m^2 to 929 m^2 (approximately 5001 sq. ft. to 10 000 sq. ft.)
- medium – 930 m^2 to 4645 m^2 (approximately 10 001 sq. ft. to 50 000 sq. ft.)
- large – 4646 m^2 to 18 580 m^2 (approximately 50 001 sq. ft. to 200 000 sq. ft.)
- very large – more than 18 580 m^2 (approximately more than 200 000 sq. ft.)

4.1 Key variables by floor area category

Figure 4.1 illustrates the breakdown of the number of establishments, energy consumption and total floor area by floor area category.

Close to two thirds of the establishments in the C&I sector were "very small" in size. Although this category had the largest number of establishments, it accounted for only 14 percent of energy consumption and 11 percent of floor area in the C&I sector. Similarly, but to a lesser degree, the "small" establishments comprised 15 percent of the establishments, used 9 percent of the energy and occupied 9 percent of the floor area.

At the other end of the spectrum, the "large" and "very large" floor area categories represented only 3 percent and 0.5 percent of the C&I sector establishments, yet accounted for 21 percent and 28 percent of the C&I sector's total energy consumption and 23 percent and 25 percent of the sector's floor area, respectively.

Medium establishments, which make up 18 percent of the C&I establishments, virtually tied for being the largest consumers of energy and having the largest total floor area, consuming 28 percent of the sector's energy and accounting for 32 percent of the floor area.

4.2 Key variables by floor area category and by activity grouping

Table 4.1 illustrates the main characteristics of C&I establishments for all floor area categories by sector.

As seen in Chapter 1, some activities occupied smaller locations, on average, while others tended to occupy larger locations. Ambulatory Health Care Services, with 42 863 very small establishments out of 48 568, was the activity grouping with the largest proportion of very small establishments (88 percent). This helped to contribute to the Health Care activity grouping having 54 151 of its establishments being very small (77 percent), which is in contrast to Hospitals in which the majority of establishments (71 percent) are categorized as large or very large. Transportation and Other Services as well as Food Services and Drinking Places both had high proportions of establishments (73 percent) in the very small category. Surprisingly, 26 639 Wholesale and Warehousing establishments were very small (54 percent). This can be explained in part by the fact that Postal Services and Couriers and Messengers establishments, which can be quite small and numerous (i.e. in all small communities across Canada), are encapsulated in this activity grouping.

Almost half of all Universities were very large. These very large Universities represented almost all of the total floor area (99 percent) and energy consumed (98 percent) by Universities in Canada. Hospitals showed a similar pattern with 31 percent of the establishments being very large and accounting for 81 percent of the total floor area and consuming 81 percent of the energy.

Table 4.1 – Number of establishments, energy consumption and floor area by activity grouping, by floor area category, 2009

Activity grouping (NAICS)	Variable	Establishment grouping																	
		Canada		Very small 465 m² (5 000 sq. ft.)			Small 466 to 929 m² (5 001 to 10 000 sq. ft.)			Medium 930 to 4 645 m² (10 001 to 50 000 sq. ft.)			Large 4 646 to 18 580 m² (50 001 to 200 000 sq. ft.)			Very large Over 18 580 m² (Over 200 000 sq. ft.)		
Wholesale and Warehousing (41 and 49)	Establishments	49 238	A	26 639	(54%)	A	6 596	(13%)	B	12 168	(25%)	A	3 574	(7%)	C	261	(1%)	C
	Total energy consumption (PJ)	57.1	A	7.3	(13%)	B	4.3	(8%)	B	18.7	(33%)	A	18.2	(32%)	B	8.6	(15%)	B
	Floor space (m²)	70.8	A	6.0	(8%)	A	4.7	(7%)	B	23.6	(33%)	A	27.6	(39%)	B	8.9	(13%)	C
Wholesale Trade (41)	Establishments	44 072	A	23 296	(53%)	A	6 326	(14%)	B	11 590	(26%)	A			F			F
	Total energy consumption (PJ)	44.7	A	6.6	(15%)	B	4.1	(9%)	B	17.2	(38%)	B	13.0	(29%)	C			F
	Floor space (m²)	55.2	A	5.0	(9%)	A	4.5	(8%)	B	21.9	(40%)	A			F			F
Postal Service (49)	Establishments		F			F			F	578		B	883		A	92		B
	Total energy consumption (PJ)	12.4	A			F			F	1.5	(12%)	B	5.1	(41%)	B	4.8	(38%)	C
	Floor space (m²)	15.5	A			F			F	1.7	(11%)	B	8.5	(55%)	A	4.3	(27%)	C
Retail Trade (44–45)	Establishments	105 531	A	71 417	(68%)	A	13 043	(12%)	B	18 328	(17%)	B	2 608	(2%)	B			F
	Total energy consumption (PJ)	110.7	A	20.1	(18%)	A	9.8	(9%)	B	46.1	(42%)	A	31.1	(28%)	B			F
	Floor space (m²)	86.8	A	12.9	(15%)	A	9.2	(11%)	B	36.6	(42%)	B	24.3	(28%)	B			F
Retail Trade (44–45, excluding 445)	Establishments	85 408	A	57 304	(67%)	A	11 189	(13%)	B	14 994	(18%)	B	1 806	(2%)	B	X		X
	Total energy consumption (PJ)	63.7	A	14.2	(22%)	A	7.6	(12%)	C	22.2	(35%)	B	16.6	(26%)	B	X		X
	Floor space (m²)	68.6	A	10.0	(15%)	A	7.9	(11%)	B	28.7	(42%)	B	19.2	(28%)	B	X		X
Food and Beverage Industries (445)	Establishments	20 123	A	14 113	(70%)	A	1 854	(9%)	C	3 334	(17%)	B			F	X		X
	Total energy consumption (PJ)	47.1	A	5.8	(12%)	A	2.2	(5%)	C	23.9	(51%)	B			F	X		X
	Floor space (m²)	18.2	A	2.9	(16%)	A	1.3	(7%)	C	7.9	(43%)	A	5.1	(28%)	C	X		X
Information and Cultural Industries (51)	Establishments	8 118	A	5 450	(67%)	A	1 033	(13%)	C	1 213	(15%)	B			F	X		X
	Total energy consumption (PJ)	15.4	C	0.9	(6%)	A	0.5	(3%)	C	2.6	(17%)	B			F	X		X
	Floor space (m²)	9.2	B	1.0	(11%)	A	0.6	(7%)	C	2.2	(24%)	B			F	X		X
Financial, Real Estate and Other Professional Services (52–56)	Establishments	128 781	A	88 249	(69%)	A	20 824	(16%)	B	18 031	(14%)	B	1 423	(1%)	C	X		X
	Total energy consumption (PJ)	132.6	A	17.7	(13%)	A	16.2	(12%)	C	63.2	(48%)	C			F	X		X
	Floor space (m²)	86.1	A	15.9	(19%)	A	14.7	(17%)	B	35.0	(41%)	C	12.8	(15%)	C	X		X

continued

Table 4.1 – Number of establishments, energy consumption and floor area by activity grouping, by floor area category, 2009 (continued)

Activity grouping (NAICS)	Variable	Establishment grouping																
		Canada		Very small 465 m² (5 000 sq. ft.)			Small 466 to 929 m² (5 001 to 10 000 sq. ft.)			Medium 930 to 4 645 m² (10 001 to 50 000 sq. ft.)			Large 4 646 to 18 580 m² (50 001 to 200 000 sq. ft.)			Very large Over 18 580 m² (Over 200 000 sq. ft.)		
Public Administration (91)	Establishments	6 552	A	2 222	(34%)	A	1 045	(16%)	B	1 685	(26%)	A	1 229	(19%)	C			F
	Total energy consumption (PJ)	87.1	B	0.8	(1%)	C	0.6	(1%)	C	3.2	(4%)	B	15.5	(18%)	C	66.9	(77%)	C
	Floor space (m²)	57.2	C	0.5	(1%)	B	0.6	(1%)	B	2.6	(4%)	A	10.3	(18%)	C			F
Education (61)	Establishments	21 392	A	5 045	(24%)	A	1 679	(8%)	B	10 719	(50%)	A	3 169	(15%)	A	780	(4%)	B
	Total energy consumption (PJ)	134.7	A	1.0	(1%)	B			F	20.7	(15%)	A	24.7	(18%)	A	85.7	(64%)	A
	Floor space (m²)	115.4	A	1.2	(1%)	A	1.1	(1%)	B	26.7	(23%)	A	27.2	(24%)	A	59.2	(51%)	A
Primary and Secondary Schools (6111)	Establishments	14 695	A			F	1 130	(8%)	C	9 018	(61%)	A	3 061	(21%)	A	511	(3%)	C
	Total energy consumption (PJ)	52.0	A			F			F	18.2	(35%)	A	23.6	(45%)	A	7.9	(15%)	C
	Floor space (m²)	63.7	A			F	0.7	(1%)	C	23.5	(37%)	A	26.2	(41%)	A	13.0	(20%)	C
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	Establishments	6 420	A	4 051	(63%)	A	534	(8%)	C	1 622	(25%)	B	75	(1%)	C	138	(2%)	A
	Total energy consumption (PJ)	18.3	B	0.7	(4%)	A			F	1.7	(9%)	B	0.7	(4%)	C	14.7	(81%)	C
	Floor space (m²)	15.6	A	0.9	(6%)	A	0.4	(2%)	C	3.0	(19%)	B	0.6	(4%)	C	10.6	(68%)	B
Universities (6113)	Establishments	278	B	19	(7%)	C	15	(5%)	C			F	32	(12%)	A	132	(47%)	A
	Total energy consumption (PJ)	64.4	A	0.0	(0%)	C			F			F	0.4	(1%)	B	63.1	(98%)	A
	Floor space (m²)	36.0	A	0.0	(0%)	C	0.0	(0%)	C			F	0.3	(1%)	B	35.6	(99%)	A

continued

Table 4.1 – Number of establishments, energy consumption and floor area by activity grouping, by floor area category, 2009 (continued)

Activity grouping (NAICS)	Variable	Establishment grouping																	
		Canada		Very small 465 m² (5 000 sq. ft.)			Small 466 to 929 m² (5 001 to 10 000 sq. ft.)			Medium 930 to 4 645 m² (10 001 to 50 000 sq. ft.)			Large 4 646 to 18 580 m² (50 001 to 200 000 sq. ft.)			Very large Over 18 580 m² (Over 200 000 sq. ft.)		
Health (62)	Establishments	70 541	A	54 151	(77%)	A	7 293	(10%)	A	6 376	(9%)	A	2 317	(3%)	A	405	(1%)	C
	Total energy consumption (PJ)	103.5	A	12.8	(12%)	A	4.4	(4%)	B	18.9	(18%)	B	24.7	(24%)	A	42.6	(41%)	A
	Floor space (m²)	70.5	A	10.3	(15%)	A	4.9	(7%)	A	14.7	(21%)	A	20.9	(30%)	B	19.7	(28%)	B
Ambulatory Health Care Services (621)	Establishments	48 568	A	42 863	(88%)	A	3 309	(7%)	C	2 103	(4%)	C			F	X		X
	Total energy consumption (PJ)	20.0	A	9.7	(48%)	A			F			F			F	X		X
	Floor space (m²)	16.4	A	7.5	(46%)	A	2.3	(14%)	C			F			F	X		X
Hospitals (622)	Establishments	633	A	X		X	X		X	162	(26%)	A	256	(40%)	A	194	(31%)	A
	Total energy consumption (PJ)	40.2	A	X		X	X		X	1.5	(4%)	B	6.3	(16%)	A	32.5	(81%)	A
	Floor space (m²)	15.8	A	X		X	X		X	0.5	(3%)	A	2.5	(16%)	A	12.8	(81%)	A
Nursing and Residential Care Facilities (623)	Establishments	7 888	A	3 118	(40%)	A	1 061	(13%)	B	2 171	(28%)	A	1 341	(17%)	B			F
	Total energy consumption (PJ)	32.7	B	1.0	(3%)	A	0.7	(2%)	B	7.3	(22%)	A	14.0	(43%)	A			F
	Floor space (m²)	24.4	B	0.9	(4%)	A	0.7	(3%)	C	5.0	(21%)	A	11.3	(46%)	B			F
Social Assistance (624)	Establishments	13 452	A	8 151	(61%)	A	2 920	(22%)	B	1 940	(14%)	B			F	X		X
	Total energy consumption (PJ)	10.6	B	2.1	(20%)	A	1.6	(15%)	B	4.0	(38%)	C			F	X		X
	Floor space (m²)	13.9	C	1.9	(14%)	A	1.9	(14%)	B	4.7	(34%)	C			F	X		X
Arts, Entertainment and Recreation (71)	Establishments	11 149	A	5 573	(50%)	A	2 440	(22%)	B	2 527	(23%)	B			F	136	(1%)	C
	Total energy consumption (PJ)	21.8	A	1.4	(6%)	A	1.6	(7%)	B	9.7	(45%)	C	3.2	(14%)	C			F
	Floor space (m²)	19.2	A	1.2	(6%)	A	1.8	(9%)	B	6.1	(32%)	B	3.3	(17%)	C			F

continued

Table 4.1 – Number of establishments, energy consumption and floor area by activity grouping, by floor area category, 2009 (continued)

Activity grouping (NAICS)	Variable	Establishment grouping																	
		Canada		Very small 465 m² (5 000 sq. ft.)			Small 466 to 929 m² (5 001 to 10 000 sq. ft.)			Medium 930 to 4 645 m² (10 001 to 50 000 sq. ft.)			Large 4 646 to 18 580 m² (50 001 to 200 000 sq. ft.)			Very large Over 18 580 m² (Over 200 000 sq. ft.)		
Accommodation and Food Services (72)	Establishments	62 780	A	42 813	(68%)	A	12 684	(20%)	B	6 160	(10%)	B	983	(2%)	B	140	(0%)	B
	Total energy consumption (PJ)	95.3	A	38.0	(40%)	A	25.3	(27%)	B	11.6	(12%)	A	12.2	(13%)	A	8.3	(9%)	B
	Floor space (m²)	43.6	A	8.9	(20%)	A	7.8	(18%)	B	12.0	(27%)	B	8.6	(20%)	A	6.4	(15%)	B
Accommodation Services (721)	Establishments	7 897	A	2 564	(32%)	A	1 329	(17%)	B	2 974	(38%)	A	889	(11%)	B	140	(2%)	B
	Total energy consumption (PJ)	29.0	A	1.7	(6%)	B	1.3	(4%)	C	7.4	(26%)	A	10.3	(36%)	A	8.3	(29%)	B
	Floor space (m²)	21.8	A	0.7	(3%)	A	0.8	(4%)	B	6.1	(28%)	A	7.7	(36%)	A	6.4	(29%)	B
Food Services and Drinking Places (722)	Establishments	54 884	A	40 249	(73%)	A	11 355	(21%)	B			F	X		X			
	Total energy consumption (PJ)	66.4	A	36.3	(55%)	A	24.0	(36%)	B	4.2	(6%)	C	X		X			
	Floor space (m²)	21.9	A	8.2	(37%)	A	6.9	(32%)	B			F	X		X			
Transportation and Other Services (48 and 81) (Except 813110)	Establishments	93 791	A	68 445	(73%)	A	10 907	(12%)	C	13 817	(15%)	C	622	(1%)	C			
	Total energy consumption (PJ)	56.3	A	14.8	(26%)	A	9.7	(17%)	C	21.7	(39%)	C	10.2	(18%)	C			
	Floor space (m²)	53.9	A	13.8	(26%)	A	7.2	(13%)	C	27.1	(50%)	C			F			
Religious Organizations (813110)	Establishments	27 601	A	5 119	(19%)	B	7 938	(29%)	A	12 811	(46%)	A			F	X		X
	Total energy consumption (PJ)	34.9	A	1.8	(5%)	B	4.7	(13%)	C	19.8	(57%)	A			F	X		X
	Floor space (m²)	52.7	A	1.5	(3%)	B	5.6	(11%)	A	25.9	(49%)	A			F	X		X
Canadian C&I sector	**Establishments**	**585 475**	**A**	**375 124**	**(64%)**	**A**	**85 481**	**(15%)**	**A**	**103 834**	**(18%)**	**A**	**18 285**	**(3%)**	**A**	**2 750**	**(0%)**	**A**
	Total energy consumption (PJ)	**849.6**	**A**	**116.6**	**(14%)**	**A**	**79.7**	**(9%)**	**A**	**236.2**	**(28%)**	**A**	**178.9**	**(21%)**	**A**	**238.2**	**(28%)**	**A**
	Floor space (m²)	**665.3**	**A**	**73.1**	**(11%)**	**A**	**58.2**	**(9%)**	**A**	**212.6**	**(32%)**	**A**	**155.5**	**(23%)**	**A**	**165.8**	**(25%)**	**A**

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

4.3 Energy intensity by floor area category and by activity grouping

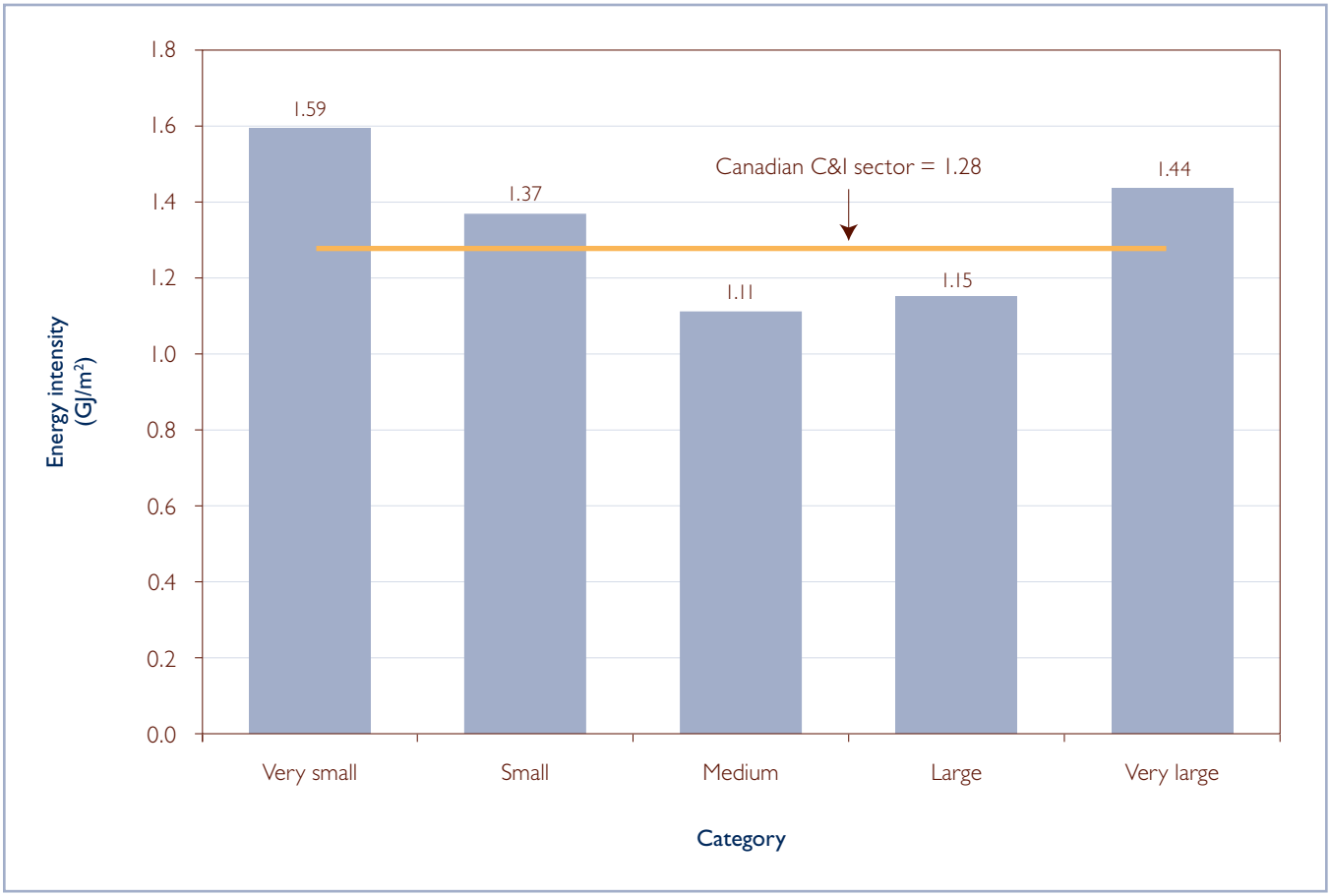
Table 4.2 shows the C&I sector's energy intensity by activity grouping and floor area category. The SCIEU 2009 observed no apparent trend between energy intensity and an establishments' size category in the activity groupings. The Religious Organizations and Wholesale and Warehousing activity groupings in the large establishment category had the lowest intensity for the C&I sector as a whole.

The Religious Organizations activity grouping had some of the lowest energy intensities for every floor area category, one of the reasons being that they do not use much energy-consuming equipment. They also have reduced hours of operation. For similar reasons, a low energy intensity was observed for the Wholesale and Warehousing activity grouping, which generally requires less space and less water heating and space cooling than other establishments in the sector.

The Health Care activity grouping was characterized by relatively low energy intensities for very small establishments (1.24 GJ/m^2) and relatively high energy intensities for very large establishments (2.17 GJ/m^2). The distribution between the floor area categories of different types of establishments can explain this observation: a high number of Ambulatory Health Care Services (almost 43 000 establishments), which tend to have lower energy intensities, were in the very small category. On the other hand, Hospitals, which are characterized by the use of specialized, energy-intensive equipment and 24-hour operations, tended to occupy the very large category (81 percent of floor space).

Based on floor area categories, the survey results show that in very small to medium establishments, energy intensity levels decreased as floor area

Figure 4.2 – Energy intensity (GJ/m^2) by floor area category, 2009



increased. This trend was reversed in medium to very large establishments, where energy intensity increased with size (see Figure 4.2). The higher energy intensity for very large establishments is the result of the category being dominated by highly intensive industries such as Hospitals, Universities and Public Administration, which account for 68 percent of the category's energy consumption.

Table 4.2 – Energy intensity of establishments by activity grouping, by floor area category, 2009

Activity grouping (NAICS)	Energy intensity (GJ/m^2)											
	Canada		Very small 465 m^2 (5 000 sq. ft.)		Small 466 to 929 m^2 (5 001 to 10 000 sq. ft.)		Medium 930 to 4 645 m^2 (10 001 to 50 000 sq. ft.)		Large 4 646 to 18 580 m^2 (50 001 to 200 000 sq. ft		Very large Over 18 580 m^2 (Over 200 000 sq. ft.)	
Wholesale and Warehousing (41 and 49)	**0.81**	**A**	1.23	B	0.93	A	0.79	A	0.66	A	0.97	A
Wholesale Trade (41)	0.81	A	1.31	B	0.90	A	0.78	A	0.68	A	0.83	B
Postal Service (49)	0.80	A	0.77	A	1.52	C	0.92	A	0.60	B	1.12	A
Retail Trade (44–45)	**1.28**	**A**	1.56	A	1.06	A	1.26	A	1.28	A	0.95	B
Retail Trade (44–45, excluding 445)	0.93	A	1.42	A	0.96	A	0.77	A	0.87	A	X	X
Food and Beverage Industries (445)	2.58	A	2.03	A	1.70	A	3.02	A	2.86	A	X	X
Information and Cultural Industries (51)	**1.68**	**A**	0.92	A	0.85	A	1.16	A	2.14	A	X	X
Financial, Real Estate and Other Professional Services (52–56)	**1.54**	**A**	1.11	A	1.10	A	1.80	A	2.05	B	X	X
Public Administration (91)	**1.52**	**A**	1.55	B	1.00	A	1.26	A	1.51	C	1.55	A
Education (61)	**1.17**	**A**	0.88	A		F	0.78	A	0.91	A	1.45	A
Primary and Secondary Schools (6111)	0.82	A	1.20	C		F	0.77	A	0.90	A	0.61	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	1.17	A	0.79	A	1.22	C	0.56	A	1.05	A	1.38	B
Universities (6113)	1.79	A	1.09	A		F	5.61	A	1.43	A	1.77	A
Health (62)	**1.47**	**A**	1.24	A	0.90	A	1.29	A	1.18	A	2.17	A
Ambulatory Health Care Services (621)	1.22	A	1.28	A	0.97	B	1.35	A	0.85	A	X	X
Hospitals (622)	2.55	A	X	X	X	X	2.96	A	2.51	A	2.54	A
Nursing and Residential Care Facilities (623)	1.34	A	1.14	A	0.93	A	1.45	A	1.24	A	1.49	A
Social Assistance (624)	0.76	A	1.11	A	0.82	A	0.86	B	0.53	A	X	X
Arts, Entertainment and Recreation (71)	**1.14**	**A**	1.18	A	0.88	A	1.59	A	0.95	A	0.88	A
Accommodation and Food Services (72)	**2.19**	**A**	4.28	A	3.25	A	0.97	A	1.41	A	1.31	A
Accommodation Services (721)	1.33	A	2.42	A	1.53	B	1.21	A	1.33	A	1.31	A
Food Services and Drinking Places (722)	3.04	A	4.44	A	3.46	A	0.71	B	X	X	X	X
Transportation and Other Services (48 and 81) (Except 813110)	**1.05**	**A**	1.07	A	1.34	B	0.80	B	1.77	A	X	X
Religious Organizations (813110)	**0.66**	**A**	1.18	A	0.84	B	0.76	A	0.60	A	X	X
Canadian C&I sector	1.28	A	1.59	A	1.37	A	1.11	A	1.15	A	1.44	A

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In 2009, the most energy-intensive establishments, based on floor area categories, were the very small establishments (1.59 GJ/m^2). One factor contributing to this result is the prevalence of Food Service and Drinking Places establishments in this floor area category. These establishments were the most energy-intensive, based on activity grouping and subactivity in the C&I sector in 2009 (see Table 1.1). While these establishments accounted for only 11 percent of the total floor area of establishments in this floor area category, they accounted for 31 percent of the category's energy consumption. The relatively small amount of floor area combined with high energy consumption yields a high energy intensity (4.44 GJ/m^2) for these establishments, which in turn contributes to the high intensity level for all very small establishments.

Finally, medium establishments had the lowest energy intensity in 2009, at 1.11 GJ/m^2. Unlike the very small floor space category, the energy intensity of the medium floor space category is not dominated by a single activity grouping. The most dominant sector is Financial, Real Estate and Other Professional Services, which accounted for 27 percent of the energy consumption but only 16 percent of the floor space. The next most dominant activity grouping by energy consumption is Retail Trade, which accounts for 20 percent of the energy consumption and 17 percent of the floor space. This ratio of energy to floor area results in an above average energy intensity of 1.26 GJ/m^2 for the size category.

5 BUILDING YEAR OF CONSTRUCTION

The SCIEU 2009 gathered data on the year of construction of the building containing/occupied by the establishment. For establishments that occupied several buildings (e.g. a university campus or hospital complex), the year of construction of the oldest part of buildings occupied by the establishment was used.

There was little variation in the age of buildings between regions. The average year of construction of buildings occupied by C&I establishments in Canada in 2009 was estimated to be 1969, meaning that in 2009, the average building was 40 years old.

Table 5.1 presents the principal characteristics of C&I establishments, based on the year that their building was constructed.

In Canada, only 9 percent of the buildings occupied by C&I establishments were built before 1920, while 12 percent were built after 2000.

The data gathered through this survey allowed for a comparison of establishments by energy intensity and the year in which the building containing an establishment was constructed. Figure 5.1 details the energy intensity for each construction period.

With the exception of the first period (before 1920) and the second to last period (1990 to 1999), the energy intensity increased every period from the oldest period (1920 to 1959) to the second newest (2000 to 2004) before a decline in the newest period (2005 and after). Buildings built between 2000 and 2004 were the most energy-intensive, at 1.52 GJ/m^2, a ratio that is almost 19 percent more than the Canadian average (1.28 GJ/m^2). This trend appears to be reversing among establishments housed in the most recently constructed buildings (after 2005). The establishments in buildings built between 1920 and 1959 had the lowest energy intensity with 1.10 GJ/m^2. For more information on buildings, consult SCIEU-Buildings on the OEE's Web site (**oee.nrcan.gc.ca**).

The increase in intensity between the period of 1990 to 1999 and after 2000 could be partially attributed to the fact that only 76 percent of those buildings constructed in the 1990s were space cooled. This proportion was significantly lower than the 92 percent of space-cooled buildings constructed in 2000. Another factor may be that buildings in the 1990s were larger on average than in the 2000s and, as shown in Figure 4.2, energy intensity generally decreases as floor space increases.

Table 5.1 – Number of establishments, energy consumption, floor area, average floor area and energy intensity by building year of construction, 2009

Building year of construction	Establishments			Energy consumption (PJ)			Floor area (million m^2)			Average floor area per establishment (m^2)		Energy intensity (GJ/m^2)	
Before 1920	53 503	(9%)	A	67.2	(8%)	B	52.9	(8%)	B	990	A	1.27	A
1920 to 1959	84 000	(14%)	A	108.2	(13%)	B	98.3	(15%)	B	1 170	A	1.10	A
1960 to 1969	72 388	(12%)	A	129.4	(15%)	A	102.2	(15%)	A	1 412	A	1.27	A
1970 to 1979	123 793	(21%)	A	162.2	(19%)	A	123.1	(19%)	A	995	A	1.32	A
1980 to 1989	119 229	(20%)	A	146.9	(17%)	A	111.2	(17%)	A	933	A	1.32	A
1990 to 1999	63 371	(11%)	A	118.5	(14%)	A	94.1	(14%)	A	1 485	A	1.26	A
2000 or later	69 191	(12%)	A	117.2	(14%)	A	83.4	(13%)	A	1 205	A	1.41	A
2000 to 2004	36 651	(6%)	A	55.6	(7%)	B	36.5	(5%)	A	996	A	1.52	A
2005 and after	32 541	(6%)	A	61.6	(7%)	B	46.9	(7%)	A	1 442	A	1.31	A
Canadian C&I sector	585 475	(100%)	A	849.6	(100%)	A	665.3	(100%)	A	1 136	A	1.28	A

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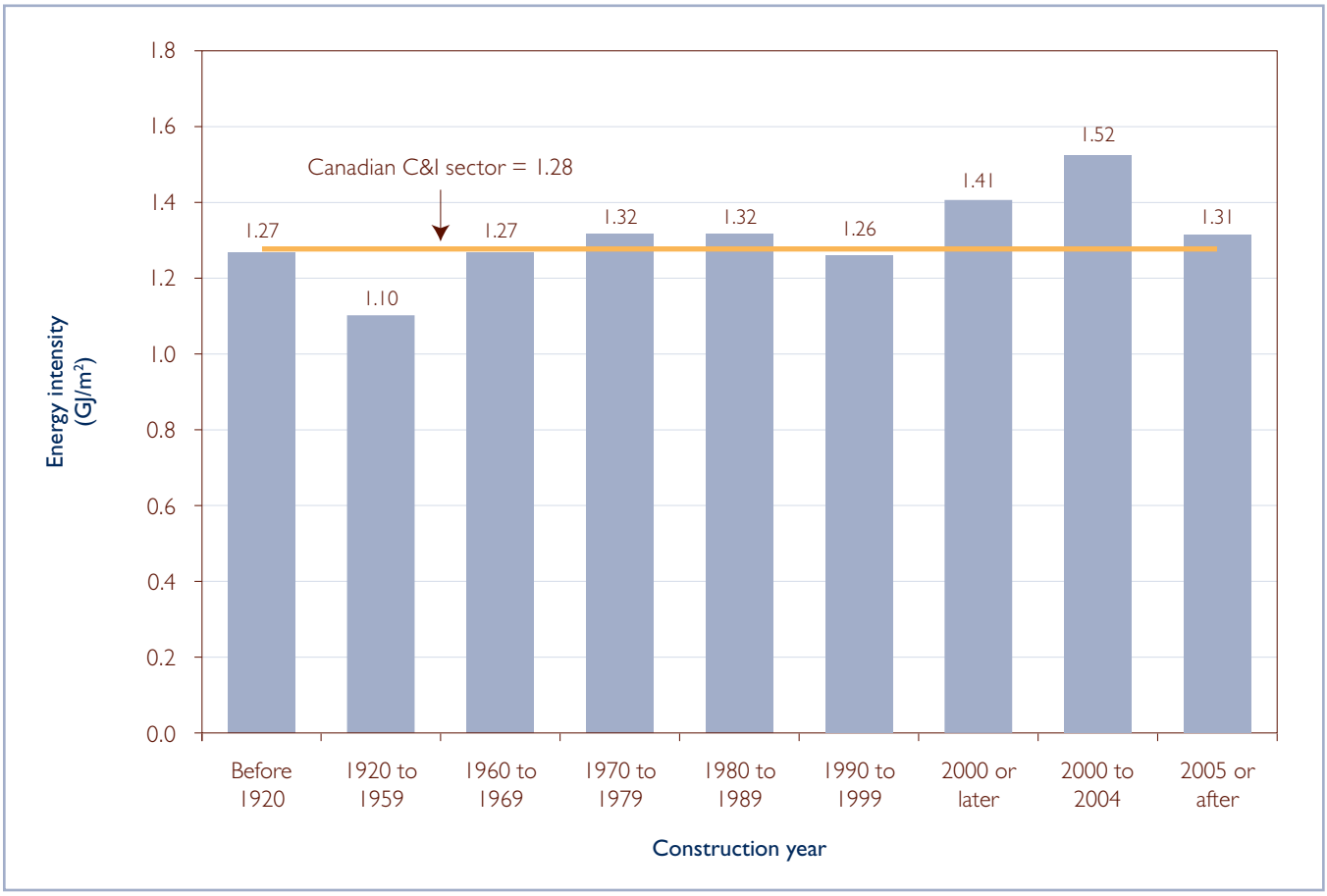
Due to rounding, numbers may not add up to the total shown, and some numbers may differ slightly from one table to the next.

Another factor that cannot be discounted is the activity mix. For example, 18 percent of the establishments in buildings constructed during the 1990s were Retail Trade (excluding food and beverage), which is a relatively low energy-intensive subactivity. The largest activity grouping by number of establishments in the 2000 or later year of construction category was Financial, Real Estate and Other Professional Services (20 percent), which is an activity with a relatively high energy intensity.

Floor space in the 1920 to 1959 period is dominated by low intensity sectors; four sectors that comprised a large proportion of floor space in this period are Wholesale Trade, Primary Schools, Retail Trade and Religious Organizations. These sectors accounted for almost 57 percent of the total floor space for the period and all have relatively low energy intensities, as seen in Table 1.1.

Figure 5.1 – Energy intensity (GJ/m^2) by building year of construction, 2009



6 ENERGY SOURCES USED FOR SPACE HEATING, SPACE COOLING AND WATER HEATING

Table 6.1 – Establishments by primary energy source for space heating, by region, 2009

Energy source	Establishments																	
	Canada		Atlantic			Quebec			Ontario			Prairies			British Columbia		
Electricity	194 910	A	23 322	(12%)	A	80 038	(41%)	A	33 058	(17%)	A	14 399	(7%)	B	44 094	(23%)	A
Natural gas	331 744	A	2 965	(1%)	B	24 352	(7%)	A	168 176	(51%)	A	94 186	(28%)	A	42 065	(13%)	A
Light fuel oil	33 349	A	15 095	(45%)	A	9 186	(28%)	B			F						F
Other	17 010	B	2 601	(15%)	B			F			F	981	(6%)	C			F
No space heating		F	532		C			F	X		X	X		X			F
Total	585 475	A	44 515	(8%)	A	123 008	(21%)	A	217 037	(37%)	A	109 566	(19%)	A	91 349	(16%)	A

*Other fuels category includes: propane, kerosene, district steam, district hot water and district chilled water, wood and on-site electricity.

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The SCIEU 2009 collected data on the type of energy used for space heating, space cooling and water heating. In the case of space heating and cooling, a distinction between primary and secondary energy sources was made.

6.1 Space heating

Almost all C&I establishments (98.6 percent) were at least partially space heated.

Table 6.1 shows the number of establishments that used a given energy source for space heating, by region, focusing on the primary energy source used.

Among establishments that had space heating, 90 percent of the C&I sector establishments in Canada used either natural gas (57 percent) or electricity (33 percent) as their primary energy source for space heating.

From a regional perspective, electricity was the most widely used primary energy source for heating by establishments in Quebec (65 percent), the Atlantic region (52 percent) and British Columbia (48 percent). Natural gas was most popular in Ontario (77 percent) and the Prairies (86 percent) among establishments that used space heating.

While the Atlantic region showed the lowest rate of natural gas use at 7 percent, this region had the highest percentage (34 percent) and absolute number of users (15 095) of light fuel oil in Canada.

These observed variations in regional energy sources used for space heating in the C&I sector are consistent with variations seen in the residential sector.[19] Therefore, it can be concluded that the type of energy source used is primarily based on regional location of the user.

In 2009, 29 percent of C&I establishments used more than one energy source for space heating. Seventy-one percent of Universities used a secondary energy source for space heating in 2009, making it the only activity grouping where more than half of the establishments used a secondary energy source. This is likely the result of the size of Universities and the likelihood of occupying multiple buildings. Hospitals (49 percent) had the second highest occurrence of secondary space heating. In Canada, electricity was the most-used secondary heating source, and this was true in every region. Natural gas was the next most-used secondary heating fuel nationally and regionally with the exception of Atlantic Canada, where light fuel oil was more prevalent. Natural gas is not a widely available option to consumers in the Atlantic region.

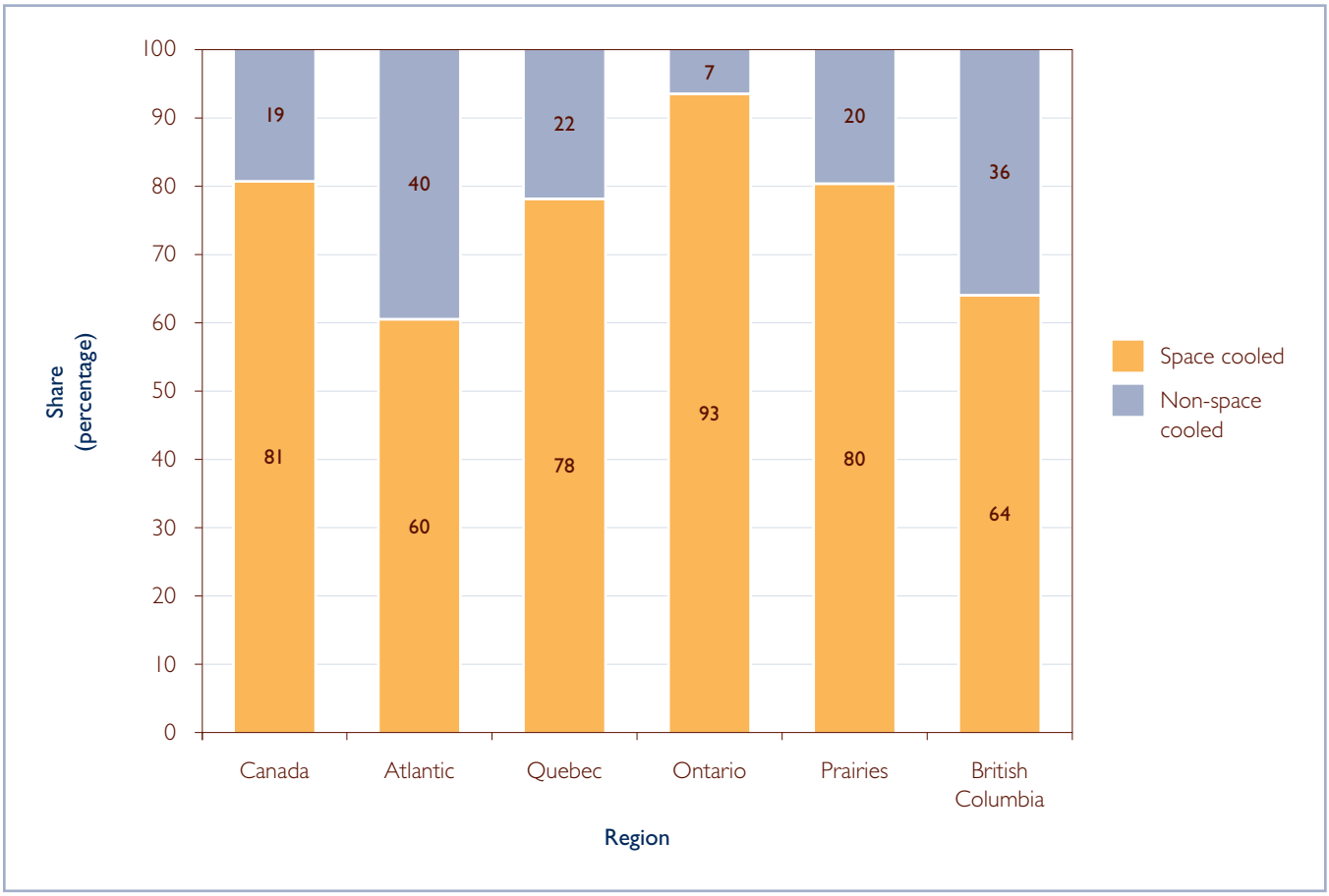
19 Natural Resources Canada, *2007 Survey of Household Energy Use – Summary Report*, p.26. **oee.nrcan.gc.ca/Publications/statistics/sheu-summary07/index.cfm?attr=0**

6.2 Space cooling

According to the SCIEU 2009 estimates, 81 percent of the C&I sector establishments were at least partially space cooled.

As shown in Figure 6.1, the proportion of establishments that were space cooled varied across Canada. While the lowest proportions of space-cooled establishments were found in British Columbia (64 percent) and Atlantic Canada (60 percent), the highest rates were shown in Ontario (93 percent), the Prairies (80 percent) and Quebec (78 percent). These trends are somewhat consistent with climatic data that show that the coastal regions were among the cooler provinces in the cooling season according to CDDs (see Appendix F), with each Atlantic province and British Columbia being below the Canadian average. The two provinces with the most CDDs in 2009 were Quebec and Ontario.

Figure 6.1 – Share of space-cooled establishments in the C&I sector, by region, 2009



Electricity was, by far, the most widely-used energy source for space cooling across all regions (see Figure 6.2). At the Canadian level, the second most-used fuel for space cooling was natural gas, used by 12 percent of cooled establishments.

The activity grouping with the lowest percentage of space-cooled establishments was Religious Organizations at 49 percent. This may result from the part-time nature of this activity.

Transportation and Other Services and Education also had a lower percentage of space-cooled establishments, with 64 percent and 72 percent, respectively. The result for Education is due to the school year not coinciding with the cooling season, particularly in Primary and Secondary Schools, which had the lowest rate among subactivities at 66 percent. The low rate of cooling in Transportation and Other Services is the result of characteristics of the activity grouping.

Figure 6.2 – Share of primary energy sources for space cooling for those that space cool in the C&I sector, by region, 2009

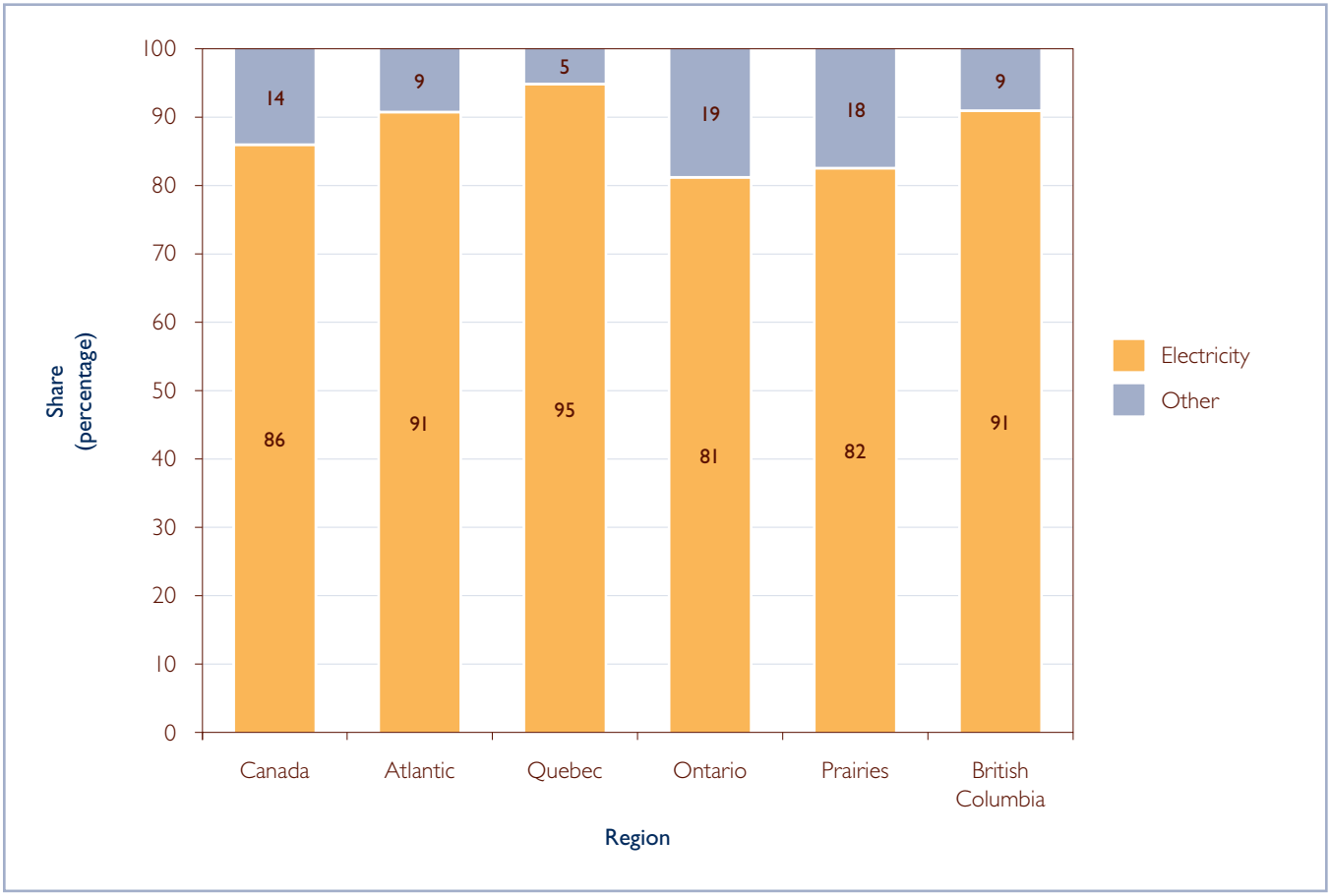


Table 6.2 – Establishments by primary source for space cooling by activity grouping, 2009

Activity grouping (NAICS)	Establishments										
	Establishments		Electricity			Other			No space cooling		
Wholesale and Warehousing (41 and 49)	49 238	A	35 820	(73%)	A	6 203	(13%)	C	7 215	(15%)	B
Wholesale Trade (41)	44 072	A	31 166	(71%)	A	6 199	(14%)	C	6 707	(15%)	B
Postal Service (49)	.	F	.		F	X		X	509		B
Retail Trade (44–45)	105 531	A	82 033	(78%)	A	10 394	(10%)	B	13 104	(12%)	B
Retail Trade (44–45, excluding 445)	85 408	A	65 270	(76%)	A	9 390	(11%)	C	10 747	(13%)	B
Food and Beverage Industries (445)	20 123	A	16 762	(83%)	A			F	2 357	(12%)	B
Information and Cultural Industries (51)	8 118	A	6 957	(86%)	A	486	(6%)	C	674	(8%)	B
Financial, Real Estate and Other Professional Services (52–56)	128 781	A	86 508	(67%)	A	21 004	(16%)	B	21 270	(17%)	C
Public Administration (91)	6 552	A	4 838	(74%)	A			F	1 378	(21%)	B
Education (61)	21 392	A	13 803	(65%)	A	1 579	(7%)	B	6 010	(28%)	A
Primary and Secondary Schools (6111)	14 695	A	8 919	(61%)	A			F	4 967	(34%)	A
Colleges and CÉGEPs (6112, 6114, 6115, 6116, 6117)	6 420	A	4 635	(72%)	A	757	(12%)	C	1 027	(16%)	B
Universities (6113)	278	B	249	(90%)	B	13	(5%)	C	16	(6%)	C
Health (62)	70 541	A	54 085	(77%)	A	10 039	(14%)	A	6 417	(9%)	A
Ambulatory Health Care Services (621)	48 568	A	38 699	(80%)	A	8 381	(17%)	B			F
Hospitals (622)	633	A	585	(93%)	A			F	X		X
Nursing and Residential Care Facilities (623)	7 888	A	5 361	(68%)	A	744	(9%)	C	1 784	(23%)	A
Social Assistance (624)	13 452	A	9 439	(70%)	A			F	3 136	(23%)	A
Arts, Entertainment and Recreation (71)	11 149	A	6 766	(61%)	A	1 942	(17%)	B	2 441	(22%)	A
Accommodation and Food Services (72)	62 780	A	49 589	(79%)	A	5 442	(9%)	C	7 750	(12%)	B
Accommodation Services (721)	7 897	A	5 825	(74%)	A			F	1 807	(23%)	A
Food Services and Drinking Places (722)	54 884	A	43 764	(80%)	A	5 177	(9%)	C	5 943	(11%)	C
Transportation and Other Services (48 and 81) (Except 813110)	93 791	A	52 331	(56%)	A			F	33 380	(36%)	A
Religious Organizations (813110)	27 601	A	11 998	(43%)	A	1 453	(5%)	C	14 149	(51%)	A
Canadian C&I sector	**585 475**	**A**	**404 729**	**(69%)**	**A**	**66 957**	**(11%)**	**A**	**113 789**	**(19%)**	**A**

Other fuels category includes natural gas, oil, propane, kerosene, district steam, district hot water and district chilled water, wood and on-site electricity.

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

6.3 Water heating

According to the SCIEU 2009 estimates, 89 percent of all C&I establishments heated their water. This rate varied from 93 percent in the Prairies to 80 percent in British Columbia. The surprising low value in British Columbia may be attributed to the province's mix of activity groupings.

Electricity was the main energy source for water heating in Canada, providing power to 53 percent of establishments that had water heaters. By comparison, 44 percent of establishments that heated water used natural gas, and only 3 percent used other fuels.

From a regional perspective, electricity was the dominant energy source used for water heating by establishments in the Atlantic region (71 percent) and Quebec (84 percent) (see Figure 6.3). Outside of these regions, the primary fuel used was natural gas. In Ontario, 53 percent of establishments used natural gas, while 46 percent used electricity. C&I establishments in British Columbia mostly used natural gas (53 percent) for their hot water needs, while 45 percent used electricity. Finally, the Prairies had the largest percentage of establishments using natural gas at 68 percent, while 32 percent used electricity to heat their water.

The SCIEU 2009 allows for the examination of water heating by activity grouping. It was found that in 2009, the percentage of establishments by sector differed depending on the type of activity. Two subactivities, Hospitals and Universities, had hot water in 100 percent of their establishments. This is expected because these are large institutions that are likely to have specific functions requiring the use of hot water, in the case of showers and sinks for sanitary purposes, for example. Activity groupings with a high percentage of establishments that heated water were Food and Accommodations Services, Health Care, Education and Public Administration. These are either characterised by activities that require hot water for sanitation or are large establishments.

The SCIEU 2009 found that the activity grouping with the lowest proportion of establishments that heated water was the Transportation and Other Services grouping. The Retail Trade subactivity also only had 84 percent of establishments heating water. In the case of Retail Trade, these can include stores located in malls that do not heat water themselves but have access via a shared facility. Transportation and Other Services includes many small establishments (average floor space of 575 m^2) that may be private enterprises with the "establishment" consisting of nothing more than a site to base operations while most of the time is spent "on the road."

The next lowest activity grouping with a low percentage of establishments that heated water was Financial, Real Estate and Other Professional Services. This activity grouping contains a number of smaller establishments (average 669 m^2) that may be housed inside a building, similar to malls, and therefore only have access to hot water outside of the establishment. This activity grouping also has a wide mix of activity types (from Legal Services to Landscaping Services to Waste Management) that may not need hot water, resulting in a lower percentage of establishments heating their water.

Figure 6.3 – Share of primary energy sources for water heating among establishments that heated water in the C&I sector, by region, 2009

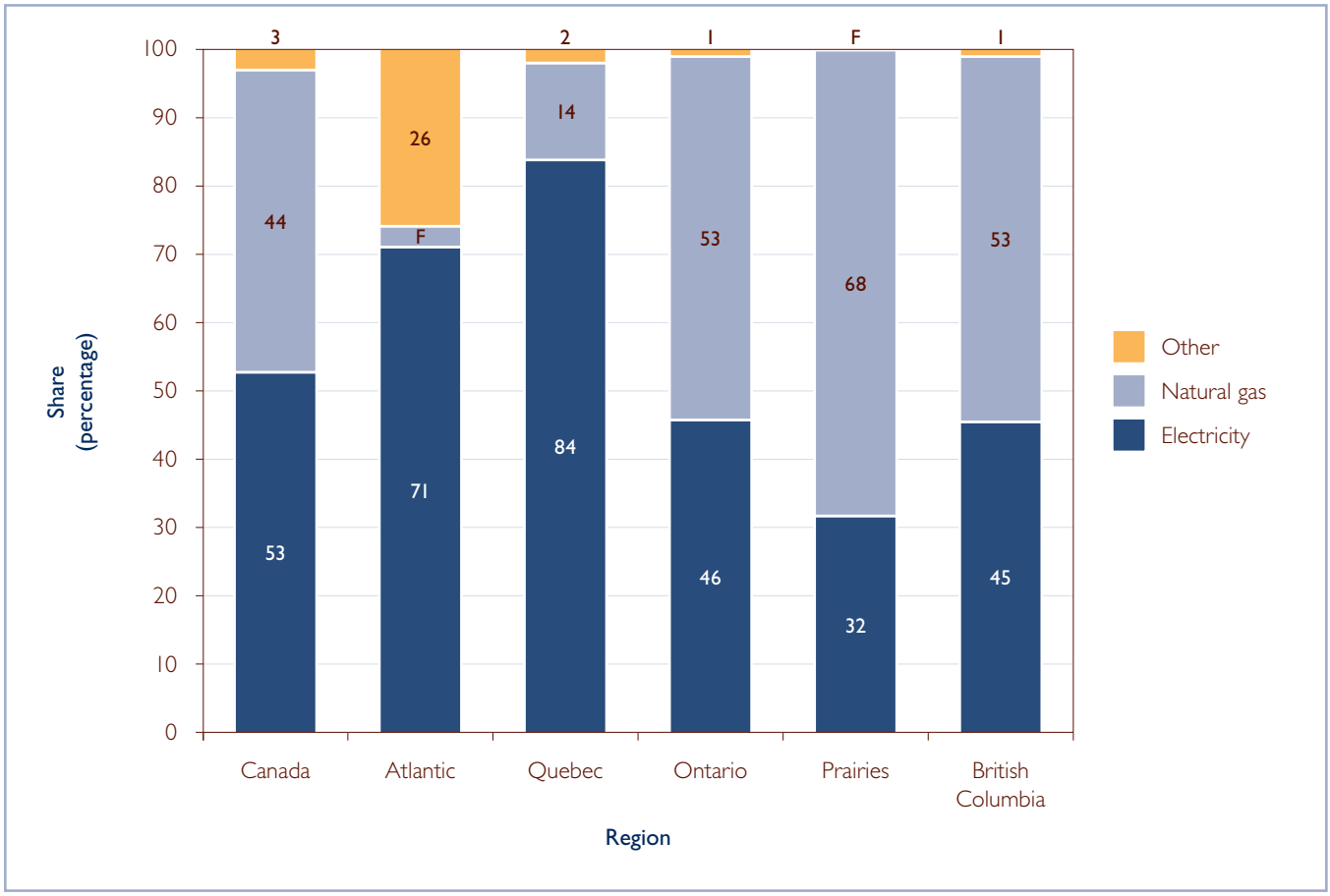

Table 6.3 – Establishments that heat water by activity grouping

Activity grouping (NAICS)	Establishments													
	Establishments		No water heating			Electricity			Natural gas			Other		
Wholesale and Warehousing (41 and 49)	49 238	A	5 062	(10%)	C	24 269	(49%)	A	19 528	(40%)	A			F
Wholesale Trade (41)	44 072	A	4 780	(11%)	C	20 394	(46%)	A	X		X	X		X
Postal Service (49)		F	282		C	X		X	1 002		A	X		X
Retail Trade (44–45)	105 531	A	14 984	(14%)	B	62 314	(59%)	A	26 791	(25%)	A	1 441	(1%)	C
Retail Trade (44–45, excluding 445)	85 408	A	13 721	(16%)	B	50 316	(59%)	A	20 289	(24%)	B			F
Food and Beverage Industries (445)	20 123	A	1 264	(6%)	C	11 998	(60%)	A	6 502	(32%)	A	359	(2%)	B
Information and Cultural Industries (51)	8 118	A	654	(8%)	C	3 883	(48%)	A	3 453	(43%)	A			F
Financial, Real Estate and Other Professional Services (52–56)	128 781	A	16 646	(13%)	C	61 104	(47%)	A	49 407	(38%)	A			F
Public Administration (91)	6 552	A	X		X	3 524	(54%)	A	2 146	(33%)	B	X		X
Education (61)	21 392	A	1 327	(6%)	B	7 695	(36%)	A	11 350	(53%)	A	1 020	(5%)	A
Primary and Secondary Schools (6111)	14 695	A			F	5 767	(39%)	A	7 827	(53%)	A	694	(5%)	A
Colleges and CÉGEPs (6112, 6114, 6115, 6116, 6117)	6 420	A	921	(14%)	B	1 887	(29%)	A	3 321	(52%)	A			F
Universities (6113)	278	B	X		X	41	(15%)	A	202	(73%)	C	35	(13%)	A
Health (62)	70 541	A	3 905	(6%)	B	32 011	(45%)	A	32 447	(46%)	A	2 178	(3%)	B
Ambulatory Health Care Services (621)	48 568	A	2 979	(6%)	C	22 343	(46%)	A	22 640	(47%)	A	606	(1%)	B
Hospitals (622)	633	A	X		X	104	(16%)	B	415	(66%)	A	111	(18%)	A
Nursing and Residential Care Facilities (623)	7 888	A	X		X	2 238	(28%)	A	4 997	(63%)	A	X		X
Social Assistance (624)	13 452	A			F	7 326	(54%)	A	4 394	(33%)	A			F
Arts, Entertainment and Recreation (71)	11 149	A			F	4 885	(44%)	A	4 503	(40%)	A	1 040	(9%)	C
Accommodation and Food Services (72)	62 780	A			F	24 552	(39%)	A	31 725	(51%)	A	4 122	(7%)	C
Accommodation Services (721)	7 897	A	X		X	2 351	(30%)	A	3 538	(45%)	A	X		X
Food Services and Drinking Places (722)	54 884	A			F	22 201	(40%)	A	28 188	(51%)	A			F
Transportation and Other Services (48 and 81) (Except 813110)	93 791	A	15 271	(16%)	B	39 922	(43%)	A	35 828	(38%)	A	2 771	(3%)	C
Religious Organizations (813110)	27 601	A	2 177	(8%)	C	10 958	(40%)	A	13 546	(49%)	A	920	(3%)	C
Canadian C&I sector	**585 475**	**A**	**63 527**	**(11%)**	**A**	**275 117**	**(47%)**	**A**	**230 723**	**(39%)**	**A**	**16 107**	**(3%)**	**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, X – Suppressed for reasons of confidentiality.

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

7 USE OF AUXILIARY EQUIPMENT

According to the annual OEE *Energy Use Data Handbook*, use of auxiliary equipment represented 18 percent of the energy used by the C&I sector in 2009.[20] It ranked second in terms of energy end use after space heating (49 percent), and ahead of lighting (11 percent), auxiliary motors (9 percent) and water heating (9 percent). Auxiliary equipment was also the fastest growing end use in the C&I sector, increasing by 134 percent from 1990 to 2009 and 54 percent since 2000. In absolute terms, auxiliary equipment was the source of 112 PJ of the 212 PJ increase seen in the C&I sector between 1990 and 2009. As a result, the SCIEU examined the prevalence of auxiliary equipment in the C&I sector in 2009.

Auxiliary equipment includes appliances that are plugged directly into an electrical outlet. For the purposes of this survey, the types of auxiliary equipment used in the C&I sector included

- computers (including laptops and other electronic devices with a microprocessor, but excluding cash registers and battery-operated and hand-held devices)
- computer servers (not including personal computers or laptops)
- cash registers
- printers (printers, photocopiers, fax machines and multifunctional devices)
- domestic appliances (e.g. stoves, microwaves, ovens, refrigerators, freezers, dishwashers)
- commercial food preparation appliances (e.g. stoves, ovens, refrigerators, freezers and dishwashers found in a cafeteria or restaurant)
- laundry washers and dryers
- medical appliances such as diagnosis or treatment machines (e.g. X-ray, CAT scan, MRI, dialysis, ultrasound)
- sterilizing machines
- vending machines
- automated teller machines (ATMs) or bank machines

Table 7.1 illustrates the auxiliary equipment used per activity grouping. According to the survey, almost 19 million units of auxiliary equipment (as defined above) were used. Computers were the most commonly used piece of equipment throughout the C&I sector, at 10.2 million units. The Financial, Real Estate and Other Professional Service activity grouping used 32 percent of all computers in the C&I sector. The Education activity grouping accounted for just over one quarter of computer use, mainly in Primary and Secondary Schools.

Printers were the second most-used units of equipment (16 percent), while domestic appliances were third (14 percent).

For specific equipment, only select activity groupings were surveyed. For example, only those in the Health Care activity grouping were asked about medical and sterilizing equipment. Only Hospitals, Nursing and Residential Care Facilities and Accommodation Services were asked if they used laundry washers and dryers. As a result, 100 percent of these equipment types appear in those select sectors while a small percentage would actually be in use outside of those sectors.

20 Natural Resources Canada, *Comprehensive Energy Use Database*, 1990–2010 **oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablestrends2/com_ca_4_e_4.cfm?attr=0**

Table 7.1 – Number of pieces of equipment used by establishments, by activity grouping, 2009

Activity grouping (NAICS)	Equipment											
	Computers			Computer servers			Printers etc.			Domestic appliances		
Wholesale and Warehousing (41 and 49)	267 950	(9%)	A	56 610	(6%)	A	267 950	(9%)	A	139 188	(5%)	A
Wholesale Trade (41)	233 567	(8%)	A	49 576	(5%)	A	233 567	(8%)	A	123 413	(5%)	A
Postal Service (49)			F	7 034	(1%)	C			F			F
Retail Trade (44–45)	345 321	(11%)	A	93 083	(9%)	A	345 321	(11%)	A	270 631	(10%)	A
Retail Trade (44–45, excluding 445)	289 896	(10%)	A	74 526	(7%)	A	289 896	(10%)	A	192 106	(7%)	A
Food and Beverage Industries (445)	55 425	(2%)	B	18 556	(2%)	C	55 425	(2%)	A	78 525	(3%)	A
Information and Cultural Industries (51)	47 276	(2%)	B	44 966	(4%)	B	47 276	(2%)	A	25 311	(1%)	A
Financial, Real Estate and Other Professional Services (52–56)	815 816	(27%)	A	452 270	(44%)	B	815 816	(27%)	A	384 574	(14%)	A
Public Administration (91)	137 493	(5%)	B	49 854	(5%)	B	137 493	(5%)	A	55 084	(2%)	A
Education (61)	407 869	(13%)	A	60 889	(6%)	A	407 869	(13%)	A	213 325	(8%)	A
Primary and Secondary Schools (6111)	132 747	(4%)	A	19 530	(2%)	A	132 747	(4%)	A	143 101	(5%)	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	58 786	(2%)	B	15 993	(2%)	A	58 786	(2%)	A	38 051	(1%)	A
Universities (6113)	216 337	(7%)	B	25 366	(2%)	A	216 337	(7%)	A	32 173	(1%)	A
Health (62)	450 328	(15%)	A	93 876	(9%)	A	450 328	(15%)	A	682 875	(25%)	B
Ambulatory Health Care Services (621)	272 204	(9%)	B	54 910	(5%)	A	272 204	(9%)	A	222 644	(8%)	B
Hospitals (622)	76 438	(3%)	A	17 860	(2%)	A	76 438	(3%)	A	28 269	(1%)	A
Nursing and Residential Care Facilities (623)	43 248	(1%)	B	8 058	(1%)	B	43 248	(1%)	A	168 853	(6%)	A
Social Assistance (624)	58 438	(2%)	A	13 048	(1%)	B	58 438	(2%)	A			F
Arts, Entertainment and Recreation (71)	43 336	(1%)	A	14 684	(1%)	C	43 336	(1%)	A	45 372	(2%)	A
Accommodation and Food Services (72)	157 344	(5%)	A	38 633	(4%)	A	157 344	(5%)	A	500 015	(18%)	A
Accommodation Services (721)	57 270	(2%)	B	6 847	(1%)	B	57 270	(2%)	A	347 818	(13%)	A
Food Services and Drinking Places (722)	100 074	(3%)	B	31 787	(3%)	B	100 074	(3%)	A	152 197	(6%)	A
Transportation and Other Services (48 and 81) (Except 813110)	266 389	(9%)	B	99 532	(10%)	B	266 389	(9%)	A	255 428	(9%)	A
Religious Organizations (813110)	92 837	(3%)	B	18 136	(2%)	B	92 837	(3%)	A	157 002	(6%)	A
Canadian C&I sector	**3 031 959**	**(100%)**	**A**	**1 022 532**	**(100%)**	**A**	**3 031 959**	**(100%)**	**A**	**2 728 806**	**(100%)**	**A**

(continued)

Table 7.1 – Number of pieces of equipment used by establishments, by activity grouping, 2009 (continued)

Activity grouping (NAICS)	Equipment											
	Commercial appliances			Laundry			Vending machines			Cash registers		
Wholesale and Warehousing (41 and 49)	17 424	(2%)	C	X		X	12 531	(6%)	A	11 768	(3%)	C
Wholesale Trade (41)	16 850	(2%)	C	X		X	9 640	(5%)	B	11 451	(3%)	C
Postal Service (49)	574	(0%)	C	X		X	2 891	(1%)	A	317	(0%)	C
Retail Trade (44–45)	111 127	(11%)	A	X		X	61 343	(30%)	C	195 250	(48%)	A
Retail Trade (44–45, excluding 445)	23 486	(2%)	B	X		X	51 345	(25%)	C	136 058	(34%)	A
Food and Beverage Industries (445)	87 641	(9%)	A	X		X	9 998	(5%)	A	59 192	(15%)	A
Information and Cultural Industries (51)	3 272	(0%)	C	X		X	3 125	(2%)	B	2 107	(1%)	C
Financial, Real Estate and Other Professional Services (52–56)			F	X		X	26 742	(13%)	B			F
Public Administration (91)	6 527	(1%)	C	X		X	13 056	(6%)	B	5 066	(1%)	B
Education (61)	47 880	(5%)	A	X		X	30 273	(15%)	A	10 262	(3%)	A
Primary and Secondary Schools (6111)	27 228	(3%)	A	X		X	14 987	(7%)	A	4 341	(1%)	A
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	12 815	(1%)	C	X		X	6 389	(3%)	A	2 075	(1%)	B
Universities (6113)	7 837	(1%)	A	X		X	8 897	(4%)	A	3 846	(1%)	A
Health (62)	104 597	(11%)	B	42 072	(57%)	A	14 431	(7%)	B	5 544	(1%)	B
Ambulatory Health Care Services (621)	9 751	(1%)	C	X		X			F			F
Hospitals (622)	10 073	(1%)	A	4 489	(6%)	A	3 539	(2%)	A	1 228	(0%)	A
Nursing and Residential Care Facilities (623)			F	37 583	(51%)	A	3 604	(2%)	B	904	(0%)	C
Social Assistance (624)			F	X		X	3 206	(2%)	C	153	(0%)	C
Arts, Entertainment and Recreation (71)	39 246	(4%)	A	X		X	5 523	(3%)	A	11 024	(3%)	A
Accommodation and Food Services (72)	573 711	(59%)	C	X		X	19 441	(10%)	A	108 028	(27%)	C
Accommodation Services (721)	39 557	(4%)	C	32 109	(43%)	A	10 937	(5%)	B	7 793	(2%)	C
Food Services and Drinking Places (722)	534 154	(55%)	C	X		X	8 505	(4%)	B	100 235	(25%)	C
Transportation and Other Services (48 and 81) (Except 813110)	21 540	(2%)	C	X		X	15 099	(7%)	B	42 760	(11%)	C
Religious Organizations (813110)	32 890	(3%)	C	X		X	2 158	(1%)	B	345	(0%)	C
Canadian C&I sector	**971 926**	**(100%)**	**A**	**74 181**	**(100%)**	**A**	**203 722**	**(100%)**	**A**	**405 551**	**(100%)**	**A**

(continued)

Table 7.1 – Number of pieces of equipment used by establishments, by activity grouping, 2009 (continued)

Activity grouping (NAICS)	Equipment								
	Medical devices			ATM machines			Sterilizing machines		
Wholesale and Warehousing (41 and 49)	X		X			F	X		X
Wholesale Trade (41)	X		X			F	X		X
Postal Service (49)	X		X			F	X		X
Retail Trade (44–45)	X		X	21 272	(20%)	A	X		X
Retail Trade (44–45, excluding 445)	X		X	13 827	(13%)	B	X		X
Food and Beverage Industries (445)	X		X	7 445	(7%)	A	X		X
Information and Cultural Industries (51)	X		X			F	X		X
Financial, Real Estate and Other Professional Services (52–56)	X		X			F	X		X
Public Administration (91)	X		X	2 069	(2%)	C	X		X
Education (61)	X		X	1 407	(1%)	A	X		X
Primary and Secondary Schools (6111)	X		X	363	(0%)	C	X		X
Colleges, CÉGEPs and Other Schools (6112, 6114, 6115, 6116, 6117)	X		X	363	(0%)	B	X		X
Universities (6113)	X		X	681	(1%)	A	X		X
Health (62)	147 171	(100%)	A	3 660	(3%)	B	60 881	(100%)	A
Ambulatory Health Care Services (621)	110 498	(75%)	A	3 022	(3%)	B	56 214	(92%)	A
Hospitals (622)	36 077	(24%)	A	373	(0%)	A	2 925	(5%)	A
Nursing and Residential Care Facilities (623)	596	(0%)	C			F	1 741	(3%)	B
Social Assistance (624)	X		X			F	X		X
Arts, Entertainment and Recreation (71)	X		X	2 670	(3%)	B	X		X
Accommodation and Food Services (72)	X		X			F	X		X
Accommodation Services (721)	X		X			F	X		X
Food Services and Drinking Places (722)	X		X			F	X		X
Transportation and Other Services (48 and 81) (Except 813110)	X		X			F	X		X
Religious Organizations (813110)	X		X			F	X		X
Canadian C&I sector	**147 367**	**(100%)**	**A**	**106 413**	**(100%)**	**A**	**60 881**	**(100%)**	**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, X – Suppressed for reasons of confidentiality.

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

APPENDIX A

CLASSIFICATION OF COMMERCIAL AND INSTITUTIONAL ESTABLISHMENTS

For the purposes of the SCIEU 2009, the establishments were classified in accordance with the 2007 North America Industry Classification System (NAICS).[21]

Wholesale and Warehousing (NAICS 41, 49)

Wholesale Trade (NAICS 41)

- 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 Electronic Markets, and Agents and Brokers.

Postal Services (NAICS 49)

- Postal Service; Couriers and Messengers; Warehousing and Storage.

Retail Trade (NAICS 44, 45)

Non-Food Retail Trade (NAICS 44 (except 445), 45)

- 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.

Food and Beverage Stores (NAICS 445)

- Grocery Stores; Specialty Food Stores; Beer, Wine and Liquor Stores.

Information and Cultural Industries (NAICS 51)

- Publishing Industries (except Internet); Motion Picture and Sound Recording Industries; Broadcasting (except Internet); Telecommunications; Data Processing, Hosting, and Related Services; Other Information Services.

Financial, Real Estate and Other Professional Services (NAICS 52, 53, 54, 55, 56)

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

- Professional, Scientific and Technical Services.

Management of Companies and Enterprises – NAICS 55

- Management of Companies and Enterprises.

Administrative and Support, Waste Management and Remediation Services – NAICS 56

- Administrative and Support Services; Waste Management and Remediation Services.

21 Statistics Canada, **http://statcan.gc.ca/subjects-sujets/standard-norme/naics-scian/2007/index-indexe-eng.htm**.

Public Administration (NAICS 91)

- Federal Government Public Administration; Provincial and Territorial Public Administration; Local, Municipal and Regional Public Administration; Aboriginal Public Administration; International and Other Extra-Territorial Public Administration.

Educational Services (NAICS 61)

Elementary and Secondary Schools (NAICS 6111)

Community Colleges and C.E.G.E.P.s (NAICS 6112)

Universities (NAICS 6113)

Business Schools and Computer Management Training (NAICS 6114)

Technical and Trade Schools (NAICS 6115)

Other Schools and Instruction (NAICS 6116)

Educational Support Services (NAICS 6117).

Health Care and Social Assistance (NAICS 62)

Ambulatory 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 Facilities, 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.

Arts, Entertainment and Recreation (NAICS 71)

- Performing Arts, Spectator Sports and Related Industries; Heritage Institutions; Amusement, Gambling and Recreation Industries.

Accommodation and Food Services (NAICS 72)

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).

Transportation and Other Services (NAICS 48, 81, except 813110)

- Air Transportation; Rail Transportation; Water Transportation; Truck Transportation; Transit and Ground Passenger Transportation; Pipeline Transportation; Scenic and Sightseeing Transportation; Support Activities for Transportation;
- Automotive Repair and Maintenance; Electronic and Precision Equipment Repair and Maintenance; Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance; Personal and Household Goods Repair and Maintenance; Personal Care Services; Funeral Services; Dry Cleaning and Laundry Services; Other Personal Services; Grant-Making and Giving Services; Social Advocacy Organizations; Civic and Social Organizations; Business, Professional, Labour and Other Membership Organizations; Private Households.

Religious Organizations (NAICS 813110)

- This industry comprises establishments primarily engaged in operating religious organizations for religious worship, training or study; administering an organized religion; or promoting religious activities.

APPENDIX B
METHODOLOGY

Appendix B summarizes the methodology used by Statistics Canada to generate the microdata file that Natural Resources Canada analyzed to create the SCIEU 2009, and contains the methodology for the establishments side of the survey. For more detail or information on the buildings side of the survey, refer to the complete version of the methodology, which is available on the Statistics Canada Web site.[22]

Introduction

The Survey of Commercial and Institutional Energy Use (SCIEU) was first conducted for reference year 2009 and amalgamated components from two previous surveys: the annual Commercial and Institutional Consumption of Energy Survey (CICES) and the Commercial and Industrial Building Energy Survey (CIBEUS). CICES had been conducted annually via mail-out/mail-back questionnaires to monitor energy consumption trends in the Commercial and Institutional sector at the establishment level. For reference year 2009, an integrated survey was designed that would collect data at both levels by using a coordinated approach for sampling and data collection.

Overview of the integrated survey

The SCIEU integrated building- and establishment-level components throughout the survey process. This was done primarily to take advantage of the direct relationships between establishments and buildings, which enabled both a cost savings and a reduction in response burden. For approximately 50 percent of the establishments in the target population, the establishment and building were equivalent entities as the establishment completely occupied a single building. For the remaining establishments in the population, the relationships were more complex as buildings could house multiple establishments, and an establishment could occupy multiple buildings (either completely or partially).

Establishment component

To maintain consistency with the quality requirements of previous iterations of the CICES survey, the establishment component of the SCIEU was designed to yield estimates of proportions with standard errors of 5 percent or less at the industry by region level. Other types of estimates produced from the survey data (e.g. totals, means and ratios such as energy intensity) could have coefficients of variation much higher than 5 percent, especially at detailed levels of industry or region.

Establishment target population

The target population of establishments consisted of all active businesses within commercial and institutional industries that had a minimum of one employee and a business location that was not a residence. The target population for institutions included hospitals and schools (primary, secondary, college and university). The predetermined NAICS codes for commercial establishments are listed in Section Establishment survey frame in Table B.1 (industries 1 to 14 and 19[23]). The target population excludes establishments located in the territories.

Establishment survey frame

The survey frame for establishments was created from three lists. The first list was comprised of hospitals and was provided by the Health Statistics Division of Statistics Canada. The second list was comprised of primary and secondary schools (private and public) and was provided by Statistics Canada's Culture, Tourism and the Centre for Education Statistics. The final list of establishments was taken from Statistics Canada's Business Register as of August 2010 and was based on the NAICS code for each industry (industries 1 to 14 and 19, see Table B.1). In total, the frame contained 867 671 units, categorized according to each industry as indicated in Table B.1.

22 Statistics Canada: Survey of Commercial and Institutional Energy Use (SCIEU) **www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5034&lang=en&db=imdb&adm=8&dis=2#b2**

23 For industry 19 (Religious Organizations), there was no employee requirement. Therefore, religious organizations with no employees were included.

Table B.1 – Stratification by industry

Frame industry number	Industry name	NAICS	Population
1	Wholesale Trade	41	61 279
2	Postal Service (491), Couriers and Messengers (492), Warehousing and Storage (493)	49	5 260
3	Retail Trade	44 (except 445) and 45	106 354
4	Food and Beverage Industries	445	23 896
5	Information and Cultural Industries	51	13 369
6	Finance and Insurance, Real Estate and Rental Leasing; Professional, Scientific and Technical Services, Management of Companies and Enterprises, Administrative and Support, Waste Management and Remediation Services	52, 53, 54, 55 and 56	265 106
7	Ambulatory Health Care Services	621	64 083
8	Nursing and Residential Care Facilities	623	10 553
9	Social Assistance	624	17 627
10	Arts, Entertainment and Recreation	71	17 059
11	Accommodation Services	721	10 498
12	Food Services and Drinking Places	722	63 354
13	Transportation and Other Services (Except Public Administration)	48 and 81 (except 813110)	160 582
14	Public Administration	91	7 379
15	Colleges and CÉGEPs, Business Schools and Computer and Management Training, Technical and Trade Schools, Other Schools, Educational Support Services	6112, 6114, 6115, 6116, 6117	9 949
16	Universities	6113	198
17	Hospitals	622[24]	702
18	Primary and Secondary Schools[25]	6111[26]	16 222
19	Religious Organizations	813110	14 201

24 Frame from Health Statistics Division of Statistics Canada

25 Primary and Secondary Schools are commonly referred to as Elementary and Secondary Schools

26 Frame from Tourism and the Centre for Education Statistics of Statistics Canada

Stratification

Several variables were used to form layers of establishments, from which the sample was drawn, namely: industry, region, climate zone and size. Note that although climate zone was not a domain of interest for establishments, it was required when forming layers for establishments as the building design relied on the establishment sample.

Table B.2 outlines the definitions of the region variable and provides population counts. For information on climate zones, refer to Statistics Canada.[27]

Table B.2 – Stratification by region

Region	Provinces	Population count
Atlantic	New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador	59 509
Quebec	Quebec	186 451
Ontario	Ontario	315 327
Prairies	Manitoba, Saskatchewan, Alberta	170 661
British Columbia	British Columbia	135 723

Sample selection of establishments

The sample selection of 7141 establishments was done by using GSAM (Statistics Canada's generalized system for sampling). An option was used within GSAM to target approximately 50 percent of the sample in common with the 2008 CICES sample, in order to control the overlap. However, after applying the procedure, the percentage of units that overlap with the 2008 CICES sample was approximately 36 percent due to changes to the population, changes to the stratification, and an inability to track units over time in two of the industries (i.e. those that were not drawn from the Business Register).

Data collection

The two-stage data collection process included a pre-contact telephone call to the selected establishments to obtain the following information:

- confirmation that the establishment was in-scope for the survey (i.e. in operation during the reference period, belonged to a commercial/institutional industry, had at least one employee and occupied commercial/institutional space)
- identification of the most suitable respondent within the organization and collection or confirmation of their contact information
- collection of a list of the buildings that were occupied (partially or completely) by the establishment, along with contact information for a potential respondent for each building. If only one building was occupied, information was also collected on whether or not the building was shared with other establishments. This was used exclusively for the development of the buildings sample.

Once the pre-contact determined that an establishment was in-scope, the establishment was assigned to a regional office and ultimately an interviewer for data collection. The personal interviews were conducted using Computer Assisted Personal Interview software.

Depending on the occupancy characteristics of the establishment, data were either collected for the establishment, the building or both, using pre-programmed skip patterns in the application. Many data validation edits were also programmed into the application including bounds on acceptable values for individual variables as well as the relationship between associated variables (e.g. number of employees and total floor space).

Note that only the establishments for which pre-contact was successfully completed were included in the set of units that would receive personal interviews. For the establishments, the overall response rate was 56 percent. This was the response rate at estimation, calculated according to Statistics Canada's guidelines on reporting of non-response rates.

Table B.3 indicates collection outcomes at the establishment level after combining the two stages.

27 Statistics Canada: Survey of Commercial and Institutional Energy Use (SCIEU) **www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5034&lang=en&db=imdb&adm=8&dis=2#b2**

Table B.3 – Collection outcomes

Total sample	7 141
Non-response to pre-contact	1 998
Non-response to personal interview	390
Out-of scope (pre-contact or personal interview)	936
Completed personal interview [28]	3 276
Unusable personal interview [29]	541

The multiple stages of data collection allowed for a breakdown of response rates at each step. The response rate at the pre-contact stage was 73 percent, followed by a response rate of 90 percent for the cases that proceeded to the personal interview stage. At the processing stage, a number of unusable records were identified (e.g. permission to share their data with Natural Resources Canada was not given or severe edit failures were found in mandatory response fields) which resulted in an effective response rate of 86 percent at this stage.

Data processing

Data validation

The data were validated by using a series of edits developed by Statistics Canada's Business Special Surveys and Technology Statistics Division (BSSTSD) and Business Survey Methods Division (BSMD) during a question-by-question review. For each question, relationships with other questions were considered, as well as any relationships that should exist with frame variables. These edits were applied either as automated updates (such as unit of measure conversions) or were used to flag individual observations for subject matter expert review.

Imputation for item non-response

Imputation for the SCIEU was performed to treat partial non-response (also called item non-response). Note that complete non-respondents were accounted for during the weighting process by adjusting the weight of all responding records. See Section 2.4 of Statistics Canada's full methodology for more information on imputation and weight adjustment for unit non-response.[30]

A returned questionnaire was considered a partial non-response when the mandatory variables (floor space, energy sources used and building activity) were fully completed for a respondent, but one or more non-mandatory variables were left blank and would be completed via imputation. Returned questionnaires that were missing one or more mandatory variables were classified as total non-respondents and treated through re-weighting. The imputation of the non-mandatory survey variables was performed using the statistical technique called nearest neighbour donor imputation.

Nearest neighbour donor imputation was applied when cells requiring imputation (the recipient) were identified and imputed by using a donor record that did not require imputation and was identified as being the most similar to the recipient record. These similar records were found by taking into account other variables that were correlated with the missing values via imputation groups and matching fields and were customized to each variable to be imputed. If a match was not found for all recipients, it was necessary to be less discriminating by changing the imputation groups and reprocessing the data.

For example, similar units would be located by region rather than by province, and thus more donors in each group would be available for the recipients requiring imputation. This substitution continued by a predetermined sequence until a donor was assigned to all records requiring imputation. Once a match was found, the value of the variable(s) imputed was copied from the donor record and used by the recipient record as the imputed value. This new imputed value replaced the previous missing value that this variable contained. Finally, post-imputation edits were applied to ensure that the resulting record did not violate any of the specified edits.

The personal interviews were conducted with a computer application containing many built-in edits; thus, the occurrences of item non-response were quite low for the most part.

28 Includes responses derived from worksheets where no personal interview took place

29 Includes responses with severe edit failures, as well as those that did not authorize Statistics Canada to share their data with Natural Resources Canada.

30 Statistics Canada: Survey of Commercial and Institutional Energy Use (SCIEU) **www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5034&lang=en&db=imdb&adm=8&dis=2#b2**

Outlier detection and treatment

In order to ensure that survey results were not unduly influenced by individual respondents or small groups of respondents, an outlier detection and treatment process was applied. These cases were referred to subject matter experts for review, and in some cases, this led to a modification of the values to correct transcription errors or reporting errors.

Factors affecting comparability

The SCIEU was not designed as a longitudinal survey that would provide an efficient basis for comparison with previous surveys. As previous iterations were designed to produce cross-sectional estimates, the special procedures required for a longitudinal survey were not implemented in the survey design.

At the request of NRCan, the SCIEU sample was selected to yield controlled overlap with the 2008 CICES sample of establishments. A target of 50 percent overlap was specified at the stratum level in the sampling program and an overlap rate of 36 percent was achieved due to stratification constraints and a lack of identifiers to identify individual establishments in multiple years in several industries. This overlap was intended to evaluate the impact of changing collection modes from 2008.

Due to the non-response encountered in both the 2008 CICES survey and the 2009 SCIEU survey, the number of responding units in common was low and insufficient for accurate year-to-year comparisons. A number of methodological changes, including those summarized below, were introduced for the 2009 survey. These changes affect comparability of the results with previous surveys, and make it difficult to draw conclusions on real changes in the population of establishments by using comparisons of the SCIEU 2009 establishment-based estimates and CICES 2008 establishment-based estimates.

- changes to the definition of the target population. The target population for the SCIEU included three industries that were not previously surveyed: NAICS codes 48, 55 and 56.
- changes to the establishment survey population. In order to consolidate the frame to minimize the number of independent sources, the Business Register was used in place of custom lists for universities and colleges.
- change in collection mode on quality of response. To improve the quality of the reported data and increase the response rate, the data collection process was altered for the current survey. In the 2008 CICES survey, after a telephone pre-contact, the questionnaire data was collected via mail-out/mail-back paper questionnaires. In 2009, the telephone pre-contact confirmed or updated address, contact and industry information but the survey data were collected via computer-assisted personal interview, with worksheet(s) mailed to the respondent prior to the interview to help with completing the SCIEU questionnaire.
- increase to response rate. The increased response rate reduced the risk of non-response bias compared to previous CICES surveys. In addition, the increase in the response rate may have yielded a different profile for the responding units, which could have led to differences in the estimates.
- change to the collection instrument. Some questions were rephrased. Also, if the respondent was unable to provide an exact value for quantitative questions, a choice of ranges was provided for the respondent to choose from.
- increased focus on defining the coverage of each questionnaire for the respondents. With the availability of a roster of buildings and more opportunity for contact with each respondent, increased efforts were made to ensure that the respondent was answering for the correct amount of physical space (i.e. report for the entire chain or only one address).

In addition to methodological changes, the sampling variance should be considered when making comparisons between surveys. As with previous iterations of the CICES, a hypothesis testing approach that incorporates the estimated sampling variance of the estimates from each year is recommended to distinguish statistically significant differences from those that are potentially attributed to sampling errors.

APPENDIX C
GLOSSARY

automated teller machine (ATM)

a computerized telecommunications device that provides the clients of a financial institution with access to financial transactions in a public space without the need for a cashier, human clerk or bank teller

auxiliary equipment

stand-alone equipment powered directly from an electrical outlet such as computers, photocopiers, refrigerators and desktop lamps. It also includes equipment that can be powered by natural gas, propane or other fuels, such as clothes dryers and cooking appliances. See Chapter 7 for the types of auxiliary equipment covered by the SCIEU 2009. It does not cover auxiliary motors.

building

a structure totally enclosed by walls extending from the foundation to the roof

commercial food preparation appliances

appliances that are typically found in a cafeteria or restaurant. This includes industrial stoves, ovens, refrigerators, freezers and dishwashers.

census

a collection of information from all units of the population

computer

for the purpose of the SCIEU 2009, the definition of a computer, including laptops, includes other electronic devices with a microprocessor (excluding cash registers and battery-operated hand-held devices)

computer server

a computer system that provides essential services over a computer network. This excludes personal computers and laptops.

cooling degree-day (CDD)

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

diesel

all grades of low-sulphur (lower than 0.05 percent) distillate fuel used as an energy source for diesel engines. For the purpose of the SCIEU 2009, diesel does not include diesel used for transportation.

district chilled water

a cooling system that distributes chilled water generated in a centralized location for residential and commercial cooling requirements. After generation, the chilled water is distributed to the customer via a network of insulated pipes.

district heating (water and steam)

a heating system that distributes heat generated in a centralized location for residential and commercial heating requirements such as space heating and water heating. After generation, the heat is distributed to the customer via a network of insulated pipes. The common medium used for heat distribution is water, but steam is also used.

domestic appliances

appliances that are typically found in a residential setting (e.g. stoves, microwave ovens, refrigerators, freezers and dishwashers)

electricity

a form of energy emanating from electric charges at rest or in movement. For the purpose of the SCIEU 2009, electricity includes only purchased electricity. Self-generated electricity was included in the Other category.

energy consumption

For the SCIEU 2009, energy consumption is the sum of all energy sources used in an establishment. Those sources include electricity (purchased), natural gas, light fuel oil and other middle distillates, propane, diesel, heavy fuel oil, wood and wood by-products, steam (purchased) and other fuels (as specified by respondent). Consumption is reported in terms of energy (gigajoules) during 2009. Establishment energy consumption accounts for only building-level energy consumed at the physical location of the establishment (assumes that on-site electricity is used on-site) and excludes energy consumed for transportation.

energy intensity

The SCIEU 2009 measures energy intensity as the total amount of gigajoules of energy used by a group of establishments, divided by the total square metres of floor area of the same group.

energy source(s)

type(s) of energy used by an establishment. For the SCIEU 2009, energy sources include electricity, natural gas, light fuel oil and other middle distillates, propane, diesel, heavy fuel oil, wood and wood by-products, steam, renewable and other fuels (as specified by respondent) and can be sorted by space heating, water heating and space cooling requirements.

establishment

An establishment is the level at which the accounting data required to measure production is available (principal inputs, revenues, salaries and wages). The establishment, as a statistical unit, is defined as the most homogeneous unit of production for which the business maintains accounting records from which it is possible to assemble all of the data elements required to compile the full structure of the gross value of production (total sales or shipments, and inventories), the cost of materials and services, and labour and capital used in production.

floor area

all the area enclosed by the exterior walls of a building, both finished and unfinished, excluding indoor parking facilities, basements, hallways, lobbies, stairways, and elevator shafts

gigajoule (GJ)

a unit of measure for energy consumption equal to 1 billion joules or the equivalent of the energy consumed by a standard 60-watt incandescent light bulb over 193 days of use

heating degree-day (HDD)

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

heavy fuel oil

all grades of residual type fuels, including low-sulphur fuels, used mainly as an energy source for steam and electric power generation and diesel motors. This term includes fuel oil grade numbers 4, 5 and 6.

laundry washers and dryers

appliances used to wash and dry clothing. In the SCIEU 2009, only Accommodation Services, Nursing and Residential Care Facilities and Hospitals were surveyed about the presence of this equipment.

medical diagnosis or treatment machines

machines typically found in Health Care establishments. For the SCIEU 2009, the definition includes, but is not limited to, X-ray, CAT scan, MRI, dialysis, and ultrasound machines. In the SCIEU 2009, only Ambulatory Health Care Services, Nursing and Residential Care Facilities and Hospitals were surveyed about the presence of this equipment.

natural gas

an energy source that is a mixture of hydrocarbons (principally methane) and small quantities of various hydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs. It is delivered directly to buildings via pipelines.

North American Industrial Classification System (NAICS)

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

operating hours

For the SCIEU 2009, normal operating hours are considered to be the hours an establishment operates during a typical week. This excludes any time when maintenance, housekeeping or security staff is working outside of the establishment's normal operating hours. If the hours vary for different parts of the building or complex, respondents report for the area that is open the longest.

petajoule

One petajoule equals 1×10^{15} joules (1 million gigajoules) where a joule is the international unit of measure for energy – the energy produced by the power of one watt flowing for a second.

propane

an energy source that is normally a gaseous, straight-chain hydrocarbon (C_3H_8) extracted from natural gas or refinery gas streams. It can also take a liquid form.

space cooling

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

space heating

as an energy end use, the use of mechanical equipment to heat all or part of a building. It includes the principal space heating unit and any supplementary equipment.

sterilizing equipment

equipment used to sanitize medical instruments or other devices. In the SCIEU 2009, only Ambulatory Health Care Services, Nursing and Residential Care Facilities and Hospitals were surveyed about the presence of this equipment.

survey

a collection of information from some (a sample of) units of the population. The SCIEU 2009 was a survey of establishments in the C&I sector. Results from this survey were used to produce representative data estimates for all establishments in the C&I sector. These estimates are presented in this summary report.

vending machine

a self-contained device that dispenses a product when the user makes a product selection, often after the deposit of legal tender

water heating

as an energy end use, the use of energy to heat water for purposes other than space heating

year of construction

for the SCIEU 2009, the year in which the major portion of an establishment's building(s) was (were) completed. If two or more portions/buildings of equal size were constructed at different times, the oldest was reported.

APPENDIX D
QUESTIONNAIRE

Business Special Surveys and Technology Statistics Division

Survey of Commercial and Institutional Energy Use, 2009

CONFIDENTIAL when completed

Collected under authority of the *Statistics Act*, Revised Statutes of Canada, 1985, Chapter S19.

Si vous préférez recevoir cette feuille de travail en français, veuillez composer le 1-800-263-1136.

Information for the Respondent

The purpose of this survey

Statistics Canada, in partnership with Natural Resources Canada and Environment Canada, is conducting this survey to collect detailed information on the energy demand and consumption patterns of Canadian businesses, organizations and institutions as well as buildings. This survey collects data on the types and quantities of energy (such as electricity, natural gas etc.) consumed by small, medium and large businesses and institutions in Canada. One of the principal goals of Natural Resources Canada is to continually improve energy efficiency in Canada through various measures. Improving energy efficiency reduces greenhouse gas emissions that contribute to climate change. Given the current energy situation, this survey will be used to assess how well Canada is fulfilling its commitment both to increasing energy efficiency and reducing greenhouse gas emissions.

This worksheet is designed to help you gather the required information prior to our personal interview that will take place. Gathering this information prior to your personal interview is crucial to the success of this initiative. You will be contacted shortly to set up an interview time that works for you.

Your participation is important

This survey is conducted under the authority of the *Statistics Act*, Revised Statutes of Canada, 1985, Chapter S19. Completion of this survey is mandatory and your co-operation is essential to ensure the accuracy of the information collected.

The data you report are confidential

Statistics Canada is prohibited by law from publishing or releasing any statistics which would divulge information obtained from this survey that relates to any identifiable business, organization or institution without the previous consent of that business or institution. The data reported in this worksheet will be treated in strict confidence, used for statistical purposes and published in aggregate form only. The confidentiality provisions of the *Statistics Act* are not affected by either the *Access to Information Act* or any other legislation.

Data sharing agreements

For information on data-sharing agreements, please refer to the letter included in this package.

1. For the purpose of this worksheet, please indicate the 12 month period in which you are reporting. The target of this survey is to capture data for 2009. If a fiscal period is being reported, please report for the fiscal year in which the most months are in 2009.

		Year		Month			Year		Month
		0101		0102			0103		0104
Starting		2 0			**Ending**		2 0		

2. As of December 2009, what was the gross building area?

- Include all enclosed floors of the building, such as indoor parking, mechanical areas, common areas and basements.
- If you don't know the exact area, please provide your best estimate (i.e. multiply the length of your building by its width and by the number of floors).

Please provide the specific area: 0201 ☐☐☐☐☐☐☐☐

What is the area measured in? 0202 01 ◯ Square meters 03 ◯ Square feet

5-5300-545.1: 2010-10-06 STC/SBS-524-75340

Statistics Canada Statistique Canada

Canada

3. As of December 2009, what was the total rentable floor area occupied by your organization?

- Exclude indoor parking, and areas occupied by other organizations.
- If your organization occupies space in more than one building, the total rentable area should include the space occupied by your organization in all buildings.
- If you don't know the exact area, please provide your best estimate.

Please provide the specific area: 0301 ☐☐☐☐☐☐☐☐

Is that measured in: 0302 01 ◯ Square meters 03 ◯ Square feet

4. What percentage of the gross building area occupied by this organization was heated to at least 10 degrees Celsius (50 degrees Fahrenheit) during 2009, including basements and enclosed garages?

0401 ☐☐☐ %

5. What percentage of the gross building area occupied by this organization was air conditioned during 2009, including basements?

0501 ☐☐☐ %

6. If your building is a warehouse space, please provide the volume of refrigerated space for the following categories?

- **Volume of space cooled to 1 degree Celsius or higher** 0601 ☐☐☐☐☐☐☐☐☐
- **Volume of space cooled between 0 and -28 degrees Celsius** 0602 ☐☐☐☐☐☐☐☐☐
- **Volume of space cooled below -28 degree Celsius** 0603 ☐☐☐☐☐☐☐☐☐

What are these volumes measured in? 0604 01 ◯ Cubic feet 03 ◯ Cubic meters

7. In which year was construction completed for the building?

If portions of the building were constructed at different times, please provide the year in which construction was completed for the largest portion.

0701 ☐☐☐☐

8. Please indicate the total number of normal operating hours for your building during a typical week.

Please exclude any time when maintenance, house-keeping, or security staff are working outside of the normal operating hours. If the hours vary for different parts of the building or complex, report for that area which is open the longest.

0801 ☐☐☐

9. If your building is an elementary or secondary school, how many students can be seated in all of the classrooms in this building at one time?

0901 ☐☐☐☐☐

10. If your building is an elementary or secondary school with portables, are the portables electrically powered by the main building supply?

1001 01 ◯ Yes 03 ◯ No

11. If your building is a hospital or nursing and residential care facility, what is the inpatient licensed bed capacity?

1101 ☐☐☐☐☐

12. How many people worked in the building during its main shift in 2009?

By main shift, we mean the shift when most people are in the building.

1201 ☐☐☐☐☐☐☐

5530545021

13. Please indicate the number of the following used in your building as of December 2009.

Type of Device	Number of Devices
Computers including laptops and other electronic devices with a micro-processor Exclude cash registers and battery-operated hand-held devices.	1301 ☐☐☐☐☐☐☐
Computer servers A computer server is a computer system that provides essential services over a computer network. Do not include personal computers or laptops.	1302 ☐☐☐☐
Vending machines	1303 ☐☐☐☐
Cash registers	1304 ☐☐☐☐☐☐☐
Medical diagnosis or treatment machines (e.g., X-ray, CAT scan, MRI, dialysis, ultrasound)	1305 ☐☐☐☐
Printers, photocopiers, fax machines and multi-functional devices (e.g. combined printer copier and fax)	1306 ☐☐☐☐☐
Automated Teller Machines (ATMs or bank machines)	1307 ☐☐☐
Major domestic appliances (appliance such as stoves, microwave ovens, refrigerators, freezers, dishwashers)	1308 ☐☐☐
Commercial food preparation appliances (e.g. stoves, ovens, refrigerators, freezers and dishwashers found in a cafeteria or restaurant)	1309 ☐☐☐☐
Laundry washers and dryers	1310 ☐☐☐☐
Sterilisation equipment	1311 ☐☐☐☐

14. If this building is a retail space, does it have open or closed refrigerated cases or freezer cases?

1401
- 01 ◯ Yes – *Continue*
- 03 ◯ No – *Go to Question 19*

15. What is the total length of the open refrigerated cases?

1501 ☐☐☐☐

Is that measured in:

1502
- 01 ◯ Meters
- 03 ◯ Feet

16. What is the total length of the closed refrigerated cases?

1601 ☐☐☐☐

Is that measured in:

1602
- 01 ◯ Meters
- 03 ◯ Feet

17. What is the total length of the open freezer cases?

1701 ☐☐☐☐

Is that measured in:

1702
- 01 ◯ Meters
- 03 ◯ Feet

18. What is the total length of the closed freezer cases?

1801 ☐☐☐☐

Is that measured in:

1802
- 01 ◯ Meters
- 03 ◯ Feet

5530545031

19. Which of the following types of heating equipment were used for spacing heating in this building?
Check all that apply.

1901 ◯ None
1902 ◯ Furnaces that heat air directly, without using steam or hot water
1903 ◯ Packaged central unit (roof mounted)
1904 ◯ Boilers inside (or adjacent to) the building that produce steam or hot water
1905 ◯ District steam or hot water piped in from outside the building
1906 ◯ Heat pumps – packaged
1907 ◯ Heat pumps – residential-type split system
1908 ◯ Heat pumps – individual room system
1909 ◯ Individual space heaters, other than heat pumps
1910 ◯ Other (Please Specify)
1911 [ ]

20. Which of the following types of cooling equipment were used for space cooling?
Check all that apply.

2001 ◯ None
2002 ◯ Residential-type central air conditioners, other than heat pumps, that cool air directly and circulate it without using chilled water
2003 ◯ Packaged air conditioning units, other than heat pumps
2004 ◯ Central chillers inside (or adjacent to) the building that chill water for air conditioning
2005 ◯ District chilled water piped in from outside the building
2006 ◯ Heat pumps for cooling – packaged unit
2007 ◯ Heat pumps for cooling – residential-type split system
2008 ◯ Heat pumps for cooling – individual room heat pump
2009 ◯ "Swamp" coolers or evaporative coolers
2010 ◯ Other (Please Specify)
2011 [ ]

21. Were any of the following renovations or retrofits executed during the years 2005 to 2009?
Check all that apply.

2101 ◯ None
2102 ◯ Lighting
2103 ◯ Cooling equipment
2104 ◯ Heating equipment
2105 ◯ Insulation of basement, roof or walls
2106 ◯ Windows
2107 ◯ Plumbing
2108 ◯ Addition or annex
2109 ◯ Reduction of enclosed floor space
2110 ◯ Other, please specify:
2111 [ ]

5530545041

22. For the 2009 calendar year, please indicate the main source of energy used to heat your building as well as any alternate sources used.

Energy Source	Main Energy Source for Space Heating *Mark (✓) one only*	Alternate Energy Source for Space Heating *Mark (✓) all that apply*
None	2201 01 ◯	2202 ◯
Electricity	02 ◯	2203 ◯
Natural Gas	03 ◯	2204 ◯
Light Fuel Oil	04 ◯	2205 ◯
Diesel	05 ◯	2206 ◯
Kerosene	06 ◯	2207 ◯
Propane or Other Bottled Gas	07 ◯	2208 ◯
District Steam purchased from an off-site plant	08 ◯	2209 ◯
District hot water purchased from an off-site plant	09 ◯	2210 ◯
District chilled water purchased from an off-site plant	10 ◯	2211 ◯
Wood or wood by-products	11 ◯	2212 ◯
On-site electricity generation (e.g. solar)	12 ◯	2213 ◯
Other – *Specify*	13 ◯	2214 ◯
	2215 ☐	2216 ☐

23. For the 2009 calendar year, please indicate only the main source of energy used to cool your organization. Also for 2009, please indicate the main source of energy used for domestic water heating (water used for consumption, not for space heating).

Energy Source	Main Energy Source for Space Cooling *Mark (✓) one only*	Main Energy Source for Domestic Water Heating *Mark (✓) one only*
None	2301 01 ◯	2302 01 ◯
Electricity	02 ◯	02 ◯
Natural Gas	03 ◯	03 ◯
Light Fuel Oil	04 ◯	04 ◯
Diesel	05 ◯	05 ◯
Kerosene	06 ◯	06 ◯
Propane or Other Bottled Gas	07 ◯	07 ◯
District Steam purchased from an off-site plant	08 ◯	08 ◯
District hot water purchased from an off-site plant	09 ◯	09 ◯
District chilled water purchased from an off-site plant	10 ◯	10 ◯
Wood or wood by-products	11 ◯	11 ◯
On-site electricity generation (e.g. solar)	12 ◯	12 ◯
Other – *Specify*	13 ◯	13 ◯
	2303 ☐	2304 ☐

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24. For the 2009 calendar year, please indicate the total quantity of energy consumed, the unit of measure, and the total amount spent for each source of energy consumed by your building.

- Please indicate only the energy consumed at the physical location of your building, relating to the floor area you have reported in question 2. If your landlord pays your energy bills please forward this question to the appropriate person. Do not include fuel or energy used for transportation.
- For amount spent, please report in Canadian dollars the total including taxes, service charges and any rebates.

Energy Source	Quantity Consumed	Energy Unit of Measure	Amount Spent Cdn $ (omit cents)
Electricity purchased (Exclude electricity generated at your building.)	2401	2402 01 kWh 02 MWh 03 GJ 04 Other ▶ 2403	2404 .00
Natural gas	2405	2406 01 m^3 02 L 03 ft^3 04 GJ 05 MMBtu 06 Other ▶ 2407	2408 .00
Light fuel oil	2409	2410 01 L 02 GJ 03 Gallons (US) 04 Gallons (UK) 05 Other ▶ 2411	2412 .00
Diesel	2413	2414 01 L 02 GJ 03 Gallons (US) 04 Gallons (UK) 05 Other ▶ 2415	2416 .00
Kerosene	2417	2418 01 L 02 GJ 03 Gallons (US) 04 Gallons (UK) 05 Other ▶ 2419	2420 .00
Propane or other bottled gas	2421	2422 01 L 02 kg 03 GJ 04 lbs 05 MMBtu 06 Other ▶ 2423	2424 .00
District steam purchased from an off-site plant	2425	2426 01 kg 02 GJ 03 lbs 04 1000 lbs 05 MMBtu 06 Other ▶ 2427	2428 .00
District hot water purchased from an off-site plant	2429	2430 01 GJ 02 MMBtu 03 Other ▶ 2431	2432 .00
District chilled water purchased from an off-site plant	2433	2434 01 GJ 02 MMBtu 03 Other ▶ 2435	2436 .00
Wood and wood by-products	2437	2438 01 Full cord 02 Pellets (tonnes) 03 Tonnes (metric) 04 lbs 05 Other ▶ 2439	2440 .00
Electricity generated on-site Including emergency generator usage	2441	2442 01 kWh 02 GJ 03 Other ▶ 2443	
Domestic Water Consumed	2444	2445 01 L 02 m^3 03 Not metered 04 Other ▶ 2446	

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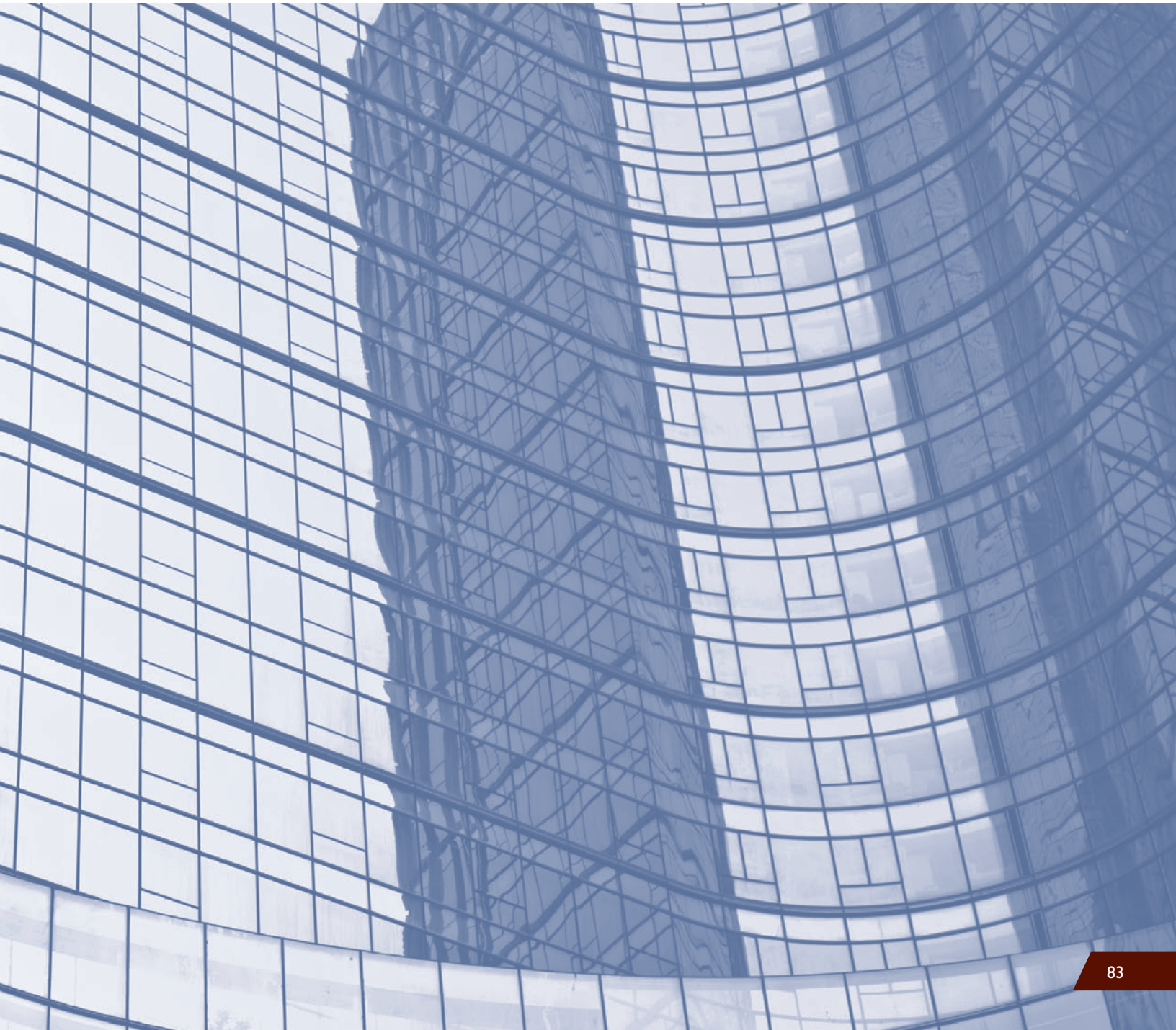
APPENDIX E
BACKGROUND DATA



Canadian regional population

SOURCE: Statistics Canada

Quarterly population estimates, national perspective – Population

Catalogue No. 91-002-X

Table E.1 – Population for the fourth quarter of 2009

Region	Population[31]	Percentage
Canada	33 747 907	100
Atlantic	2 346 714	7
Quebec	7 851 174	23
Ontario	13 121 266	39
Prairies	5 945 030	18
British Columbia	4 483 723	13

31 For the purpose of this report, the Canadian population data excludes the territories. This was necessary in order to have comparable data between the population and the SCIEU 2009 sample, which also excluded the territories.

APPENDIX F

COOLING AND HEATING DEGREE-DAYS

The following table presents the CDDs and HDDs calculated for use in the OEE's Energy Use Model for the provinces and regions across Canada, based on data gathered from Environment Canada's National Climate Data and Information Archive.[32]

A greater number of CDDs represents a hotter cooling season (summer), which leads to a greater cooling requirement. Similarly, a larger number of HDDs represents a colder heating season (winter), which increases heating requirements.

Table F.1 – Cooling and heating degree-days, by province

	Cooling degree-days	Heating degree-days
	2009	
Atlantic	92.1	4445.3
Newfoundland and Labrador	31.5	4479.7
Prince Edward Island	129.1	4558.6
Nova Scotia	120.3	4263.4
New Brunswick	87.4	4735.3
Quebec	211.5	4509.3
Ontario	194.5	3987.7
Manitoba	118.6	5888.4
Saskatchewan	69.3	6195.9
Alberta	83.1	5276.6
British Columbia	97.2	3002.6
Canada	161.4	4275.2

32 Environment Canada's National Climate Data and Information Archive: **http://climate.weatheroffice.gc.ca/prods_servs/cdn_climate_summary_e.html**