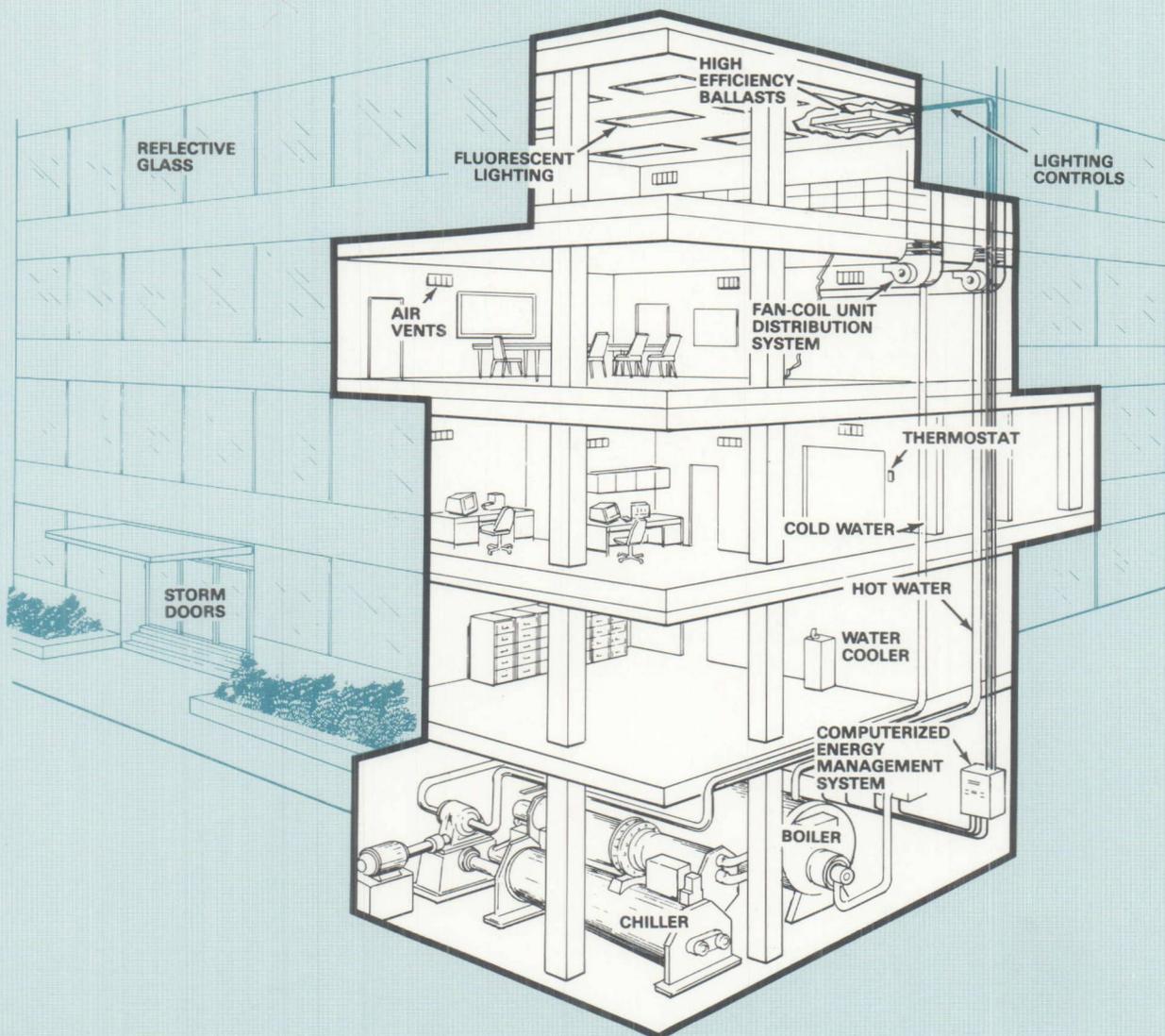


Commercial Buildings Energy Consumption and Expenditures 1989



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As part of EIA's mission to provide meaningful data, the consumption surveys have ongoing user needs efforts to ascertain the requirements of its users. Therefore, if you have any suggestions to make the data in this report more useful to your needs, please contact Ms. Martha M. Johnson, CBECS Manager, at 202/586-1135 or at the address below. A User Needs Study for the 1993 Residential Energy Consumption Survey (RECS) is underway. If you have any data or report-related requirements or suggestions for the residential survey, please contact Mr. Wendel Thompson, RECS Manager, at 202/586-1119 or at the address below. Your feedback is important to us and you are encouraged to provide your comments at any time to the survey managers.

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Commercial Buildings Energy Consumption and Expenditures 1989

April 1992

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The previous title of this report was *Nonresidential Buildings Energy Consumption Survey: Commercial Buildings Consumption and Expenditures*, including the proper survey year.

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Executive Summary

This report, *Commercial Buildings Energy Consumption and Expenditures 1989*, is based upon data from the 1989 Commercial Buildings Energy Consumption Survey (CBECS). Focusing on energy end-use consumption and expenditures pertaining to commercial buildings, the 1989 CBECS was the fourth in a series conducted since 1979 by the Energy Information Administration (EIA) of the U.S. Department of Energy.

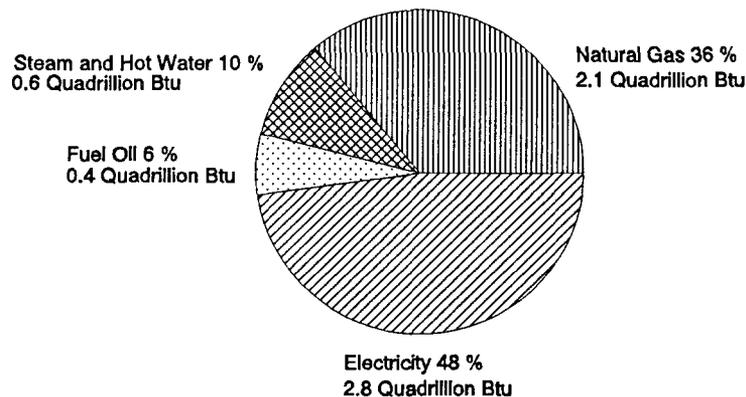
The results of the 1989 CBECS reflect the energy-related characteristics of a sample of the Nation's 4.5 million commercial buildings, which account for about 10 percent of total net energy consumption nationwide.¹ In addition to statistics on quantities of energy consumed and the factors that were related to energy consumption in the commercial sector in 1989, this report also reviews key energy consumption developments in commercial buildings during the period 1979 to 1989.

Commercial Buildings' Energy Consumption Patterns

What were commercial buildings' energy consumption and expenditures in 1989?

- U.S. commercial buildings consumed 5.8 quadrillion Btu of four major energy sources: electricity, natural gas, fuel oil, and district heat.
- Of the four energy sources, electricity accounted for 48 percent of the consumption; natural gas, 36 percent; district heat, 10 percent; and fuel oil, 6 percent (Figure ES1).
- Expenditures for the four major energy sources consumed in commercial buildings amounted to 70.8 billion dollars, averaging

Figure ES1. Net Energy Consumption in the Commercial Sector by Major Energy Sources, 1989



Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 11.

¹Consumption in this report is given on a "net" basis; no adjustment was made for the efficiency losses incurred by the use of primary fuels to generate the electricity consumed in commercial buildings. This concept tracks the consumption of end-use energy sources (i.e., electricity, heating oil, natural gas, etc.), but not the use of primary energy needed to generate the electricity.

15.6 thousand dollars per building and 1.12 dollars per square foot of total floorspace (averaged over all commercial buildings). Electricity accounted for 79 percent of total expenditures; fuel oil, only 3 percent.

How did energy consumption change during the 1979-1989 period?

- Between 1979 and 1989, energy consumption per square foot and per square foot per hour of operation decreased by 20 percent and 23 percent, respectively.
- The decrease in energy consumption per square foot per hour of operation led to an estimated savings of 23 percent in the net energy consumed in 1989 compared to what it would have been had the 1979 consumption patterns continued.
- The consumption per square foot of fuel oil and natural gas dropped by 64 percent and 34 percent, respectively, in contrast to no change for electricity (Figure ES2).

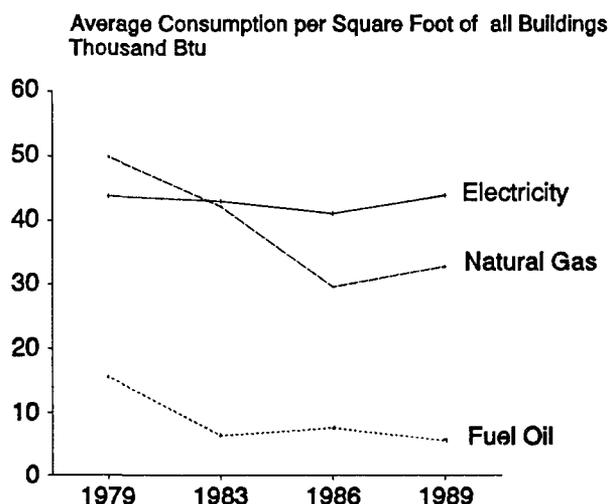
- Energy expenditures per square foot of commercial floorspace increased by 45 percent during the decade. During the same time period, consumer price indices rose approximately 70 percent. Thus, in terms of real prices, expenditures decreased.

- However, consumption of electricity, natural gas, fuel oil, and district heat in commercial buildings increased by 16 percent in the 3-year period between 1986 and 1989. That increase represents, in part, the growth of commercial activity, as reflected by the 9 percent increase in commercial floorspace during that period.

Are newer commercial buildings more energy efficient?

- In general, the trend toward reduced energy consumption per square foot per hour of operation was apparent among the stock of buildings constructed after 1945.

Figure ES2. Trends In Consumption by Energy Sources, 1979 to 1989



Note: See Appendix B, "Nonsampling and Sampling Errors," for a discussion on comparisons between the 1979, 1983, 1986 and 1989 CBECS.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1979, 1983, 1986 and 1989 Commercial Buildings Energy Consumption Surveys, Table B17.

- Of the total commercial building stock, buildings constructed in the fifties and sixties used the most energy per square foot per hour of operation.
- Of the commercial buildings constructed since 1945, the lowest energy consumption per square foot per hour of operation was found among those built in the eighties.

To what extent did energy consumption vary according to geographic location?

- Different geographic locations display different energy consumption patterns, which reflect variations in climate, construction patterns, and energy source preferences.
- Focusing on electricity, commercial buildings in the Middle Atlantic, Pacific, and South Atlantic Census Divisions consumed the largest amounts of electricity, 47 percent of the total consumption of electricity in commercial buildings.
- For natural gas, buildings in the East North Central and the Middle Atlantic Divisions had the highest consumption of natural gas, 42 percent of the total amount of natural gas used in commercial buildings.
- For fuel oil, buildings in the Middle Atlantic and New England Divisions accounted for 66 percent of the total fuel oil consumed by commercial buildings.
- For district heat, buildings in the Middle Atlantic and the East North Central Divisions accounted for 47 percent of the total amount of district heat consumed by commercial buildings.

Other interesting major issues relating to specific sources of energy were:

- Of all natural gas consumed by commercial buildings in 1989, 12 percent was purchased directly from the producer rather than from the local utility. Commercial buildings in the Midwest consumed 60 percent of such gas.
- About 32 percent of the natural gas and 23 percent of the fuel oil consumed as a main

heating source in commercial buildings were in buildings that could switch to an alternate source within a week. Fuel oil was the predominant alternate energy source for natural gas-heated buildings reporting short-term fuel-switching capability. In buildings where fuel oil was the main heating source, natural gas was the principal alternate energy source.

- Buildings whose main space-heating fuel was electricity had little discretionary ability to switch fuels. Of all the electricity consumed in these buildings, for any purpose, only 10 percent could be switched within a week.

Energy Consumption by Building Activity

How does energy consumption vary by building activity?

- In 1989, buildings whose principal activity was described as office building consumed 21 percent of all energy used in commercial buildings, and they accounted for 19 percent of the total amount of floorspace.
- Buildings whose principal activity was mercantile and service consumed 18 percent of all energy used in commercial buildings in 1989, and they accounted for 20 percent of the commercial floorspace.
- Buildings whose principal activity was education consumed 12 percent of the total energy used in commercial buildings and accounted for 13 percent of commercial floorspace.
- Within a building, energy intensities of the major energy sources (electricity, natural gas, fuel oil, and district heat) for commercial buildings were related to the concentration of workers per square foot and the principal building activity.
- Buildings using fuel oil tend to be older and more energy intensive. However, either from demolition or conversion, the stock of fuel oil buildings is declining.

How energy efficient were certain types of commercial buildings according to selected indicators of energy consumption?

- Energy efficiency is measured differently by focusing on a particular aspect of activity level within a building. These aspects of activity include energy consumption per square foot, hours a building is in operation, and the concentration of workers in a building. Depending on which indicator was used, energy efficiency ranged from a high of 319 thousand Btu per square foot for laboratories to a low of 7 Btu per square foot per hour of operation for parking garages.
- In health care and food service buildings, energy consumption averaged 219 and 218 thousand Btu per square foot, respectively.
- In assembly, education, and warehouse buildings, energy consumption averaged 64, 87, and 58 thousand Btu per square foot, respectively.
- In office buildings, energy consumption averaged 104 thousand Btu per square foot.



This building is classified as an office building. Other activities that occupy floorspace in this building are assembly, and merchantile and service, which were also included in the types of buildings sampled in the 1989 CBECS.

Introduction

The *Commercial Buildings Energy Consumption and Expenditures 1989* report is the second publication based on data from the 1989 Commercial Buildings Energy Consumption Survey (CBECS). A previous report, *Commercial Buildings Characteristics 1989*, covered the characteristics that affected energy use in the 1989 building stock. This second report covers energy consumption and expenditures in that building stock. Both reports were prepared by the Energy End Use and Integrated Statistics Division, Office of Energy Markets and End Use, Energy Information Administration (EIA) of the U.S. Department of Energy. EIA is mandated by Congress as the agency within the DOE that collects, analyzes, and disseminates impartial, comprehensive data about energy--how much is produced, who uses it, and the purpose for which it is used. To comply with that Congressional mandate, EIA collects energy data from a wide variety of sources covering a range of topics.¹ The CBECS is the only source of national-level data on commercial building characteristics and related energy consumption.

Background

The data for this report are based on the Building Characteristics Survey (Form EIA-871A) and the Energy Suppliers Survey (Forms EIA-871B through F). An adjunct Facility Survey (Form EIA-871B) was also conducted in 1989 as part of the CBECS Energy Suppliers Survey.² EIA conducts this national sample survey on a triennial basis. Previous surveys were conducted in 1979,

1983, and 1986 under the title Nonresidential Buildings Energy Consumption Survey (NBECS). For consistency, all the surveys will be referred to as CBECS in this report.

EIA also conducts energy consumption surveys in the residential, residential transportation, and manufacturing sectors. See Appendix G, "Related EIA Publications in Energy Consumption," for a listing of publications from the CBECS and from other EIA consumption surveys.

Information on building characteristics is collected during a personal interview with building managers, owners, or tenants. Following the collection of the building characteristics data and after obtaining an authorization form, billing data containing energy consumption and expenditures are collected, via a mail questionnaire, from the energy suppliers to these buildings.

Based on calendar year 1989, this report provides the annual consumption and expenditure estimates in commercial buildings for electricity, natural gas, fuel oil (including kerosene), and district heat (steam or hot water from either a central plant or utility). These are the principal energy sources for which billing data were collected as part of the CBECS. The use of other energy sources in the building, such as propane, wood, coal, and solar, was also determined. However, statistics on the consumption of these energy sources in the CBECS buildings are not available since no billing data for these energy sources were collected.³

¹The EIA conducts numerous energy-related surveys. In general, these surveys can be divided into two broad groups. One group of surveys is directed to the suppliers and marketers of specific energy sources. These surveys measure the quantities of specific fuels produced and/or supplied to the market. These types of surveys are called supply surveys. The results of these supply surveys are combined and published in the *Monthly Energy Review* and other EIA publications. The second group of surveys gathers information on the types of energy used by the end users of energy along with the characteristics of those end users that can be associated with energy use. CBECS belongs to the consumption survey group because it collects information directly from the end users--the buildings. There are important differences between the supply and consumption surveys that need to be taken into account in any analysis that uses both data sources. For information on these differences, see Energy Information Administration, *Energy Consumption by End-Use Sector, A Comparison of Measures by Consumption and Supply Surveys*, DOE/EIA-0533 (Washington, D.C., April 6, 1990.) Appendix C of this report also includes a summary of the differences for the commercial sector.

²Facility data are available on the 1989 CBECS Public Use Files.

³Since propane accounted for only 1 percent of the total energy consumption in commercial buildings in the previous CBECS, the 1989 CBECS did not collect billing data for propane. The 1989 CBECS is the first CBECS that did not collect this billing data. However, statistics on whether propane was used in buildings are shown in this report.

Consumption and expenditures of major energy sources for calendar year 1989 are presented in the form of net aggregate totals as well as consumption per building and dollars per Btu. A second measure of energy use is also presented in the form of energy consumption intensities. These energy intensities are a method of adjusting the amount of energy consumed for the effects of various building characteristics such as size of the building, number of workers, or number of operating hours. The adjustment facilitates comparisons of energy consumption across time, fuels, and buildings. In this report, energy consumption intensities are presented both as gross energy intensities and conditional energy intensities.⁴ (For further discussion about how to calculate and use these energy intensities, see the box on page 7. For a definition of gross and conditional energy intensities, see the Glossary.) Estimates of consumption and expenditure totals are provided at both the national level and Census region level. These estimates are provided for the following building categorizations:

- Building Structure--Includes characteristics such as number of floors, type of wall and roof materials, and building shell conservation features.
- Building Use--Includes principal activity, operating hours, number of workers, and type of ownership/occupancy.
- Building Size--Includes square feet of building floorspace.
- Building Age--Presented by year constructed.
- Geographic Location and Climate Zone--Geographic location includes the four Census regions, the nine Census divisions, and the metropolitan status. Climate zone is measured in terms of heating and cooling degree-days and is presented in both 45-year averages and 1989 degree-days.
- Energy Sources--Energy sources are the fuels going into the buildings. These include electricity, natural gas, fuel oil,

district heat and chilled water, and propane. (The 1989 CBECS did not collect billing data on propane. However, data were collected on whether propane was used in a building.) Energy sources such as wood, coal, and active solar are included in the "other" category.

- Energy End Uses--End uses in this report are space heating, water heating, air conditioning, cooking, and manufacturing. These end uses are respondent reported rather than metered end uses.
- Equipment--Includes types of equipment used for heating, cooling, lighting, and refrigeration. Also includes, for lighting, the percent lit and for selected cooling equipment, the year the system was installed. Information on refrigeration equipment was collected for the first time in the 1989 CBECS.
- Energy Management Practices--Includes whether occupants of the building (as opposed to an individual responsible for maintenance) have control of heating and cooling, whether the building has reduced energy use during off-hours, if there is a Computerized Energy Management Control System and what systems it controls, if there is regular heating ventilation and air conditioning (HVAC) maintenance, and if there is participation in utility-sponsored conservation programs.

These data are published to provide meaningful, objective, and accurate energy information for a wide audience including Congress, Federal and State agencies, industry, and the general public. The data presented in this report were collected and published by the EIA to fulfill its responsibilities as specified in the Federal Energy Administration Act of 1974 (Public Law 93-275), as amended. All data in this report are aggregated; individual building name and address information are confidential.

The EIA gratefully acknowledges the cooperation of the respondents and their energy suppliers for

⁴In previous CBECS reports, only the conditional energy intensities were presented and were referred to as energy intensities.

providing the information used to produce the estimates in this report.

Organization of this Report

A detailed discussion of the highlights presented in the Executive Summary follows this section. Tables and figures interspersed throughout the text highlight information of special interest, summarize a detailed breakdown of the data that are provided in the "Detailed Tables" section, or are based on analyses of CBECS data which can be replicated using CBECS Public Use Data files. Topics that are covered in the following text sections include:

- A description of the consumption and expenditures of the major energy sources in commercial buildings
- A comparison of changes in energy consumption over a 3- and 10-year period
- An analysis of variations in consumption by Census regions and divisions, by year the building was constructed, and by building activity.

New or expanded topic areas such as district heating and cooling, gas transported for the account of others (the ability of large natural gas users to purchase gas via direct purchases from the source rather than from the local utility), the potential for fuel switching in commercial buildings, and the energy suppliers' classification of sales accounts are also discussed in this report.

Extensive crosstabulations of building characteristics and energy consumption and expenditures appear in the "Detailed Tables" section following the main text. The organization of the detailed tables and the procedures for calculating Relative Standard Errors (RSE's) in the tables are explained at the beginning of that section. A Quick-Reference Guide by topic is provided for the 43 detailed tables.

The findings of the survey are presented for a general audience interested in buildings and their energy consumption. For more statistically-oriented readers, information on the sample design

and data collection procedures is provided in Appendix A, "How the Survey Was Conducted." Adjustments to the collected data and factors affecting data quality are discussed in Appendix B, "Nonsampling and Sampling Errors." A comparison of consumption and expenditure indices by survey year and a comparison of CBECS coverage completeness by survey year are also included in Appendix B. Differences between the coverage of this survey and the EIA supply data sources are discussed in Appendix C, "CBECS Coverage Related to EIA Supply Surveys." A detailed description of the principal building activity categories is contained in Appendix D, "Types of Buildings." Appendix E contains maps showing the Census regions and divisions and the climate zones by which the data in this report are organized. All estimates in this report are based on data collected on Forms EIA-871A through H. These forms are reproduced in Appendix F, "Survey Forms." A list of related energy consumption publications appears in Appendix G for readers interested in earlier CBECS publications or consumption reports for the other sectors. A glossary of terms is included to assist users in understanding the statistical and engineering terminology used in this publication.

Statistics Reported

Commercial Buildings

For purposes of the CBECS, a commercial building is a roofed and walled structure whose principal activity is nonresidential, nonagricultural, and nonindustrial. The CBECS population is restricted to buildings larger than 1,000 square feet (roughly twice the size of a two-car garage).

Principal Building Activity

The principal building activity is the activity that occupies the most floorspace in the building. Data were collected for 20 building types. However, in some instances, the CBECS sample was too small to permit reliable estimates for breakdowns within the 20 categories. Thus, several types of building activities have been combined in most tables and figures. Inpatient and outpatient health care facilities have been combined into a single health

care building type; refrigerated and nonrefrigerated warehouses form a single warehouse category. With a few exceptions, laboratory buildings have been included with those classified as "other," and skilled nursing buildings have been included in lodging. For the 1989 CBECS, parking garages are presented in a separate category in the detailed tables instead of being included in the "other" category as was the case in previous reports.

Energy Sources

The CBECS identifies all energy sources delivered into the building. In most tables in this report, coal, wood, and active solar are grouped with "other" under the category "Energy Sources and End Uses." District steam and district hot water are combined into "district heat." (For certain types of minor energy sources [most notably, propane, coal, and the renewable sources, wood and active solar], there are no consumption data in this report. It is not cost effective to collect billing data for these fuels since their usage is minimal in commercial buildings). In the text of this report, electricity, natural gas, fuel oil and district heat are referred to as major energy sources. In the detailed tables they are referred to as major fuels.

Main and Secondary Fuels

Main and secondary space-heating fuels are distinguished in certain tables, but are combined in other tables. The 1986 CBECS also separated primary from secondary water-heating fuel. This end-use category distinction was dropped from the

1989 CBECS because very few buildings reported a secondary water-heating fuel.

Energy Consumption and Energy Intensities

Consumption is reported on a net basis in terms of energy delivered to the site; no adjustment was made for the primary fuels consumed to produce electricity or district heating and cooling. Energy intensities are reported in terms of conditional energy intensities and gross energy intensities. In previous CBECS reports, only conditional energy intensities were reported, which were referred to simply as "energy intensities." (Refer to the box on page 7 for an explanation of how to calculate and use these intensities).

Survey Estimates

The statistics published in this report are based on a random sample selected from the population of all commercial buildings in the United States as of the fall of 1989. As a result, all the numbers are estimates rather than exact measures for the population. As described in Appendix B, "Nonsampling and Sampling Errors," the accuracy of each estimate is indicated by the RSE. No estimates were published that were based on data from fewer than 20 sample buildings or that had an RSE greater than 50 percent. All of the estimates in the detailed tables include corresponding RSE's that can be calculated using row/column RSE factors. Overall, the RSE's for the 1989 CBECS are comparable to those for the corresponding aggregates from the 1986 survey, indicating a continuing high accuracy of the survey estimates.

Commercial Buildings Energy Consumption Patterns

In 1989, U.S. commercial buildings consumed a total of 5.8 quadrillion Btu of four major energy sources: electricity, natural gas, fuel oil, and district heat (Table 1). This is the net energy consumption delivered to commercial buildings. Taking into account the fossil fuels needed to generate electricity, this amount of delivered energy represents about 11.3 quadrillion Btu of primary energy. To estimate the primary energy, the delivered electricity was multiplied by a factor of 3.0, an approximation of the Btu value of the input fuels used to generate electricity in 1989.

This chapter attempts to answer several questions about the use of energy in the commercial sector for three different time periods: 1989, between 1986 and 1989, and between 1979 and 1989. First, energy consumption patterns are examined by looking at how much and what type of energy was used in 1989 in commercial buildings, as well as determining how this energy was used and by whom. Energy consumption patterns in 1989 are discussed in terms of the factors that relate to energy consumption such as the year the building was constructed, the geographical region, and the major type of activity. Second, energy consumption data from the 1989 CBECS are compared with the 1986 CBECS to examine energy trends for the short run. Third, energy trends are examined over a longer period of time by comparing the 1989 CBECS data with the 1979 CBECS. This comparison over 10 years describes changes not only in the net total amount of energy used, but also the changes in consumption per square foot of floorspace.

Net Energy Consumption and Expenditures in 1989

- Electricity was the dominant energy source used in the commercial sector. Electricity consumption amounted to 2.8 quadrillion Btu (813 billion kWh), accounting for 48 percent of the con-

sumption of all four energy sources. The intensity of its use in buildings using electricity was moderate (45 thousand Btu per square foot).

- Natural gas accounted for an additional 36 percent of the energy consumption. Its consumption amounted to 2.1 quadrillion Btu (2.0 trillion cubic feet). The intensity of its use in buildings using natural gas was also moderate (50 thousand Btu per square foot).
- Fuel oil accounted for only 6 percent of the energy consumption, and the intensity of its use in buildings using fuel oil was relatively low (28 thousand Btu per square foot). However, its consumption still amounted to an average of approximately 166 thousand barrels per day (0.4 quadrillion Btu).
- District heat is steam and hot water delivered to a building from a central plant or utility. Consumption data related to district heat were collected from multibuilding facilities. (See the "Energy Source-Specific Issues" section for a discussion on district heat.) District heat accounted for only 10 percent of the energy consumption, since most buildings did not use it. However, in buildings that did use district heat, the intensity of its use was high (89 thousand Btu per square foot).

The expenditures for all major energy sources consumed in commercial buildings amounted to 70.8 billion dollars in 1989, averaging 15.6 thousand dollars per building and 1.12 dollars per square foot of total floorspace (averaged over all commercial buildings). Electricity accounted for 79 percent, or 55.9 billion dollars of the total expenditures in the commercial sector. Since the price per Btu of electricity is relatively high, its share in the total expenditures for energy in com-

mercial buildings in 1989 was much larger than its share in the total energy consumption.⁵ Fuel oil accounted for only 3 percent of the total expenditures or 1.8 billion dollars. District heat was typically used in large buildings; therefore, the

total expenditures per building for district heat were high relative to all other fuels. However, the expenditures per square foot for district heat were relatively low compared to electricity but still somewhat high when compared to fuel oil and natural gas.

Table 1. Net Energy Consumption and Expenditures Indices in Commercial Buildings by Energy Source, 1989

Consumption and Expenditure Indices	Total	Energy Source			
		Electricity	Natural Gas	Fuel Oil	District Heat
Building Characteristics					
Number of Buildings (thousand)	4,528	4,294	2,420	581	98
Floorspace (million square feet)	63,184	61,563	41,143	12,600	6,578
Energy Consumption					
Total (trillion Btu)	5,788	2,773	2,073	357	585
Share of Total Consumption	100.0	47.9	35.8	6.2	10.1
Per Building (million Btu)	1,278	646	857	614	5,969
Per Worker (million Btu)	82	39.3	43.2	21.0	56.5
Energy Intensities^a					
Gross (thousand Btu per square foot)	91.6	43.9	32.8	5.6	9.3
Conditional (thousand Btu per square foot)	--	45.0	50.4	28.3	89.0
Energy Expenditures					
Total (million dollars)	70,826	55,943	9,204	1,822	3,857
Per Million Btu (dollars)	12.24	20.17	4.44	5.10	6.59
Per Building (thousand dollars)	15.6	13.0	3.8	3.1	39.3
Per Square Foot (dollars)	1.12	0.91	0.22	0.14	0.59

^aFor definitions of energy intensities, see the box on page 7 of this section and the Glossary.

-- Data not applicable.

Notes: • Net energy consumption is measured in terms of the amount *delivered* to the point of end use. No adjustment was made for the primary fuels used to produce electricity or district heat. • District heat includes steam and hot water. • All ratios are calculated for the specific energy source, except for the share of each source, which is based on all energy sources and gross energy intensity, which is based on total floorspace.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 11, 14, 21, 22, 38, 39, 47, 48, 52, and 53.

⁵When considering the expenditures for various energy sources, one should be aware that, on the one hand, the primary energy needed to produce a Btu of electricity is larger than that required to produce a Btu of the other types of energy. On the other hand, the efficiency of some electricity-based equipment is quite high.

Energy Consumption Intensities

When analyzing how intensively energy is used in buildings, it is necessary to normalize consumption by the amount of floorspace in buildings. There are two ways of defining this floorspace in buildings. One definition includes the total floorspace in all buildings. A second definition includes only the floorspace in buildings that actually use a specific energy source. This second definition is conditional on the actual use of an energy source. Each definition of floorspace leads to a different measure of energy intensity and both are relevant, depending on the focus of the analysis.

The measure of intensity that includes total floorspace is the Gross Energy Intensity.

$$\text{Gross Energy Intensity} = \text{Btu/Total Square Feet.}$$

where

Btu = total consumption of a specific energy source in all buildings within a specific category.

Total Square Feet = total floorspace included in all the buildings within that category.

For example: Total consumption of electricity is highest in office buildings, since this category includes many buildings, some of which are very large. However, the gross intensity of electricity in office buildings is small when compared to other building categories, such as health care, where the total floorspace is not as large, but the average amount of electricity used relative to the floorspace is very high.

The measure of intensity that includes only buildings that use an energy source is Conditional Energy Intensity.

$$\text{Conditional Energy Intensity} = \text{Btu/Energy Source-Specific Square Feet}$$

where

Btu = total consumption of a specific type of energy in all buildings within a specific category.

Energy Source-Specific Square Feet = floorspace included in buildings within that category, which actually use that particular energy source.

For example: More electricity is consumed in health care buildings than district heat. However, in health care buildings that do use district heat, the intensity of its use is very high.

In previous CBECS reports, only the conditional intensity was presented and was referred to as energy intensity. The measure of gross energy intensity is being introduced in this report to allow for comparisons of *total* net energy consumption across building types, across energy sources, and across time, while using a common basis of comparison.

Since energy consumption is also strongly related to the number of hours of operation, a third measure of intensity used in this report is the gross intensity per hour of operation.

$$\text{Intensity per Hour} = \text{Btu}/(\text{Sq.ft.} \cdot \text{Annual Hours of Operation})$$

where

Sq.ft. * Annual Hours of Operation = total square footage of a building multiplied by total weekly hours of operation multiplied by 52 weeks per year, summed over all buildings within a specific category.

Changes in Energy Consumption Over 3- and 10-Year Periods

Data concerning net energy consumption and expenditures in commercial buildings have been collected by EIA four times since 1979. Basically the same sampling and interviewing methods and procedures have been used with incremental refinements based on EIA's ongoing evaluation of the data. Analyses of trends in energy use across a whole decade are reported for the first time in this publication. Following is a comparison of various consumption indices over a 3-year period between the last two CBECS's (1986 through 1989) and over a 10-year period (1979 through 1989).

Net energy consumption of electricity, natural gas, fuel oil and district heat in commercial buildings increased by 16 percent in the 3-year period between 1986 and 1989. This increase in energy consumption represents, in part, the growth of commercial activity during these 3 years, as reflected in the 9 percent increase in commercial floorspace. (See the EIA *Commercial Buildings Characteristics 1989* report.) Thus, a comparison of consumption per square foot of commercial floorspace for 1986 and 1989 did not reveal any statistically significant changes. Since the total hours of operation in commercial buildings increased by 7 percent between 1986 and 1989, a comparison of the energy intensity per hour indicated a decrease of 5 percent over the 3-year period.

When comparisons were made over the whole decade between 1979 and 1989, the data showed a reduction of 20 percent in the consumption per square foot of floorspace (gross energy intensity) and a reduction of 23 percent in the gross energy intensity per hour of operation (Table 2). Since the services that energy provides have increased rather than decreased over the decade, this reduction may represent continued conservation efforts and more efficient use of energy.

Because of the sharp decrease in gross energy intensity between 1979 and 1989, the increase in commercial buildings net energy consumption between those years was less than what might have

been expected. Had the gross energy intensity per operating hour continued to be the same in 1989 as it was in 1979 (30.0 instead of 23.1 Btu per square foot per hour of operation), the net energy consumption of commercial buildings in 1989 would have been 7.5 quadrillion Btu rather than 5.8 quadrillion Btu (Figure 1). Thus, changes in energy consumption patterns over the decade have led to an estimated savings of 23 percent (1.7 quadrillion Btu) in the net energy consumed in 1989.

Over the decade (1979-1989), the gross intensity of fuel oil dropped 64 percent and the gross intensity of natural gas dropped 34 percent. These changes do not represent decreases in the number of buildings that use natural gas and fuel oil, but rather in the amounts used. In contrast to fuel oil and natural gas, the gross intensity of electricity has not changed compared to 1979 (Table 2).

This reduction in the gross intensity of fuel oil and natural gas and the static gross intensity of electricity may imply that some buildings have switched part of their end uses from fuel oil and natural gas to electricity. In addition, since natural gas and fuel oil are mainly used for heating, some commercial buildings may have reduced heating temperatures or improved heating efficiency, but added electricity-intensive equipment, such as computers, air-conditioners, etc. (Such equipment may, in itself, generate some of the heat for the building.) The increase in the share of office buildings and in buildings that are located in the South and West Census Regions also contributed partially to the changes in the relative consumption of various energy sources.

The new electric equipment and appliances tend to be more efficient than the equipment and appliances that use other types of energy for similar end uses. Thus, the trend of replacing natural gas and fuel oil with electricity may decrease the amount of energy required for producing the same services in buildings. However, since the generation of each Btu of electricity requires approximately 3 Btu of other fuels, the trend of replacing natural gas and fuel oil with electricity actually represents an increase in the primary energy used in producing the same services.

Table 2. Energy Consumption and Expenditures in Commercial Buildings Over 1,000 Square Feet, 1979, 1986, and 1989

Consumption and Expenditure Indices	1979 ^a	1986	1989	Percent Difference 1979 to 1989
Net Energy Consumption in Buildings Over 1,000 Square Feet (trillion Btu)				
All Major Energy Sources	4,965	4,977	5,788	-- ^b
Electricity	1,908	2,390	2,773	}
Natural Gas	2,174	1,723	2,073	} -- ^b
Fuel Oil	681	442	357	}
District Heat	201	422	585	}
Gross Energy Intensity^c (thousand Btu/square foot)				
All Major Energy Sources	114.01	85.52	91.61	-19.7
Electricity	43.8	41.1	43.9	0.0
Natural Gas	49.9	29.6	32.8	-34.3
Fuel Oil	15.6	7.6	5.6	-64.1
District Heat	4.6	7.3	9.3	-- ^d
Gross Energy Intensity per Hour of Operation (Btu/(sq.ft.*hr))				
All Major Energy Sources	30.02	24.17	23.07	-23.1
Electricity	11.5	11.6	11.1	-3.5
Natural Gas	13.1	8.4	8.3	-36.6
Fuel Oil	4.1	2.1	1.4	-65.8
District Heat	1.2	2.0	2.3	-- ^d
Expenditures per Square Foot (nominal dollars)	0.77	1.03	1.12	45.0
Expenditures per Million Btu (nominal dollars)	6.77	12.10	12.24	80.8

^aDue to differences in population definitions between the 1979 survey and the subsequent 1986 and 1989 surveys, the 1979 total consumption and intensities presented here have been recalculated, so as to better match the 1986 and 1989 surveys. Thus, they only include buildings with floorspace greater than 1,000 square feet. In addition, the 1989 survey did not include LPG, so the 1979 and 1986 data presented here include only the consumption of the four major energy sources. (Therefore, these numbers will not match with numbers published in previous reports.) For further discussion about comparability over survey years, see Appendix B, "Nonsampling and Sampling Errors."

^bDue to differences in sampling coverage, comparisons of 1979 data with 1986 and 1989 data in this table are relevant only for energy intensities, not for total consumption.

^cGross energy intensity for a particular energy source is the ratio of the net consumption of that energy source to the floorspace in all buildings. The gross intensity measure is used for comparisons across time, rather than the net consumption of that specific energy source, since it takes into account the growth in floorspace over time. (See the Detailed Tables for the ratio of consumption of particular energy sources over the limited floorspace of buildings that use that particular type of energy.)

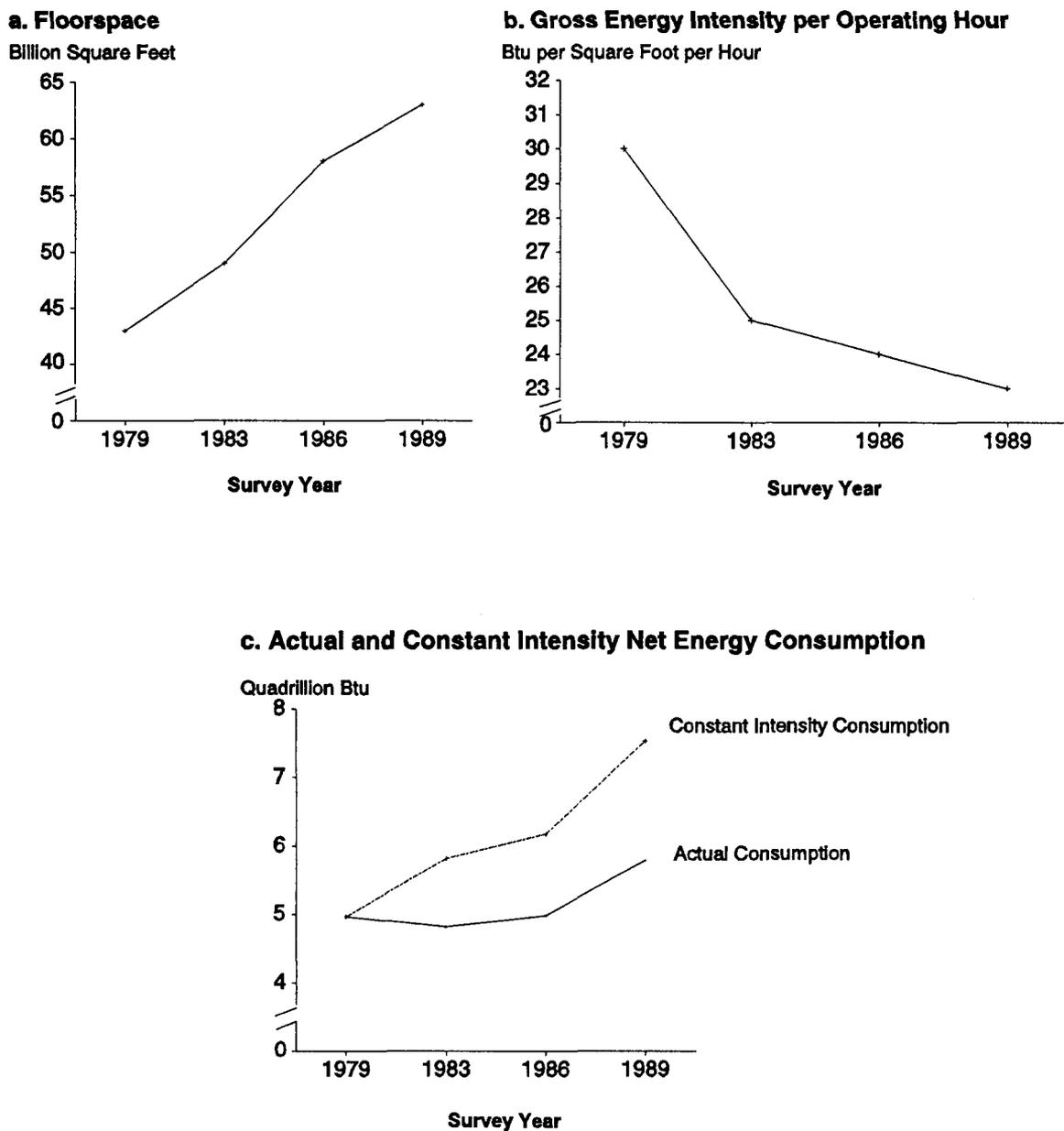
^dThese changes represent, in part, the improvement in coverage of district heat in the CBECs over the years, rather than actual changes in consumption. (A discussion of district heat and its measurement is included in Appendix B, "Nonsampling and Sampling Errors.")

-- Data Not Applicable.

Notes: See the "Glossary" for the definition of terms used in this table. • Because of rounding, data may not sum to totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1979, 1986, and 1989 Commercial Buildings Energy Consumption Surveys, Tables 11, 14, and B17.

Figure 1. Floorspace and Net Energy Consumption Trends In Commercial Buildings



Notes: Constant Intensity Consumption is the consumption that would have existed had the gross energy intensity per hour of operation of 1979 persisted in following years. See Appendix B, "Nonsampling and Sampling Errors," for a discussion on comparisons between the 1979, 1983, 1986 and 1989 CBECS.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the Commercial Buildings Energy Consumption Surveys, Tables 11 and B17.

The energy expenditures per square foot of commercial floorspace have increased by 45 percent between the 1979 and 1989 CBECS. During the same period, consumer price indices rose approximately 70 percent and the implicit price deflators for gross national product amounted to 60 percent.⁶ In terms of real prices, expenditures per square foot of commercial floorspace have decreased.

The changes in energy consumption patterns are also reflected in the differences between old and new buildings, as will be discussed in the following cross-sectional analysis by building construction year. Additional aspects of the changes in energy consumption patterns across the decade are discussed in the following sections focusing on year of construction, geographical regions and building activities.

Energy Consumption by Construction Year

Beginning in 1973, energy efficiency has been a national concern for almost two decades. Therefore, a natural question is, "to what extent have commercial buildings become more energy-efficient." While certain types of equipment may be replaced in existing buildings, construction materials and basic heating/cooling systems are more difficult to replace. Thus, the increased awareness of the need for energy conservation and the changes in building codes at the national and local levels may be more dramatically reflected in new buildings constructed in the last decade. The cross-sectional analysis of energy consumption in buildings of different construction years, presented below, indicates that energy efficiency in commercial buildings has indeed improved continually since the fifties.

Within the existing building stock, the lowest gross energy intensity per hour (consumption per square foot per hour of operation) was found in buildings constructed in 1945 or before. However, within the stock of buildings constructed after 1945, there

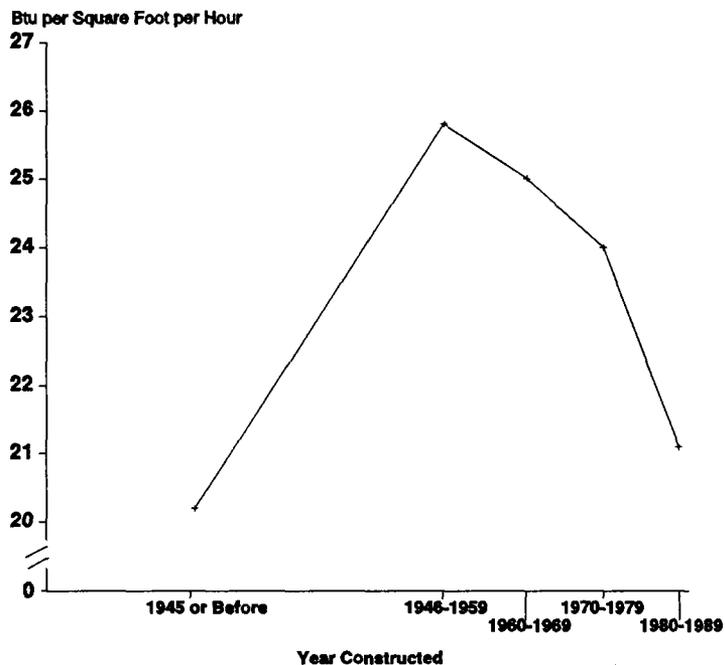
is a trend toward reduced gross energy intensity per hour in newer buildings (Figure 2 and Table 3). The highest gross energy intensity per hour was found in buildings constructed in the fifties and sixties. The lowest gross energy intensity per hour (almost as low as the pre-1946 buildings) was found in buildings constructed in the eighties. A partial explanation may be that a higher proportion of construction in the eighties was located in the South Census Region where energy intensities are low due to the warmer weather. For example, 42 percent of the floorspace in buildings constructed in the eighties was in the South compared to 33 percent of the floorspace in buildings constructed in the sixties (Table 16).

A comparison of newer and older building regarding their use of various energy sources, also revealed that newer buildings tended to depend more heavily on electricity and less on other energy sources (Table 3). This difference in the composition of the types of energy used may reflect a general increase in the use of electricity-related services and equipment, such as computers. In addition, it may also reflect the fact that a higher percent of newer buildings are located in warmer geographical areas, where the use of fossil fuels for heating is less prevalent, and the fact that a higher percent of newer buildings are office buildings, where a wide range of electricity-consuming equipment and appliances is employed. In newer buildings the gross energy intensity of electricity is higher than in older buildings, while the gross energy intensities of natural gas and fuel oil are lower (Figure 3).

If buildings constructed between 1960 and 1989 had the same gross energy intensity per hour of operation as did buildings constructed in the fifties (25.8 Btu per square foot per hour), then the total energy used in commercial buildings in 1989 would have been 6.2 quadrillion Btu, rather than 5.8 quadrillion Btu (assuming that all other characteristics related to energy consumption remained the same). Thus, an estimated conservation of 6 percent in the energy used in commercial buildings may be attributed to changes that occurred in energy-consumption patterns in newer buildings in the last two decades.

⁶*Economic Report of the President 1991*, Council of Economic Advisers (Washington, D.C.: U.S. Government Printing Office, February 1991), Tables B-3 and B-58.

Figure 2. Gross Energy Intensity per Hour of Operation by Year Constructed



Notes: "Gross energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of all buildings, regardless of the use or nonuse of any specific energy source in each building. The horizontal position of each year category corresponds to the median construction year of all buildings in the category.

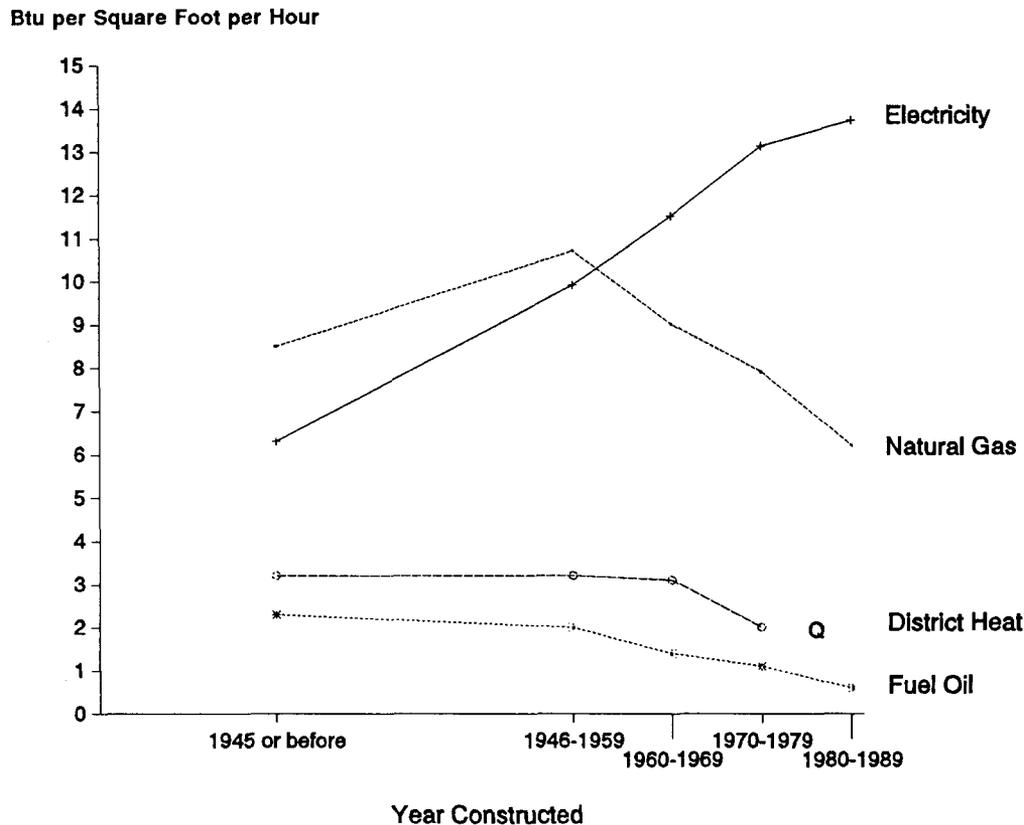
Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the Buildings Energy Consumption Survey, Tables 11 and B18.

Table 3. Net Energy Consumption and Expenditures in Commercial Buildings by Year Constructed

Year Constructed	Total Consumption of Major Energy Sources (trillion Btu)	Total Floorspace (million sq.ft.)	Gross Energy Intensity (thousand Btu/sq.ft)	Gross Energy Intensity per Operating Hour (Btu/(sq.ft*hr))	The Share of Electricity in Total Energy Consumption (percent)
1945 or Before	1.00	13,997	71.6	20.2	31
1946 - 1959	0.99	10,511	94.0	25.8	38
1960 - 1969	1.27	12,167	104.8	25.0	46
1970 - 1979	1.34	13,329	100.7	24.0	54
1980 - 1989	1.18	13,179	89.6	21.1	65

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 11 and B18.

Figure 3. Gross Energy Intensity per Hour of Operation for Major Energy Sources by Year Constructed



Q--Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: •The horizontal position of each year category corresponds to the median construction year of all buildings in the category. •"Gross energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of all buildings, regardless of the use or nonuse of any specific energy source in each building.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 11 and B18.

The reduction in gross energy intensity by building age, which was apparent when comparisons were done for buildings constructed across the last four decades, was not apparent when comparisons were done for buildings constructed within the last decade. In the 1989 CBECS data, there is some indication that buildings constructed between 1987 and 1989 consumed more energy per square foot in 1989 than buildings constructed between 1984 and 1986. It is not readily discernible whether this

reflects a decline of energy-related concerns, a difference in energy prices between 1984 and 1986 and 1987 and 1989, an increase in the stock of energy-consuming equipment in the newer buildings, a change in the trends of building construction patterns, or some combination of these factors. The differences in gross energy intensities within this decade were not found to be statistically significant, and the time span was not sufficiently long to draw conclusions. (These issues will be addressed in future studies.)

In order to evaluate whether differences in net energy consumption by decade of building construction reflect differences in the prevalence of energy conservation features, the conservation features that exist in buildings of different ages were also summarized (Table 4).

In general, energy conservation measures were found to be more prevalent in newer buildings than in older buildings. The more pronounced differences existed in wall and roof insulation, which are generally installed at the time of construction. In lighting features, which can easily be changed, there were almost no differences between new and old buildings.⁷ It may be inferred that new design patterns and construction codes, as well as an increased awareness of energy-related issues, have contributed to the more efficient energy consumption in commercial buildings in the last two decades. The extent to which these changes have exploited most of the realistic potential for conservation in the existing building stock cannot be determined from the CBECS data. This type of analysis would require actual audits of all the equipment in the commercial buildings, an evaluation of the conditions of such equipment, and the cost effectiveness of its replacement. Most of the energy conservation features that were listed in Table 4 have been incorporated in more than 70

percent of the floorspace in newer buildings, except for Computerized Energy Management and Control Systems.

Geographical Variation in Energy Use

Energy consumption patterns vary by geographic location, reflecting differences in climate, construction patterns, and energy source preferences. The following is an analysis of net energy consumption in nine Census divisions, the smallest geographical units for which the CBECS can publish data. Figure 4 presents the total net consumption of each major energy source in each Census division, illustrating differences in the consumption of various types of energy within and across divisions. (See the U.S. Census Regions and Divisions Map in Appendix E.)

The largest amounts of electricity were consumed in the Middle Atlantic, Pacific, and South Atlantic Divisions (470, 425, and 416 trillion Btu, respectively, accounting for 47 percent of the total consumption of electricity). The largest consumption of natural gas was found in the East North Central and the Middle Atlantic Divisions (561 and 314 trillion Btu, respectively, accounting

Table 4. Energy Conservation Features in Commercial Buildings by Year Constructed

Year Constructed	Percent of Floorspace in Buildings Having Each of These Characteristics					
	Roof or Ceiling Insulation	Wall Insulation	Other Shell Insulation ^a	At Least 50 Percent High-Efficiency Lighting ^b	Computerized Energy Management & Control Systems	Regular HVAC ^c Maintenance
1945 or Before	51.8	23.7	68.0	80.1	12.1	54.9
1946 - 1959	70.2	37.5	80.9	86.0	19.9	65.2
1960 - 1969	69.8	44.9	84.1	88.9	24.2	72.3
1970 - 1979	82.0	55.6	86.9	90.2	26.3	75.0
1980 - 1989	83.6	72.5	87.7	89.5	31.1	73.4

^aIncludes storm or multiple glazing, tinted reflective or shading glass, exterior or interior shadings or awnings, weather stripping or caulking.

^bIncludes high-intensity discharge or fluorescent lighting (see Glossary for definition).

^cHeating, ventilation, and air conditioning (see Glossary for definition).

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 104 of the *Commercial Buildings Characteristics 1989 Report*.

⁷A more detailed presentation of the conservation features that exist in buildings of different construction years may be found in the EIA's *Commercial Buildings Characteristics 1989 report*, Tables 97 through 110. An analysis of the penetration of energy-conserving lighting equipment in commercial buildings may be found in the EIA report: *Lighting in Commercial Buildings*, DOE/EIA-0555(92)/1.

Figure 4. Net Energy Consumption in U.S. Census Divisions

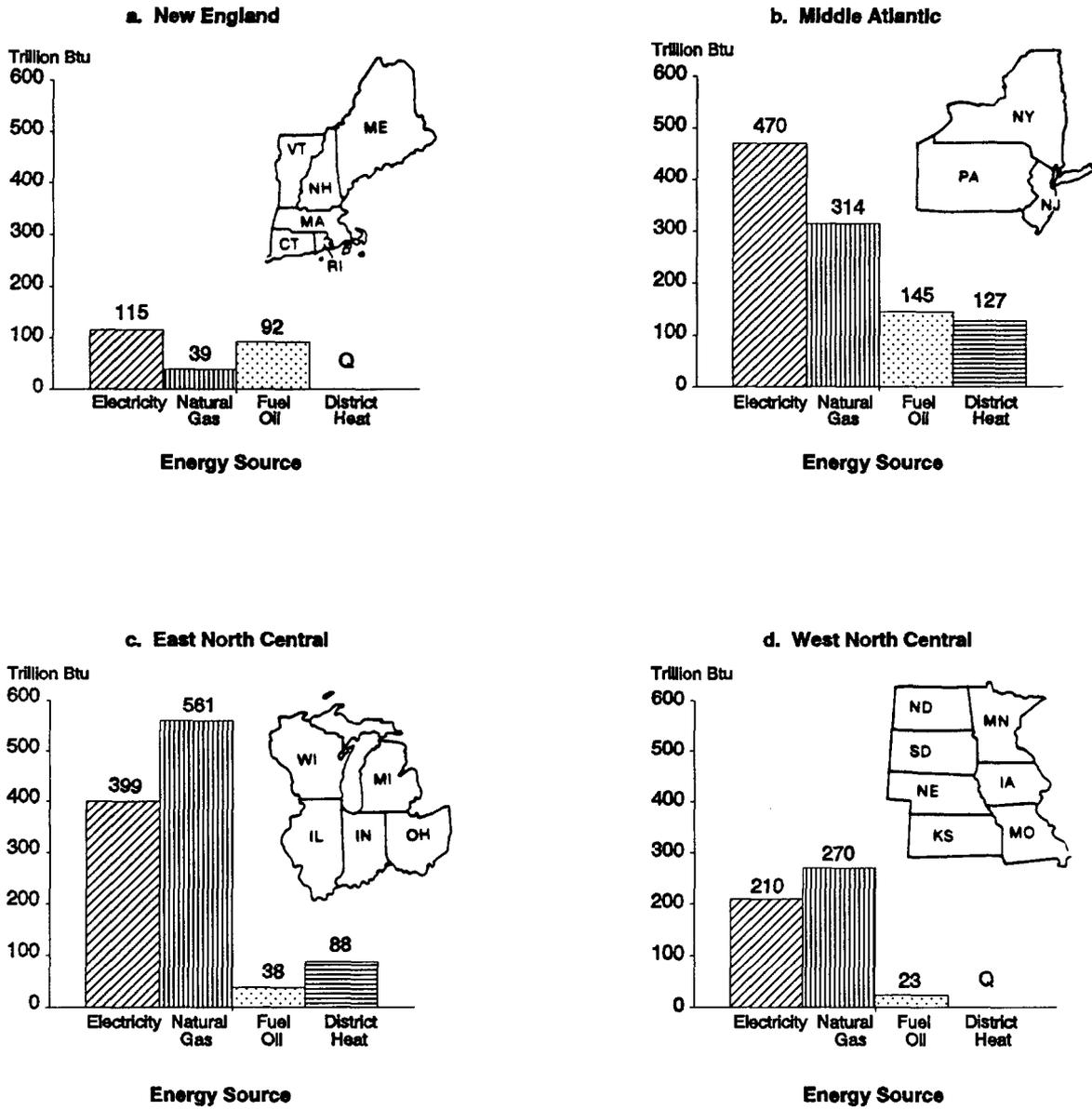
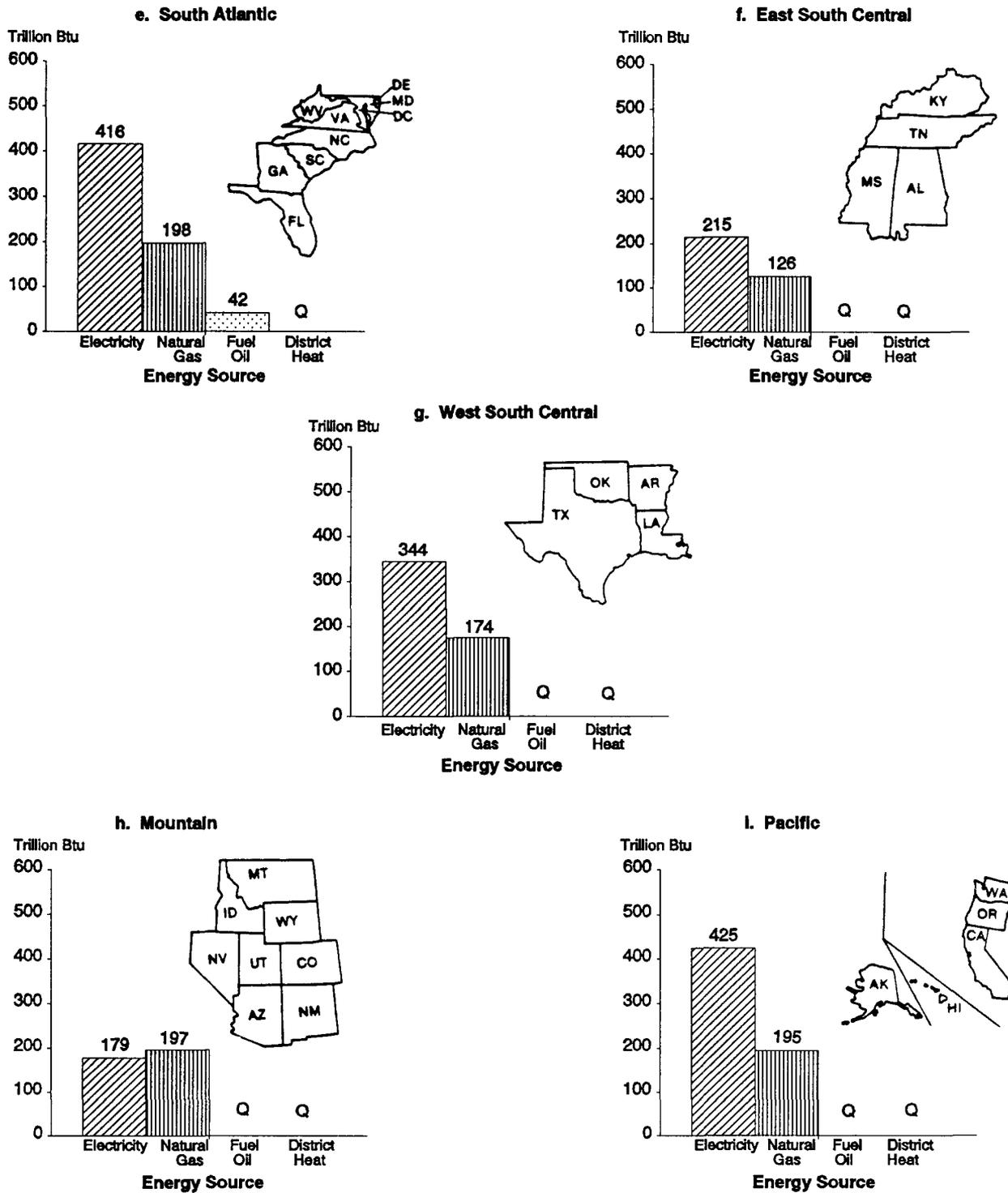


Figure 4. Net Energy Consumption In U.S. Census Divisions (Continued)



Notes: "Gross energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of all buildings, regardless of the use or nonuse of any specific energy source in each building. See Appendix B, "Nonsampling and Sampling Errors," for a discussion on comparisons between the 1979, 1983, 1986 and 1989 CBECS.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 11.

for 42 percent of the total). Most of the fuel oil was consumed in the Middle Atlantic and New England Divisions (145 and 92 trillion Btu, respectively, accounting for 66 percent of the total). A significant amount of the district heat was consumed in the Middle Atlantic and the East North Central Divisions (127 and 88 trillion Btu, respectively, accounting for 47 percent of the total consumption of district heat).

Since Census divisions vary in size, a comparison of energy consumption patterns is more clearly shown by examining the gross energy intensities. As expected, the highest gross energy intensity was found among the coldest Census divisions (Table 5). These were also the divisions in which fuels that are typically used for heating were consumed more intensely. In the East North Central, West North Central, and Mountain Divisions, the gross

energy intensity of natural gas exceeded even that of electricity. In the Middle Atlantic Division, the gross energy intensity of fuel oil and district heat were also relatively high. A relatively high gross intensity of fuel oil was also found in the New England Division, which includes many older buildings. The gross energy intensity of all fuels was lowest in the South Atlantic Division, which mainly includes areas with moderate and warm climates.

Although there was less of a regional variation in the gross intensity of electricity than in other energy sources, there was a regional difference in the total consumption of electricity. In the moderate and warm Census divisions, electricity consumption accounted for approximately 60 percent of the total energy consumed in the divisions.

Table 5. Gross Energy Intensity In Commercial Buildings by U.S. Census Divisions

Census Regions and Divisions	Total Floorspace (million sq.ft)	Gross Energy Intensity of All Major Energy Sources (thousand Btu/sq.ft.)	Gross Energy Intensity by Major Energy Source ^a (thousand Btu/sq.ft.)			
			Electricity	Natural Gas	Fuel Oil	District Heat
Northeast						
New England	3,173	94.0	36.3	12.4	28.9	Q
Middle Atlantic	10,395	101.6	45.2	30.2	13.9	12.3
Midwest						
East North Central . .	10,681	101.7	37.4	52.5	3.5	8.2
West North Central . .	5,275	108.7	39.7	51.2	4.3	Q
South						
South Atlantic	10,090	67.6	41.2	19.6	4.2	Q
East South Central . .	14,296	86.8	50.1	29.3	Q	Q
West South Central . .	7,653	77.6	44.9	22.8	Q	Q
West						
Mountain	4,388	102.5	40.7	44.8	Q	Q
Pacific	7,232	93.4	58.8	26.9	Q	Q

^aGross Energy Intensity for a specific energy source is the ratio of the consumption of that energy source to the total floorspace in all buildings. The gross intensity measure allows for comparisons across divisions as well as across energy sources.

Q - Data withheld because the Relative Standard Error was greater than 50 percent, or data were reported for fewer than 20 buildings.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 11.

Energy Consumption by Building Activity

Net energy consumption and gross energy intensity are related to the main activity performed in a building. Different activities require different equipment, building structures, work schedules, and the concentration of workers in the buildings, all of which are related to energy consumption. (A detailed description of the different building activity types is provided in Appendix D, "Types of Buildings.")

In 1989, office buildings consumed 21 percent (1,230 billion Btu) of the total amount of energy

used in commercial buildings, and they accounted for 19 percent of the total amount of floorspace. An additional 1,048 trillion Btu (18 percent) were consumed in mercantile and service buildings, which included 20 percent of the commercial floorspace (Table 6). The most intensive energy consumption per square foot was found in health care and food service buildings and in laboratories. (In the detailed tables, laboratories are included in the category of "other" buildings, since they represent a relatively small group of buildings and tend to be associated with industrial sites.)

Table 6. Net Energy Consumption In Commercial Buildings by Principal Building Activity

Principal Building Activity	Total Net Energy Consumption (trillion Btu)	Total Floorspace (million sq.ft)	Gross Energy Intensity (thousand Btu/sq.ft)	Gross Intensity per Hour of Operation (Btu/(sq.ft*hr))	Consumption per Worker (million Btu)
All Buildings	5,788	63,183	91.6	23.1	81.9
Assembly	441	6,909	63.8	19.8	109.7
Education	704	8,076	87.2	25.9	97.8
Food Sales	139	792	175.6	31.5	164.7
Food Service	255	1,167	218.4	41.7	131.2
Health Care	449	2,054	218.5	29.4	106.3
Laboratory ^a	293	919	319.2	79.0	198.7
Lodging	425	3,476	122.3	14.3	137.6
Mercantile and Service	1,048	12,365	84.8	22.4	84.4
Office	1,230	11,802	104.2	29.5	44.3
Parking Garage	42	983	42.6	7.1	126.1
Public Order and Safety	78	616	127.0	19.1	91.0
Warehouse	535	9,253	57.8	16.9	122.4
Other	50	610	82.7	16.3	79.4
Vacant ^b	98	4,161	23.5	11.0	66.5

^aIn the Detailed Tables section, laboratory is included in the category of "other" buildings.

^bBuildings in which more than 50 percent of the floorspace was vacant.

Note: Because of rounding, data may not sum to totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 11, 13, and B18.

Energy Efficiency Across Building Types

One area of interest when looking at energy consumption by building type (defined by principal building activity) is the relative energy efficiency across different building types. This energy efficiency can be measured differently by focusing on a particular aspect of activity level within the building. These aspects of activity include: energy consumption per square foot (gross energy intensity), hours a building is in operation (gross energy intensity per hour of operation), and the concentration of workers in the building (energy consumption per worker). All three factors: floorspace, hours of operation, and concentration of workers are indicators of the building activity level that are related to energy consumption.

Depending on which activity indicator is used, different building types will stand out compared to others. Therefore, each of these indicators may present a different picture regarding the energy efficiency of a certain type of building in relation to other types of buildings. When one of the activity indicators is particularly high in a specific building type, the corresponding energy indicator (consumption per unit of that factor) will tend to be low, even if other indicators (consumption per unit of other factors) are at an average or above-average level (Table 6).

A comparison of the three different indicators of consumption by principal building activity: gross energy intensity, intensity per hour of operation, and consumption per worker shows that:

- In **health care** buildings the consumption per square foot is high, relative to the whole building population. However, in health care buildings both the hours of operation and the concentration of workers are relatively large, contributing substantially to the energy consumption in these buildings. Therefore, in terms of intensity per hour of operation

and in terms of consumption per worker, the rate of energy use in health care buildings is similar to most other buildings. A similar situation exists in **food service** buildings.

- **Assembly, education, and warehouse** buildings have lower than average operating hours and lower than average concentration of workers. Thus, while they are low compared to other buildings in terms of gross energy intensity, they consume more energy than other buildings in terms of intensity per hour of operation and consumption per worker.
- **Lodging, food sales, and public order and safety** buildings are characterized by long operating hours, which would be expected to contribute to high energy consumption. Thus, in terms of the intensity per hour of operation, these buildings have lower rates of energy consumption than in terms of either the intensity or the consumption per worker.
- **Parking garages** are characterized by a relatively low concentration of workers in conjunction with relatively large floorspaces and long operating hours. Therefore, relative to other building types, these buildings have very low energy intensity and very low consumption per operating hour, while consumption per worker is relatively high.
- **Office buildings** are characterized by a large concentration of workers. Therefore, their consumption per worker is much lower relative to other buildings than the gross energy intensity and the intensity per hour.
- **Mercantile and service** buildings are not characterized by especially large floorspace or high concentration of workers or long hours of operation. Therefore, their consumption relative to other buildings is similar for all three indicators.

Energy Source Mix by Building Type

The activity performed in a building affects not only the energy consumption in the building, but also the sources of energy and the intensity of the consumption of different sources.

Figures 5 through 7 present the consumption patterns of the four major energy sources for all buildings and for each building type, respectively. The data indicate that, in most building types, electricity and natural gas were consumed in similar amounts; however, in education buildings the consumption of natural gas was larger than that of electricity, while in office buildings the consumption of electricity was much larger than that of natural gas. Fuel oil was consumed in small amounts in most building types, while district heat was found mainly in health care, assembly, and office buildings (Figures 6 and 7).

Comparison of gross energy intensities across the decade shows that there was little change in gross electricity intensity for commercial buildings as a whole. There were substantial declines for both natural gas and fuel oil. The gross energy intensity of natural gas decreased in most building types, particularly in assembly, mercantile and service, office, and warehouse buildings (Figure 8). The gross energy intensity of fuel oil decreased in most building types.⁸

Factors Related to Specific Energy Source Consumption

Previous sections of this report have compared aggregate intensity among building characteristic categories, such as categories of the year constructed. To examine whether the relationships

suggested by the aggregate intensity comparisons hold at the individual building level, a statistical procedure known as multiple regression was used to relate intensity to six explanatory variables: the concentration of workers per square foot, weekly operating hours, building age, heating degree-days, cooling degree-days, and the principal building activity.⁹

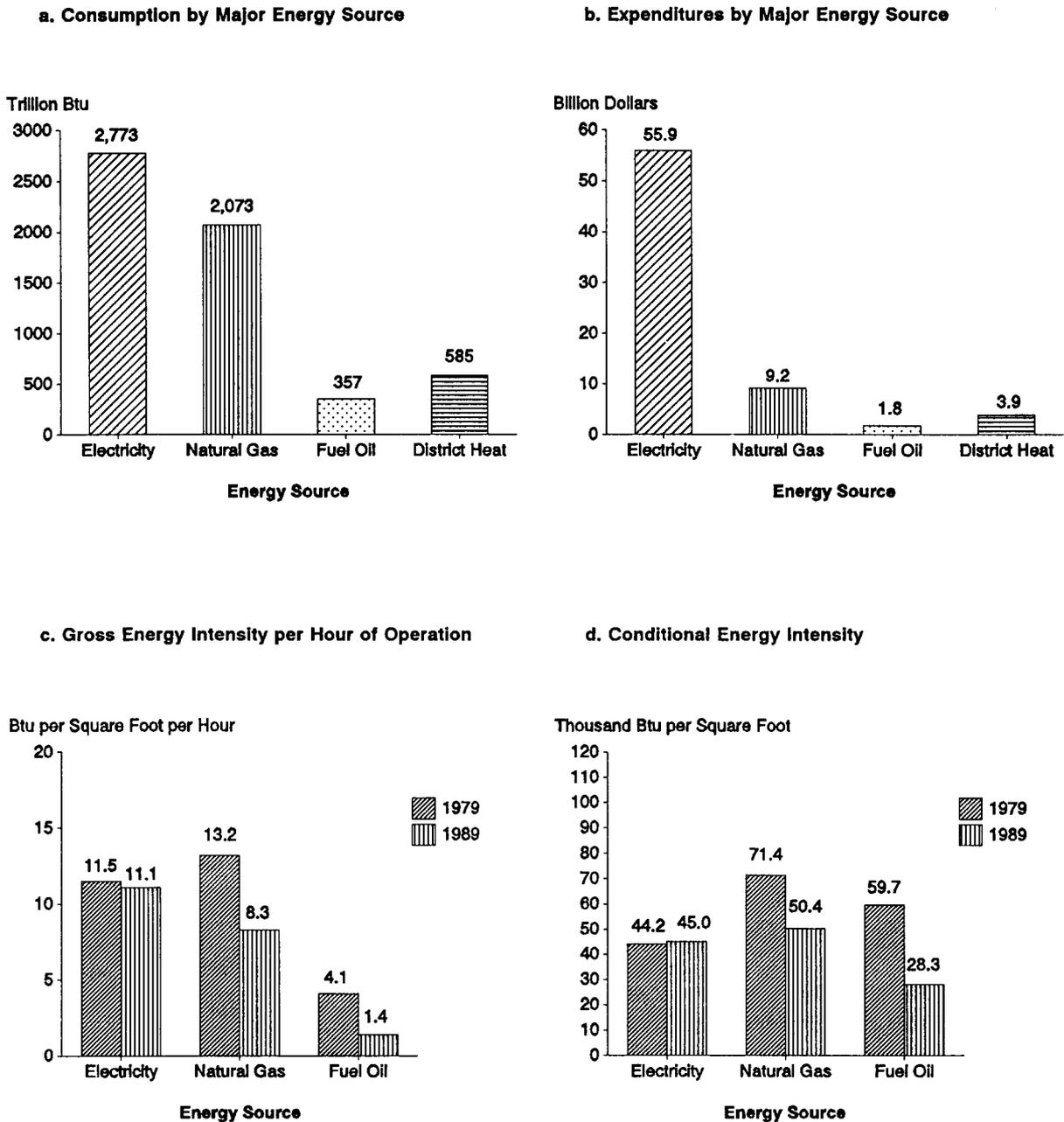
Overall, major energy source intensity was significantly related to all items except building age and cooling degree-days. All four specific energy source intensities were related to the concentration of workers per square foot and the principal building activity; differences among energy sources appeared with regard to the other items. Electricity intensity was related to cooling, rather than heating degree-days, as befits its dominant role in air conditioning. Electricity intensity was also related to the age of the building, probably as a result of the growing electrification of buildings over time. Similar to electricity, fuel oil intensity was related to building age, mirroring the overall decline in fuel oil (Figure 3). As would be expected given their minor use as cooling energy sources, neither natural gas nor fuel oil intensities were significantly related to cooling degree-days. Neither fuel oil nor natural gas intensities were related to weekly operating hours.

The relationship between intensity and principal building activity remains even when the other factors were considered. This finding indicates that differences in the intensity patterns by principal building activity (Figures 5 and 8) are not simply due to differences in the distribution of buildings across activity categories by age, location, and worker concentration. Rather, there are other differences among activity categories, such as differences in the types of equipment used to perform the activities, which have important bearing on the intensity of energy use.

⁸Since the 1979 CBECS only collected purchased steam, district heat was omitted for comparison between 1979 and 1989. Thus, 1979 and 1989 data are not directly comparable.

⁹See Appendix B, "Nonsampling and Sampling Errors," for further methodological details.

Figure 5. Consumption Patterns in Commercial Buildings

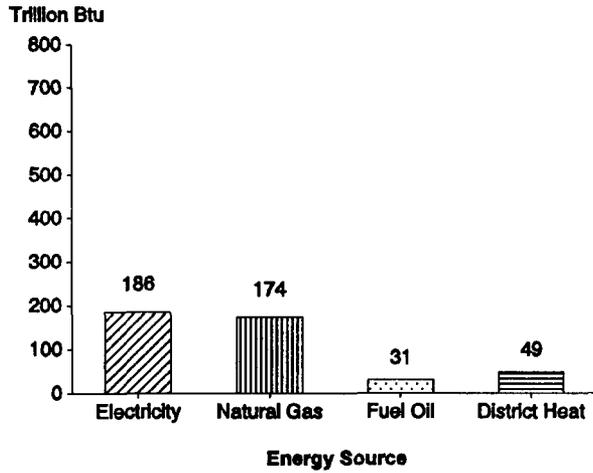


Notes: •"Gross energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of all buildings, regardless of the use or nonuse of any specific energy source in each building. •"Conditional energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of buildings using that energy source. •See Appendix B, "Nonsampling and Sampling Errors," for a discussion on comparisons between the 1979, 1983, 1986, and 1989 CBECS.

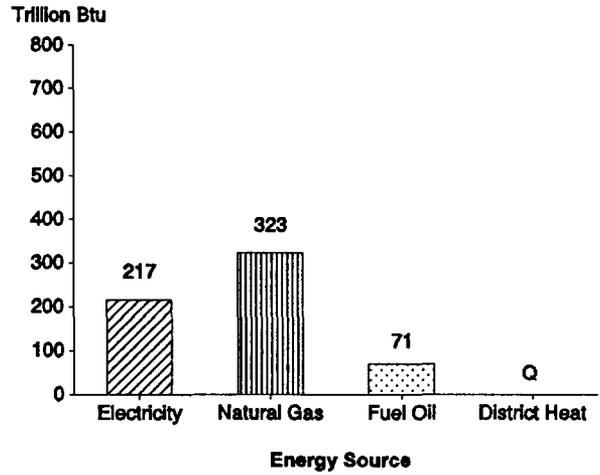
Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1979 and 1989 Commercial Buildings Energy Consumption Surveys, Tables 11, 12, and B17.

Figure 6. Consumption of Major Energy Sources by Building Activity

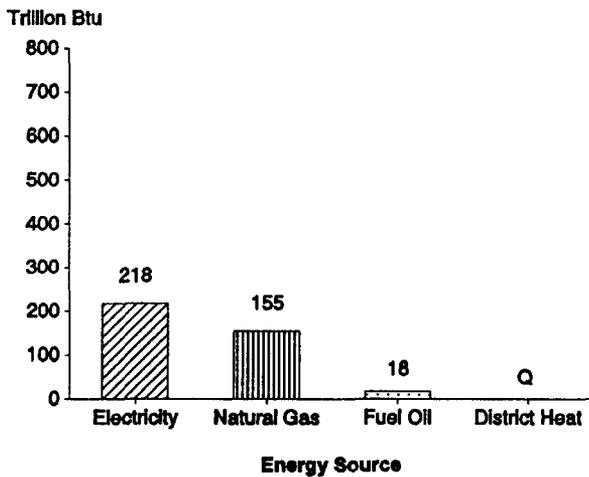
a. Assembly Buildings



b. Education Buildings



c. Food Sales and Food Service Buildings



d. Health Care Buildings

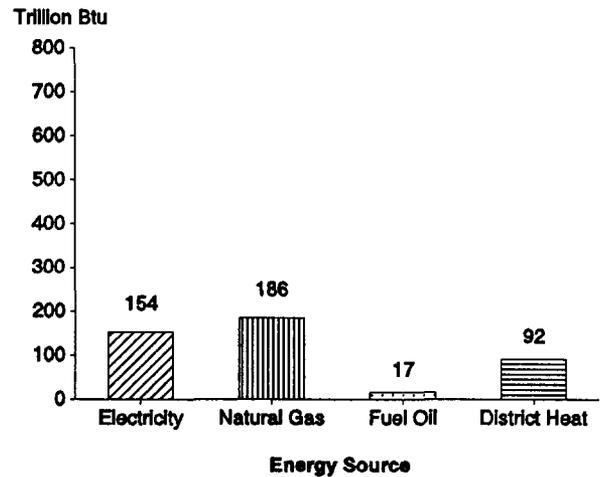
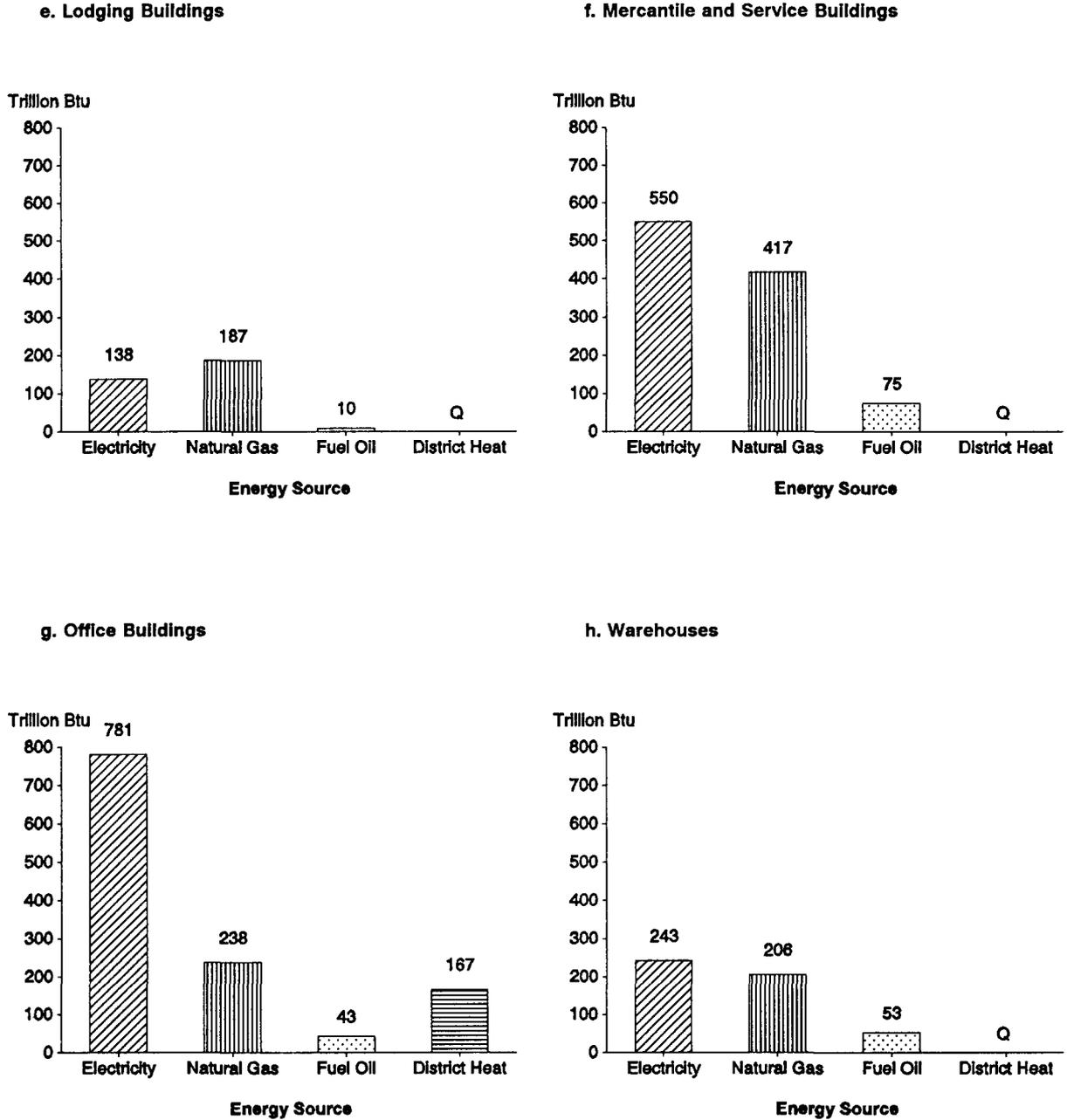


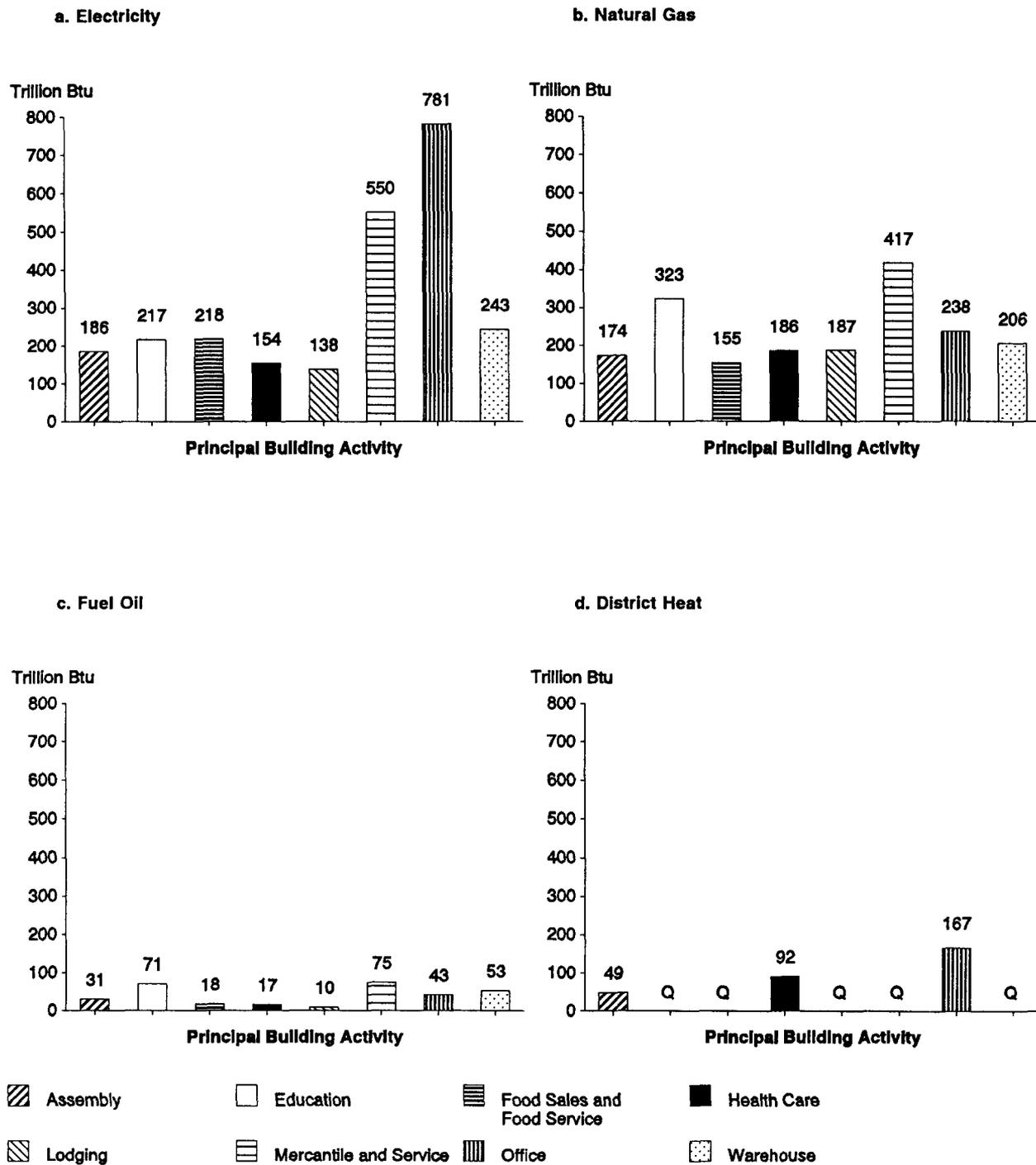
Figure 6. Consumption of Major Energy Sources by Building Activity (Continued)



Q—Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 11.

Figure 7. Consumption in Buildings with Selected Activities by Major Energy Source



Q--Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table 11.

Figure 8. Gross Energy Intensity by Building Activity

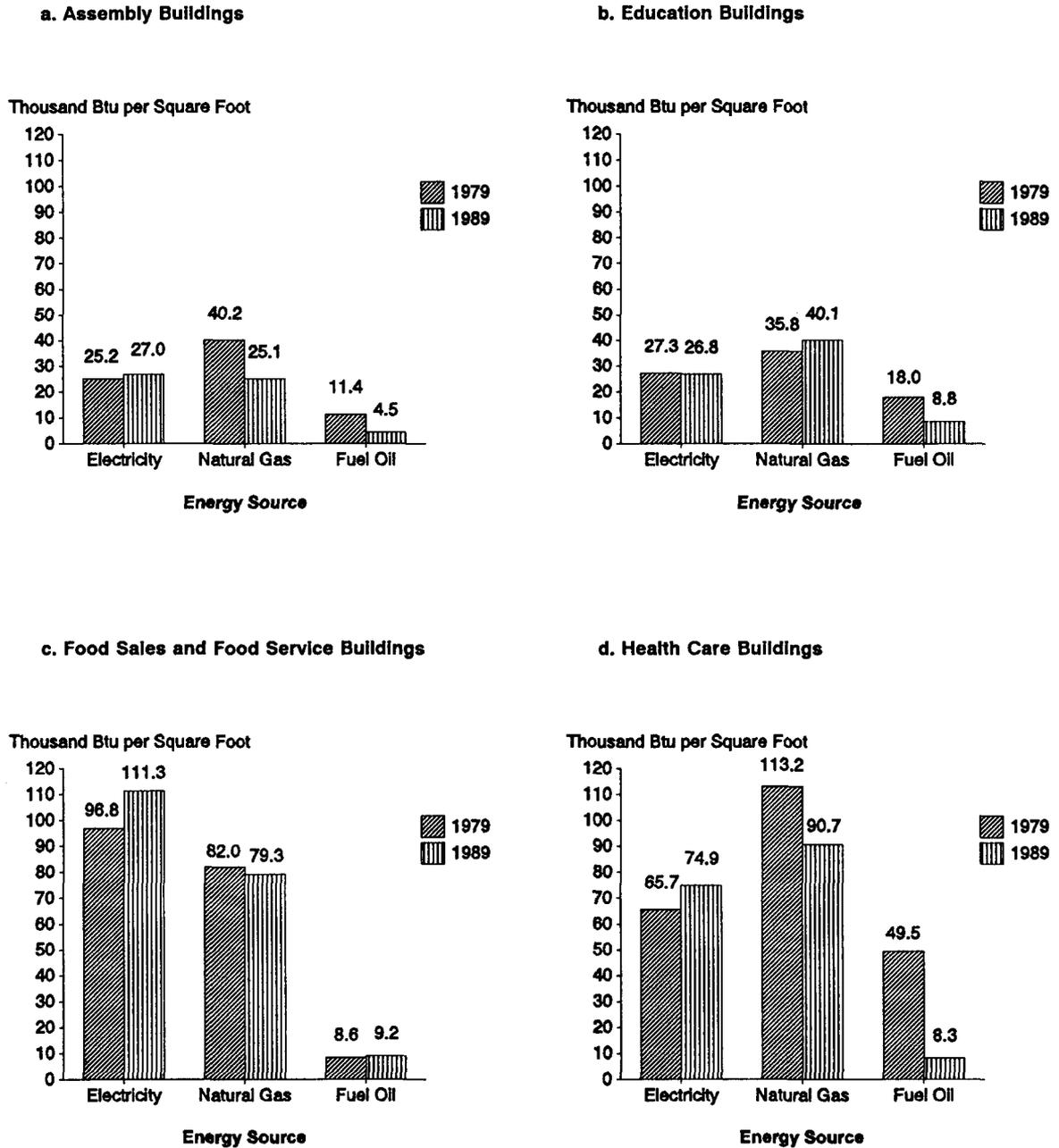
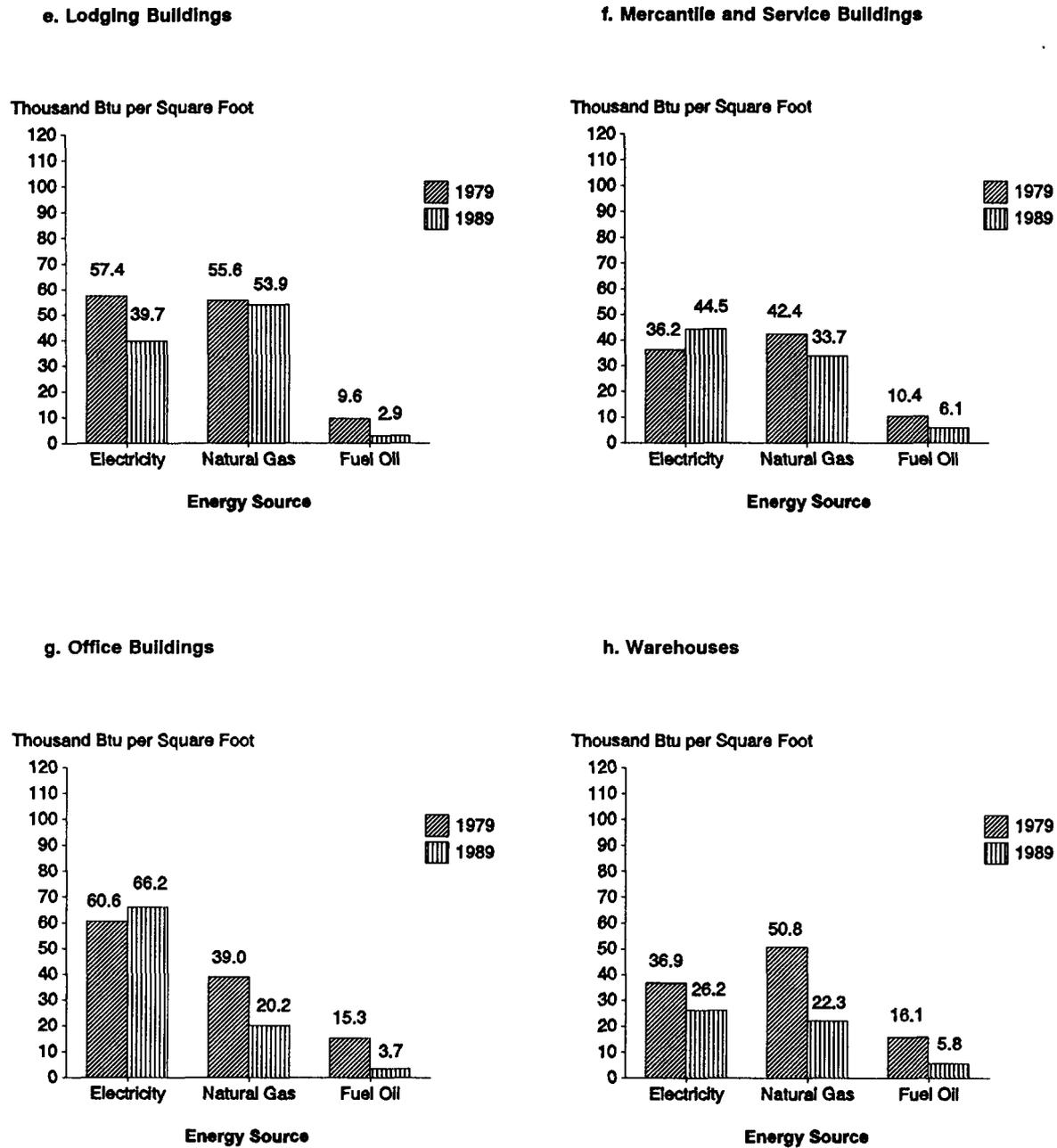


Figure 8. Gross Energy Intensity by Building Activity (Continued)



Notes: • "Gross energy intensity" is the ratio of the consumption of a specific energy source to the total floorspace of all buildings, regardless of the use or nonuse of any specific energy source in each building. • Since the 1979 CBECS collected data on purchased steam only, district heat was omitted for comparison between 1979 and 1989. • See Appendix B, "Nonsampling and Sampling Errors," for a discussion on comparisons between the 1979, 1983, 1986, and 1989 CBECS.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1979 and 1989 Commercial Buildings Energy Consumption Surveys, Table B17.

Energy Source-Specific Issues

District Heating and Cooling

A special effort was made in the 1989 CBECS to collect consumption data about district heating and cooling energy. The category of district heating and cooling includes district steam, district hot water, and district chilled water, which are piped into a building from a central source located outside the building and serving more than one building.

In 1989, roughly 10 percent of commercial floorspace was in buildings served by district steam or hot water (EIA *Commercial Buildings Characteristics 1989* report), and about 5 percent of air-conditioned commercial floorspace was cooled by district chilled water.

The most intensive consumption (conditional intensity) of district heat in 1989 was found in health care buildings and laboratories (135 and 114 thousand Btu per square foot, respectively), and 87 percent of the total consumption of district heat was consumed by buildings that used it as their main space-heating source. In the very cold climate zone, the conditional intensity of district heat reached a high of 206 thousand Btu per square foot.

The central source for district steam, district hot water, and district chilled water may be a utility or a central plant that serves the entire multibuilding facility of which the sampled CBECS building is a part. Typical examples of multibuilding facilities are university campuses and hospital complexes. Also included are industrial sites, office parks, motels, schools, or shopping centers, consisting of more than one building at the same site. About 40 percent of all commercial floorspace was found in multibuilding facilities with 13 percent of commercial floorspace on facilities that had central plants. In inpatient health care buildings, 72 percent of the floorspace was on multibuilding facilities, 56 percent of the floorspace on facilities having a central plant.

When the district heating or cooling is purchased from a utility or similar vendor, the amounts delivered are usually metered and billed similar to electricity or natural gas. Thus, consumption information is relatively easy to obtain for purchased district heating and cooling. However, roughly three-quarters of the commercial floorspace served by district heating or cooling is served by a central plant on the same multibuilding facility. Often in such cases, there is no metering of individual buildings' steam, hot water, or chilled water use. There may be metering records for an entire district or system that serves several buildings, or a record only of total central plant output, or no record even of the overall output. In the latter case, the total facility input fuel consumption may be the only data available. In the 1989 CBECS, if the building that includes the central plant was defined as a commercial building, information about its input fuel consumption was collected. However, in some cases the central plant was defined as an industrial building. In these cases, neither its input nor its output, which flows into other commercial buildings was collected. For these reasons, it has been difficult for the previous CBECS to provide accurate estimates of total district heating and cooling consumption by commercial buildings.

In order to collect more accurate data on the district heat that flows into commercial buildings, an adjunct survey of multibuilding facilities with central plants was undertaken in 1989. This survey collected data at the entire facility level, but included information on specific buildings within the facility. Data were received from 261 multibuilding facilities, of which 237 did actually have a central plant. See Appendix A of this report for more information on the Facility Survey.

The Facility Survey found the largest share (36 percent) of floorspace in facilities to be on college or university campuses. The commercial buildings on these campuses included education, assembly, lodging and office buildings. Twenty percent of the floorspace was in hospitals, and 15 percent on industrial facilities.

Offices and warehouses were the two most prominent types of commercial buildings in multibuilding facilities. Consumption data from the adjunct Facility Study are not yet available and will be published in a separate analytic report.

Gas Transported for the Account of Others

A new development in energy markets in the last decade is the ability of large natural gas users to purchase their gas via direct purchases from the source, rather than from the local utility. The local utility would then deliver the gas to the building via pipelines. Gas purchased directly is

referred to as gas transported for the account of others, transportation gas, direct purchase gas, or spot market gas. In this report, for simplicity, it is referred to as transported gas. Gas purchased directly from the source may be advantageous for buildings that consume large amounts of natural gas since the price paid for the gas through a separate transaction with a gas producer or intermediary may be lower than that paid when gas is bought directly from the local gas utility.

Overall, 12 percent of all natural gas consumed by commercial buildings in 1989 was transported gas (Table 7). Transported gas was consumed in 24,000 buildings with a total floorspace of 2,265 million square feet. As a group, these customers received

Table 7. Transported Gas Consumption as a Percent of Natural Gas Consumption in Commercial Buildings

Building Characteristics	Number of Buildings (thousand)	Floorspace (million sq.ft.)	Total Natural Gas Consumed (billion cu.ft.)	Transported Gas Consumed (billion cu.ft.)	Percent Transported Gas Consumed
All Buildings Using Natural Gas	2,420	41,143	2,015	242	12
Census Region					
Midwest	734	12,815	808	145	18
Remainder	1,686	28,329	1,207	Q	8
Principal Building Activity					
Education	199	6,640	314	Q	21
Health Care	40	1,602	181	49	27
Other	2,181	32,902	1,519	126	8
Natural Gas Account Classification^a					
Commercial	2,203	35,489	1,592	110	7
Industrial	30	1,975	203	Q	37
Other	187	3,680	219	Q	26
Multibuilding Facility					
Yes	665	15,016	880	160	18
No	1,755	26,127	1,135	82	7

^aThese numbers refer to the classification made by the supplier. CBECS' classification of commercial buildings does not always match the suppliers' classification, as explained in Appendix C.

Q - Data withheld because the Relative Standard Error was greater than 50 percent, or data were reported for fewer than 20 buildings.

Note: Because of rounding, data may not sum to totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 38 and CBECS Public Use Data.

89 percent of their gas via direct purchases, with the remaining 11 percent bought from their local utility companies.

Approximately 18 percent of the natural gas purchased in the Midwest Census Region was classified as transported gas. The Midwest consumed 60 percent of the 242 billion cubic feet of transported gas reported for all commercial buildings in the 1989 survey. Education and health care buildings received substantial proportions of their natural gas as transported gas, 21 and 27 percent, respectively. Only 7 percent of all gas provided to buildings that were defined by the energy suppliers as "commercial" customers was transported gas. In contrast, in commercial buildings defined by the suppliers as "industrial" customers, 37 percent of consumed natural gas was purchased under this arrangement (Table 7). For further discussion of technical issues related to transportation gas, see Appendix B, "Nonsampling and Sampling Errors."¹⁰

Fuel Switching

Fuel switching, as used in this report, is the ability to change to a different main heating fuel within a period of 1 week without substantially reducing the area heated or the temperature maintained in the heated area. For the first time, the 1989 CBECS data allow analysis of this short-term capability to switch to another energy source. Prior to the 1989 CBECS, data were collected that addressed only the long-term potential for fuel switching.

In 1989, two types of information relating to fuel switching were requested. As in previous CBECS, data were collected regarding the use of other energy sources in the building for each building with a specific main heating source. These other energy sources were used for secondary space heating, water heating, cooling, or for end uses other than main heating. For the first time, CBECS respondents were asked (a) whether the building could switch to a different main heating source within a week's time, without substantially reducing the area heated or the temperature

maintained in the heated area, and (b) to which energy source the building could switch.

Only the maximum amounts of energy sources that were potentially relevant for fuel switching could be estimated, since the CBECS did not collect metered data on the amount of energy consumed for each end use. Thus, any estimates are based on the total consumption of the particular energy source used as the main heating source, rather than on the consumption used solely for main space heating.

Long-Term Potential for Fuel Switching. Many buildings that used a particular energy source for heating were also supplied with other energy sources and therefore had a long-term potential for converting their heating systems to an alternate energy source. Virtually all buildings using natural gas or fuel oil as their main heating source were also supplied with electricity (less than 1 percent of the buildings was not supplied with electricity). Therefore, in the long term and at some costs, electricity could replace natural gas or fuel oil.

In buildings using electricity as the main heating source, approximately 38 percent of the consumption of electricity was in buildings also supplied with natural gas. In buildings using fuel oil as their main source of heating, about 34 percent of the fuel oil consumption was in buildings that were also supplied with natural gas.

About 12 percent of the electricity consumption for buildings using electricity as the main heating source and about 21 percent of the natural gas consumption for buildings using natural gas as the main heating source took place in buildings that were also supplied with fuel oil (Table 8).

Short-Term Capability to Switch Fuel. Only a small percentage of the buildings reported the short-term capability to switch their heating to an alternate type of energy. Of the 234 billion kWh consumed in buildings where electricity was the main heating source, only 10 percent (24 billion kWh) was in buildings that could switch to another heating source within a week's time.

¹⁰For statistics of transportation gas by state, see *Natural Gas Annual 1990*, EIA-0131(90)/1 (Volume 1, Table 18), Energy Information Administration.

Table 8. Long-Term Potential for Fuel Switching

	Electricity		Natural Gas		Fuel Oil	
	Consumption ¹ (billion kWh)	Percent Using Other Energy Source	Consumption ¹ (billion cu.ft.)	Percent Using Other Energy Source	Consumption ¹ (million gallons)	Percent Using Other Energy Source
Main Heating Energy Source	234	100	1,728	100	2,056	100
Other Energy Sources Used in Building						
Electricity	--	--	1,725	100	2,044	99
Natural Gas	90	38	--	--	703	34
Fuel Oil	27	12	361	21	--	--

¹Includes consumption of fuel for all end uses, not just main heating source.

-- Data Not Applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Tables 29, 45, and 51.

The ability to switch to an alternate main heating fuel was greater for buildings with either natural gas or fuel oil as the main heating fuel. About 32 percent (554 billion cubic feet) of the natural gas and 23 percent (466 million gallons) of the fuel oil consumed as the main heating sources were in buildings that could switch to an alternate main heating fuel within a week (Table 9).

Fuel oil was the predominant alternate energy source for natural gas-heated buildings reporting short-term fuel-switching capability. Of the 554 billion cubic feet of natural gas consumption in buildings that could switch their main heating fuel, 391 billion cubic feet (71 percent) were consumed in buildings that reported a short-term capability to switch to fuel oil. In contrast, although electricity was used in almost all buildings that had natural gas as a main heating source, it was an alternate source of main heating in only a small fraction of these buildings.

In buildings where fuel oil was the main heating source, natural gas was the predominant alternate source (Table 9). Of the 466 million gallons of fuel oil consumed in buildings with an alternate

main heating source, 310 million gallons (67 percent) were consumed in buildings where natural gas was the alternate energy source. For additional discussion of fuel-switching capability, see Appendix B, "Nonsampling and Sampling Errors."

Energy Suppliers Account Classification

The CBECS' definition of a commercial building is not always synonymous with an energy supplier's account classification of that building. For the CBECS, a building is classified as commercial if over 50 percent of its floorspace is used for commercial activities (for a more complete definition of a CBECS building, see the "Glossary"). For the purpose of classification of customer accounts, an energy supplier could classify that same building as either commercial, industrial, residential, or a combination of commercial/residential or commercial/industrial depending upon the rate structure and guidelines of the utility and state public service commission.¹¹

¹¹A more detailed discussion of account classification as it relates to the CBECS can be found in Appendix C, "CBECS Coverage Related to EIA Supply Surveys."

Table 9. Short-Term Capability to Switch Fuels Within a Week's Time

	Electricity Consumption			Natural Gas Consumption			Fuel Oil Consumption		
	Billion kWh	Percent	Percent Alternate Source	Billion cu.ft.	Percent	Percent Alternate Source	Million Gallons	Percent	Percent Alternate Source
Main Heating Source	234	100	--	1,728	100	--	2,056	100	--
Ability to Switch									
Main Heating Source									
No Alternate	210	90		1,174	68		1,590	77	
Have Alternate	24	10	100	554	32	100	466	23	100
Alternate Main Heating Source									
Used in Building									
Electricity	--	--	--	71	--	13	Q	--	Q
Natural Gas	15	--	63	--	--	--	310	--	67
Fuel Oil	5	--	21	391	--	71	--	--	--

Q - Data withheld because the Relative Standard Error was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data Not Applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Buildings Energy Consumption Survey, Tables 29, 45, and 51.

The potential discrepancy between a CBECS building and the supplier's classification of a building is further compounded by the fact that different energy suppliers can classify the same building differently. For example, the supplier of electricity could classify the building as commercial, while the supplier of natural gas could classify the same building as industrial.

To investigate this issue, the 1989 CBECS asked the energy suppliers to provide the account classification for each building when they provided the energy consumption billing data for that building. (For a discussion of the Energy Suppliers Survey, see Appendix A, "How the Survey Was Conducted.")

Analysis of the classification of energy accounts by the energy suppliers indicate that of the total 61,563 million square feet in buildings using electricity, approximately 77 percent was in buildings classified by electricity suppliers as

commercial. An additional 4 percent was classified as either schools, government buildings, or institutional buildings. The remaining 18 percent of the floorspace was classified as noncommercial or a mix of commercial/noncommercial accounts. Included in this noncommercial classification was approximately 16 percent of floorspace that was classified as industrial or a combination of industrial/commercial.

The classification of natural gas accounts differs from the account classification of electricity in that only about 6 percent of the floorspace in buildings using natural gas was classified as industrial or mixed industrial/commercial sales accounts. About 86 percent of the floorspace was classified as commercial by the natural gas suppliers. Additional analysis of energy consumption in the CBECS buildings by the energy suppliers' account classification of that building, indicates that the degree of difference in account classification varies by energy source (Table 10).

**Table 10. Consumption by Energy Source and Energy Supplier's Account Classification
(Trillion Btu)**

Account Classification	Electricity	Natural Gas	Fuel Oil
All Buildings, All Accounts	2,773	2,073	357
Commercial Sales	2,077	1,704	263
Mixed Commercial/ Noncommercial Sales	279	120	69
Not Classified as Commercial Sales	415	251	26
Residential	16	42	6
Industrial	399	209	20

Note: Because of rounding, data may not sum to totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Table C1.



This church is located in the West Census Region and is classified as an assembly building in the 1989 CBECS.

Detailed Tables

The following 43 tables present detailed energy consumption and expenditure data from the 1989 CBECS for buildings in the commercial sector. A "Quick-Reference Guide" to the statistics in the different tables is provided to point the reader to the relevant tables concerning specific topics. Directions for calculating an approximate relative standard error for each estimate in the tables are also presented. For comparability with previous CBECS, the four major energy sources are referred to as major fuels in the following Detailed Tables.

Table Organization

Overall Organization

Tables are sequenced by a summary of all major fuels for total consumption, total expenditures, and intensities, and then by specific fuels: electricity, natural gas, fuel oil, and district heat. In general, the floorspace total shown in the detailed tables include all the floorspace in buildings where the indicated feature is present. That is, particular buildings' floorspace is either entirely included or excluded from a particular table cell.

Row Stubs

There is a standard set of row categories (stubs), which appears in all the summary tables. Depending on the specific table topic, the standard stub may be augmented with selected variables pertinent to that topic. The standard stub items always appear in the same order, with any additional stub items interspersed adjacent to the related standard stub items.

There are two types of row stubs, those that divide commercial buildings into exclusive, nonoverlapping categories and those that indicate nonexclusive, overlapping subsets. For example, "Climate Zone" is a set of exclusive categories; a

given building belongs in only one of these. "Energy Sources," on the other hand, is a set of nonexclusive categories; a given building may be represented in more than one line under this stub, since the building may use more than one energy source. The phrase "Solely or in Combination" indicates that the categories under this row header are overlapping. Both exclusive and overlapping categories may be nonexhaustive; that is, there may be some buildings that do not fall into any of the listed categories.

Summary and Gross Intensities Tables

Tables 11 and 12 are summary tables of total energy consumption and expenditures by major fuels. Total consumption and expenditures for all major fuels, as well as consumption and expenditures per building, per square foot and per worker are provided in Tables 13 and 14. Table 15 presents expenditure intensities for the sum of major fuels by main heating fuel. Tables 16 through 20 present energy intensities by consumption totals and total floorspace by two-factor classifications. The first factor is Census region (Tables 16-17), building size (Table 18), principal building activities (Table 19) and the year the building was constructed (Table 20). Energy intensity statistics for these tables are gross energy intensities. That is, they are the ratio of total consumption to total building floorspace including buildings and floorspace where the fuel is not used.¹² For a discussion of Gross Intensities, see the box on page 7 of this report. For more information on complete definition see the "Glossary."

Specific Fuel Tables

Tables 21 through 53 are the specific fuel tables. These tables are subdivided into tables showing total consumption and expenditures for a specific

¹²In previous CBECS reports, only conditional energy intensities were presented. These intensities were referred to in the report as energy intensities.

fuel, tables showing consumption for buildings that use the specific fuel, and tables showing consumption for buildings that are heated with the specific fuels. For electricity, consumption statistics are presented for buildings that cool (Table 28) and heat (Table 29) with electricity. Tables 30 through 36 contain peak electricity demand information.

With the exception of fuel oil and district heat, the consumption tables are also presented by Census region, building size, principal activity, and year the building was constructed.

Energy intensity statistics for these fuel-specific tables are conditional energy intensities. That is, they are the ratio of consumption of a particular fuel to the total floorspace of a building using that fuel. For a discussion of Conditional Energy Intensities, see the box on page 7 of this report.

Row and Column Factors

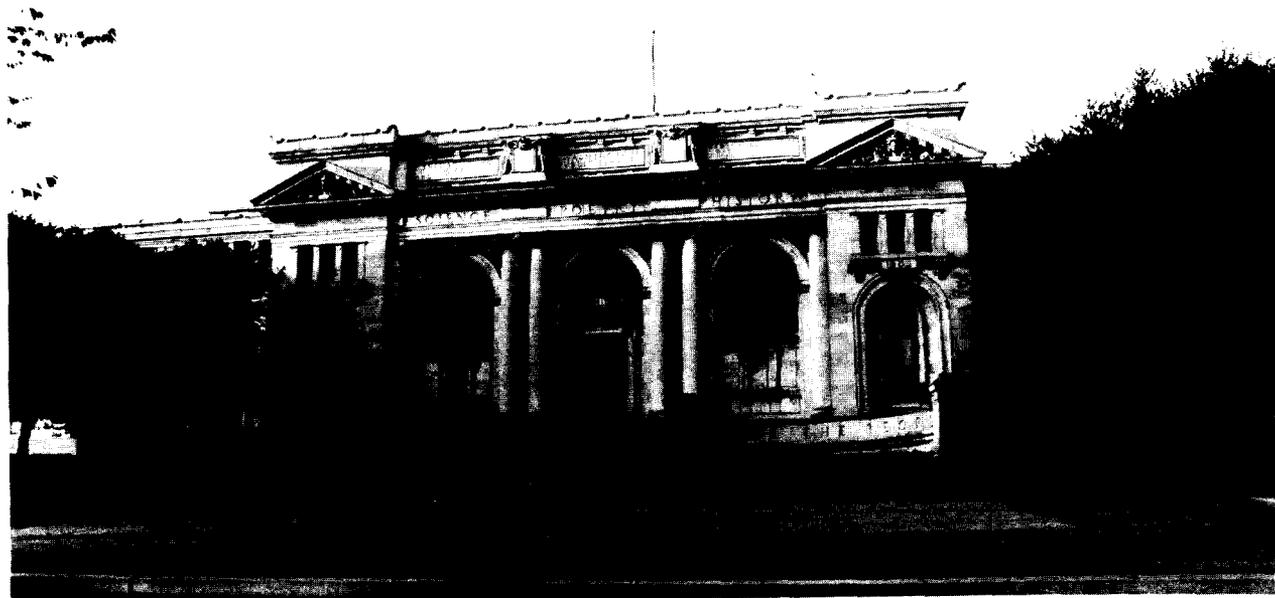
The tables in this report present estimates for commercial buildings and their related consumption and expenditures in the United States. Since the estimates are based on the sample surveyed, they are subject to sampling error. To help the reader compute an approximate Relative Standard Error (RSE) for each of the estimates in the tables, row and column factors are displayed on the top line and in the far right

column of each table, except for Tables 35 through 37 and Table 46.

To calculate the RSE for a specific estimate, multiply the row factor by the column factor. The use of the row and column RSE factors is illustrated in Figure 9, a sample table from a previous report. The row of the table labeled "Mercantile and Service" and the column labeled "Total Floorspace (million square feet)" give an estimate of 12.805 billion square feet for the total commercial floorspace contained in Mercantile and Service buildings. The RSE row factor is: $R_{\text{Mercantile and Service}} = 5.17$. The RSE column factor is: $C_{\text{Total Floorspace}} = 1.096$. The approximate RSE for the estimate is, therefore, computed as:

$$\text{RSE}_{\text{Mercantile and Service, Total Floorspace}} = 5.17 \times 1.096 = 5.67 \text{ percent.}$$

The standard error derived from the row and column factors can be used to construct confidence intervals, as in Figure 9, and to perform hypothesis tests by standard statistical methods. However, because the generalized variance procedure gives only approximate RSE's, such confidence intervals and statistical tests must also be regarded as only approximate. For the example above, the RSE determined directly by the jackknife method is actually 6.7, not 5.7. For more details about the derivation of the row and column RSE factors, see Appendix B, "Nonsampling and Sampling Errors."



This is a university library located off campus and is classified as an assembly building in the 1989 CBECS.

Figure 9. Use of RSE Row and Column Factors

Table 1. Principal Building Activity

Building Characteristics	Number of Buildings (thousand)	Number of Buildings (percent)	Total Floorspace (million square feet)	Total Floorspace (percent)	RSE Row Factor
RSE Column Factor:	0.975	0.879	1.096	1.064	
All Buildings.....	4,154	100.0	58,229	100.0	3.13
Principal Building Activity					
Assembly.....	575	13.8	7,339	12.6	6.22
Education.....	241	5.8	7,321	12.6	6.62
Food Sales.....	102	2.5	712	1.2	13.65
Food Service.....	201	4.8	1,281	2.2	8.48
Health Care (inpatient).....	14	.3	1,757	3.0	20.29
Health Care (outpatient).....	38	.9	350	.6	19.96
Laboratory.....	17	.4	283	.5	28.19
Lodging.....	123	3.0	2,179	3.7	10.11
Mercantile and Service.....	1,287	31.0	12,805	22.0	5.17
Office.....	614	14.8	9,546	16.4	5.76
Public Order and Safety.....	55	1.3	680	1.2	14.96
Skilled Nursing.....	13	.3	605	1.0	23.46
Warehouse (nonrefrigerated)...	524	12.6	8,522	14.6	6.74
Warehouse (refrigerated).....	25	.6	474	.8	24.12
Other.....	86	2.1	1,442	2.5	15.37
Vacant	238	5.7	2,931	5.0	8.94

Total Floorspace in buildings where the Principal Building Activity is Mercantile and Service = 12,805 Million Square Feet.
 $R(\text{Mercantile and Service}) = 5.17$
 $C(\text{Total Floorspace}) = 1,096$
 Approximate RSE (Mercantile and Service, Total Floorspace) = $(5.17) \cdot (1.096) = 5.67$ percent
 Approximate Standard Error (Mercantile and Service, Total Floorspace) = $(.0587) \cdot (12,805) = 726$ Million Square Feet
 Approximate 2 Standard Errors (95 percent) Confidence Interval = $(1.96) \cdot (726) = 1,423$ Million Square Feet

Therefore, with 95 percent confidence, the total floorspace in mercantile and service buildings in 1989 was between 11,382 million and 14,228 million square feet (12,805 + 1,423).

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1986 Nonresidential Buildings Energy Consumption Survey.

Quick-Reference Guide

The Quick-Reference Guide lists, by broad class, the topic areas covered by the detailed tables and

the table numbers for the different types of tables. To help the reader quickly locate a particular table, the broad topic class is marked along the outside edge of each table page.

Quick-Reference Guide

Data Item/Category	Table Numbers				
	Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat
Total Consumption	11	11, 21	11, 38	11, 47	11, 52
Total Expenditures	12	12, 22	12, 39	12, 48	12, 53
Consumption per Building, Square Foot, Worker	13	21	38	47	52
Expenditures per Building, Square Foot, Energy Unit	14	22	39	48	53
Expenditure Intensities by Main Heating Fuel	15				
Consumption and Intensity by:					
Census Region	16	23	40	49	
Building Size	18	25	42		
Selected Building Activities	19	26	43		
Year Constructed	20	27	44		
Building Level Intensities (percentile)		37	46		
Expenditures per Energy Unit and Intensity by Census Region	17	24	41	50	
Consumption and Intensity by End Use					
Cooling		28			
Heating		29	45	51	
Electricity Peak Demand by					
Demand Metering		30			
Season of Peak Demand		31-32			
Peak Demand Category		33-34			
Peak Demand Intensity (percentile)		35			
Load Factoring (percentile)		36			

Table 11. Commercial Buildings Energy Consumption by Major Fuel

Building Characteristics	All Buildings		Total Energy Consumption (trillion Btu)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor:	0.537	0.568	0.860	0.844	1.057	1.802	2.370	
All Buildings	4,528	63,184	5,788	2,773	2,073	357	585	6.91
Building Floorspace (Square Feet)								
1,001 to 5,000	2,529	6,790	692	326	302	59	Q	7.94
5,001 to 10,000	890	6,532	567	246	265	41	Q	12.39
10,001 to 25,000	644	10,393	791	381	278	69	63	11.08
25,001 to 50,000	247	8,801	756	331	309	47	Q	11.42
50,001 to 100,000	127	9,130	855	433	249	54	119	16.39
100,001 to 200,000	61	8,277	777	387	238	46	106	16.88
200,001 to 500,000	23	7,022	698	366	228	28	76	23.49
Over 500,000	7	6,239	652	303	203	12	133	24.92
Year Constructed								
1899 or Before	172	1,654	128	25	53	17	Q	23.38
1900 to 1919	242	4,245	239	75	123	26	15	20.22
1920 to 1945	680	8,098	636	211	244	69	Q	14.60
1946 to 1959	868	10,511	988	379	411	77	Q	14.41
1960 to 1969	821	12,167	1,275	589	458	73	156	13.89
1970 to 1979	884	13,329	1,342	730	441	61	110	11.59
1980 to 1983	317	4,274	432	295	117	10	Q	15.73
1984 to 1986	329	5,670	464	303	141	Q	Q	14.86
1987 to 1989	215	3,235	284	167	85	Q	Q	21.95
BUILDING USE								
Principal Building Activity								
Assembly	617	6,909	441	186	174	31	49	14.04
Education	282	8,076	704	217	323	71	Q	15.01
Food Sales	102	792	139	105	27	Q	Q	27.90
Food Service	241	1,167	255	113	128	Q	Q	14.50
Health Care	80	2,054	449	154	186	17	92	23.76
Lodging	140	3,476	425	138	187	10	Q	15.95
Mercantile and Service	1,278	12,365	1,048	550	417	75	Q	10.81
Office	679	11,802	1,230	781	238	43	167	9.94
Parking Garage	45	983	42	18	Q	Q	Q	32.20
Public Order and Safety	50	616	78	29	25	Q	Q	37.22
Warehouse	618	9,253	536	243	206	53	Q	19.64
Other	62	1,529	344	201	102	Q	Q	40.29
Vacant	333	4,161	98	39	49	Q	Q	28.35
Weekly Operating Hours								
39 or Fewer	876	6,073	203	71	100	26	Q	11.92
40 to 48	1,117	13,905	998	440	388	65	105	10.30
49 to 60	987	13,473	925	478	326	54	66	9.89
61 to 84	625	10,777	991	522	342	68	60	11.28
85 to 167	515	9,387	998	485	360	80	Q	16.68
168 (Open Continuously)	408	9,569	1,673	779	557	65	272	13.58
Workers								
4 or Fewer	2,491	15,146	697	294	300	83	Q	7.78
5 to 9	906	7,938	534	258	218	35	Q	8.99
10 to 19	507	6,445	540	238	248	38	16	12.00
20 to 49	381	9,665	939	401	332	72	Q	10.13
50 to 99	132	7,389	701	348	253	34	Q	13.98
100 to 249	79	6,771	992	478	358	57	99	17.44
250 or More	32	9,829	1,386	758	364	39	225	20.27

See footnotes at end of table.

Table 11. Commercial Buildings Energy Consumption by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Consumption (trillion Btu)					Per Sq. Foot
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
Ownership and Occupancy								
Nongovernment Owned	3,950	48,842	4,239	2,113	1,601	242	284	7.51
Owner Occupied	2,814	35,954	3,331	1,575	1,292	200	263	6.66
Single Establishment	2,445	27,081	2,668	1,182	1,083	176	228	10.00
Multiple Establishment	369	8,873	663	393	210	24	35	10.89
Nonowner Occupied	1,136	12,888	908	537	309	42	Q	12.12
Single Establishment	672	6,248	471	265	176	Q	Q	16.00
Multiple Establishment	259	5,239	394	265	102	19	Q	13.00
Vacant	206	1,401	Q	8	Q	Q	Q	23.15
Government Owned	577	14,342	1,549	660	472	115	301	13.43
Federal	40	1,917	Q	132	Q	Q	Q	47.10
State	137	3,902	585	240	112	31	201	22.25
Local	400	8,522	692	288	290	79	Q	14.00
Multibuilding Facility								
Not on Multibuilding Facility	3,030	37,237	2,887	1,428	1,168	234	58	6.80
Part of Multibuilding Facility	1,497	25,947	2,901	1,345	905	123	527	11.00
On Facility with Central Plant	203	8,346	1,593	635	423	60	476	20.81
LOCATION								
Census Region								
Northeast	783	13,569	1,354	586	353	237	179	14.20
Midwest	1,046	15,955	1,659	609	831	61	159	12.42
South	1,847	22,039	1,648	975	498	50	126	12.30
West	851	11,620	1,126	604	391	Q	121	14.77
Census Division								
Northeast								
New England	184	3,173	298	115	39	92	Q	17.97
Middle Atlantic	599	10,395	1,056	470	314	145	127	14.30
Midwest								
East North Central	686	10,681	1,086	399	561	38	88	15.40
West North Central	360	5,275	573	210	270	23	Q	22.00
South								
South Atlantic	737	10,090	682	416	198	42	Q	12.70
East South Central	397	4,296	373	215	126	Q	Q	20.20
West South Central	712	7,653	594	344	174	Q	Q	17.74
West								
Mountain	322	4,388	450	179	197	Q	Q	20.75
Pacific	529	7,232	676	425	195	Q	Q	19.90
Metropolitan Status								
Metropolitan	3,073	50,809	4,780	2,366	1,608	274	532	7.71
Nonmetropolitan	1,454	12,375	1,008	407	465	83	Q	18.90
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	357	5,062	617	211	252	65	Q	17.00
5,500-7,000 HDD	1,120	17,957	1,855	668	850	137	199	14.70
4,000-5,499 HDD	965	15,385	1,393	706	407	127	152	16.20
Under 4,000 HDD	1,024	12,903	1,115	663	350	Q	83	20.40
2,000 CDD or More and --								
Under 4,000 HDD	1,063	11,876	809	525	213	Q	Q	17.40

See footnotes at end of table.

Table 11. Commercial Buildings Energy Consumption by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Consumption (trillion Btu)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor	0.557	0.506	0.590	0.544	1.057	1.032	2.370	
ENERGY SOURCES AND END USES *								
Energy Sources								
(Solely or in Combination)								
Electricity	4,294	61,563	5,782	2,773	2,068	355	585	6.96
Natural Gas	2,420	41,143	4,336	1,824	2,073	149	290	9.29
Fuel Oil	581	12,600	1,589	662	427	357	143	16.32
District Heat	98	6,578	1,207	444	Q	Q	585	24.39
District Chilled Water	24	1,927	344	162	Q	Q	147	42.83
Propane	348	4,695	453	200	145	66	Q	27.35
Other	130	1,542	87	45	29	Q	Q	26.46
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	3,876	57,868	5,667	2,676	2,051	356	584	7.12
Air-Conditioned Buildings	3,184	51,770	5,101	2,555	1,780	260	506	7.49
Buildings with Water Heating	3,183	53,584	5,462	2,602	1,960	321	580	7.37
Buildings with Cooking	864	23,668	2,755	1,331	975	150	298	10.70
Buildings with Manufacturing	205	5,601	709	291	286	Q	Q	24.06
Space-Heating Energy Source								
(Solely or in Combination)								
Electricity	1,283	18,702	1,499	1,039	338	38	Q	10.71
Natural Gas	2,158	33,017	3,418	1,385	1,856	76	Q	9.31
Fuel Oil	555	10,526	1,305	502	371	344	Q	14.58
District Heat	94	6,130	1,008	363	Q	Q	520	20.35
Propane	238	1,767	118	74	Q	Q	Q	37.21
Other	110	994	46	23	14	Q	Q	35.79
Main Space-Heating Energy Source								
Electricity	957	13,448	978	800	170	4	Q	11.94
Natural Gas	2,079	31,110	3,192	1,287	1,778	44	Q	10.22
Fuel Oil	473	5,599	498	182	25	287	Q	17.11
District Heat	93	6,026	988	355	Q	Q	511	20.59
Propane	208	1,230	Q	Q	Q	Q	NC	29.76
Other	70	766	26	14	Q	Q	Q	48.38
Air-Conditioning Energy Source								
(Solely or in Combination)								
Electricity	3,072	47,911	4,580	2,373	1,611	237	360	7.69
Natural Gas	97	1,976	225	88	128	Q	Q	22.67
District Chilled Water	24	1,938	360	169	37	10	145	29.19
Other	13	1,076	Q	54	Q	Q	Q	62.10
Water-Heating Energy Source								
(Solely or in Combination)								
Electricity	1,554	21,493	1,761	1,135	416	109	101	10.60
Natural Gas	1,391	25,923	2,706	1,111	1,451	93	50	9.66
Fuel Oil	126	2,284	233	66	31	124	Q	24.83
District Heat	49	4,751	898	308	Q	Q	447	25.66
Propane	88	1,023	Q	57	NC	Q	NC	47.51
Other	15	403	25	19	Q	Q	NC	56.73
Cooking Energy Source (Solely or in Combination)								
Electricity	387	10,850	1,157	593	330	69	165	13.64
Natural Gas	462	14,766	1,707	758	744	62	144	11.03
Propane	93	923	77	52	Q	24	NC	32.65
Other	7	1,150	308	Q	Q	Q	104	37.09

See footnotes at end of table.

Table 11. Commercial Buildings Energy Consumption by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Consumption (trillion Btu)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor	0.007	0.006	0.003	0.004	0.007	1.002	2.370	
Manufacturing Energy Source (Solely or in Combination)								
Electricity	163	4,406	495	219	196	Q	Q	26.67
Natural Gas	23	838	172	45	116	Q	Q	34.40
Other	28	1,002	175	62	Q	Q	Q	48.09
HEATING AND COOLING								
Percent Heated								
Not Heated	662	5,419	126	98	23	Q	Q	16.35
1 to 50	630	9,314	371	210	128	27	Q	14.61
51 to 99	496	8,673	892	496	274	62	59	15.42
100	2,739	39,777	4,399	1,969	1,648	264	519	7.58
Percent Cooled								
Not Cooled	1,344	11,413	687	218	293	97	Q	12.68
1 to 50	1,037	17,821	1,336	461	616	146	113	12.49
51 to 99	597	13,139	1,409	783	424	65	137	10.89
100	1,550	20,811	2,356	1,311	740	50	256	10.64

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^{nc} No cases in responding sample.

^q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 12. Commercial Buildings Energy Expenditures by Major Fuel

Building Characteristics	All Buildings		Total Energy Expenditures (million dollars)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor:	0.558	0.588	0.823	0.836	0.990	1.780	2.507	
All Buildings	4,528	63,184	70,826	55,943	9,204	1,822	3,858	6.82
Building Floorspace (Square Feet)								
1,001 to 5,000	2,529	6,790	9,601	7,592	1,620	351	Q	7.90
5,001 to 10,000	890	6,532	7,870	6,232	1,304	232	Q	15.25
10,001 to 25,000	644	10,393	9,869	7,809	1,348	378	335	10.75
25,001 to 50,000	247	8,801	8,950	6,919	1,318	233	479	12.24
50,001 to 100,000	127	9,130	10,124	8,042	1,094	251	738	15.46
100,001 to 200,000	61	8,277	9,265	7,410	1,016	198	641	15.88
200,001 to 500,000	23	7,022	7,853	6,326	836	126	565	22.38
Over 500,000	7	6,239	7,293	5,613	668	54	959	22.50
Year Constructed								
1899 or Before	172	1,654	1,214	603	270	96	Q	24.39
1900 to 1919	242	4,245	2,448	1,676	527	138	107	18.82
1920 to 1945	680	8,098	7,033	4,772	1,135	377	Q	14.03
1946 to 1959	868	10,511	10,334	7,333	1,809	404	788	13.47
1960 to 1969	821	12,167	14,894	11,667	1,975	349	903	12.25
1970 to 1979	884	13,329	17,807	14,815	1,939	288	766	11.27
1980 to 1983	317	4,274	6,194	5,570	502	50	Q	15.22
1984 to 1986	329	5,670	7,184	6,363	665	26	Q	16.74
1987 to 1989	215	3,235	3,718	3,143	382	Q	Q	19.79
BUILDING USE								
Principal Building Activity								
Assembly	617	6,909	5,986	4,648	809	180	349	16.66
Education	282	8,076	6,589	4,391	1,309	331	Q	12.04
Food Sales	102	792	2,163	1,992	137	Q	Q	27.21
Food Service	241	1,167	3,282	2,520	675	Q	Q	14.70
Health Care	80	2,054	4,052	2,670	712	72	Q	22.80
Lodging	140	3,476	4,014	2,593	818	52	Q	16.02
Mercantile and Service	1,278	12,365	13,527	11,116	1,931	430	Q	9.46
Office	679	11,802	18,323	15,757	1,128	232	1,207	10.47
Parking Garage	45	983	485	357	Q	Q	Q	30.22
Public Order and Safety	50	616	875	582	120	Q	Q	36.04
Warehouse	618	9,253	6,085	4,836	853	234	Q	17.48
Other	62	1,529	4,224	3,558	420	Q	Q	40.42
Vacant	333	4,161	1,218	924	237	Q	Q	24.64
Weekly Operating Hours								
39 or Fewer	876	6,073	2,430	1,718	508	144	Q	12.34
40 to 48	1,117	13,905	12,619	9,871	1,771	331	647	12.02
49 to 60	987	13,473	12,561	10,146	1,563	296	557	9.42
61 to 84	625	10,777	13,233	10,899	1,587	364	383	10.71
85 to 167	515	9,387	11,833	9,480	1,537	391	Q	14.28
168 (Open Continuously)	408	9,569	18,149	13,829	2,238	296	1,786	13.01
Workers								
4 or Fewer	2,491	15,146	9,013	6,835	1,564	475	Q	7.56
5 to 9	906	7,938	6,902	5,464	1,087	201	Q	8.22
10 to 19	507	6,445	6,483	4,993	1,177	203	109	11.64
20 to 49	381	9,665	11,724	8,968	1,538	365	Q	12.16
50 to 99	132	7,389	8,651	7,018	1,070	164	Q	13.87
100 to 249	79	6,771	11,155	8,910	1,417	241	587	15.76
250 or More	32	9,829	16,898	13,754	1,350	173	1,622	19.19

See footnotes at end of table.

Table 12. Commercial Buildings Energy Expenditures by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Expenditures (million dollars)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor	0.568	0.569	0.823	0.826	0.890	1.789	2.507	
Ownership and Occupancy								
Nongovernment Owned	3,950	48,842	53,488	43,117	7,213	1,282	1,876	7.01
Owner Occupied	2,814	35,954	40,069	31,565	5,680	1,069	1,755	8.03
Single Establishment	2,445	27,081	30,511	23,444	4,713	932	1,423	9.47
Multiple Establishment	369	8,873	9,558	8,122	968	137	332	10.88
Nonowner Occupied	1,136	12,888	13,419	11,552	1,533	213	Q	10.89
Single Establishment	672	6,248	6,574	5,594	850	91	Q	14.98
Multiple Establishment	259	5,239	6,481	5,765	535	103	Q	15.48
Vacant	206	1,401	363	193	Q	Q	Q	25.59
Government Owned	577	14,342	17,338	12,826	1,991	540	1,982	13.79
Federal	40	1,917	2,854	2,172	Q	Q	Q	44.87
State	137	3,902	6,056	4,112	504	145	1,295	23.84
Local	400	8,522	8,429	6,542	1,271	370	Q	18.85
Multibuilding Facility								
Not on Multibuilding Facility	3,030	37,237	36,983	29,810	5,426	1,231	515	6.52
Part of Multibuilding Facility	1,497	25,947	33,843	26,133	3,777	591	3,343	10.75
On Facility with Central Plant	203	8,346	16,124	11,397	1,554	262	2,911	21.42
LOCATION								
Census Region								
Northeast	783	13,569	17,505	13,188	1,807	1,225	1,286	12.00
Midwest	1,046	15,955	16,468	11,697	3,381	310	1,081	11.52
South	1,847	22,039	21,759	18,409	2,293	241	816	12.93
West	851	11,620	15,093	12,649	1,724	Q	Q	11.80
Census Division								
Northeast								
New England	184	3,173	3,654	2,662	226	473	Q	16.96
Middle Atlantic	599	10,395	13,852	10,527	1,580	752	993	15.12
Midwest								
East North Central	686	10,681	11,089	7,964	2,386	194	546	13.80
West North Central	360	5,275	5,379	3,733	995	116	Q	21.98
South								
South Atlantic	737	10,090	10,067	8,817	894	203	Q	20.63
East South Central	397	4,296	4,345	3,558	553	Q	Q	27.75
West South Central	712	7,653	7,347	6,034	846	Q	Q	16.81
West								
Mountain	322	4,388	4,436	3,344	683	Q	Q	27.32
Pacific	529	7,232	10,657	9,305	1,040	Q	275	14.73
Metropolitan Status								
Metropolitan	3,073	50,809	60,604	48,494	7,185	1,414	3,512	7.56
Nonmetropolitan	1,454	12,375	10,222	7,449	2,019	408	Q	14.49
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	357	5,062	5,496	3,669	971	339	Q	17.17
5,500-7,000 HDD	1,120	17,957	19,214	13,671	3,627	687	1,229	13.95
4,000-5,499 HDD	965	15,385	17,726	14,043	1,830	676	1,177	15.82
Under 4,000 HDD								
Under 4,000 HDD	1,024	12,903	15,570	13,271	1,677	Q	540	17.58
2,000 CDD or More and --								
Under 4,000 HDD	1,063	11,876	12,820	11,289	1,099	Q	Q	18.91

See footnotes at end of table.

Table 12. Commercial Buildings Energy Expenditures by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Expenditures (million dollars)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor:	0.556	0.589	0.223	0.836	0.890	1.760	2.507	
ENERGY SOURCES AND END USES *								
Energy Sources (Solely or in Combination)								
Electricity	4,294	61,563	70,801	55,943	9,187	1,814	3,858	6.58
Natural Gas	2,420	41,143	48,225	36,376	9,204	717	1,928	8.41
Fuel Oil	581	12,600	17,356	12,980	1,694	1,822	860	16.30
District Heat	98	6,578	12,689	8,192	Q	Q	3,858	23.46
District Chilled Water	24	1,927	3,914	2,791	Q	Q	972	31.84
Propane	348	4,695	5,069	4,051	481	323	Q	23.82
Other	130	1,542	1,033	814	126	Q	Q	24.00
Energy End Uses (Solely or in Combination)								
Heated Buildings	3,876	57,868	67,740	52,965	9,113	1,815	3,849	6.81
Air-Conditioned Buildings	3,184	51,770	64,029	51,497	7,852	1,321	3,360	7.30
Buildings with Water Heating	3,183	53,584	66,193	52,097	8,648	1,624	3,825	7.05
Buildings with Cooking	864	23,668	32,078	25,083	4,164	720	2,111	8.80
Buildings with Manufacturing	205	5,601	7,217	5,464	1,049	206	Q	22.12
Space-Heating Energy Source (Solely or in Combination)								
Electricity	1,283	18,702	22,228	20,037	1,552	196	Q	10.37
Natural Gas	2,158	33,017	37,145	27,925	8,281	351	Q	8.51
Fuel Oil	555	10,526	13,490	9,781	1,454	1,758	Q	13.87
District Heat	94	6,130	10,763	6,892	379	Q	3,433	22.87
Propane	238	1,767	1,605	1,421	87	Q	Q	34.71
Other	110	994	515	379	65	Q	Q	30.88
Main Space-Heating Energy Source								
Electricity	957	13,448	16,020	15,183	778	25	Q	11.83
Natural Gas	2,079	31,110	34,603	25,959	7,947	207	Q	9.03
Fuel Oil	473	5,599	5,838	4,176	150	1,483	Q	16.44
District Heat	93	6,026	10,553	6,720	371	Q	3,409	23.06
Propane	208	1,230	981	918	Q	Q	NC	26.52
Other	70	766	294	217	Q	Q	Q	40.30
Air-Conditioning Energy Source (Solely or in Combination)								
Electricity	3,072	47,911	58,728	47,887	7,207	1,230	2,406	7.77
Natural Gas	97	1,976	2,431	1,811	549	Q	Q	23.71
District Chilled Water	24	1,938	4,067	2,922	141	44	961	28.73
Other	13	1,076	1,678	1,112	Q	Q	414	42.88
Water-Heating Energy Source (Solely or in Combination)								
Electricity	1,554	21,493	25,694	22,779	1,785	554	576	11.12
Natural Gas	1,391	25,923	29,855	22,505	6,569	455	327	8.90
Fuel Oil	126	2,284	2,645	1,773	143	631	Q	24.10
District Heat	49	4,751	9,123	5,593	Q	Q	3,048	25.32
Propane	88	1,023	1,264	1,129	NC	Q	NC	33.86
Other	15	403	392	360	Q	Q	NC	47.88
Cooking Energy Source (Solely or in Combination)								
Electricity	387	10,850	13,684	10,762	1,376	328	1,217	12.88
Natural Gas	462	14,766	19,212	14,717	3,244	303	949	10.71
Propane	93	923	1,381	1,246	Q	125	NC	28.88
Other	7	1,150	3,082	Q	Q	Q	Q	48.31

See footnotes at end of table.

Table 12. Commercial Buildings Energy Expenditures by Major Fuel (Continued)

Building Characteristics	All Buildings		Total Energy Expenditures (million dollars)					RSE Row Factor
	Total Number (thousand)	Total Floorspace (million square feet)	Total of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat	
RSE Column Factor:	0.558	0.589	0.823	0.836	0.990	1.780	2.507	
Manufacturing Energy Source (Solely or in Combination)								
Electricity	163	4,406	5,347	4,174	728	106	Q	25.65
Natural Gas	23	838	1,321	849	395	Q	Q	32.57
Other	28	1,002	1,661	1,183	Q	Q	Q	41.38
HEATING AND COOLING								
Percent Heated								
Not Heated	662	5,419	3,132	3,004	99	Q	Q	25.50
1 to 50	630	9,314	5,425	4,551	685	151	Q	13.88
51 to 99	496	8,673	11,497	9,476	1,263	291	467	13.79
100	2,739	39,777	50,772	38,912	7,157	1,362	3,342	7.27
Percent Cooled								
Not Cooled	1,344	11,413	6,797	4,446	1,352	501	Q	11.18
1 to 50	1,037	17,821	14,183	10,013	2,721	726	722	10.92
51 to 99	597	13,139	17,906	14,698	1,862	326	1,020	10.18
100	1,550	20,811	31,940	26,785	3,269	269	1,617	10.97

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

nc No cases in responding sample.

Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Column Factor:	0.735	0.849	0.760	1.290	1.303	1.014	1.138	
All Buildings	4,528	63,184	14.0	5,788	1,278	91.6	81.9	4.65
Building Floorspace (Square Feet)								
1,001 to 5,000	2,529	6,790	2.7	692	274	101.9	68.6	4.08
5,001 to 10,000	890	6,532	7.3	567	637	86.8	79.2	5.44
10,001 to 25,000	644	10,393	16.1	791	1,229	76.1	78.5	4.96
25,001 to 50,000	247	8,801	35.7	756	3,065	85.9	86.1	6.04
50,001 to 100,000	127	9,130	71.7	855	6,717	93.7	93.9	7.96
100,001 to 200,000	61	8,277	136.6	777	12,826	93.9	104.0	7.97
200,001 to 500,000	23	7,022	301.5	698	29,966	99.4	84.1	13.43
Over 500,000	7	6,239	866.8	652	90,596	104.5	67.3	16.17
Year Constructed								
1899 or Before	172	1,654	9.6	128	743	77.2	106.9	15.23
1900 to 1919	242	4,245	17.5	239	989	56.4	90.2	16.86
1920 to 1945	680	8,098	11.9	636	935	78.5	82.7	12.47
1946 to 1959	868	10,511	12.1	988	1,139	94.0	84.9	9.71
1960 to 1969	821	12,167	14.8	1,275	1,553	104.8	94.5	7.96
1970 to 1979	884	13,329	15.1	1,342	1,519	100.7	85.4	7.22
1980 to 1983	317	4,274	13.5	432	1,365	101.2	82.9	9.93
1984 to 1986	329	5,670	17.2	464	1,409	81.9	55.1	10.71
1987 to 1989	215	3,235	15.1	284	1,321	87.7	61.0	15.08
BUILDING USE								
Principal Building Activity								
Assembly	617	6,909	11.2	441	714	63.8	109.7	10.48
Education	282	8,076	28.6	704	2,497	87.2	97.8	11.11
Food Sales	102	792	7.7	139	1,359	175.6	164.7	17.39
Food Service	241	1,167	4.8	255	1,058	218.4	131.2	9.90
Health Care	80	2,054	25.7	449	5,625	218.7	106.3	17.06
Lodging	140	3,476	24.8	425	3,041	122.4	137.6	13.16
Mercantile and Service	1,278	12,365	9.7	1,048	820	84.8	84.4	7.13
Office	679	11,802	17.4	1,230	1,811	104.2	44.3	6.72
Parking Garage	45	983	22.0	42	938	42.6	126.1	23.28
Public Order and Safety	50	616	12.3	78	1,565	127.0	91.0	23.27
Warehouse	618	9,253	15.0	536	866	57.9	122.4	12.34
Other	62	1,529	24.7	344	5,542	224.8	162.8	27.04
Vacant	333	4,161	12.5	98	293	23.5	66.5	22.92
Weekly Operating Hours								
39 or Fewer	876	6,073	6.9	203	232	33.5	59.5	6.29
40 to 48	1,117	13,905	12.4	998	893	71.8	65.9	6.21
49 to 60	987	13,473	13.7	925	937	68.6	57.1	6.20
61 to 84	625	10,777	17.2	991	1,585	92.0	70.1	7.21
85 to 167	515	9,387	18.2	998	1,940	106.3	112.7	11.52
168 (Open Continuously)	408	9,569	23.5	1,673	4,099	174.8	129.4	9.09
Workers								
4 or Fewer	2,491	15,146	6.1	697	280	46.0	146.7	5.32
5 to 9	906	7,938	8.8	534	590	67.3	83.7	7.01
10 to 19	507	6,445	12.7	540	1,064	83.8	83.2	6.60
20 to 49	381	9,665	25.4	939	2,466	97.2	87.7	6.48
50 to 99	132	7,389	56.1	701	5,320	94.8	85.2	6.39
100 to 249	79	6,771	85.9	992	12,586	146.5	87.6	10.35
250 or More	32	9,829	308.0	1,386	43,424	141.0	60.8	12.55

See footnote at end of table.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Column Factor	0.799	0.349	0.780	1.250	1.303	1.014	1.136	
Ownership and Occupancy								
Nongovernment Owned	3,950	48,842	12.4	4,239	1,073	86.8	77.7	4.79
Owner Occupied	2,814	35,954	12.8	3,331	1,184	92.6	82.7	5.85
Single Establishment	2,445	27,081	11.1	2,668	1,091	98.5	101.9	5.66
Multiple Establishment	369	8,873	24.0	663	1,795	74.7	47.1	8.68
Nonowner Occupied	1,136	12,888	11.3	908	799	70.5	63.4	7.10
Single Establishment	672	6,248	9.3	471	701	75.4	73.1	10.23
Multiple Establishment	259	5,239	20.2	394	1,522	75.2	53.2	9.83
Vacant	206	1,401	6.8	Q	Q	Q	89.3	18.55
Government Owned	577	14,342	24.8	1,549	2,683	108.0	96.3	9.20
Federal	40	1,917	47.6	Q	6,763	142.1	84.9	32.58
State	137	3,902	28.4	585	4,260	149.8	119.4	18.98
Local	400	8,522	21.3	692	1,730	81.2	86.7	9.14
Multibuilding Facility								
Not on Multibuilding Facility	3,030	37,237	12.3	2,887	953	77.5	70.9	4.33
Part of Multibuilding Facility	1,497	25,947	17.3	2,901	1,937	111.8	96.8	7.18
On Facility with Central Plant	203	8,346	41.0	1,593	7,831	190.9	135.8	13.60
Percent Vacant at Least Three Months								
0	3,581	43,080	12.0	4,320	1,206	100.3	90.3	4.87
1 to 50	376	12,436	33.1	1,086	2,892	87.3	57.7	9.25
51 to 99	102	3,519	34.5	218	2,141	62.1	120.3	27.28
100	469	4,149	8.8	164	349	39.5	75.0	12.05
Months in Use Out of Past 12 Months								
0 to 8	471	4,551	9.7	174	369	38.2	77.1	11.28
9 to 11	272	3,780	13.9	272	1,001	72.0	84.9	11.24
12	3,784	54,852	14.5	5,342	1,412	97.4	81.9	4.91
LOCATION								
Census Region								
Northeast	783	13,569	17.3	1,354	1,729	99.8	85.2	10.33
Midwest	1,046	15,955	15.3	1,659	1,587	104.0	106.7	9.10
South	1,847	22,039	11.9	1,648	892	74.8	70.7	7.57
West	851	11,620	13.7	1,126	1,322	96.9	70.8	10.12
Census Division								
Northeast								
New England	184	3,173	17.2	298	1,617	94.0	93.4	17.11
Middle Atlantic	599	10,395	17.4	1,056	1,764	101.6	83.2	12.33
Midwest								
East North Central	686	10,681	15.6	1,086	1,584	101.7	109.4	10.84
West North Central	360	5,275	14.6	573	1,591	108.7	101.8	18.91
South								
South Atlantic	737	10,090	13.7	682	925	67.6	65.3	13.39
East South Central	397	4,296	10.8	373	938	86.8	69.3	16.75
West South Central	712	7,653	10.7	594	833	77.6	79.4	9.52
West								
Mountain	322	4,388	13.6	450	1,398	102.5	99.7	19.66
Pacific	529	7,232	13.7	676	1,277	93.4	59.3	11.16
Metropolitan Status								
Metropolitan	3,073	50,809	16.5	4,780	1,555	94.1	79.6	6.12
Nonmetropolitan	1,454	12,375	8.5	1,008	693	81.5	94.8	10.80

See footnote at end of table.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	357	5,062	14.2	617	1,727	121.8	110.9	13.71
5,500-7,000 HDD	1,120	17,957	16.0	1,855	1,656	103.3	107.0	10.13
4,000-5,499 HDD	965	15,385	15.9	1,393	1,444	90.5	74.2	13.98
Under 4,000 HDD	1,024	12,903	12.6	1,115	1,089	86.4	63.7	11.70
2,000 CDD or More and --								
Under 4,000 HDD	1,063	11,876	11.2	809	761	68.1	70.3	9.94
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	529	7,656	14.5	875	1,654	114.3	106.4	13.30
5,500-7,000 HDD	1,285	21,992	17.1	2,206	1,717	100.3	102.2	9.31
4,000-5,499 HDD	739	10,425	14.1	917	1,240	87.9	66.0	13.20
Under 4,000 HDD	975	12,043	12.3	1,020	1,046	84.7	63.5	11.00
2,000 CDD or More and --								
Under 4,000 HDD	999	11,068	11.1	770	771	69.6	70.7	9.72
STRUCTURE								
Floors								
1	2,886	23,755	8.2	1,806	626	76.0	82.9	9.30
2	1,057	16,112	15.2	1,532	1,450	95.1	89.6	7.01
3	408	8,604	21.1	765	1,875	88.9	82.5	13.12
4 to 6	152	8,314	54.8	893	5,887	107.5	91.7	12.72
7 or More	25	6,398	257.0	791	31,786	123.7	62.1	13.81
Wall Materials								
Masonry	2,849	42,074	14.8	3,919	1,376	93.2	86.9	4.37
Siding or Shingles	802	4,788	6.0	325	406	68.0	70.9	9.98
Metal Panels	557	5,689	10.2	457	821	80.4	92.6	13.33
Concrete Panels	240	7,221	30.1	706	2,939	97.7	79.4	14.41
Window Glass	33	1,924	57.5	224	6,688	116.4	49.9	20.77
Other	46	1,487	32.1	156	3,371	105.1	59.3	22.37
Roof Materials								
Built-Up	1,614	31,057	19.2	3,019	1,871	97.2	78.0	9.94
Shingles (Not Wood)	1,392	10,917	7.8	794	570	72.8	76.6	7.39
Metal Surfacing	901	8,197	9.1	597	662	72.8	93.9	11.92
Synthetic or Rubber	211	6,911	32.8	850	4,029	123.0	96.5	11.37
Slate or Tile	193	2,582	13.4	206	1,066	79.8	100.3	14.13
Concrete	72	1,932	26.8	111	1,538	57.4	41.5	23.26
Wooden Materials	106	727	6.8	63	596	87.2	95.6	14.88
Other	38	860	22.7	Q	Q	172.1	141.8	32.13
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	3,056	45,091	14.8	4,486	1,468	99.5	80.6	9.14
Wall Insulation	2,026	29,692	14.7	3,056	1,508	102.9	78.4	8.31
Storm or Multiple Glazing	1,440	24,068	16.7	2,557	1,776	106.2	81.0	1.76
Tinted, Reflective, or Shading								
Glass	944	22,040	23.3	2,385	2,526	108.2	72.1	7.00
Exterior or Interior Shadings								
or Awnings	1,473	26,173	17.8	2,720	1,846	103.9	75.8	9.97
Weather Stripping or Caulking	2,774	44,694	16.1	4,549	1,640	101.8	80.7	1.30
None of the Above	750	7,767	10.4	335	447	43.2	94.8	13.43

See footnote at end of table.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Column Factor:	0.799	0.849	0.789	1.280	1.303	1.014	1.136	
ENERGY SOURCES AND END USES*								
Energy Sources								
(Solely or in Combination)								
Electricity	4,294	61,563	14.3	5,782	1,346	93.9	81.9	4.52
Natural Gas	2,420	41,143	17.0	4,336	1,792	105.4	90.4	5.73
Fuel Oil	581	12,600	21.7	1,589	2,735	126.1	93.7	13.28
District Heat	98	6,578	67.0	1,207	12,302	183.5	116.6	20.35
District Chilled Water	24	1,927	79.9	344	14,286	178.7	117.6	27.70
Propane	348	4,695	13.5	453	1,300	96.4	95.4	18.88
Other	130	1,542	11.9	87	671	56.6	66.4	19.48
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	3,876	57,868	14.9	5,667	1,462	97.9	82.5	4.79
Air-Conditioned Buildings	3,184	51,770	16.3	5,101	1,602	98.5	79.0	4.85
Buildings with Water Heating	3,183	53,584	16.8	5,462	1,716	101.9	83.9	4.35
Buildings with Cooking	864	23,668	27.4	2,755	3,189	116.4	91.7	7.21
Buildings with Manufacturing	205	5,601	27.4	709	3,462	126.5	112.6	16.13
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and								
Cooking	660	20,786	31.5	2,457	3,725	118.2	90.2	7.66
With Water Heating,								
Without Cooking								
Without Water Heating or	1,908	25,904	13.6	2,363	1,239	91.2	72.9	6.08
Cooking	484	3,641	7.5	177	365	48.5	54.0	10.22
Without Air Conditioning								
With Water Heating and								
Cooking	138	2,079	15.0	236	1,709	113.7	158.5	23.00
With Water Heating,								
Without Cooking								
Without Water Heating or	373	3,700	9.9	321	861	86.8	114.0	13.58
Cooking	294	1,538	5.2	92	314	59.9	105.2	15.54
Buildings Without Heating, Air								
Conditioning, Water Heating,								
or Cooking								
.....	496	3,858	7.8	23	47	6.1	49.2	12.52
All Other Combinations	176	1,678	9.6	118	674	70.5	57.8	19.00
Space-Heating Energy Source								
(Solely or in Combination)								
Electricity	1,283	18,702	14.6	1,499	1,168	80.1	66.1	6.39
Natural Gas	2,158	33,017	15.3	3,418	1,584	103.5	93.1	5.77
Fuel Oil	555	10,526	18.9	1,305	2,349	124.0	104.7	11.59
District Heat	94	6,130	65.0	1,008	10,677	164.4	103.9	16.19
Propane	238	1,767	7.4	118	494	66.6	64.7	24.33
Other	110	994	9.0	46	421	46.7	62.9	25.37
Main Space-Heating Energy Source								
Electricity	957	13,448	14.1	978	1,022	72.7	54.8	5.27
Natural Gas	2,079	31,110	15.0	3,192	1,535	102.6	93.3	5.85
Fuel Oil	473	5,599	11.8	498	1,052	88.9	87.1	12.16
District Heat	93	6,026	64.5	988	10,577	163.9	104.1	16.32
Propane	208	1,230	5.9	Q	Q	49.9	46.1	23.66
Other	70	766	11.0	26	Q	33.7	Q	32.23

See footnote at end of table.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Column Factor:	0.779	0.816	0.670	1.290	1.335	0.959	1.066	
Air-Conditioning Energy Source (Solely or in Combination)								
Electricity	3,072	47,911	15.6	4,580	1,491	95.6	77.3	4.63
Natural Gas	97	1,976	20.5	225	2,332	113.9	103.2	13.94
District Chilled Water	24	1,938	81.6	360	15,164	185.9	117.6	23.70
Other	13	1,076	80.3	Q	Q	161.2	84.5	34.80
Water-Heating Energy Source (Solely or in Combination)								
Electricity	1,554	21,493	13.8	1,761	1,134	82.0	63.8	6.16
Natural Gas	1,391	25,923	18.6	2,706	1,945	104.4	94.7	5.45
Fuel Oil	126	2,284	18.1	233	1,848	102.2	87.1	17.28
District Heat	49	4,751	97.8	898	18,499	189.1	124.2	19.93
Propane	88	1,023	11.6	Q	Q	80.9	71.2	29.84
Other	15	403	27.3	25	1,727	63.2	43.6	33.42
Cooking Energy Source (Solely or in Combination)								
Electricity	387	10,850	28.0	1,157	2,990	106.7	84.6	10.17
Natural Gas	462	14,766	32.0	1,707	3,695	115.6	89.3	7.64
Propane	93	923	9.9	77	830	83.8	59.3	21.00
Other	7	1,150	166.9	308	44,747	268.2	134.2	26.76
Manufacturing Energy Source (Solely or in Combination)								
Electricity	163	4,406	27.1	495	3,043	112.4	103.2	19.77
Natural Gas	23	838	36.1	172	7,411	205.2	172.5	23.59
Other	28	1,002	35.7	175	6,239	174.5	142.0	26.59
HEATING AND COOLING								
Percent Heated								
Not Heated	662	5,419	8.2	126	190	23.3	63.3	12.63
1 to 50	630	9,314	14.8	371	589	39.8	76.6	9.59
51 to 99	496	8,673	17.5	892	1,796	102.8	74.8	9.53
100	2,739	39,777	14.5	4,399	1,606	110.6	84.8	5.16
Percent Cooled								
Not Cooled	1,344	11,413	8.5	687	511	60.2	113.5	10.56
1 to 50	1,037	17,821	17.2	1,336	1,288	75.0	108.4	7.95
51 to 99	597	13,139	22.0	1,409	2,361	107.2	73.6	6.63
100	1,550	20,811	13.4	2,356	1,520	113.2	71.1	6.95
Heating Equipment (Solely or in Combination)								
Furnaces	1,619	15,592	9.6	1,387	857	89.0	83.7	7.03
Boilers	704	19,907	28.3	2,249	3,196	113.0	91.4	6.28
Individual Space Heaters	1,389	22,542	16.2	2,032	1,463	90.1	88.0	7.86
Packaged Heating Units	859	15,598	18.2	1,549	1,804	99.3	80.1	7.64
Heat Pumps	453	8,357	18.5	730	1,612	87.4	62.4	10.20
Air Ducts	1,990	37,297	18.7	3,982	2,002	106.8	80.8	5.92
Heating or Reheating Coils	243	15,693	64.6	2,098	8,633	133.7	82.5	9.11
Fan-Coil Units	185	11,839	63.8	1,578	8,507	133.3	95.7	10.70
Steam or Hot Water Radiators or Baseboards	498	15,822	31.7	1,973	3,957	124.7	102.7	10.00
Other	57	1,476	25.7	258	4,488	174.6	121.8	26.18

See footnotes at end of table.

MAJOR FUELS

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Per Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Current Factor	0.779	0.816	0.879	1.698	1.328	0.208	1.585	
Cooling Equipment (Solely or in Combination)								
Central Chillers	201	14,048	69.9	1,775	8,840	126.4	75.1	10.91
Individual Air Conditioners	1,074	19,239	17.9	1,839	1,712	95.6	94.9	7.18
Packaged Cooling Units	1,980	34,753	17.6	3,468	1,751	99.8	77.6	8.21
Heat Pumps	437	7,827	17.9	773	1,769	98.7	70.8	12.10
Air Ducts	1,712	34,225	20.0	3,669	2,143	107.2	80.2	5.69
Fan-Coil Units	110	10,787	98.1	1,527	13,892	141.5	79.1	11.43
Other	100	1,468	14.6	Q	Q	118.9	107.9	53.59
Year Main Central Chiller Installed								
1959 or Before	26	1,477	56.0	175	6,640	118.5	66.3	17.69
1960 to 1969	52	3,718	72.1	525	10,191	141.3	100.0	21.37
1970 to 1979	50	3,541	71.4	413	8,331	116.6	72.2	12.89
1980 to 1986	47	3,515	74.4	462	9,775	131.5	65.9	18.87
1987 to 1989	26	1,798	68.9	200	7,667	111.3	66.4	20.64
Year Packaged Cooling System Installed								
1959 or Before	76	1,736	23.0	172	2,281	99.3	71.9	14.16
1960 to 1969	262	4,849	18.5	608	2,326	125.5	89.2	14.89
1970 to 1979	603	10,469	17.3	1,042	1,726	99.5	81.8	7.20
1980 to 1986	659	11,340	17.2	1,002	1,521	88.4	69.2	8.31
1987 to 1989	380	6,358	16.7	643	1,691	101.2	78.2	10.18
Computer Area with Separate Air-Conditioning System								
Present in Building	265	16,684	63.0	2,274	8,584	136.3	79.8	8.11
Not Present	4,263	46,499	10.9	3,514	824	75.6	83.3	4.57
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	306	2,359	7.7	22	70	9.1	279.2	17.75
1 to 50	1,002	10,870	10.9	533	532	49.1	95.7	6.94
51 to 99	951	16,950	17.8	1,625	1,708	95.9	80.7	7.39
100	2,269	33,004	14.5	3,608	1,591	109.3	80.4	6.98
Percent Lit When Closed								
Not Lit	2,693	28,054	10.4	2,146	797	76.5	85.4	6.09
1 to 50	1,706	31,825	18.7	3,147	1,845	98.9	75.9	6.92
51 to 99	68	2,308	34.2	408	6,036	176.5	114.6	16.70
100	62	997	16.1	87	1,407	87.3	165.9	23.88
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	2,404	38,790	16.1	3,786	1,575	97.6	80.7	6.66
Fluorescent Lamps	3,920	58,892	15.0	5,683	1,450	96.5	81.5	4.88
High-Intensity Discharge Lamps	456	18,188	39.9	1,980	4,342	108.9	91.5	9.07
Other Lamps	24	513	21.5	51	2,121	98.5	62.9	21.31
High-Efficiency Ballasts	1,074	24,226	22.6	2,730	2,541	112.7	85.1	7.08

See footnotes at end of table.

Table 13. Commercial Buildings Consumption for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Consumption				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)	
RSE Column Factor:	0.770	0.810	0.070	1.290	1.335	0.959	1.065	
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	918	24,663	26.9	2,974	3,241	120.6	93.6	6.92
Freezers	713	21,675	30.4	2,802	3,931	129.3	95.4	6.83
Residential								
Refrigerators	2,485	44,264	17.8	4,411	1,775	99.6	79.0	5.59
Freezers	619	12,421	20.1	1,479	2,387	119.0	94.4	6.76
Ice-Making Machines	775	23,443	30.3	2,988	3,857	127.5	89.5	6.92
Refrigerated Vending Machines	1,517	38,865	25.6	4,347	2,865	111.9	84.5	5.59
Water Coolers	1,750	42,864	24.5	4,454	2,545	103.9	81.9	5.58
Other	56	1,408	25.1	346	6,162	245.4	138.7	24.33
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	2,399	27,044	11.3	2,331	972	86.2	74.4	5.95
With Thermostats	2,100	24,773	11.8	2,158	1,028	87.1	75.1	6.48
Any Control of Cooling	1,977	26,314	13.3	2,320	1,173	88.2	74.8	6.04
With Thermostats	1,756	24,043	13.7	2,115	1,204	87.9	73.8	6.69
Reduced Use During Off-Hours								
Heating Only	790	7,147	9.0	649	822	90.8	106.8	11.22
Cooling Only	283	4,112	14.5	429	1,514	104.3	102.4	15.06
Heating and Cooling	2,397	38,689	16.1	3,347	1,397	86.5	71.3	6.88
Computerized Energy Management and Control System								
Present in Building	264	14,345	54.3	1,714	6,494	119.5	80.7	9.51
Controls Heating and Cooling	251	13,793	54.9	1,668	6,634	120.9	80.3	9.34
Controls Lighting	51	3,855	75.5	431	8,448	111.9	67.1	18.10
Controls Other	32	2,316	73.5	336	10,668	145.1	95.8	23.66
Other Energy Management								
Regular HVAC Maintenance	2,102	43,014	20.5	4,773	2,271	111.0	84.0	5.66
Participated in Utility Conservation Program	324	10,826	33.4	1,206	3,721	111.4	75.2	6.90

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

o Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

MAJOR FUELS

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor	0.203	0.380	0.850	1.232	1.332	1.047	0.723	
All Buildings	4,528	63,184	14.0	70,826	15.6	1.12	12.24	4.06
Building Floorspace (Square Feet)								
1,001 to 5,000	2,529	6,790	2.7	9,601	3.8	1.41	13.88	3.60
5,001 to 10,000	890	6,532	7.3	7,870	8.8	1.20	13.88	7.56
10,001 to 25,000	644	10,393	16.1	9,869	15.3	.95	12.48	4.41
25,001 to 50,000	247	8,801	35.7	8,950	36.3	1.02	11.84	5.61
50,001 to 100,000	127	9,130	71.7	10,124	79.5	1.11	11.84	7.29
100,001 to 200,000	61	8,277	136.6	9,265	152.9	1.12	11.92	7.04
200,001 to 500,000	23	7,022	301.5	7,853	337.2	1.12	11.25	11.38
Over 500,000	7	6,239	866.8	7,293	1,013.2	1.17	11.18	12.71
Year Constructed								
1899 or Before	172	1,654	9.6	1,214	7.1	.73	9.51	15.55
1900 to 1919	242	4,245	17.5	2,448	10.1	.58	10.22	15.42
1920 to 1945	680	8,098	11.9	7,033	10.3	.87	11.06	10.25
1946 to 1959	868	10,511	12.1	10,334	11.9	.98	10.46	8.03
1960 to 1969	821	12,167	14.8	14,894	18.1	1.22	11.68	7.69
1970 to 1979	884	13,329	15.1	17,807	20.2	1.34	13.27	7.16
1980 to 1983	317	4,274	13.5	6,194	19.5	1.45	14.32	8.58
1984 to 1986	329	5,670	17.2	7,184	21.8	1.27	15.48	9.69
1987 to 1989	215	3,235	15.1	3,718	17.3	1.15	13.11	12.03
BUILDING USE								
Principal Building Activity								
Assembly	617	6,909	11.2	5,986	9.7	.87	13.59	14.37
Education	282	8,076	28.6	6,589	23.4	.82	9.36	3.15
Food Sales	102	792	7.7	2,163	21.1	2.73	15.56	14.80
Food Service	241	1,167	4.8	3,282	13.6	2.81	12.88	8.32
Health Care	80	2,054	25.7	4,052	50.7	1.97	9.02	13.57
Lodging	140	3,476	24.8	4,014	28.7	1.15	9.44	10.91
Mercantile and Service	1,278	12,365	9.7	13,527	10.6	1.09	12.90	5.28
Office	679	11,802	17.4	18,323	27.0	1.55	14.90	8.67
Parking Garage	45	983	22.0	485	10.9	.49	11.60	18.98
Public Order and Safety	50	616	12.3	875	17.5	1.42	Q	25.61
Warehouse	618	9,253	15.0	6,085	9.8	.66	11.36	10.51
Other	62	1,529	24.7	4,224	68.1	2.76	12.29	23.71
Vacant	333	4,161	12.5	1,218	3.7	.29	12.45	16.46
Weekly Operating Hours								
39 or Fewer	876	6,073	6.9	2,430	2.8	.40	11.95	7.48
40 to 48	1,117	13,905	12.4	12,619	11.3	.91	12.65	8.24
49 to 60	987	13,473	13.7	12,561	12.7	.93	13.58	8.30
61 to 84	625	10,777	17.2	13,233	21.2	1.23	13.35	6.82
85 to 167	515	9,387	18.2	11,833	23.0	1.26	11.85	8.49
168 (Open Continuously)	408	9,569	23.5	18,149	44.5	1.90	10.85	8.63
Workers								
4 or Fewer	2,491	15,146	6.1	9,013	3.6	.60	12.94	4.66
5 to 9	906	7,938	8.8	6,902	7.6	.87	12.93	5.49
10 to 19	507	6,445	12.7	6,483	12.8	1.01	12.01	8.59
20 to 49	381	9,665	25.4	11,724	30.8	1.21	12.48	8.60
50 to 99	132	7,389	56.1	8,651	65.7	1.17	12.35	7.76
100 to 249	79	6,771	85.9	11,155	141.6	1.65	11.25	8.51
250 or More	32	9,829	308.0	16,898	529.4	1.72	12.19	10.60

See footnote at end of table.

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Row Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor:	0.903	0.960	0.859	1.332	1.332	1.047	0.723	
Ownership and Occupancy								
Nongovernment Owned	3,950	48,842	12.4	53,488	13.5	1.10	12.62	3.94
Owner Occupied	2,814	35,954	12.8	40,069	14.2	1.11	12.03	4.61
Single Establishment	2,445	27,081	11.1	30,511	12.5	1.13	11.43	5.45
Multiple Establishment	369	8,873	24.0	9,558	25.9	1.08	14.43	7.05
Nonowner Occupied	1,136	12,888	11.3	13,419	11.8	1.04	14.77	6.07
Single Establishment	672	6,248	9.3	6,574	9.8	1.05	13.95	8.47
Multiple Establishment	259	5,239	20.2	6,481	25.0	1.24	16.46	6.47
Vacant	206	1,401	6.8	363	1.8	.26	8.38	16.82
Government Owned	577	14,342	24.8	17,338	30.0	1.21	11.19	9.96
Federal	40	1,917	47.6	2,854	70.8	1.49	10.47	26.22
State	137	3,902	28.4	6,056	44.1	1.55	10.36	16.63
Local	400	8,522	21.3	8,429	21.1	.99	12.18	12.23
Multibuilding Facility								
Not on Multibuilding Facility	3,030	37,237	12.3	36,983	12.2	.99	12.81	3.73
Part of Multibuilding Facility	1,497	25,947	17.3	33,843	22.6	1.30	11.67	6.63
On Facility with Central Plant	203	8,346	41.0	16,124	79.3	1.93	10.12	13.91
Percent Vacant at Least Three Months								
0	3,581	43,080	12.0	52,738	14.7	1.22	12.21	4.39
1 to 50	376	12,436	33.1	14,418	38.4	1.16	13.27	7.50
51 to 99	102	3,519	34.5	1,822	17.9	.52	8.34	22.85
100	469	4,149	8.8	1,849	3.9	.45	11.29	9.25
Months in Use Out of Past 12 Months								
0 to 8	471	4,551	9.7	2,175	4.6	.48	12.52	10.41
9 to 11	272	3,780	13.9	2,696	9.9	.71	9.91	8.75
12	3,784	54,852	14.5	65,955	17.4	1.20	12.35	4.29
LOCATION								
Census Region								
Northeast	783	13,569	17.3	17,505	22.3	1.29	12.92	8.86
Midwest	1,046	15,955	15.3	16,468	15.7	1.03	9.92	7.53
South	1,847	22,039	11.9	21,759	11.8	.99	13.20	7.08
West	851	11,620	13.7	15,093	17.7	1.30	13.41	8.41
Census Division								
Northeast								
New England	184	3,173	17.2	3,654	19.8	1.15	12.25	13.20
Middle Atlantic	599	10,395	17.4	13,852	23.1	1.33	13.11	10.66
Midwest								
East North Central	686	10,681	15.6	11,089	16.2	1.04	10.21	9.10
West North Central	360	5,275	14.6	5,379	14.9	1.02	9.38	14.48
South								
South Atlantic	737	10,090	13.7	10,067	13.7	1.00	14.76	12.92
East South Central	397	4,296	10.8	4,345	10.9	1.01	11.66	12.95
West South Central	712	7,653	10.7	7,347	10.3	.96	12.38	8.36
West								
Mountain	322	4,388	13.6	4,436	13.8	1.01	9.86	17.71
Pacific	529	7,232	13.7	10,657	20.1	1.47	15.77	9.20
Metropolitan Status								
Metropolitan	3,073	50,809	16.5	60,604	19.7	1.19	12.68	4.68
Nonmetropolitan	1,454	12,375	8.5	10,222	7.0	.83	10.14	7.63

See footnote at end of table.

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Flow Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor:	0.900	0.900	0.859	1.332	1.332	1.047	0.723	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	357	5,062	14.2	5,496	15.4	1.09	8.91	11.29
5,500-7,000 HDD	1,120	17,957	16.0	19,214	17.2	1.07	10.36	8.86
4,000-5,499 HDD	965	15,385	15.9	17,726	18.4	1.15	12.73	11.27
Under 4,000 HDD	1,024	12,903	12.6	15,570	15.2	1.21	13.96	10.39
2,000 CDD or More and --								
Under 4,000 HDD	1,063	11,876	11.2	12,820	12.1	1.08	15.85	10.51
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	529	7,656	14.5	8,224	15.5	1.07	9.39	11.53
5,500-7,000 HDD	1,285	21,992	17.1	23,469	18.3	1.07	10.64	8.08
4,000-5,499 HDD	739	10,425	14.1	12,422	16.8	1.19	13.55	12.14
Under 4,000 HDD	975	12,043	12.3	14,548	14.9	1.21	14.27	11.26
2,000 CDD or More and --								
Under 4,000 HDD	999	11,068	11.1	12,163	12.2	1.10	15.79	10.82
STRUCTURE								
Floors								
1	2,886	23,755	8.2	24,674	8.5	1.04	13.66	5.37
2	1,057	16,112	15.2	18,598	17.6	1.15	12.14	5.80
3	408	8,604	21.1	8,575	21.0	1.00	11.20	12.19
4 to 6	152	8,314	54.8	8,892	58.6	1.07	9.95	10.07
7 or More	25	6,398	257.0	10,087	405.3	1.58	12.75	11.13
Wall Materials								
Masonry	2,849	42,074	14.8	46,050	16.2	1.09	11.75	4.27
Siding or Shingles	802	4,788	6.0	4,173	5.2	.87	12.82	8.17
Metal Panels	557	5,689	10.2	5,557	10.0	.98	12.15	11.32
Concrete Panels	240	7,221	30.1	9,691	40.4	1.34	13.73	13.95
Window Glass	33	1,924	57.5	3,462	103.4	1.80	15.46	18.38
Other	46	1,487	32.1	1,893	40.8	1.27	12.11	22.24
Roof Materials								
Built-Up	1,614	31,057	19.2	37,728	23.4	1.21	12.50	5.69
Shingles (Not Wood)	1,392	10,917	7.8	10,039	7.2	.92	12.64	6.20
Metal Surfacing	901	8,197	9.1	7,299	8.1	.89	12.24	9.60
Synthetic or Rubber	211	6,911	32.8	9,668	45.8	1.40	11.37	9.36
Slate or Tile	193	2,582	13.4	2,147	11.1	.83	10.41	13.64
Concrete	72	1,932	26.8	1,907	26.4	.99	17.20	29.44
Wooden Materials	106	727	6.8	880	8.3	1.21	13.88	13.17
Other	38	860	22.7	Q	Q	1.35	7.83	24.20
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	3,056	45,091	14.8	55,069	18.0	1.22	12.28	4.50
Wall Insulation	2,026	29,692	14.7	37,704	18.6	1.27	12.34	5.47
Storm or Multiple Glazing	1,440	24,068	16.7	30,010	20.8	1.25	11.74	4.86
Tinted, Reflective, or Shading								
Glass	944	22,040	23.3	31,092	32.9	1.41	13.04	6.22
Exterior or Interior Shadings or Awnings								
.....	1,473	26,173	17.8	33,715	22.9	1.29	12.40	5.69
Weather Stripping or Caulking	2,774	44,694	16.1	56,238	20.3	1.26	12.36	4.68
None of the Above	750	7,767	10.4	3,925	5.2	.51	11.71	9.63

See footnote at end of table.

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Rate Factor
	Total Number (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Header	0,000	0,000	0,000	1,000	1,000	1,000	0,723	
ENERGY SOURCES AND END USES*								
Energy Sources (Solely or in Combination)								
Electricity	4,294	61,563	14.3	70,801	16.5	1.15	12.25	3.06
Natural Gas	2,420	41,143	17.0	48,225	19.9	1.17	11.12	3.01
Fuel Oil	581	12,600	21.7	17,356	29.9	1.38	10.93	11.03
District Heat	98	6,578	67.0	12,689	129.3	1.93	10.51	17.23
District Chilled Water	24	1,927	79.9	3,914	162.4	2.03	11.37	26.61
Propane	348	4,695	13.5	5,069	14.6	1.08	11.20	13.82
Other	130	1,542	11.9	1,033	7.9	.67	11.83	17.46
Energy End Uses (Solely or in Combination)								
Heated Buildings	3,876	57,868	14.9	67,740	17.5	1.17	11.95	4.02
Air-Conditioned Buildings	3,184	51,770	16.3	64,029	20.1	1.24	12.55	4.32
Buildings with Water Heating	3,183	53,584	16.8	66,193	20.8	1.24	12.12	4.41
Buildings with Cooking	864	23,668	27.4	32,078	37.1	1.36	11.64	6.32
Buildings with Manufacturing	205	5,601	27.4	7,217	35.3	1.29	10.18	12.94
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and Cooking	660	20,786	31.5	28,964	43.9	1.39	11.79	8.93
With Water Heating, Without Cooking	1,908	25,904	13.6	29,723	15.6	1.15	12.58	4.91
Without Water Heating or Cooking	484	3,641	7.5	2,546	5.3	.70	14.40	8.93
Without Air Conditioning								
With Water Heating and Cooking	138	2,079	15.0	1,914	13.8	.92	8.10	17.15
With Water Heating, Without Cooking	373	3,700	9.9	3,308	8.9	.89	10.30	12.94
Without Water Heating or Cooking	294	1,538	5.2	936	3.2	.61	10.16	14.05
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	496	3,858	7.8	488	1.0	.13	20.77	9.74
All Other Combinations	176	1,678	9.6	2,948	16.8	1.76	24.93	27.09
Space-Heating Energy Source (Solely or in Combination)								
Electricity	1,283	18,702	14.6	22,228	17.3	1.19	14.83	5.61
Natural Gas	2,158	33,017	15.3	37,145	17.2	1.13	10.87	5.02
Fuel Oil	555	10,526	18.9	13,490	24.3	1.28	10.34	10.09
District Heat	94	6,130	65.0	10,763	114.0	1.76	10.68	14.52
Propane	238	1,767	7.4	1,605	6.7	.91	13.63	18.65
Other	110	994	9.0	515	4.7	.52	11.10	16.07
Main Space-Heating Energy Source								
Electricity	957	13,448	14.1	16,020	16.7	1.19	16.37	5.62
Natural Gas	2,079	31,110	15.0	34,603	16.6	1.11	10.84	5.18
Fuel Oil	473	5,599	11.8	5,838	12.3	1.04	11.73	10.01
District Heat	93	6,026	64.5	10,553	113.0	1.75	10.68	14.54
Propane	208	1,230	5.9	981	4.7	.80	16.00	21.15
Other	70	766	11.0	294	4.2	.38	11.39	23.05

See footnote at end of table.

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor	0.861	0.923	0.864	1.519	1.369	0.939	0.703	
Air-Conditioning Energy Source (Solely or in Combination)								
Electricity	3,072	47,911	15.6	58,728	19.1	1.23	12.82	4.39
Natural Gas	97	1,976	20.5	2,431	25.2	1.23	10.80	13.12
District Chilled Water	24	1,938	81.6	4,067	171.3	2.10	11.29	23.53
Other	13	1,076	80.3	1,678	125.2	1.56	9.67	31.47
Water-Heating Energy Source (Solely or in Combination)								
Electricity	1,554	21,493	13.8	25,694	16.5	1.20	14.59	6.26
Natural Gas	1,391	25,923	18.6	29,855	21.5	1.15	11.03	4.76
Fuel Oil	126	2,284	18.1	2,645	20.9	1.16	11.33	16.14
District Heat	49	4,751	97.8	9,123	187.9	1.92	10.16	18.39
Propane	88	1,023	11.6	1,264	14.3	1.24	15.28	25.30
Other	15	403	27.3	392	26.6	.97	15.39	27.21
Cooking Energy Source (Solely or in Combination)								
Electricity	387	10,850	28.0	13,684	35.3	1.26	11.82	8.06
Natural Gas	462	14,766	32.0	19,212	41.6	1.30	11.25	6.74
Propane	93	923	9.9	1,381	14.8	1.50	17.85	17.23
Other	7	1,150	166.9	3,082	447.1	2.68	9.99	29.63
Manufacturing Energy Source (Solely or in Combination)								
Electricity	163	4,406	27.1	5,347	32.9	1.21	10.80	15.36
Natural Gas	23	838	36.1	1,321	57.0	1.58	7.69	20.36
Other	28	1,002	35.7	1,661	59.2	1.66	9.50	23.07
HEATING AND COOLING								
Percent Heated								
Not Heated	662	5,419	8.2	3,132	4.7	.58	24.85	17.73
1 to 50	630	9,314	14.8	5,425	8.6	.58	14.62	8.60
51 to 99	496	8,673	17.5	11,497	23.2	1.33	12.89	8.06
100	2,739	39,777	14.5	50,772	18.5	1.28	11.54	4.54
Percent Cooled								
Not Cooled	1,344	11,413	8.5	6,797	5.1	.60	9.89	8.19
1 to 50	1,037	17,821	17.2	14,183	13.7	.80	10.61	6.77
51 to 99	597	13,139	22.0	17,906	30.0	1.36	12.71	5.82
100	1,550	20,811	13.4	31,940	20.6	1.53	13.56	6.67
Heating Equipment (Solely or in Combination)								
Furnaces	1,619	15,592	9.6	16,477	10.2	1.06	11.88	5.76
Boilers	704	19,907	28.3	23,499	33.4	1.18	10.45	5.44
Individual Space Heaters	1,389	22,542	16.2	23,157	16.7	1.03	11.40	6.66
Packaged Heating Units	859	15,598	18.2	20,663	24.1	1.32	13.34	6.54
Heat Pumps	453	8,357	18.5	9,710	21.4	1.16	13.30	8.91
Air Ducts	1,990	37,297	18.7	48,644	24.4	1.30	12.21	4.97
Heating or Reheating Coils	243	15,693	64.6	24,493	100.8	1.56	11.68	7.87
Fan-Coil Units	185	11,839	63.8	16,876	91.0	1.43	10.69	9.80
Steam or Hot Water Radiators or Baseboards	498	15,822	31.7	18,748	37.6	1.18	9.50	8.41
Other	57	1,476	25.7	2,848	49.6	1.93	11.05	21.79

See footnotes at end of table.

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor	0.891	0.823	0.984	1.318	1.063	0.920	0.723	
Cooling Equipment (Solely or in Combination)								
Central Chillers	201	14,048	69.9	22,078	109.9	1.57	12.43	9.60
Individual Air Conditioners	1,074	19,239	17.9	20,383	19.0	1.06	11.08	8.55
Packaged Cooling Units	1,980	34,753	17.6	44,020	22.2	1.27	12.69	4.79
Heat Pumps	437	7,827	17.9	10,348	23.7	1.32	13.39	11.05
Air Ducts	1,712	34,225	20.0	45,453	26.6	1.33	12.39	5.11
Fan-Coil Units	110	10,787	98.1	18,011	163.9	1.67	11.80	5.79
Other	100	1,468	14.6	1,647	16.4	1.12	9.44	26.82
Year Main Central Chiller Installed								
1959 or Before	26	1,477	56.0	2,226	84.5	1.51	12.72	10.75
1960 to 1969	52	3,718	72.1	5,902	114.5	1.59	11.23	19.81
1970 to 1979	50	3,541	71.4	5,879	118.6	1.66	14.24	17.58
1980 to 1986	47	3,515	74.4	5,782	122.3	1.65	12.51	17.28
1987 to 1989	26	1,798	68.9	2,288	87.7	1.27	11.44	16.89
Year Packaged Cooling System Installed								
1959 or Before	76	1,736	23.0	2,085	27.6	1.20	12.09	13.36
1960 to 1969	262	4,849	18.5	6,762	25.9	1.39	11.11	19.83
1970 to 1979	603	10,469	17.3	13,028	21.6	1.24	12.51	6.40
1980 to 1986	659	11,340	17.2	14,430	21.9	1.27	14.39	7.32
1987 to 1989	380	6,358	16.7	7,715	20.3	1.21	11.99	8.19
Computer Area with Separate Air-Conditioning System								
Present in Building	265	16,684	63.0	27,309	103.1	1.64	12.01	7.20
Not Present	4,263	46,499	10.9	43,517	10.2	.94	12.38	4.15
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	306	2,359	7.7	263	.9	.11	12.16	15.65
1 to 50	1,002	10,870	10.9	6,127	6.1	.56	11.49	6.42
51 to 99	951	16,950	17.8	20,155	21.2	1.19	12.40	6.31
100	2,269	33,004	14.5	44,281	19.5	1.34	12.27	5.37
Percent Lit When Closed								
Not Lit	2,693	28,054	10.4	25,443	9.4	.91	11.86	5.70
1 to 50	1,706	31,825	18.7	38,660	22.7	1.21	12.28	4.91
51 to 99	68	2,308	34.2	5,495	81.4	2.38	13.48	16.48
100	62	997	16.1	1,228	19.8	1.23	14.11	21.55
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	2,404	38,790	16.1	44,285	18.4	1.14	11.70	4.71
Fluorescent Lamps	3,920	58,892	15.0	69,625	17.8	1.18	12.25	4.09
High-Intensity Discharge Lamps	456	18,188	39.9	22,495	49.3	1.24	11.36	7.42
Other Lamps	24	513	21.5	624	26.2	1.22	12.34	19.83
High-Efficiency Ballasts	1,074	24,226	22.6	34,017	31.7	1.40	12.46	6.53

See footnotes at end of table.

MAJOR FUELS

Table 14. Commercial Buildings Expenditures for Sum of Major Fuels (Continued)

Building Characteristics	All Buildings			Sum of Major Fuel Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Million Btu (dollars)	
RSE Column Factor:	0.881	0.923	0.984	1.319	1.363	0.899	0.703	
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	918	24,663	26.9	35,753	39.0	1.45	12.02	6.22
Freezers	713	21,675	30.4	33,567	47.1	1.55	11.98	6.06
Residential								
Refrigerators	2,485	44,264	17.8	51,797	20.8	1.17	11.74	4.53
Freezers	619	12,421	20.1	16,588	26.8	1.34	11.22	8.14
Ice-Making Machines	775	23,443	30.3	35,987	46.5	1.54	12.04	6.12
Refrigerated Vending Machines	1,517	38,865	25.6	52,592	34.7	1.35	12.10	4.78
Water Coolers	1,750	42,864	24.5	53,317	30.5	1.24	11.97	4.92
Other	56	1,408	25.1	3,935	70.2	2.79	11.39	20.99
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	2,399	27,044	11.3	28,464	11.9	1.05	12.21	4.65
With Thermostats	2,100	24,773	11.8	26,237	12.5	1.06	12.16	5.05
Any Control of Cooling	1,977	26,314	13.3	28,556	14.4	1.09	12.31	4.81
With Thermostats	1,756	24,043	13.7	26,203	14.9	1.09	12.39	5.23
Reduced Use During Off-Hours								
Heating Only	790	7,147	9.0	6,473	8.2	.91	9.97	8.89
Cooling Only	283	4,112	14.5	5,775	20.4	1.40	13.46	17.95
Heating and Cooling	2,397	38,689	16.1	42,521	17.7	1.10	12.70	4.82
Computerized Energy Management and Control System								
Present in Building	264	14,345	54.3	21,014	79.6	1.46	12.26	7.60
Controls Heating and Cooling	251	13,793	54.9	20,355	81.0	1.48	12.20	7.82
Controls Lighting	51	3,855	75.5	5,055	99.0	1.31	11.72	14.06
Controls Other	32	2,316	73.5	3,989	126.6	1.72	11.87	17.28
Other Energy Management								
Regular HVAC Maintenance	2,102	43,014	20.5	57,884	27.5	1.35	12.13	4.54
Participated in Utility Conservation Program	324	10,826	33.4	14,564	44.9	1.35	12.08	7.75

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

o Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 15. Gross Expenditures Intensities for Sum of Major Fuels by Main Heating Fuel
(Dollars per Square Foot)

Building Characteristics	All Buildings	Buildings with Heating				Heating not Performed In Building	1989	
		All Heated Buildings	Main Heat					
			Electricity	Natural Gas	Fuel Oil			District
All Buildings	1.12	1.17	1.19	1.11	1.04	1.75	0.82	19.26
Building Floorspace (Square Feet)								
1,001 to 5,000	1.41	1.58	1.85	1.64	1.51	2.53	.80	19.26
5,001 to 10,000	1.20	1.14	1.28	1.08	1.20	Q	Q	19.26
10,001 to 25,000 .....	.95	1.01	1.14	.91	.83	2.13	.53	19.26
25,001 to 50,000	1.02	1.08	1.18	.97	.88	2.45	.43	19.26
50,001 to 100,000	1.11	1.18	1.01	1.11	.83	1.88	.34	19.26
100,001 to 200,000	1.12	1.15	1.26	1.08	1.27	1.53	Q	19.26
200,001 to 500,000	1.12	1.14	.95	1.14	1.17	1.42	.54	19.26
Over 500,000	1.17	1.21	.92	1.17	Q	1.65	Q	21.07
Year Constructed								
1899 or Before .....	.73	.79	Q	.68	.71	Q	Q	20.79
1900 to 1919 .....	.58	.66	.64	.64	.68	1.11	Q	20.84
1920 to 1945 .....	.87	.93	.84	.86	.80	1.79	.22	19.26
1946 to 1959 .....	.98	1.04	.80	.93	1.29	1.40	.47	19.26
1960 to 1969	1.22	1.29	1.17	1.28	1.11	1.93	.57	14.96
1970 to 1979	1.34	1.30	1.28	1.27	1.37	1.80	Q	19.26
1980 to 1983	1.45	1.53	1.47	1.47	Q	Q	.84	19.26
1984 to 1986	1.27	1.38	1.32	1.47	Q	Q	.31	19.26
1987 to 1989	1.15	1.23	.90	1.28	Q	Q	.71	19.26
BUILDING USE								
Principal Building Activity								
Assembly .....	.87	.72	.71	.66	.51	1.43	Q	19.26
Education .....	.82	.81	1.06	.76	.75	1.14	Q	19.26
Food Sales	2.73	2.69	2.99	2.94	Q	Q	Q	19.26
Food Service	2.81	2.91	3.44	2.90	2.51	Q	Q	19.26
Health Care	1.97	1.97	1.27	2.03	Q	2.43	Q	19.26
Lodging	1.15	1.15	1.37	1.11	Q	1.37	Q	20.79
Mercantile and Service	1.09	1.10	1.11	1.14	1.14	Q	.93	19.26
Office	1.55	1.55	1.53	1.48	1.22	1.92	Q	19.26
Parking Garage .....	.49	.58	.23	Q	Q	Q	.37	20.79
Public Order and Safety	1.42	1.44	Q	1.01	Q	Q	NC	19.26
Warehouse .....	.66	.78	.55	.67	1.26	Q	.25	17.79
Other	2.76	3.16	Q	4.00	Q	Q	Q	20.84
Vacant .....	.29	.44	.40	.46	Q	Q	.22	19.26
Weekly Operating Hours								
39 or Fewer .....	.40	.56	.57	.58	.48	Q	.25	19.26
40 to 48 .....	.91	.87	.86	.82	.65	1.63	Q	19.26
49 to 60 .....	.93	.96	.92	.89	.87	1.76	.53	19.26
61 to 84	1.23	1.24	1.25	1.15	1.22	1.90	.92	17.10
85 to 167	1.26	1.30	1.48	1.26	1.29	1.01	.78	14.96
168 (Open Continuously)	1.90	2.01	1.81	2.06	2.49	2.24	.68	19.26
Workers								
4 or Fewer .....	.60	.73	.87	.70	.82	1.04	.34	19.26
5 to 9 .....	.87	.90	1.10	.80	.78	2.07	Q	19.26
10 to 19	1.01	1.02	1.03	1.01	1.05	1.22	.73	19.26
20 to 49	1.21	1.10	1.16	.98	1.12	1.83	Q	19.26
50 to 99	1.17	1.16	1.53	1.02	.72	2.00	Q	19.26
100 to 249	1.65	1.65	1.50	1.60	1.86	1.78	Q	14.97
250 or More	1.72	1.72	1.33	1.96	1.68	1.75	Q	19.26

See footnote at end of table.

Table 15. Gross Expenditures Intensities for Sum of Major Fuels by Main Heating Fuel (Continued)
(Dollars per Square Foot)

Building Characteristics	Buildings with Heating						Heating not Performed in Building	RSE Row Factor
	All Buildings	All Heated Buildings	Main Heat					
			Electricity	Natural Gas	Fuel Oil	District		
RSE Column Factor:	0.656	0.690	0.837	0.788	1.484	1.357	1.901	
Ownership and Occupancy								
Nongovernment Owned	1.10	1.16	1.21	1.11	0.98	2.02	0.55	6.88
Owner Occupied	1.11	1.17	1.17	1.09	1.05	2.04	.58	7.41
Single Establishment	1.13	1.20	1.23	1.13	1.05	2.26	.56	9.52
Multiple Establishment	1.08	1.09	1.08	.97	1.08	1.66	.72	9.80
Nonowner Occupied	1.04	1.15	1.28	1.18	.75	1.75	.46	11.98
Single Establishment	1.05	1.10	1.23	1.16	.49	Q	.61	16.20
Multiple Establishment	1.24	1.26	1.35	1.22	1.29	Q	.47	14.53
Vacant .....	.26	.68	Q	1.05	Q	Q	Q	51.00
Government Owned	1.21	1.19	1.07	1.11	1.20	1.50	Q	17.11
Federal	1.49	1.50	Q	2.08	Q	1.29	Q	24.32
State	1.55	1.64	1.04	1.72	Q	1.66	Q	33.92
Local .....	.99	.91	1.06	.87	.97	1.44	Q	18.95
Percent Vacant at Least Three Months								
0	1.22	1.25	1.31	1.18	1.11	1.95	1.01	9.61
1 to 50	1.16	1.18	1.08	1.13	1.43	1.65	.39	10.82
51 to 99 .....	.52	.53	.52	.43	Q	Q	Q	36.14
100 .....	.45	.68	.63	.87	.40	Q	.34	20.51
Months in Use Out of Past 12 Months								
0 to 8 .....	.48	.73	.79	.92	Q	Q	.39	20.31
9 to 11 .....	.71	.72	.70	.84	.56	.83	Q	17.90
12	1.20	1.22	1.24	1.14	1.18	1.83	.95	6.48
LOCATION								
Census Region								
Northeast	1.29	1.34	1.33	1.23	1.21	2.00	.28	13.01
Midwest	1.03	1.08	1.31	1.03	.88	1.62	.24	11.58
South .....	.99	1.02	1.08	.94	.58	1.74	1.11	11.29
West	1.30	1.37	1.30	1.43	Q	1.43	.82	12.53
Census Division								
Northeast								
New England	1.15	1.19	1.21	1.42	1.05	1.73	Q	17.76
Middle Atlantic	1.33	1.39	1.37	1.21	1.32	2.06	.31	15.80
Midwest								
East North Central	1.04	1.09	1.51	1.00	.80	1.65	.22	13.52
West North Central	1.02	1.07	.99	1.08	Q	1.54	.28	14.10
South								
South Atlantic	1.00	.96	.97	1.05	.55	2.39	Q	12.22
East South Central	1.01	1.12	1.24	.95	Q	Q	Q	17.28
West South Central .....	.96	1.02	1.19	.86	Q	1.58	.47	15.01
West								
Mountain	1.01	1.08	1.19	1.02	Q	1.19	Q	17.84
Pacific	1.47	1.55	1.36	1.65	Q	1.82	.89	16.25
Metropolitan Status								
Metropolitan	1.19	1.23	1.23	1.15	1.14	1.74	.98	8.93
Nonmetropolitan .....	.83	.92	.99	.97	.76	2.03	.39	13.28
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	1.09	1.14	1.27	.99	.98	1.98	Q	14.37
5,500-7,000 HDD	1.07	1.12	1.34	1.07	1.10	1.43	.28	12.91
4,000-5,499 HDD	1.15	1.22	1.23	1.12	1.13	1.99	.21	11.98
Under 4,000 HDD	1.21	1.28	1.09	1.39	.44	1.92	.61	16.90
2,000 CDD or More and --								
Under 4,000 HDD	1.08	1.07	1.19	.90	.91	1.69	Q	10.96

See footnote at end of table.

Table 15. Gross Expenditures Intensities for Sum of Major Fuels by Main Heating Fuel (Continued)
(Dollars per Square Foot)

Building Characteristics	Buildings with Heating						Heating not Performed in Building	RSE Row Factor
	All Buildings	All Heated Buildings	Main Heat					
			Electricity	Natural Gas	Fuel Oil	District		
RSE Column Factor:	0.656	0.600	0.837	0.788	1.494	1.357	1.901	
ENERGY SOURCES AND END USES*								
Energy Sources								
(Solely or in Combination)								
Electricity	1.15	1.17	1.19	1.11	1.05	1.75	0.82	7.49
Natural Gas	1.17	1.17	1.28	1.11	1.12	1.79	1.41	9.86
Fuel Oil	1.38	1.37	1.44	1.56	1.04	Q	Q	15.12
District Heat	1.93	1.93	Q	Q	Q	1.75	Q	12.81
District Chilled Water	2.03	2.03	Q	Q	Q	1.65	Q	25.30
Propane	1.08	1.06	1.23	1.15	1.14	Q	Q	18.93
Other .....	.67	.67	Q	Q	Q	Q	Q	27.73
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	1.17	1.17	1.19	1.11	1.04	1.75	NC	6.72
Air-Conditioned Buildings	1.24	1.22	1.24	1.13	1.11	1.80	1.98	8.47
Buildings with Water Heating	1.24	1.22	1.25	1.14	1.06	1.77	Q	7.09
Buildings with Cooking	1.36	1.35	1.42	1.29	1.07	1.74	1.46	9.76
Buildings with Manufacturing	1.29	1.32	1.28	1.17	1.22	1.57	.73	18.86
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and								
Cooking	1.39	1.39	1.46	1.32	1.18	1.73	NC	10.56
Without Cooking								
Without Water Heating or	1.15	1.15	1.17	1.04	1.12	1.93	NC	7.98
Cooking .....	.70	.70	.82	.70	.69	Q	NC	13.73
Without Air Conditioning								
With Water Heating and								
Cooking .....	.92	.92	Q	1.04	.77	Q	NC	36.67
Without Cooking								
Without Water Heating or	.89	.89	.84	.92	Q	Q	NC	22.07
Cooking .....	.61	.61	.23	.73	.97	Q	NC	29.84
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking								
.....	.13	NC	NC	NC	NC	NC	.21	13.04
All Other Combinations	1.76	1.59	Q	Q	Q	NC	1.78	34.01
Space-Heating Energy Source								
(Solely or in Combination)								
Electricity	1.19	1.19	1.19	1.01	1.02	2.93	NC	9.20
Natural Gas	1.13	1.13	1.30	1.11	1.26	2.21	NC	12.69
Fuel Oil	1.28	1.28	1.35	1.55	1.04	1.47	NC	15.28
District Heat	1.76	1.76	Q	2.02	Q	1.75	NC	17.48
Propane .....	.91	.91	Q	1.14	Q	Q	NC	34.92
Other .....	.52	.52	Q	Q	Q	Q	NC	21.48
Ability to Switch Main Heating Fuel								
No Alternate	1.16	1.16	1.20	1.08	1.10	1.68	NC	6.47
Alternate Main Heating Fuel								
Electricity .....	.69	.69	Q	.57	1.01	Q	NC	24.01
Natural Gas	1.30	1.30	1.25	Q	.88	Q	NC	23.07
Fuel Oil	1.58	1.58	1.29	1.68	Q	1.51	NC	22.73
Propane .....	.81	.82	Q	.89	.63	Q	NC	22.12
Other .....	.74	.74	Q	Q	Q	Q	NC	28.68

See footnote at end of table.

Table 15. Gross Expenditures Intensities for Sum of Major Fuels by Main Heating Fuel (Continued)
(Dollars per Square Foot)

Building Characteristics	Buildings with Heating						Heating not Performed in Building	RSE Base Factor
	All Buildings	All Heated Buildings	Main Heat					
			Electricity	Natural Gas	Fuel Oil	District		
RSE Column Factor:	0.656	0.600	0.637	0.766	1.404	1.367	1.001	
Air-Conditioning Energy Source (Solely or in Combination)								
Electricity	1.23	1.21	1.22	1.13	1.09	1.95	Q	7.25
Natural Gas	1.23	1.22	Q	1.21	Q	Q	Q	22.47
District Chilled Water	2.10	2.10	Q	Q	Q	1.66	Q	32.74
Other	1.56	1.56	Q	Q	Q	1.58	NC	18.59
Water-Heating Energy Source (Solely or in Combination)								
Electricity	1.20	1.15	1.21	1.03	1.08	2.06	Q	10.47
Natural Gas	1.15	1.15	1.42	1.12	1.05	1.92	1.32	12.17
Fuel Oil	1.16	1.15	Q	Q	1.05	Q	Q	12.88
District Heat	1.92	1.92	Q	Q	Q	1.69	Q	17.00
Propane	1.24	1.17	Q	NC	Q	NC	Q	43.91
Other .....	.97	.97	Q	Q	Q	NC	Q	47.54
Cooking Energy Source (Solely or in Combination)								
Electricity	1.26	1.27	1.38	1.11	.83	1.80	1.12	10.99
Natural Gas	1.30	1.29	1.37	1.25	1.06	1.67	Q	11.29
Propane	1.50	1.39	1.66	NC	1.36	Q	Q	24.81
Other	2.68	2.68	Q	Q	Q	1.72	NC	37.50
Manufacturing Energy Source (Solely or in Combination)								
Electricity	1.21	1.25	1.28	1.15	Q	Q	.74	19.63
Natural Gas	1.58	1.58	Q	1.60	Q	Q	Q	27.48
Other	1.66	1.69	Q	1.39	Q	Q	Q	31.78
HEATING AND COOLING								
Percent Heated								
Not Heated .....	.58	Q	Q	Q	Q	Q	.82	32.75
1 to 50 .....	.58	.58	.58	.54	.57	Q	NC	15.45
51 to 99	1.33	1.33	1.46	1.24	1.31	1.60	NC	12.46
100	1.28	1.28	1.34	1.23	1.07	1.82	NC	7.67
Percent Cooled								
Not Cooled .....	.60	.84	.48	.93	.90	1.27	.24	18.31
1 to 50 .....	.80	.80	.67	.75	.95	1.69	.67	13.90
51 to 99	1.36	1.36	1.41	1.19	1.49	1.82	1.39	9.54
100	1.53	1.48	1.41	1.50	1.17	1.84	Q	9.79
Computer Area with Separate Air-Conditioning System								
Present in Building	1.64	1.64	1.53	1.63	1.66	1.82	Q	10.93
Not Present .....	.94	.99	1.06	.92	.87	1.68	.77	6.34
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit .....	.11	.48	Q	Q	Q	Q	.21	27.70
1 to 50 .....	.56	.60	.70	.59	.59	Q	.27	13.53
51 to 99	1.19	1.20	1.24	1.14	1.05	1.64	.83	10.50
100	1.34	1.34	1.31	1.28	1.24	1.87	Q	8.32

See footnote at end of table.

Table 15. Gross Expenditures Intensities for Sum of Major Fuels by Main Heating Fuel (Continued)
(Dollars per Square Foot)

Building Characteristics	All Buildings	Buildings with Heating					Heating not Performed in Building	RSE Floor Factor
		All Heated Buildings	Main Heat					
			Electricity	Natural Gas	Fuel Oil	District		
RSE Column Factor:	0.622	0.563	0.679	0.694	1.062	1.159	2.468	
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	1.45	1.45	1.53	1.42	1.21	1.74	1.42	9.78
Freezers	1.55	1.55	1.58	1.56	1.22	1.78	1.53	9.90
Residential								
Refrigerators	1.17	1.18	1.16	1.10	1.10	1.75	.84	7.60
Freezers	1.34	1.35	1.25	1.31	1.34	1.81	.92	13.45
Ice-Making Machines	1.54	1.54	1.44	1.47	1.66	1.87	1.55	8.83
Refrigerated Vending Machines	1.35	1.32	1.32	1.26	1.15	1.77	3.07	8.64
Water Coolers	1.24	1.23	1.17	1.16	1.09	1.80	Q	8.31
Other	2.79	2.81	2.70	3.04	Q	Q	Q	32.11
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	1.05	1.05	1.10	.98	.99	2.04	NC	8.90
With Thermostats	1.06	1.06	1.08	.99	.99	2.06	NC	9.67
Any Control of Cooling	1.09	1.09	1.12	.97	1.18	2.03	1.07	9.17
With Thermostats	1.09	1.09	1.11	.99	1.15	2.04	1.03	9.40
Reduced Use During Off-Hours								
Heating Only .....	.91	.91	.69	1.06	.79	1.27	NC	21.08
Cooling Only	1.40	1.19	1.37	1.02	1.27	2.13	Q	23.62
Heating and Cooling	1.10	1.10	1.11	1.06	.99	1.53	NC	7.98
Computerized Energy Management and Control System								
Present in Building	1.46	1.47	1.44	1.46	1.27	1.58	Q	10.20
Controls Heating and Cooling	1.48	1.48	1.44	1.47	1.28	1.58	Q	10.37
Controls Lighting	1.31	1.33	1.32	1.39	Q	1.23	Q	13.52
Controls Other	1.72	1.73	1.75	1.75	Q	1.75	Q	15.04

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for space heating, not statistics on electricity consumed for space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

NC No cases in responding sample.

Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 16. Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1.249	1.189	1.158	1.246	0.966	0.981	0.919	0.940	1.082	0.956	0.967	0.911	
All Buildings	1,354	1,659	1,648	1,126	13,569	15,955	22,039	11,620	99.8	104.0	74.8	96.9	9.00
Building Floorspace (Square Feet)													
1,001 to 5,000	131	193	233	135	1,047	1,612	2,852	1,279	125.3	119.5	81.7	105.7	8.86
5,001 to 10,000	117	118	232	100	1,271	1,468	2,530	1,263	92.3	80.2	91.8	79.0	13.58
10,001 to 25,000	180	225	233	152	1,980	2,250	4,109	2,054	91.0	100.1	56.7	74.1	12.30
25,001 to 50,000	174	221	205	157	1,722	2,049	3,322	1,708	100.8	108.1	61.6	91.7	15.81
50,001 to 100,000	171	253	219	212	1,507	2,362	3,632	1,630	113.6	107.0	60.4	130.0	19.30
100,001 to 200,000	182	253	210	132	2,079	2,232	2,226	1,739	87.7	113.2	94.3	75.9	20.27
200,001 to 500,000	203	192	209	95	1,508	2,593	2,088	832	134.4	74.0	99.9	113.7	30.39
Over 500,000	196	Q	108	Q	2,454	1,390	1,281	1,115	79.8	147.5	84.2	128.6	26.69
Year Constructed													
1899 or Before	66	30	7	Q	743	445	308	Q	88.5	68.1	23.8	Q	22.98
1900 to 1919	84	68	Q	42	1,408	1,602	628	606	59.4	42.6	Q	68.9	26.82
1920 to 1945	223	263	73	76	2,574	2,401	2,250	873	86.6	109.6	32.5	87.4	20.05
1946 to 1959	206	236	326	219	2,196	2,250	4,089	1,975	94.0	105.1	79.7	111.0	18.04
1960 to 1969	369	375	300	230	2,736	3,286	4,057	2,089	135.0	114.3	73.9	110.3	14.89
1970 to 1979	218	375	463	286	2,030	3,160	5,217	2,923	107.2	118.6	88.8	97.9	15.06
1980 to 1983	60	101	190	81	439	893	1,926	1,015	136.8	113.2	98.9	79.6	18.70
1984 to 1986	80	117	153	115	849	1,218	2,437	1,166	94.2	95.9	62.6	98.4	19.77
1987 to 1989	Q	93	90	52	593	700	1,127	816	82.0	133.2	79.7	63.7	24.19
BUILDING USE													
Principal Building Activity													
Assembly	93	109	159	80	1,507	1,408	2,822	1,174	61.9	77.2	56.4	67.8	18.01
Education	149	225	151	Q	1,888	2,221	2,332	1,634	78.9	101.1	64.9	109.6	15.91
Food Sales	Q	Q	49	Q	Q	Q	278	Q	Q	Q	176.6	Q	21.40
Food Service	57	62	86	50	284	339	370	173	200.7	182.5	231.7	289.3	22.09
Health Care	76	250	73	51	378	912	472	292	201.7	273.6	154.0	173.5	23.89
Lodging	96	143	101	85	549	982	1,215	730	175.6	145.8	82.8	116.8	22.74
Mercantile and Service	308	309	294	137	2,647	3,059	4,778	1,882	116.3	101.1	61.5	73.0	11.69
Office	265	275	365	326	2,703	2,281	3,817	3,001	97.9	120.4	95.5	108.6	12.20
Parking Garage	Q	11	Q	Q	160	384	245	194	Q	28.9	Q	Q	43.59
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	137	182	175	41	1,811	2,639	3,422	1,381	75.6	69.1	51.2	29.9	24.92
Other	Q	35	Q	Q	161	178	821	369	Q	193.6	160.1	Q	37.49
Vacant	31	20	Q	9	905	1,349	1,326	581	34.2	15.1	Q	15.2	29.87
Weekly Operating Hours													
39 or Fewer	47	56	66	36	973	1,293	2,833	973	47.8	42.9	23.2	36.6	14.68
40 to 48	175	257	417	149	2,610	2,777	6,427	2,091	67.1	92.4	64.9	71.1	11.79
49 to 60	248	249	257	171	2,799	3,207	4,529	2,937	88.5	77.6	56.8	58.2	13.43
61 to 84	244	305	281	161	2,983	2,807	3,171	1,817	82.0	108.6	88.8	88.8	13.98
85 to 167	230	297	241	230	2,368	3,091	2,244	1,683	97.0	96.0	107.5	136.9	21.53
168 (Open Continuously)	411	497	386	379	1,835	2,781	2,835	2,119	223.9	178.8	136.2	178.7	17.92
Workers													
4 or Fewer	162	190	218	127	2,618	3,973	6,011	2,543	61.7	47.7	36.3	50.0	11.82
5 to 9	112	137	184	100	1,375	1,812	3,455	1,296	81.8	75.9	53.4	76.9	14.49
10 to 19	113	164	158	105	1,253	1,433	2,291	1,468	90.1	114.3	69.1	71.5	14.98
20 to 49	225	256	292	166	2,265	2,196	3,538	1,666	99.2	116.6	82.6	99.9	13.57
50 to 99	155	206	228	112	1,781	2,188	2,261	1,160	86.8	94.2	101.0	96.1	17.84
100 to 249	270	311	253	158	1,656	2,050	1,623	1,441	163.2	151.5	155.9	109.5	21.01
250 or More	318	396	314	358	2,619	2,303	2,860	2,047	121.3	171.9	109.8	175.1	22.32

See footnotes at end of table.

Table 16. Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.248	1.155	1.158	1.268	0.966	0.861	0.818	0.940	1.082	0.852	0.897	0.911	
Ownership and Occupancy													
Nongovernment Owned	1,000	1,294	1,206	739	10,335	12,619	17,086	8,801	96.8	102.6	70.6	84.0	9.49
Owner Occupied	832	1,072	882	544	8,281	10,003	11,893	5,776	100.5	107.2	74.2	94.2	10.21
Single Establishment	643	872	721	432	5,733	7,689	9,364	4,294	112.2	113.4	77.0	100.7	12.13
Multiple Establishment	189	201	161	112	2,547	2,314	2,529	1,482	74.2	86.7	63.7	75.4	13.04
Nonowner Occupied	168	222	324	195	2,055	2,616	5,193	3,025	81.7	84.9	62.3	64.5	14.28
Single Establishment	76	103	192	101	902	1,166	2,861	1,318	84.3	88.0	67.1	76.4	16.79
Multiple Establishment	87	111	105	91	991	1,165	1,588	1,496	88.1	94.9	66.2	60.7	17.42
Vacant	Q	9	Q	Q	162	284	744	211	Q	30.9	Q	Q	20.72
Government Owned	354	365	443	387	3,233	3,336	4,953	2,819	109.6	109.4	89.4	137.1	17.06
Federal	Q	Q	110	Q	183	Q	913	Q	Q	Q	120.5	182.1	33.52
State	177	134	131	Q	911	904	1,340	748	194.2	148.2	97.4	Q	26.66
Local	161	218	202	111	2,139	2,341	2,699	1,343	75.4	92.9	74.9	82.5	16.94
Multibuilding Facility													
Not on Multibuilding Facility	698	892	828	469	8,802	10,472	12,405	5,558	79.3	85.2	66.7	84.5	8.14
Part of Multibuilding Facility	657	767	821	656	4,766	5,483	9,635	6,062	137.7	139.9	85.2	108.3	15.15
On Facility with Central Plant	391	454	377	372	1,732	2,075	2,590	1,949	225.5	218.7	145.4	190.8	24.66
Percent Vacant at Least Three Months													
0	998	1,211	1,281	830	8,899	10,656	15,751	7,774	112.1	113.7	81.3	106.8	9.33
1 to 50	265	387	263	172	3,086	3,403	3,693	2,254	85.7	113.7	71.3	76.2	14.53
51 to 99	Q	33	23	Q	673	1,203	831	Q	95.3	Q	27.8	121.0	32.77
100	28	28	82	26	910	693	1,765	780	30.8	40.9	46.3	32.8	24.21
Months in Use Out of Past 12 Months													
0 to 8	31	45	58	39	756	942	2,013	840	41.6	48.1	28.9	46.3	23.54
9 to 11	72	60	87	53	1,136	704	1,180	760	63.5	84.8	73.9	69.6	20.69
12	1,251	1,554	1,503	1,034	11,677	14,309	18,846	10,020	107.1	108.6	79.8	103.2	9.86
LOCATION													
Metropolitan Status													
Metropolitan	1,102	1,341	1,323	1,014	11,561	12,652	16,220	10,376	95.3	106.0	81.5	97.7	9.82
Nonmetropolitan	253	318	326	112	2,008	3,303	5,819	1,244	125.8	96.4	56.0	90.0	16.48
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	101	424	NC	93	953	3,419	NC	690	105.4	123.9	NC	134.2	17.86
5,500-7,000 HDD	677	893	NC	285	6,356	9,171	NC	2,430	106.5	97.3	NC	117.5	16.44
4,000-5,499 HDD	577	343	358	114	6,259	3,366	4,542	1,219	92.2	102.0	78.8	93.7	16.17
Under 4,000 HDD	NC	NC	593	523	NC	NC	7,221	5,682	NC	NC	82.1	92.0	14.68
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	698	111	NC	NC	10,277	1,600	NC	NC	67.9	69.3	14.98
STRUCTURE													
Floors													
1	271	466	751	318	3,667	4,870	10,838	4,380	74.0	95.7	69.3	72.7	11.47
2	386	412	426	309	3,109	3,866	5,922	3,216	124.0	106.6	71.9	95.9	12.77
3	254	188	161	162	2,260	2,842	2,221	1,281	112.5	66.3	72.4	126.3	16.80
4 to 6	215	303	150	Q	2,488	2,534	1,601	1,690	86.4	119.5	93.7	133.5	20.95
7 or More	228	290	161	112	2,044	1,844	1,456	1,053	111.7	157.4	110.5	105.9	21.21
Wall Materials													
Masonry	911	1,317	1,076	615	9,751	11,860	14,362	6,100	93.5	111.1	74.9	100.8	9.58
Siding or Shingles	88	71	78	88	1,292	1,013	1,396	1,087	67.9	70.5	55.7	81.4	18.89
Metal Panels	Q	116	149	59	669	1,420	2,788	812	Q	81.5	53.4	72.3	20.29
Concrete Panels	100	87	239	280	899	1,061	2,531	2,730	111.0	82.1	94.5	102.4	26.76
Window Glass	83	47	38	56	Q	316	356	589	124.6	148.5	107.5	95.2	29.24
Other	39	21	68	28	294	286	Q	302	132.0	74.4	Q	92.4	29.80

See footnotes at end of table.

Table 16. Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1.248	1.155	1.159	1.256	0.998	0.991	0.919	0.940	1.082	0.852	0.987	0.911	
Roof Materials													
Built-Up	547	809	960	702	5,738	8,083	10,861	6,374	95.3	100.1	88.4	110.2	11.47
Shingles (Not Wood)	224	216	171	184	2,884	2,274	3,456	2,303	77.5	95.1	49.3	79.8	13.71
Metal Surfacing	205	127	201	64	1,537	1,694	3,865	1,101	133.3	74.9	52.0	57.8	18.81
Synthetic or Rubber	247	315	229	58	1,789	2,402	2,152	568	138.2	131.2	106.5	103.0	19.84
Slate or Tile	49	41	41	75	673	506	811	592	73.5	81.5	50.0	126.4	30.48
Concrete	Q	33	24	15	Q	407	641	265	62.7	81.2	36.8	58.0	27.53
Wooden Materials	Q	14	Q	16	Q	223	Q	244	Q	64.5	Q	63.6	28.78
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	922	1,364	1,370	830	8,842	11,620	16,010	8,620	104.3	117.4	85.6	96.3	10.09
Wall Insulation	679	973	859	544	6,028	8,188	10,069	5,407	112.7	118.9	85.3	100.6	12.82
Storm or Multiple Glazing	650	1,091	513	303	6,133	8,829	6,362	2,744	105.9	123.6	80.6	110.5	9.82
Tinted, Reflective, or Shading Glass	465	669	706	546	3,728	4,994	7,934	5,384	124.8	133.9	88.9	101.4	13.01
Exterior or Interior Shadings or Awnings	595	763	775	586	5,801	6,340	9,303	4,728	102.6	120.4	83.3	123.9	11.81
Weather Stripping or Caulking	1,043	1,414	1,284	809	9,878	12,044	15,036	7,736	105.5	117.4	85.4	104.6	9.30
None of the Above	96	72	97	71	1,554	2,099	2,931	1,183	61.6	34.2	33.0	60.1	24.42
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	1,353	1,656	1,647	1,126	13,326	15,704	21,215	11,318	101.5	105.4	77.7	99.5	8.84
Natural Gas	884	1,464	1,064	924	8,517	12,815	11,660	8,151	103.8	114.2	91.2	113.4	11.12
Fuel Oil	573	496	303	216	5,127	3,197	2,844	1,432	111.8	155.2	106.5	151.2	21.89
District Heat	337	320	259	Q	2,236	1,509	1,583	Q	150.6	212.0	163.7	232.9	27.38
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	97	114	130	Q	1,073	1,061	1,738	Q	90.4	107.3	74.5	136.2	28.85
Other	26	35	16	Q	370	552	456	Q	Q	62.9	34.8	Q	32.70
Energy End Uses (Solely or in Combination)													
Heated Buildings	1,350	1,647	1,568	1,101	12,969	15,067	19,170	10,662	104.1	109.3	81.8	103.3	9.26
Air-Conditioned Buildings	1,028	1,500	1,590	982	10,334	13,159	18,957	9,320	99.5	114.0	83.9	105.4	9.25
Buildings with Water Heating	1,305	1,588	1,504	1,066	12,447	14,211	16,925	10,002	104.8	111.7	88.9	106.6	9.53
Buildings with Cooking	694	792	694	574	5,870	6,490	7,194	4,114	118.3	122.1	96.5	139.7	12.82
Buildings with Manufacturing	117	194	222	Q	1,026	1,538	1,732	1,304	113.9	125.9	128.0	135.3	28.44
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking	556	745	649	508	4,965	5,908	6,543	3,371	111.9	126.2	99.1	150.6	13.13
With Water Heating, Without Cooking	461	712	769	422	5,163	6,701	8,999	5,041	89.2	106.3	85.4	83.6	12.38
Without Water Heating or Cooking	11	37	101	28	176	519	2,328	618	62.6	70.7	43.3	45.6	20.05
Without Air Conditioning													
With Water Heating and Cooking	Q	45	Q	55	849	568	Q	604	Q	79.7	Q	90.9	24.71
With Water Heating, Without Cooking	154	78	22	67	1,423	909	582	786	108.1	85.9	37.9	85.7	20.50
Without Water Heating or Cooking	Q	30	17	14	365	453	556	165	86.3	65.5	30.7	84.3	28.93
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	3	5	10	5	552	762	1,847	696	6.0	6.7	5.5	6.9	26.42
All Other Combinations	Q	Q	78	28	Q	Q	1,125	340	Q	Q	69.6	81.0	24.80

See footnotes at end of table.

Table 16. Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.248	1.155	1.158	1.256	0.866	0.881	0.819	0.940	1.082	0.852	0.867	0.911	
Space-Heating Energy Source (Solely or in Combination)													
Electricity	275	235	645	344	2,558	2,808	8,956	4,379	107.5	83.8	72.0	78.5	11.60
Natural Gas	628	1,294	822	675	5,970	11,709	9,098	6,241	105.1	110.5	90.3	108.1	11.41
Fuel Oil	504	447	243	110	4,772	2,746	2,314	694	105.7	163.0	105.2	158.3	18.03
District Heat	328	198	256	Q	2,209	1,143	1,577	1,202	148.5	173.4	162.2	187.9	27.55
Propane	Q	Q	30	Q	324	435	887	121	Q	Q	33.8	74.8	34.15
Other	Q	13	Q	Q	301	210	Q	Q	70.8	60.9	27.5	Q	33.33
Main Space-Heating Energy Source													
Electricity	103	151	477	247	1,351	1,746	6,911	3,441	76.3	86.5	69.1	71.8	12.95
Natural Gas	550	1,254	753	634	5,319	11,352	8,609	5,830	103.5	110.5	87.4	108.8	12.91
Fuel Oil	381	49	60	Q	3,860	518	1,117	Q	98.7	94.4	53.9	Q	20.27
District Heat	324	197	252	Q	2,180	1,126	1,557	1,163	148.5	175.1	161.7	185.0	27.69
Propane	Q	Q	14	Q	168	370	608	Q	Q	Q	22.8	Q	26.10
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	16.3	Q	7.75
Air-Conditioning Energy Source (Solely or in Combination)													
Electricity	898	1,372	1,489	822	9,308	12,298	18,062	8,243	96.5	111.5	82.4	99.7	9.38
Natural Gas	65	86	43	31	517	673	445	340	126.2	128.2	96.2	90.1	27.57
District Chilled Water	61	Q	120	Q	332	284	856	465	183.4	191.6	140.4	Q	36.40
Other	49	Q	Q	Q	386	Q	Q	Q	126.4	Q	Q	Q	21.74
Water-Heating Energy Source (Solely or in Combination)													
Electricity	356	370	736	300	4,029	4,384	9,136	3,945	88.4	84.4	80.5	75.9	10.72
Natural Gas	595	958	612	540	5,414	8,834	6,468	5,206	110.0	108.4	94.6	103.8	10.49
Fuel Oil	179	Q	24	Q	1,747	Q	273	Q	102.6	Q	89.2	Q	27.44
District Heat	255	274	Q	Q	1,780	1,235	877	Q	143.2	221.7	151.6	275.8	31.04
Propane	23	Q	11	Q	276	324	334	Q	82.7	Q	32.0	Q	41.01
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooking Energy Source (Solely or in Combination)													
Electricity	231	402	362	162	2,705	2,923	3,666	1,555	85.3	137.6	98.8	104.2	16.75
Natural Gas	395	527	376	409	3,426	4,587	3,845	2,909	115.4	114.9	97.8	140.7	12.83
Propane	40	Q	29	Q	412	Q	367	Q	95.8	Q	79.2	Q	32.42
Other	69	Q	Q	Q	387	576	Q	Q	178.1	267.8	Q	Q	32.39
Manufacturing Energy Source (Solely or in Combination)													
Electricity	69	101	168	Q	682	1,047	1,560	1,116	101.4	96.3	107.7	140.8	34.70
Natural Gas	Q	75	Q	Q	Q	308	Q	Q	Q	241.8	Q	Q	34.43
Other	Q	Q	Q	Q	Q	467	Q	Q	Q	145.0	Q	Q	36.03
HEATING AND COOLING													
Percent Heated													
Not Heated	8	12	81	25	629	907	2,902	982	12.9	13.7	27.9	25.0	23.77
1 to 50	71	110	110	80	1,766	2,396	3,338	1,814	40.4	45.9	32.9	44.1	19.43
51 to 99	146	176	361	208	1,215	1,801	3,549	2,108	119.8	97.9	101.9	98.8	17.08
100	1,129	1,361	1,096	813	9,959	10,851	12,250	6,716	113.4	125.4	89.5	121.0	9.88
Percent Cooled													
Not Cooled	326	160	58	143	3,234	2,797	3,082	2,300	100.8	57.2	18.8	62.3	14.48
1 to 50	428	438	333	137	4,866	5,302	5,288	2,364	88.0	82.6	63.0	57.9	14.30
51 to 99	261	464	432	253	2,462	3,495	4,834	2,347	105.8	132.7	89.3	107.6	12.99
100	340	597	826	593	3,006	4,361	8,835	4,608	113.0	137.0	93.4	128.7	13.48

See footnotes at end of table.

Table 16. Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.246	1.166	1.158	1.256	0.966	0.861	0.819	0.940	1.062	0.852	0.867	0.911	
LIGHTING													
Percent Lit When Open													
Not Lit	Q	8	5	Q	408	429	1,085	437	Q	18.7	4.8	Q	30.17
1 to 50	142	171	118	103	1,765	3,175	4,087	1,843	80.3	53.7	28.9	55.9	13.89
51 to 99	317	478	480	350	3,806	4,529	5,520	3,096	83.3	105.5	87.0	113.2	14.46
100	890	1,003	1,045	670	7,590	7,822	11,347	6,245	117.3	128.3	92.1	107.3	11.51

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 17. Expenditures by Census Region for Sum of Major Fuels

Building Characteristics	Sum of Major Fuel Expenditures (million dollars)				Sum of Major Fuel Expenditures (dollars)								RSE Row Factor
					per Million Btu				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.548	1.315	1.307	1.538	0.788	0.527	0.663	0.651	1.244	0.999	0.978	1.073	
All Buildings	17,505	16,468	21,759	15,093	12.92	9.92	13.20	13.41	1.29	1.03	0.99	1.30	7.82
Building Floorspace (Square Feet)													
1,001 to 5,000	1,900	2,207	3,575	1,919	14.49	11.46	15.35	14.19	1.82	1.37	1.25	1.50	7.94
5,001 to 10,000	1,521	1,187	3,758	1,405	12.96	10.08	16.18	14.07	1.20	.81	1.49	1.11	13.53
10,001 to 25,000	2,161	2,261	3,115	2,332	11.99	10.04	13.36	15.32	1.09	1.00	.76	1.14	10.89
25,001 to 50,000	2,483	2,059	2,470	1,938	14.31	9.30	12.07	12.38	1.44	1.00	.74	1.13	13.44
50,001 to 100,000	1,742	2,525	3,069	2,789	10.17	9.99	14.00	13.16	1.16	1.07	.85	1.71	15.76
100,001 to 200,000	2,490	2,515	2,211	2,050	13.65	9.95	10.53	15.52	1.20	1.13	.99	1.18	15.70
200,001 to 500,000	2,179	1,925	2,299	1,450	10.75	10.03	11.02	15.31	1.45	.74	1.10	1.74	23.29
Over 500,000	3,030	1,791	1,262	1,210	15.47	8.73	11.70	8.44	1.23	1.29	.99	1.09	20.11
Year Constructed													
1899 or Before	662	265	106	Q	10.07	8.75	14.53	Q	.89	.60	.35	Q	17.11
1900 to 1919	1,157	599	321	370	13.83	8.77	Q	8.87	.82	.37	.51	.61	20.73
1920 to 1945	2,880	2,453	908	792	12.92	9.33	12.40	10.37	1.12	1.02	.40	.91	17.68
1946 to 1959	2,569	2,112	3,752	1,901	12.45	8.93	11.51	8.67	1.17	.94	.92	.96	13.61
1960 to 1969	4,255	3,569	3,827	3,242	11.52	9.51	12.76	14.07	1.56	1.09	.94	1.55	12.71
1970 to 1979	2,820	3,956	6,600	4,431	12.96	10.56	14.24	15.48	1.39	1.25	1.27	1.52	11.86
1980 to 1983	969	1,079	2,716	1,429	16.12	10.68	14.26	17.69	2.21	1.21	1.41	1.41	14.20
1984 to 1986	1,552	1,419	2,234	1,979	19.39	12.15	14.64	17.25	1.83	1.17	.92	1.70	15.22
1987 to 1989	642	1,015	1,294	767	Q	10.89	14.40	14.76	1.08	1.45	1.15	.94	17.41
BUILDING USE													
Principal Building Activity													
Assembly	1,266	1,031	2,868	822	13.57	9.49	18.03	10.32	.84	.73	1.02	.70	18.29
Education	1,664	1,848	1,733	1,345	11.17	8.23	11.44	7.50	.88	.83	.74	.82	12.18
Food Sales	Q	Q	708	Q	Q	Q	14.40	Q	Q	Q	2.54	Q	13.55
Food Service	794	661	1,165	662	13.92	10.67	13.58	13.24	2.79	1.95	3.15	3.83	15.66
Health Care	780	1,882	814	576	10.23	7.54	11.19	11.37	2.06	2.06	1.72	1.97	17.45
Lodging	759	1,222	1,154	879	7.88	8.54	11.47	10.30	1.38	1.24	.95	1.20	21.24
Mercantile and Service	3,739	3,430	4,183	2,175	12.14	11.09	14.24	15.83	1.41	1.12	.88	1.16	9.13
Office	4,489	3,189	5,261	5,384	16.97	11.61	14.43	16.52	1.66	1.40	1.38	1.79	8.79
Parking Garage	171	144	Q	Q	9.36	12.96	Q	Q	Q	.38	Q	Q	31.86
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	6
Warehouse	1,809	1,880	1,579	817	13.22	10.31	9.02	19.79	1.00	.71	.46	.59	16.63
Other	Q	421	Q	Q	Q	12.19	12.24	13.92	Q	2.36	1.96	Q	18.77
Vacant	494	227	363	135	15.97	11.09	9.63	15.33	.55	.17	.27	.23	24.60
Weekly Operating Hours													
39 or Fewer	517	529	925	459	11.12	9.54	14.08	12.88	.53	.41	.33	.47	14.12
40 to 48	2,347	2,385	5,950	1,938	13.39	9.29	14.26	13.03	.90	.86	.93	.93	12.94
49 to 60	3,514	2,799	3,638	2,610	14.19	11.25	14.14	15.26	1.26	.87	.80	.89	9.59
61 to 84	3,751	3,345	3,761	2,376	15.34	10.98	13.39	14.73	1.26	1.19	1.19	1.31	10.94
85 to 167	3,311	3,162	2,947	2,413	14.41	10.66	12.21	10.47	1.40	1.02	1.31	1.43	13.36
168 (Open Continuously)	4,065	4,249	4,539	5,296	9.89	8.54	11.76	13.99	2.22	1.53	1.60	2.50	14.37
Workers													
4 or Fewer	2,073	1,975	3,271	1,693	12.82	10.42	15.00	13.31	.79	.50	.54	.67	8.52
5 to 9	1,323	1,486	2,638	1,455	11.76	10.81	14.31	14.60	.96	.82	.76	1.12	10.49
10 to 19	1,463	1,566	1,965	1,489	12.96	9.56	12.42	14.19	1.17	1.09	.86	1.01	12.79
20 to 49	2,502	2,606	4,524	2,091	11.13	10.18	15.48	12.57	1.10	1.19	1.28	1.26	14.60
50 to 99	2,261	1,950	2,771	1,669	14.63	9.46	12.13	14.96	1.27	.89	1.23	1.44	13.64
100 to 249	3,275	3,021	2,725	2,134	12.12	9.72	10.77	13.52	1.98	1.47	1.68	1.48	15.59
250 or More	4,608	3,864	3,864	4,562	14.50	9.76	12.31	12.73	1.76	1.68	1.35	2.23	15.61

See footnotes at end of table.

Table 17. Expenditures by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Expenditures (million dollars)				Sum of Major Fuel Expenditures (dollars)								RSE Row Factor
					per Million Btu				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.548	1.315	1.307	1.536	0.788	0.527	0.663	0.681	1.244	0.999	0.978	1.073	
Ownership and Occupancy													
Nongovernment Owned	13,451	13,360	15,527	11,150	13.45	10.32	12.88	15.08	1.30	1.06	0.91	1.27	7.22
Owner Occupied	10,716	10,612	11,144	7,598	12.88	9.90	12.63	13.96	1.29	1.06	.94	1.32	8.31
Single Establishment	7,443	8,324	8,935	5,810	11.57	9.55	12.39	13.43	1.30	1.08	.95	1.35	9.90
Multiple Establishment	3,273	2,288	2,209	1,788	17.32	11.40	13.71	16.00	1.28	.99	.87	1.21	10.72
Nonowner Occupied	2,735	2,748	4,384	3,552	16.29	12.38	13.55	18.22	1.33	1.05	.84	1.17	10.73
Single Establishment	1,262	1,134	2,415	1,762	16.61	11.05	12.59	17.49	1.40	.97	.84	1.34	13.47
Multiple Establishment	1,426	1,539	1,786	1,730	16.33	13.92	17.00	19.05	1.44	1.32	1.12	1.16	13.26
Vacant	Q	75	Q	Q	Q	8.53	6.86	Q	Q	.26	Q	Q	28.81
Government Owned	4,055	3,108	6,232	3,943	11.44	8.51	14.08	10.20	1.25	.93	1.26	1.40	17.93
Federal	Q	Q	1,488	Q	Q	Q	13.52	7.64	Q	Q	1.63	1.39	24.50
State	1,884	1,112	1,342	Q	10.65	8.31	10.28	11.99	2.07	1.23	1.00	Q	21.69
Local	1,966	1,849	3,402	1,213	12.18	8.50	16.83	10.94	.92	.79	1.26	.90	18.51
Multibuilding Facility													
Not on Multibuilding Facility	9,973	9,364	10,854	6,792	14.29	10.49	13.12	14.47	1.13	.89	.88	1.22	6.91
Part of Multibuilding Facility	7,532	7,105	10,905	8,301	11.47	9.26	13.28	12.65	1.58	1.30	1.13	1.37	13.36
On Facility with Central Plant	3,518	3,730	5,087	3,788	9.01	8.22	13.50	10.19	2.03	1.80	1.96	1.94	21.87
Percent Vacant at Least Three Months													
0	12,303	11,871	16,953	11,612	12.33	9.80	13.24	13.99	1.38	1.11	1.08	1.49	8.25
1 to 50	4,289	3,939	3,582	2,608	16.21	10.18	13.62	15.19	1.39	1.16	.97	1.16	11.46
51 to 99	586	359	302	Q	9.13	10.93	13.08	5.85	.87	Q	.36	.71	20.52
100	328	300	923	298	11.69	10.57	11.29	11.63	.36	.43	.52	.38	18.39
Months in Use Out of Past 12 Months													
0 to 8	355	501	861	459	11.27	11.05	14.81	11.80	.47	.53	.43	.55	20.54
9 to 11	647	553	901	595	8.96	9.27	10.33	11.23	.57	.79	.76	.78	15.00
12	16,504	15,414	19,997	14,039	13.19	9.92	13.30	13.58	1.41	1.08	1.06	1.40	8.02
LOCATION													
Metropolitan Status													
Metropolitan	15,207	13,481	17,801	14,114	13.80	10.05	13.46	13.92	1.32	1.07	1.10	1.36	8.51
Nonmetropolitan	2,298	2,987	3,959	978	9.10	9.38	12.15	8.74	1.14	.90	.68	.79	13.37
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	1,140	3,545	NC	811	11.34	8.37	NC	8.75	1.20	1.04	NC	1.17	23.83
5,500-7,000 HDD	7,544	9,301	NC	2,369	11.15	10.42	NC	8.30	1.19	1.01	NC	.97	11.04
4,000-5,499 HDD	8,822	3,622	4,186	1,097	15.28	10.55	11.69	9.61	1.41	1.08	.92	.90	11.88
Under 4,000 HDD													
2,000 CDD or More and --	NC	NC	6,908	8,661	NC	NC	11.66	16.57	NC	NC	.96	1.52	9.50
Under 4,000 HDD	NC	NC	10,666	2,155	NC	NC	15.28	19.44	NC	NC	1.04	1.35	12.35
STRUCTURE													
Floors													
1	4,016	5,163	10,585	4,910	14.80	11.08	14.10	15.43	1.10	1.06	.98	1.12	8.81
2	4,477	4,200	5,449	4,471	11.61	10.19	12.79	14.49	1.44	1.09	.92	1.39	9.84
3	2,857	1,743	2,012	Q	11.24	9.25	12.50	12.14	1.26	.61	.91	1.53	17.44
4 to 6	2,288	2,684	1,722	2,197	10.64	8.86	11.48	9.74	.92	1.06	1.08	1.30	17.28
7 or More	3,868	2,678	1,990	1,550	16.94	9.23	12.37	13.89	1.89	1.45	1.37	1.47	14.43

See footnotes at end of table.

Table 17. Expenditures by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Expenditures (million dollars)				Sum of Major Fuel Expenditures (dollars)								RSE Row Factor
					per Million Btu				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
Wall Materials													
Masonry	11,801	12,576	13,419	8,255	12.95	9.55	12.47	13.42	1.21	1.06	0.93	1.35	7.77
Siding or Shingles	1,098	765	1,130	1,180	12.51	10.70	14.53	13.34	.85	.75	.81	1.09	15.10
Metal Panels	1,460	1,263	1,935	899	10.90	10.92	13.01	15.30	2.18	.89	.69	1.11	16.70
Concrete Panels	1,311	1,019	3,962	3,399	13.13	11.71	16.56	12.15	1.46	.96	1.57	1.24	21.05
Window Glass	Q	Q	549	930	17.19	12.01	14.33	16.58	2.14	1.78	1.54	1.58	19.82
Other	415	283	765	431	10.68	Q	Q	15.45	1.41	Q	1.26	1.43	27.74
Roof Materials													
Built-Up	7,660	8,253	12,467	9,348	14.00	10.20	12.98	13.31	1.33	1.02	1.15	1.47	10.13
Shingles (Not Wood)	2,830	2,207	2,565	2,438	12.66	10.21	15.04	13.26	.98	.97	.74	1.06	10.91
Metal Surfacing	2,252	1,283	2,704	1,061	10.99	10.10	13.45	16.66	1.47	.76	.70	.96	14.47
Synthetic or Rubber	3,051	3,041	2,801	774	12.34	9.65	12.22	13.24	1.71	1.27	1.30	1.36	14.47
Slate or Tile	463	350	489	845	9.35	8.48	12.05	11.30	.69	.69	.60	1.43	24.74
Concrete	Q	382	437	220	22.33	Q	18.52	14.31	1.40	Q	.68	.83	24.44
Wooden Materials	Q	193	Q	277	Q	13.42	Q	17.82	Q	.86	Q	1.13	20.83
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	12,228	13,499	18,218	11,124	13.26	9.90	13.30	13.39	1.38	1.16	1.14	1.29	8.16
Wall Insulation	8,699	9,915	11,984	7,106	12.80	10.19	13.95	13.07	1.44	1.21	1.19	1.31	10.18
Storm or Multiple Glazing	8,494	10,642	6,817	4,057	13.08	9.76	13.29	13.38	1.38	1.21	1.07	1.48	8.14
Tinted, Reflective, or Shading Glass	6,557	6,795	10,076	7,664	14.10	10.16	14.28	14.04	1.76	1.36	1.27	1.42	11.24
Exterior or Interior Shadings or Awnings	8,145	7,659	10,504	7,407	13.68	10.04	13.55	12.64	1.40	1.21	1.13	1.57	8.97
Weather Stripping or Caulking	14,007	14,086	17,531	10,614	13.44	9.96	13.65	13.12	1.42	1.17	1.17	1.37	8.53
None of the Above	1,088	702	1,175	960	11.37	9.78	12.15	13.50	.70	.33	.40	.81	17.88
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	17,497	16,456	21,755	15,093	12.93	9.94	13.21	13.41	1.31	1.05	1.03	1.33	7.25
Natural Gas	11,031	13,816	11,868	11,510	12.47	9.44	11.16	12.46	1.30	1.08	1.02	1.41	8.39
Fuel Oil	7,026	4,267	3,065	2,999	12.26	8.60	10.12	13.85	1.37	1.33	1.08	2.09	17.71
District Heat	4,562	2,700	Q	Q	13.54	8.44	10.58	9.22	2.04	1.79	1.73	2.15	21.63
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	1,444	1,237	1,486	Q	14.87	10.86	11.47	8.06	1.35	1.17	.85	1.10	16.33
Other	254	369	251	Q	9.92	10.64	15.79	Q	.69	.67	.55	Q	25.91
Energy End Uses (Solely or in Combination)													
Heated Buildings	17,398	16,312	19,472	14,558	12.89	9.90	12.42	13.22	1.34	1.08	1.02	1.37	7.13
Air-Conditioned Buildings	14,382	14,968	21,013	13,666	13.98	9.98	13.21	13.91	1.39	1.14	1.11	1.47	7.90
Buildings with Water Heating	16,871	15,670	19,584	14,068	12.93	9.87	13.02	13.20	1.36	1.10	1.16	1.41	8.13
Buildings with Cooking	8,507	7,586	9,281	6,705	12.26	9.58	13.37	11.67	1.45	1.17	1.29	1.63	10.16
Buildings with Manufacturing	1,368	1,817	2,222	1,809	11.71	9.38	10.03	10.25	1.33	1.18	1.28	1.39	19.18

See footnotes at end of table.

MAJOR FUELS

Table 17. Expenditures by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Expenditures (million dollars)				Sum of Major Fuel Expenditures (dollars)								RSE Row Factor
					per Million Btu				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1,548	1,319	1,297	1,256	2,709	2,427	2,563	2,081	1,344	1,149	1,075	1,073	
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking	7,411	7,172	8,412	5,970	13.34	9.62	12.97	11.76	1.49	1.21	1.29	1.77	10.69
With Water Heating, Without Cooking	6,826	7,284	8,967	6,646	14.82	10.23	11.67	15.77	1.32	1.09	1.00	1.32	8.77
Without Water Heating or Cooking	123	470	1,458	496	11.14	12.80	14.46	17.59	.70	.91	.63	.80	15.95
Without Air Conditioning													
With Water Heating and Cooking	Q	389	Q	453	7.67	8.60	Q	8.25	1.21	.69	Q	.75	19.93
With Water Heating, Without Cooking	1,584	772	257	695	10.30	9.89	11.64	10.32	1.11	.85	.44	.88	17.91
Without Water Heating or Cooking	Q	221	191	141	12.14	7.47	11.17	10.16	1.05	.49	.34	.86	10.51
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	82	104	196	106	24.56	20.22	19.17	22.12	.15	.14	.11	.15	20.77
All Other Combinations	Q	Q	Q	587	Q	Q	28.51	21.33	Q	Q	Q	1.73	20.10
Space-Heating Energy Source (Solely or in Combination)													
Electricity	3,840	3,245	9,589	5,554	13.96	13.80	14.87	16.16	1.50	1.16	1.07	1.27	8.94
Natural Gas	7,401	12,153	8,709	8,883	11.79	9.39	10.60	13.17	1.24	1.04	.96	1.42	8.93
Fuel Oil	6,094	3,765	2,335	1,296	12.08	8.41	9.60	11.79	1.28	1.37	1.01	1.87	16.53
District Heat	4,440	1,832	2,742	1,749	13.54	9.25	10.73	7.74	2.01	1.60	1.74	1.46	21.16
Propane	Q	Q	461	162	18.87	10.13	15.36	17.83	1.24	1.34	.52	1.33	24.85
Other	200	135	Q	Q	9.38	10.55	14.11	Q	.66	.64	.39	Q	26.45
Main Space-Heating Energy Source													
Electricity	1,792	2,282	7,460	4,485	17.38	15.12	15.63	18.16	1.33	1.31	1.08	1.30	9.99
Natural Gas	6,548	11,640	8,071	8,344	11.90	9.28	10.73	13.15	1.23	1.03	.94	1.43	9.40
Fuel Oil	4,664	456	642	Q	12.24	9.32	10.67	Q	1.21	.88	.58	Q	15.75
District Heat	4,364	1,820	2,712	1,658	13.48	9.23	10.77	7.71	2.00	1.62	1.74	1.43	21.76
Propane	Q	Q	273	Q	Q	13.03	19.66	Q	Q	Q	.45	Q	15.42
Other	Q	Q	Q	Q	Q	Q	15.93	Q	Q	Q	.26	Q	18.12
Air-Conditioning Energy Source (Solely or in Combination)													
Electricity	12,697	13,716	19,935	12,380	14.14	10.00	13.39	15.06	1.36	1.12	1.10	1.50	7.99
Natural Gas	711	886	518	315	10.90	10.27	12.09	10.28	1.38	1.32	1.16	.93	21.16
District Chilled Water	699	440	1,196	Q	11.46	8.09	9.95	13.90	2.10	1.55	1.40	Q	27.82
Other	875	Q	Q	Q	17.92	Q	Q	Q	2.26	Q	Q	Q	12.33
Water-Heating Energy Source (Solely or in Combination)													
Electricity	5,550	4,561	10,829	4,754	15.59	12.33	14.71	15.87	1.38	1.04	1.19	1.21	9.51
Natural Gas	6,706	9,030	6,955	7,164	11.26	9.43	11.37	13.25	1.24	1.02	1.08	1.38	8.40
Fuel Oil	2,122	Q	219	Q	11.84	Q	8.98	Q	1.21	Q	.80	Q	21.93
District Heat	3,364	2,185	1,395	Q	13.20	7.98	10.49	9.20	1.89	1.77	1.59	Q	25.95
Propane	382	Q	220	Q	16.77	11.79	20.60	Q	1.39	1.61	.66	Q	24.31
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	6

See footnotes at end of table.

Table 17. Expenditures by Census Region for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Expenditures (million dollars)				Sum of Major Fuel Expenditures (dollars)								RSE Row Factor
					per Million Btu				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.546	1.315	1.307	1.536	0.768	0.527	0.663	0.681	1.244	0.899	0.978	1.073	
Cooking Energy Source (Solely or in Combination)													
Electricity	2,944	3,789	4,984	1,967	12.75	9.42	13.76	12.14	1.09	1.30	1.36	1.27	13.54
Natural Gas	5,172	5,056	4,582	4,402	13.08	9.60	12.19	10.76	1.51	1.10	1.19	1.51	10.07
Propane	588	Q	565	Q	14.87	Q	19.46	Q	1.43	Q	1.54	Q	20.43
Other	729	Q	Q	Q	10.57	7.55	Q	Q	1.88	2.02	Q	Q	24.55
Manufacturing Energy Source (Solely or in Combination)													
Electricity	888	986	1,898	1,574	12.84	9.78	11.30	10.02	1.30	.94	1.22	1.41	23.54
Natural Gas	Q	530	Q	Q	Q	7.10	Q	Q	Q	1.72	Q	Q	28.87
Other	Q	Q	Q	Q	Q	11.48	Q	Q	Q	1.67	Q	Q	17.66
HEATING AND COOLING													
Percent Heated													
Not Heated	142	160	Q	538	17.53	12.90	28.31	21.88	.23	.18	.79	.55	24.47
1 to 50	1,074	1,285	1,604	1,462	15.05	11.70	14.61	18.26	.61	.54	.48	.81	12.39
51 to 99	1,832	1,807	4,590	3,269	12.58	10.25	12.70	15.69	1.51	1.00	1.29	1.55	12.25
100	14,458	13,217	13,273	9,825	12.80	9.71	12.11	12.09	1.45	1.22	1.08	1.46	7.88
Percent Cooled													
Not Cooled	3,123	1,500	747	1,427	9.58	9.38	12.89	9.95	.97	.54	.24	.62	12.91
1 to 50	5,063	3,865	3,513	1,742	11.83	8.82	10.54	12.72	1.04	.73	.66	.74	11.79
51 to 99	3,700	4,851	5,640	3,715	14.20	10.46	13.07	14.71	1.50	1.39	1.17	1.58	10.28
100	5,619	6,252	11,860	8,210	16.54	10.46	14.36	13.85	1.87	1.43	1.34	1.78	11.64
LIGHTING													
Percent Lit When Open													
Not Lit	Q	72	62	Q	Q	8.90	12.06	Q	Q	.17	.06	Q	32.72
1 to 50	1,598	1,455	1,695	1,380	11.27	8.53	14.38	13.40	.91	.46	.41	.75	10.55
51 to 99	4,279	4,900	5,965	5,012	13.50	10.26	12.42	14.31	1.12	1.08	1.08	1.62	10.77
100	11,559	10,042	14,037	8,643	12.99	10.01	13.43	12.90	1.52	1.28	1.24	1.38	8.95

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labeled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^o Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 18. Consumption and Gross Energy Intensity by Building Size for Sum of Major Fuels

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Floor Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	0.967	1.076	1.747	0.714	0.707	1.059	0.754	0.986	1.295	
All Buildings	1,259	2,402	2,127	13,321	28,325	21,538	94.5	84.8	98.8	6.31
Year Constructed										
1899 or Before	37	87	Q	569	1,016	Q	65.5	86.0	Q	24.82
1900 to 1919	58	102	Q	737	1,783	Q	78.2	57.4	Q	17.67
1920 to 1945	166	243	227	2,105	3,479	2,514	78.6	69.9	90.3	16.15
1946 to 1959	242	386	360	2,596	4,605	3,309	93.1	83.8	108.9	14.53
1960 to 1969	207	586	482	2,224	5,600	4,344	93.3	104.6	110.9	11.80
1970 to 1979	297	486	560	2,606	5,692	5,031	113.8	85.4	111.2	10.48
1980 to 1983	97	185	151	904	1,986	1,384	106.8	93.2	109.0	16.08
1984 to 1986	92	186	186	961	2,635	2,074	95.7	70.5	89.9	16.10
1987 to 1989	64	141	79	619	1,528	1,088	103.8	92.1	72.4	23.27
BUILDING USE										
Principal Building Activity										
Assembly	149	200	Q	2,188	3,327	Q	68.2	60.2	Q	16.97
Education	57	344	303	680	4,063	3,333	84.3	84.7	90.8	14.20
Food Sales	49	69	Q	256	378	Q	192.3	181.7	Q	22.91
Food Service	203	51	NC	680	486	NC	298.8	105.8	NC	19.81
Health Care	22	51	377	198	345	1,511	109.5	147.1	249.3	24.80
Lodging	49	264	112	401	1,795	1,279	123.3	146.8	87.9	18.80
Mercantile and Service	360	410	279	3,873	5,412	3,080	92.9	75.7	90.5	11.77
Office	187	497	546	1,781	4,755	5,266	104.8	104.5	103.7	9.80
Parking Garage	15	Q	12	145	Q	657	104.9	Q	Q	27.31
Public Order and Safety	18	Q	Q	164	Q	Q	109.5	Q	Q	28.10
Warehouse	65	258	213	1,831	4,957	2,465	35.4	52.0	86.3	17.47
Other	Q	204	Q	150	989	Q	273.8	205.9	Q	46.20
Vacant	Q	23	Q	974	1,430	Q	44.4	15.9	Q	23.68
Weekly Operating Hours										
39 or Fewer	105	83	Q	2,733	2,675	Q	38.6	31.0	Q	12.88
40 to 48	295	495	208	3,458	7,178	3,270	85.3	68.9	63.6	11.82
49 to 60	202	382	340	2,858	6,619	3,995	70.8	57.7	85.2	10.08
61 to 84	226	409	357	1,714	4,366	4,697	131.6	93.6	76.0	10.44
85 to 167	230	379	390	1,456	3,727	4,204	157.9	101.6	92.7	15.82
168 (Open Continuously)	201	655	817	1,102	3,760	4,707	182.0	174.2	173.6	12.58
Workers										
4 or Fewer	503	181	12	7,550	5,836	1,759	66.6	31.0	7.1	12.83
5 to 9	316	210	Q	3,076	3,986	Q	102.8	52.6	Q	11.97
10 to 19	251	272	Q	1,772	4,066	Q	141.5	67.0	Q	11.41
20 to 49	179	659	101	861	6,946	1,858	208.3	94.9	54.4	18.92
50 to 99	Q	511	183	Q	4,186	3,173	Q	122.1	57.5	11.88
100 to 249	Q	441	548	Q	2,815	3,924	Q	156.5	139.7	13.77
250 or More	NC	Q	1,258	NC	489	9,340	NC	Q	134.7	12.82
Ownership and Occupancy										
Nongovernment Owned										
Owner Occupied	1,088	1,708	1,443	11,769	22,205	14,868	92.5	76.9	97.0	6.67
Single Establishment	834	1,311	1,186	8,552	15,876	11,527	97.5	82.6	102.9	7.64
Multiple Establishment	739	1,114	816	7,360	12,706	7,015	100.4	87.7	116.3	6.98
Nonowner Occupied	95	198	370	1,192	3,169	4,512	79.5	62.4	82.0	10.87
Single Establishment	255	397	257	3,217	6,329	3,342	79.2	62.7	76.9	10.76
Multiple Establishment	159	199	113	1,908	3,059	1,280	83.6	64.9	88.5	15.11
Vacant	63	190	141	696	2,658	1,885	89.9	71.5	74.8	15.83
Government Owned	Q	8	Q	613	612	Q	Q	12.9	Q	32.50
Federal	170	694	684	1,553	6,120	6,669	109.8	113.4	102.6	14.86
State	Q	67	Q	85	542	1,290	Q	122.8	151.3	46.07
Local	35	301	249	328	1,652	1,922	106.4	182.2	129.4	26.98
Vacant	125	327	240	1,139	3,926	3,456	109.5	83.2	69.5	14.80

See footnotes at end of table.

Table 18. Consumption and Gross Energy Intensity by Building Size for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	0.967	1.078	1.747	0.714	0.707	1.263	0.764	0.668	1.270	
Multibuilding Facility										
Not on Multibuilding Facility	842	1,169	875	8,859	16,869	11,508	95.1	69.3	76.1	6.65
Part of Multibuilding Facility	416	1,233	1,252	4,462	11,455	10,029	93.3	107.6	124.8	9.89
On Facility with Central Plant	87	670	836	408	3,246	4,692	212.6	206.4	178.2	20.24
LOCATION										
Census Region										
Northeast	248	525	581	2,318	5,210	6,041	107.2	100.8	96.2	12.75
Midwest	310	700	650	3,079	6,661	6,215	100.8	105.0	104.5	11.57
South	465	657	526	5,382	11,062	5,595	86.4	59.4	94.1	10.86
West	235	521	370	2,542	5,392	3,686	92.5	96.6	100.4	13.83
Census Division										
Northeast										
New England	61	140	98	534	1,427	1,212	114.1	97.8	80.6	23.49
Middle Atlantic	187	385	483	1,783	3,782	4,830	105.1	101.9	100.1	14.82
Midwest										
East North Central	198	476	412	1,967	4,527	4,187	100.8	105.2	98.3	14.52
West North Central	112	223	238	1,113	2,134	2,028	100.8	104.6	117.3	18.47
South										
South Atlantic	155	288	238	2,155	5,404	2,531	72.0	53.4	94.2	15.41
East South Central	147	132	94	1,111	2,140	1,045	132.1	61.7	89.8	24.76
West South Central	163	236	194	2,116	3,519	2,019	77.1	67.2	96.2	16.24
West										
Mountain	100	171	Q	909	2,086	1,393	110.3	82.0	128.3	21.10
Pacific	135	350	191	1,633	3,306	2,293	82.5	105.8	83.4	14.39
Metropolitan Status										
Metropolitan	938	1,943	1,899	8,869	22,196	19,744	105.8	87.5	96.2	7.25
Nonmetropolitan	321	460	228	4,452	6,129	1,794	72.1	75.0	127.2	14.01
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	110	366	140	995	2,902	1,165	110.6	126.2	120.5	16.97
5,500-7,000 HDD	365	736	754	3,286	7,449	7,223	111.1	98.8	104.3	12.19
4,000-5,499 HDD	242	508	644	2,812	6,271	6,302	85.9	81.0	102.1	15.46
Under 4,000 HDD	267	465	383	2,993	5,544	4,366	89.3	83.8	87.8	14.97
2,000 CDD or More and --										
Under 4,000 HDD	275	327	206	3,236	6,159	2,481	85.0	53.2	83.2	15.79
ENERGY SOURCES AND END USES ^a										
Energy Sources										
(Solely or in Combination)										
Electricity	1,258	2,399	2,124	12,706	27,577	21,280	99.0	87.0	99.8	6.44
Natural Gas	913	1,658	1,765	7,378	17,410	16,356	123.8	95.2	107.9	7.62
Fuel Oil	173	486	929	1,519	4,489	6,592	114.1	108.2	141.0	15.72
District Heat	Q	456	709	Q	1,877	4,553	Q	243.2	155.8	20.41
District Chilled Water	Q	Q	202	Q	Q	1,372	Q	Q	147.4	22.75
Propane	56	174	Q	1,040	1,946	1,708	53.7	89.3	130.5	25.10
Other	23	31	Q	390	619	Q	58.5	50.4	Q	33.33
Energy End Uses										
(Solely or in Combination)										
Heated Buildings	1,197	2,361	2,109	11,378	25,848	20,641	105.2	91.3	102.2	6.45
Air-Conditioned Buildings	1,020	2,107	1,974	9,374	23,045	19,351	108.8	91.4	102.0	6.64
Buildings with Water Heating	1,094	2,273	2,095	9,277	24,101	20,206	117.9	94.3	103.7	6.73
Buildings with Cooking	369	884	1,502	2,307	8,263	13,098	159.9	107.0	114.7	9.22
Buildings with Manufacturing	53	296	361	489	2,593	2,520	107.5	114.0	143.1	22.62

See footnotes at end of table.

Table 18. Consumption and Gross Energy Intensity by Building Size for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor	0.997	1.078	1.747	0.714	0.707	1.263	0.784	0.888	1.270	
Space-Heating Energy Source (Solely or in Combination)										
Electricity	319	798	442	3,514	9,596	5,592	90.7	76.9	79.1	9.02
Natural Gas	792	1,386	1,240	6,711	15,009	11,297	118.1	92.3	109.7	7.98
Fuel Oil	170	422	713	1,484	4,045	4,997	114.4	104.4	142.7	14.80
District Heat	Q	369	598	147	1,736	4,246	279.5	212.4	140.8	23.59
Propane	26	Q	Q	729	922	Q	36.3	89.6	Q	35.15
Other	16	Q	Q	339	486	Q	48.5	44.2	Q	39.52
Main Space-Heating Energy Source										
Electricity	239	428	312	2,561	6,449	4,437	93.4	66.3	70.2	9.75
Natural Gas	752	1,303	1,136	6,488	14,108	10,514	116.0	92.4	108.0	8.41
Fuel Oil	145	222	130	1,306	2,756	1,536	110.7	80.7	84.9	20.14
District Heat	Q	366	580	147	1,721	4,157	279.5	212.9	139.6	23.77
Propane	16	Q	Q	652	539	Q	24.6	Q	Q	24.99
Other	6	Q	Q	222	416	Q	26.4	Q	Q	48.12
Air-Conditioning Energy Source (Solely or in Combination)										
Electricity	970	1,979	1,631	9,058	21,868	16,984	107.1	90.5	96.1	6.74
Natural Gas	45	70	110	277	958	740	162.3	73.2	148.5	19.29
District Chilled Water	Q	Q	219	Q	505	1,395	Q	Q	215.3	21.57
Other	Q	Q	Q	Q	Q	944	Q	Q	164.9	20.23
Water-Heating Energy Source (Solely or in Combination)										
Electricity	431	718	613	4,623	9,892	6,979	93.1	72.6	87.8	9.02
Natural Gas	601	1,145	960	4,103	11,777	10,044	146.4	97.2	95.6	8.20
Fuel Oil	41	94	98	297	1,183	804	139.4	79.3	122.1	20.45
District Heat	Q	310	566	Q	1,117	3,574	Q	277.4	158.5	24.19
Propane	11	Q	Q	237	576	Q	45.7	111.1	Q	30.83
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooking Energy Source (Solely or in Combination)										
Electricity	143	344	671	956	3,999	5,895	149.3	86.0	113.8	17.55
Natural Gas	258	497	953	1,254	4,593	8,919	205.8	108.1	106.8	9.89
Propane	25	41	Q	292	474	Q	85.8	87.0	Q	33.21
Other	Q	Q	Q	Q	Q	918	Q	Q	214.0	20.89
Manufacturing Energy Source (Solely or in Combination)										
Electricity	43	165	288	390	1,898	2,117	109.7	86.8	135.9	25.90
Natural Gas	Q	85	79	Q	394	382	Q	215.6	207.6	31.73
Other	Q	Q	Q	Q	546	Q	Q	158.7	Q	37.33
HEATING AND COOLING										
Percent Heated										
Not Heated	64	44	18	1,984	2,528	908	32.2	17.4	20.1	21.58
1 to 50	114	189	68	1,837	4,633	2,843	62.1	40.8	23.9	18.72
51 to 99	161	321	410	1,521	3,382	3,771	105.6	94.9	108.8	12.74
100	920	1,848	1,631	7,979	17,782	14,016	115.4	103.9	116.4	7.10
Percent Cooled										
Not Cooled	239	295	Q	3,947	5,279	2,186	60.5	55.9	Q	12.30
1 to 50	263	688	386	3,174	8,964	5,683	82.8	76.7	67.9	11.85
51 to 99	222	462	725	1,664	5,071	6,405	133.2	91.2	113.2	13.10
100	536	957	863	4,537	9,011	7,264	118.1	106.2	118.8	10.94

See footnotes at end of table.

Table 18. Consumption and Gross Energy Intensity by Building Size for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	0.987	1.078	1.747	0.714	0.707	1.263	0.764	0.888	1.270	
LIGHTING										
Percent Lit When Open										
Not Lit	8	11	Q	857	1,044	Q	9.2	10.4	Q	31.44
1 to 50	210	238	85	3,089	5,559	2,223	67.9	42.9	38.3	13.30
51 to 99	282	705	638	2,836	7,446	6,668	99.4	94.6	95.7	9.97
100	759	1,448	1,401	6,539	14,275	12,189	116.1	101.4	114.9	8.30
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	689	1,535	1,562	7,015	16,759	15,016	98.2	91.6	104.0	7.14
Fluorescent Lamps	1,200	2,363	2,120	11,475	26,372	21,045	104.6	89.6	100.7	6.42
High-Intensity Discharge Lamps	137	606	1,237	1,108	5,849	11,231	124.1	103.5	110.2	12.31
Other Lamps	Q	Q	31	Q	Q	280	Q	Q	112.2	20.79
High-Efficiency Ballasts	382	1,158	1,190	2,722	11,062	10,443	140.3	104.7	114.0	9.39
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	720	911	700	7,249	12,144	7,650	99.3	75.0	91.5	9.04
With Thermostats	643	852	664	6,339	11,196	7,239	101.4	76.1	91.7	9.74
Any Control of Cooling	608	933	779	5,911	12,023	8,381	102.9	77.6	93.0	8.61
With Thermostats	533	825	756	5,269	10,747	8,027	101.1	76.8	94.2	9.37
Reduced Use During Off-Hours										
Heating Only	210	278	Q	2,289	3,260	1,598	91.7	85.4	Q	13.59
Cooling Only	103	174	151	859	1,932	1,321	120.3	90.3	114.4	22.63
Heating and Cooling	649	1,293	1,406	7,189	16,421	15,079	90.2	78.7	93.2	7.69
Computerized Energy Management and Control System										
Present in Building	79	482	1,153	516	4,318	9,511	153.5	111.6	121.2	11.75
Controls Heating and Cooling	77	460	1,131	492	4,176	9,124	156.3	110.1	123.9	12.05
Controls Lighting	Q	98	316	Q	882	2,908	Q	111.4	108.7	17.95
Controls Other	Q	74	260	Q	576	1,716	Q	127.7	151.6	21.39
Other Energy Management										
Regular HVAC Maintenance	745	2,018	2,010	5,870	19,529	17,614	126.9	103.3	114.1	7.38
Participated in Utility Conservation Program	92	527	586	839	4,319	5,668	110.1	122.1	103.4	11.75

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

MAJOR FUELS

Table 19. Consumption and Gross Energy Intensity by Selected Principal Building Activities for Sum of Major Fuels

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	
RSE Column Factor:	1.329	1.121	1.113	0.944	1.090	0.686	0.987	0.990	0.883	
All Buildings	1,048	1,230	3,510	12,365	11,802	39,016	84.8	104.2	90.0	6.41
Building Floorspace (Square Feet)										
1,001 to 5,000	204	108	380	2,120	961	3,709	96.4	112.1	102.4	7.52
5,001 to 10,000	155	79	333	1,753	821	3,959	88.6	96.2	84.1	12.99
10,001 to 25,000	167	185	439	2,639	1,721	6,033	63.1	107.6	72.8	10.94
25,001 to 50,000	158	179	419	1,395	1,459	5,948	113.5	122.5	70.5	14.99
50,001 to 100,000	85	133	637	1,378	1,575	6,177	61.7	84.4	103.2	14.39
100,001 to 200,000	109	151	517	1,417	1,465	5,395	77.1	102.9	95.9	16.88
200,001 to 500,000	Q	189	399	692	1,695	4,635	158.9	111.7	86.0	27.61
Over 500,000	60	206	386	972	2,107	3,161	61.3	97.9	122.2	23.34
Year Constructed										
1899 or Before	Q	45	54	428	289	937	67.0	155.9	57.5	26.86
1900 to 1919	29	48	163	514	552	3,180	56.1	87.0	51.2	24.50
1920 to 1945	91	130	416	1,322	1,166	5,610	68.5	111.1	74.1	16.54
1946 to 1959	141	194	653	1,694	1,849	6,968	83.0	105.0	93.7	16.53
1960 to 1969	295	199	781	2,458	1,736	7,973	120.0	114.9	97.9	14.56
1970 to 1979	281	273	789	3,464	2,425	7,440	81.0	112.4	106.0	11.90
1980 to 1983	75	112	245	873	1,174	2,226	85.7	95.7	110.2	16.22
1984 to 1986	55	163	246	896	1,860	2,914	61.2	87.5	84.6	15.07
1987 to 1989	54	66	164	717	750	1,768	76.0	87.4	92.6	23.05
BUILDING USE										
Weekly Operating Hours										
39 or Fewer	12	Q	183	286	Q	5,670	43.2	Q	32.2	14.45
40 to 48	111	333	554	2,105	3,366	8,434	52.8	98.8	65.7	10.05
49 to 60	206	366	353	3,368	4,022	6,083	61.1	90.9	58.1	10.37
61 to 84	350	228	413	3,902	2,390	4,485	89.8	95.5	92.0	11.75
85 to 167	200	73	726	1,934	780	6,672	103.4	93.3	108.7	15.00
168 (Open Continuously)	169	222	1,282	770	1,127	7,671	219.0	196.9	167.1	18.91
Workers										
4 or Fewer	191	37	469	3,007	502	11,636	63.6	72.7	40.3	9.59
5 to 9	149	67	318	2,127	759	5,053	70.0	88.0	63.0	12.54
10 to 19	116	109	314	1,417	1,114	3,915	82.2	98.1	80.3	12.13
20 to 49	166	150	624	1,943	1,492	6,230	85.2	100.5	100.1	12.88
50 to 99	170	131	399	1,393	1,338	4,657	122.3	98.1	85.6	16.51
100 to 249	173	194	625	1,321	1,728	3,721	130.9	112.3	167.9	18.63
250 or More	83	542	762	1,157	4,868	3,804	71.6	111.2	200.2	17.74
Ownership and Occupancy										
Nongovernment Owned	1,005	951	2,283	11,966	9,449	27,427	84.0	100.6	83.2	6.81
Owner Occupied	700	692	1,939	7,985	6,644	21,326	87.6	104.2	90.9	7.98
Single Establishment	486	393	1,790	4,945	3,046	19,091	98.2	129.1	93.7	10.35
Multiple Establishment	214	299	149	3,040	3,598	2,235	70.4	83.1	66.8	10.54
Nonowner Occupied	305	259	344	3,981	2,805	6,101	76.7	92.2	56.4	12.00
Single Establishment	111	131	229	1,743	1,216	3,289	63.9	107.8	69.6	15.34
Multiple Establishment	194	128	72	2,238	1,589	1,412	86.7	80.3	51.1	18.04
Vacant	--	--	Q	--	--	1,401	--	--	Q	19.41
Government Owned	43	279	1,227	399	2,353	11,590	108.2	118.4	105.9	17.96
Federal	Q	94	Q	Q	Q	Q	Q	117.6	167.1	36.97
State	Q	106	470	Q	618	3,214	Q	171.9	146.2	26.71
Local	Q	78	591	Q	932	7,381	Q	83.6	80.1	15.30
LOCATION										
Census Region										
Northeast	308	265	782	2,647	2,703	8,218	116.3	97.9	95.2	13.49
Midwest	309	275	1,076	3,059	2,281	10,615	101.1	120.4	101.3	11.23
South	294	365	990	4,778	3,817	13,445	61.5	95.5	73.6	11.04
West	137	326	663	1,882	3,001	6,738	73.0	108.6	98.3	11.31

See footnotes at end of table.

Table 19. Consumption and Gross Energy Intensity by Selected Principal Building Activities for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Flow Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.329	1.121	1.113	0.944	1.090	0.686	0.987	0.980	0.683	
Census Division										
Northeast										
New England	57	67	174	608	693	1,873	93.2	97.4	93.0	10.32
Middle Atlantic	251	197	608	2,039	2,011	6,346	123.2	98.0	95.8	16.52
Midwest										
East North Central	197	180	709	1,852	1,615	7,214	106.4	111.2	98.3	14.24
West North Central	112	95	366	1,207	666	3,402	92.8	142.6	107.7	17.70
South										
South Atlantic	124	148	409	2,048	1,767	6,275	60.6	84.0	65.3	16.35
East South Central	52	102	218	899	Q	2,419	58.1	104.3	90.3	24.66
West South Central	117	114	362	1,830	1,073	4,751	64.2	106.4	76.2	14.09
West										
Mountain	50	109	291	797	707	2,884	62.4	154.5	100.9	24.02
Pacific	88	217	372	1,084	2,293	3,854	80.8	94.4	96.4	15.69
Metropolitan Status										
Metropolitan	773	1,102	2,904	8,987	10,698	31,124	86.0	103.1	93.3	6.80
Nonmetropolitan	275	127	606	3,379	1,104	7,892	81.4	115.2	76.8	14.92
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	133	111	372	1,322	662	3,079	100.5	168.4	121.0	17.68
5,500-7,000 HDD	358	338	1,159	3,327	2,873	11,757	107.5	117.7	98.6	13.07
4,000-5,499 HDD	233	302	858	2,642	3,105	9,638	88.1	97.2	89.0	13.42
Under 4,000 HDD	170	327	618	2,515	3,513	6,875	67.5	93.1	90.0	14.12
2,000 CDD or More and --										
Under 4,000 HDD	155	151	502	2,559	1,649	7,667	60.6	91.7	65.5	13.70
ENERGY SOURCES AND END USES ^a										
Energy Sources (Solely or in Combination)										
Electricity	1,047	1,227	3,508	12,361	11,796	37,406	84.7	104.0	93.8	6.20
Natural Gas	829	768	2,739	8,790	7,220	25,133	94.3	106.3	109.0	5.03
Fuel Oil	166	320	1,103	1,616	2,909	8,075	102.5	110.0	136.6	15.10
District Heat	Q	334	861	Q	2,316	4,148	Q	144.1	207.7	24.16
District Chilled Water	Q	Q	268	Q	Q	1,221	Q	Q	219.3	36.31
Propane	69	Q	377	910	Q	3,660	75.9	Q	103.0	23.44
Other	25	Q	53	516	Q	905	48.4	Q	58.9	30.22
Energy End Uses (Solely or in Combination)										
Heated Buildings	1,032	1,221	3,414	12,040	11,682	34,146	85.7	104.5	100.0	6.56
Air-Conditioned Buildings	852	1,208	3,041	10,803	11,635	29,332	78.9	103.8	103.7	6.31
Buildings with Water Heating	923	1,182	3,358	10,163	11,195	32,226	90.8	105.6	104.2	6.93
Buildings with Cooking	415	465	1,875	4,035	3,917	15,715	102.9	118.7	119.3	11.77
Buildings with Manufacturing	110	115	484	853	968	3,780	129.0	118.9	127.9	25.49

See footnotes at end of table.

MAJOR FUELS

Table 19. Consumption and Gross Energy Intensity by Selected Principal Building Activities for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.329	1.121	1.113	0.944	1.090	0.686	0.987	0.980	0.883	
Energy End-Use Combinations										
Heated Buildings										
With Air Conditioning										
With Water Heating and										
Cooking	341	451	1,666	3,865	3,751	13,170	88.2	120.2	126.5	10.82
With Water Heating,										
Without Cooking										
425	707	1,231	5,281	7,241	13,381	80.4	97.7	92.0	8.40	
Without Water Heating or										
Cooking										
71	36	69	1,393	472	1,776	51.3	76.3	39.1	17.66	
Without Air Conditioning										
With Water Heating and										
Cooking										
Q	Q	166	Q	Q	1,961	Q	Q	84.5	14.97	
With Water Heating,										
Without Cooking										
83	Q	224	843	Q	2,761	98.3	Q	81.3	18.24	
Without Water Heating or										
Cooking										
42	Q	50	529	Q	999	79.2	Q	49.7	22.92	
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking										
Q	Q	21	Q	Q	3,762	Q	Q	5.7	15.11	
All Other Combinations										
21	14	84	302	170	1,205	70.1	79.8	69.3	27.33	
Space-Heating Energy Source (Solely or in Combination)										
Electricity	300	411	788	4,530	4,545	9,627	66.2	90.3	81.9	9.06
Natural Gas	725	530	2,163	7,427	4,990	20,600	97.6	106.2	105.0	8.67
Fuel Oil	142	190	973	1,444	1,819	7,263	98.0	104.7	134.0	14.91
District Heat	Q	335	661	Q	2,335	3,682	Q	143.3	179.6	19.67
Propane	27	Q	Q	510	Q	1,231	59.0	Q	73.0	30.21
Other	14	Q	31	382	Q	567	36.1	Q	55.6	32.23
Main Space-Heating Energy Source										
Electricity	218	342	419	3,330	3,908	6,210	65.3	87.4	67.5	10.26
Natural Gas	686	512	1,994	6,961	4,814	19,334	98.5	106.3	103.1	9.05
Fuel Oil	105	65	327	1,099	723	3,777	95.9	89.6	86.7	18.35
District Heat	Q	319	657	Q	2,254	3,659	Q	141.6	179.6	20.32
Propane	13	Q	Q	362	Q	842	37.0	Q	Q	27.22
Other	7	Q	Q	290	Q	434	24.5	Q	Q	36.28
Air-Conditioning Energy Source (Solely or in Combination)										
Electricity	818	1,091	2,671	10,448	10,595	26,867	78.3	103.0	99.4	6.78
Natural Gas	30	42	153	339	283	1,354	89.1	146.9	113.2	21.80
District Chilled Water	Q	72	284	Q	648	1,229	Q	110.8	230.9	31.35
Other	Q	38	Q	Q	290	Q	Q	129.3	179.5	18.70
Water-Heating Energy Source (Solely or in Combination)										
Electricity	390	543	829	5,785	5,522	10,187	67.4	98.3	81.4	9.39
Natural Gas	533	455	1,718	4,553	4,110	17,260	117.0	110.7	99.5	9.26
Fuel Oil	26	29	179	269	328	1,687	97.1	87.8	105.8	22.87
District Heat	Q	202	688	Q	1,414	3,234	Q	142.7	212.6	25.47
Propane	Q	Q	Q	Q	Q	916	Q	Q	82.0	43.40
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooking Energy Source (Solely or in Combination)										
Electricity	133	203	821	1,537	1,690	7,623	86.8	120.3	107.7	15.79
Natural Gas	257	276	1,174	2,954	2,384	9,428	87.0	115.7	124.6	12.19
Propane	14	Q	62	182	Q	723	78.0	Q	85.6	29.87
Other	Q	28	279	Q	172	965	Q	165.5	289.5	35.53

See footnotes at end of table.

Table 19. Consumption and Gross Energy Intensity by Selected Principal Building Activities for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.329	1.121	1.113	0.044	1.000	0.686	0.987	0.980	0.683	
Manufacturing Energy Source (Solely or in Combination)										
Electricity	62	107	326	575	Q	2,960	107.4	122.9	110.3	30.79
Natural Gas	Q	Q	101	Q	Q	567	Q	Q	178.4	34.13
Other	Q	Q	139	Q	Q	749	Q	Q	185.5	36.48
HEATING AND COOLING										
Percent Heated										
Not Heated	16	Q	100	329	125	4,966	48.4	Q	20.2	22.13
1 to 50	87	34	249	1,905	495	6,914	45.9	69.5	36.0	16.90
51 to 99	148	287	457	2,011	3,045	3,618	73.5	94.2	126.4	14.35
100	797	899	2,704	8,121	8,137	23,519	98.2	110.4	115.0	7.26
Percent Cooled										
Not Cooled	196	22	470	1,562	167	9,684	125.4	129.1	48.5	18.74
1 to 50	303	109	924	3,848	984	12,989	78.7	111.0	71.2	13.14
51 to 99	213	435	760	2,640	4,431	6,068	80.8	98.2	125.3	12.04
100	336	664	1,356	4,315	6,220	10,275	78.0	106.7	131.9	8.69
Computer Area with Separate Air-Conditioning System										
Present in Building	174	812	1,287	1,823	6,571	8,290	95.7	123.6	155.3	11.18
Not Present	874	417	2,223	10,542	5,231	30,726	82.9	79.8	72.4	6.76
LIGHTING AND REFRIGERATION										
Percent Lit When Open										
Not Lit	Q	Q	20	Q	Q	2,332	Q	Q	8.7	21.68
1 to 50	104	78	351	1,911	1,035	7,923	54.6	75.2	44.3	13.16
51 to 99	267	430	928	3,287	4,582	9,082	81.3	93.8	102.2	12.19
100	675	722	2,211	7,145	6,180	19,679	94.5	116.8	112.3	8.53
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	544	799	2,443	6,816	7,986	23,988	79.8	100.0	101.9	7.05
Fluorescent Lamps	1,034	1,227	3,422	12,212	11,739	34,942	84.7	104.5	97.9	6.44
High-Intensity Discharge Lamps	280	367	1,334	2,893	3,493	11,802	96.9	105.0	113.0	14.87
Other Lamps	Q	Q	31	Q	Q	202	Q	Q	153.3	29.61
High-Efficiency Ballasts	523	669	1,538	5,287	5,631	13,307	98.9	118.8	115.6	10.31
Refrigeration Equipment (Solely or in Combination)										
Commercial										
Refrigeration Units	468	474	2,031	5,221	4,086	15,356	89.7	116.0	132.3	9.47
Freezers	423	438	1,941	4,634	3,756	13,285	91.2	116.7	146.1	9.91
Residential										
Refrigerators	695	1,068	2,647	7,776	10,148	26,340	89.4	105.2	100.5	7.96
Freezers	128	201	1,150	1,650	1,634	9,138	77.6	122.8	125.8	13.90
Ice-Making Machines	414	579	1,994	4,498	4,964	13,981	92.1	116.7	142.7	9.75
Refrigerated Vending Machines	773	990	2,584	8,104	8,984	21,777	95.4	110.2	118.6	8.05
Water Coolers	654	1,079	2,721	7,803	9,888	25,174	83.8	109.2	108.1	8.04
Other	Q	61	262	Q	312	859	Q	196.8	304.3	29.10

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labeled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.158	1.284	1.184	1.243	0.806	0.808	0.861	0.879	0.982	1.065	0.922	0.954	
All Buildings	1,991	1,275	1,342	1,180	24,508	12,167	13,329	13,180	81.2	104.8	100.7	89.6	7.73
Building Floorspace (Square Feet)													
1,001 to 5,000	290	111	156	134	3,149	1,197	1,266	1,178	92.2	92.9	123.6	113.5	8.89
5,001 to 10,000	212	96	140	119	2,859	1,027	1,340	1,306	74.1	93.7	104.6	91.2	14.28
10,001 to 25,000	253	189	167	182	3,863	2,064	2,180	2,286	65.5	91.7	76.4	79.6	12.72
25,001 to 50,000	298	130	171	158	3,493	1,648	1,884	1,776	85.3	78.7	90.7	88.8	14.96
50,001 to 100,000	268	267	148	172	3,527	1,889	1,628	2,087	76.0	141.4	91.1	82.3	16.33
100,001 to 200,000	156	211	277	133	2,226	2,253	2,254	1,543	70.2	93.5	122.9	86.2	19.03
200,001 to 500,000	221	198	109	169	2,805	1,518	1,196	1,502	78.8	130.4	91.5	112.6	24.19
Over 500,000	292	73	173	114	2,586	572	1,581	1,501	113.0	127.7	109.4	76.0	26.23
BUILDING USE													
Principal Building Activity													
Assembly	192	86	117	46	3,274	1,249	1,482	904	58.6	68.8	79.1	50.5	17.36
Education	338	209	119	38	3,962	2,201	1,319	593	85.2	95.1	90.5	63.8	16.50
Food Sales	28	Q	Q	34	263	Q	Q	169	105.7	Q	Q	198.4	24.13
Food Service	75	39	79	62	436	282	268	181	173.2	137.8	293.8	340.9	22.17
Health Care	Q	47	142	66	802	355	586	310	241.6	132.1	242.1	214.3	23.57
Lodging	123	133	74	95	1,038	1,042	578	818	118.4	127.9	128.6	116.1	22.94
Mercantile and Service	289	295	281	184	3,957	2,458	3,464	2,486	72.9	120.0	81.0	74.1	12.84
Office	417	199	273	341	3,856	1,736	2,425	3,785	108.1	114.9	112.4	90.0	12.26
Parking Garage	Q	Q	Q	8	Q	Q	270	427	Q	Q	Q	19.7	33.37
Public Order and Safety	19	Q	Q	Q	292	Q	Q	Q	65.2	Q	Q	Q	39.07
Warehouse	152	84	153	147	3,159	1,702	2,178	2,214	48.0	49.1	70.4	66.3	23.98
Other	77	Q	37	Q	404	228	242	655	Q	Q	154.1	189.9	35.05
Vacant	66	11	Q	12	2,932	464	233	531	22.7	22.8	Q	22.1	31.31
Weekly Operating Hours													
39 or Fewer	101	38	45	20	3,355	1,019	988	710	30.0	37.3	45.0	28.4	15.73
40 to 48	436	191	211	160	6,171	2,411	2,681	2,641	70.6	79.2	78.7	60.6	12.32
49 to 60	357	176	172	220	5,153	2,305	2,807	3,207	69.4	76.2	61.3	68.5	12.80
61 to 84	314	222	242	214	3,569	2,209	2,468	2,532	88.0	100.4	97.9	84.5	13.62
85 to 167	294	245	285	175	3,416	2,302	2,112	1,557	86.0	106.3	134.7	112.5	18.20
168 (Open Continuously)	489	404	388	391	2,843	1,920	2,274	2,532	172.0	210.3	170.9	154.6	16.64
Workers													
4 or Fewer	320	123	134	119	7,477	2,308	2,698	2,663	42.7	53.5	49.8	44.7	9.99
5 to 9	199	88	135	112	3,371	1,358	1,688	1,521	59.1	64.8	80.1	73.4	15.69
10 to 19	189	109	117	126	2,582	1,395	1,150	1,318	73.2	77.9	101.4	95.3	14.28
20 to 49	307	226	221	185	3,371	2,186	2,088	2,020	91.2	103.4	105.6	91.8	14.10
50 to 99	211	219	171	100	2,472	2,042	1,703	1,172	85.4	107.1	100.2	85.2	17.37
100 to 249	293	264	215	220	2,020	1,473	1,563	1,715	145.0	179.3	137.8	128.0	20.09
250 or More	471	246	349	319	3,214	1,406	2,438	2,771	146.7	175.2	143.2	115.1	21.27
Ownership and Occupancy													
Nongovernment Owned													
Owner Occupied	1,080	708	762	781	13,383	6,932	7,510	8,129	80.7	102.1	101.5	96.1	9.74
Single Establishment	872	583	606	608	10,585	5,478	5,470	5,548	82.4	106.3	110.7	109.5	11.55
Multiple Establishment	207	125	156	174	2,798	1,454	2,040	2,581	74.2	86.2	76.6	67.2	13.98
Nonowner Occupied	217	154	256	280	4,120	2,213	2,890	3,665	52.8	69.7	88.7	76.5	14.35
Single Establishment	109	64	144	154	2,088	1,060	1,397	1,703	52.2	60.0	103.4	90.6	17.85
Multiple Establishment	79	85	105	124	1,168	914	1,328	1,829	68.1	93.3	78.7	68.0	17.86
Vacant	Q	Q	Q	Q	864	239	165	132	Q	Q	Q	Q	30.57
Government Owned													
Federal	694	413	324	119	7,005	3,022	2,929	1,386	99.0	136.7	110.5	85.6	16.73
State	Q	Q	Q	Q	1,376	Q	196	Q	147.0	Q	154.2	Q	46.43
Local	218	190	129	Q	1,566	834	1,013	489	139.1	227.4	127.3	98.0	29.37
Vacant	273	199	164	55	4,063	1,973	1,720	766	67.3	100.8	95.6	71.9	16.77

See footnote at end of table.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.158	1.204	1.184	1.243	0.806	0.808	0.861	0.879	0.982	1.065	0.822	0.954	
Multibuilding Facility													
Not on Multibuilding Facility	988	583	682	635	15,104	7,148	7,460	7,525	65.4	81.6	91.4	84.3	7.76
Part of Multibuilding Facility	1,003	692	660	546	9,404	5,019	5,869	5,654	106.7	137.8	112.5	96.5	12.25
On Facility with Central Plant	591	460	329	213	3,142	1,898	2,241	1,065	188.0	242.4	146.9	200.2	21.15
Percent Vacant at Least Three Months													
0	1,364	1,042	1,085	830	15,823	9,011	10,067	8,179	86.2	115.6	107.7	101.4	8.11
1 to 50	401	157	229	298	4,009	2,019	2,582	3,826	100.1	77.9	88.7	78.0	15.00
51 to 99	Q	47	Q	11	2,615	400	Q	363	58.1	117.0	Q	29.3	20.88
100	74	29	19	42	2,061	738	538	811	35.8	39.8	35.4	51.2	21.49
Months in Use Out of Past 12 Months													
0 to 8	46	23	Q	84	2,385	666	349	1,151	19.5	35.1	Q	72.8	20.88
9 to 11	130	87	34	20	1,702	993	698	387	76.2	88.1	49.1	52.9	19.65
12	1,815	1,164	1,287	1,076	20,420	10,508	12,282	11,642	88.9	110.8	104.8	92.4	8.17
LOCATION													
Census Region													
Northeast	579	369	218	189	6,922	2,736	2,030	1,881	83.6	135.0	107.2	100.3	17.19
Midwest	598	375	375	311	6,699	3,286	3,160	2,811	89.3	114.3	118.6	110.7	13.32
South	452	300	463	433	7,274	4,057	5,217	5,491	62.2	73.9	88.8	78.8	12.05
West	362	230	286	248	3,613	2,089	2,923	2,996	100.1	110.3	97.9	82.6	17.35
Census Division													
Northeast													
New England	129	Q	52	33	1,544	717	477	436	83.8	Q	108.4	75.6	21.60
Middle Atlantic	449	285	166	156	5,378	2,019	1,554	1,444	83.6	141.2	106.8	107.8	20.65
Midwest													
East North Central	364	276	238	208	4,845	2,207	1,867	1,762	75.2	125.1	127.4	117.9	14.80
West North Central	Q	99	137	103	1,854	1,079	1,292	1,050	126.1	92.1	105.8	98.5	20.37
South													
South Atlantic	209	127	191	155	3,339	1,725	2,148	2,877	62.5	73.7	89.1	53.8	18.26
East South Central	108	44	92	128	1,504	782	961	1,049	72.0	56.5	96.0	122.0	24.64
West South Central	135	129	180	150	2,431	1,550	2,107	1,565	55.6	83.0	85.3	95.8	16.70
West													
Mountain	235	44	77	93	1,754	600	908	1,127	134.2	74.1	85.2	82.3	26.50
Pacific	126	186	209	155	1,859	1,489	2,015	1,870	67.9	124.9	103.7	82.8	18.27
Metropolitan Status													
Metropolitan	1,607	1,032	1,096	1,045	18,806	10,018	10,831	11,154	85.4	103.0	101.2	93.7	8.49
Nonmetropolitan	384	243	246	136	5,702	2,149	2,498	2,025	67.4	113.0	98.4	67.0	15.61
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	215	171	116	115	2,093	1,065	977	927	102.5	160.5	119.1	123.8	20.00
5,500-7,000 HDD	755	432	343	325	8,563	3,625	2,848	2,921	88.1	119.1	120.5	111.3	14.19
4,000-5,499 HDD	616	265	300	212	6,880	2,634	3,231	2,640	89.6	100.5	92.9	80.2	15.73
Under 4,000 HDD	240	250	345	280	3,845	2,296	3,535	3,226	62.4	108.8	97.7	86.8	18.38
2,000 CDD or More and --													
Under 4,000 HDD	166	158	237	248	3,127	2,547	2,738	3,465	53.0	61.9	86.5	71.7	15.03
STRUCTURE													
Floors													
1	408	410	575	413	6,644	5,248	6,492	5,371	61.4	78.2	88.6	76.8	10.08
2	475	371	315	371	5,604	3,477	3,207	3,824	84.8	106.7	98.2	97.1	12.75
3	398	186	91	92	5,744	1,069	912	880	69.2	173.5	99.3	104.1	19.82
4 to 6	420	170	127	177	4,339	1,271	1,043	1,661	96.8	133.9	121.6	106.3	21.94
7 or More	290	138	234	128	2,177	1,103	1,674	1,444	133.4	125.5	139.9	88.8	20.65

See footnote at end of table.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.158	1.294	1.184	1.243	0.806	0.808	0.861	0.879	0.982	1.065	0.922	0.954	
Wall Materials													
Masonry	1,550	920	812	638	19,366	8,653	7,471	6,584	80.0	106.3	108.7	96.9	8.95
Siding or Shingles	127	43	78	77	1,905	651	1,401	830	66.4	66.1	56.0	93.2	17.73
Metal Panels	59	Q	136	132	787	1,215	1,840	1,847	75.2	Q	74.1	71.6	20.43
Concrete Panels	Q	108	220	206	1,539	1,212	1,867	2,604	111.6	89.1	117.9	79.1	21.74
Window Glass	Q	43	74	95	Q	276	504	995	Q	154.5	147.3	95.0	28.70
Other	71	Q	21	32	Q	Q	245	321	93.4	Q	85.8	101.1	29.41
Roof Materials													
Built-Up	1,052	698	762	507	12,543	6,479	6,901	5,133	83.9	107.8	110.4	98.7	10.32
Shingles (Not Wood)	350	179	150	115	5,775	1,970	1,493	1,679	60.5	91.1	100.5	68.7	13.29
Metal Surfacing	116	151	132	198	1,519	1,601	2,342	2,736	76.2	94.4	56.4	72.2	20.44
Synthetic or Rubber	177	170	232	271	1,759	1,289	1,714	2,149	100.6	132.0	135.5	126.0	20.22
Slate or Tile	125	33	21	27	1,693	Q	270	289	74.1	Q	77.9	91.9	27.52
Concrete	29	26	15	Q	339	313	298	982	86.6	84.5	50.2	40.8	28.89
Wooden Materials	28	Q	Q	Q	362	Q	Q	Q	78.1	Q	Q	Q	24.56
Other	Q	Q	Q	Q	Q	Q	Q	Q	219.8	Q	Q	Q	23.47
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	1,442	842	1,135	1,067	14,642	8,495	10,936	11,017	98.5	99.1	103.8	96.8	8.74
Wall Insulation	734	593	751	978	7,261	5,463	7,414	9,555	101.1	108.6	101.2	102.3	11.33
Storm or Multiple Glazing	797	435	581	743	7,483	4,480	5,316	6,789	106.5	97.2	109.3	109.5	10.36
Tinted, Reflective, or Shading Glass	604	401	676	704	5,067	3,742	6,104	7,126	119.2	107.3	110.7	98.8	11.10
Exterior or Interior Shadings or Awnings	945	526	650	598	9,659	4,710	5,649	6,154	97.9	111.6	115.1	97.2	11.23
Weather Stripping or Caulking	1,495	952	1,052	1,049	14,990	8,707	10,178	10,819	99.7	109.4	103.4	97.0	8.54
None of the Above	163	86	64	22	4,556	1,323	920	969	35.9	65.1	69.5	22.7	21.41
ENERGY SOURCES AND END USES^a													
Energy Sources (Solely or in Combination)													
Electricity	1,988	1,272	1,342	1,180	23,483	11,921	13,172	12,987	84.7	106.7	101.9	90.9	7.54
Natural Gas	1,539	982	978	836	17,051	8,467	8,103	7,522	90.2	116.0	120.8	111.2	8.79
Fuel Oil	604	268	401	316	5,744	2,275	2,399	2,182	105.2	117.7	167.0	144.8	18.53
District Heat	580	302	206	Q	3,281	1,214	1,227	Q	176.7	249.1	167.8	139.3	27.78
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	79	119	86	1,790	831	1,020	1,054	94.4	95.5	116.3	81.2	28.63
Other	31	26	12	Q	616	Q	247	287	50.6	66.7	49.2	62.0	37.29
Energy End Uses (Solely or in Combination)													
Heated Buildings	1,973	1,255	1,294	1,145	22,491	11,183	12,373	11,821	87.7	112.2	104.6	96.9	7.78
Air-Conditioned Buildings	1,656	1,067	1,252	1,126	18,427	10,056	11,616	11,671	89.9	106.1	107.8	96.5	8.12
Buildings with Water Heating	1,858	1,217	1,258	1,130	20,421	10,476	11,304	11,383	91.0	116.1	111.2	99.3	8.18
Buildings with Cooking	934	636	679	505	9,376	4,733	5,213	4,346	99.7	134.4	130.2	116.3	11.83
Buildings with Manufacturing	319	107	171	112	2,652	786	1,085	1,078	120.3	136.7	157.4	103.5	28.12

See footnote at end of table.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.158	1.294	1.184	1.243	0.806	0.808	0.861	0.879	0.982	1.065	0.922	0.954	
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and													
Cooking	816	527	646	468	7,930	4,153	4,778	3,926	102.9	126.9	135.2	119.3	12.65
Without Cooking													
Without Water Heating or	748	486	526	603	8,671	4,979	5,620	6,635	86.2	97.7	93.6	90.8	10.29
Cooking	84	37	35	21	1,653	683	757	548	51.0	54.1	46.0	37.6	19.56
Without Air Conditioning													
With Water Heating and													
Cooking	110	Q	Q	Q	1,332	424	Q	Q	82.8	Q	Q	Q	21.71
Without Cooking													
Without Water Heating or	176	90	33	22	2,288	674	469	269	76.8	133.0	71.3	83.5	25.82
Cooking	33	15	34	10	570	256	492	220	58.2	60.0	68.5	44.7	28.81
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking													
All Other Combinations	9	4	4	7	1,770	718	574	797	4.8	5.2	7.5	8.6	23.50
	15	18	49	36	294	281	472	631	50.9	65.2	103.0	57.6	31.48
Space-Heating Energy Source (Solely or in Combination)													
Electricity	339	262	428	470	4,409	3,292	5,014	5,986	77.0	79.4	85.3	78.5	12.26
Natural Gas	1,175	829	759	655	13,789	7,092	6,563	5,573	85.2	116.8	115.6	117.5	10.20
Fuel Oil	563	246	271	225	5,467	2,051	1,640	1,368	103.0	120.0	165.1	164.4	18.24
District Heat	470	220	201	117	2,975	1,100	1,207	847	157.8	199.8	166.6	138.2	29.73
Propane	10	Q	21	Q	499	390	431	447	20.3	97.8	48.6	108.7	31.96
Other	26	Q	9	Q	540	Q	224	Q	48.2	Q	41.4	Q	42.64
Main Space-Heating Energy Source													
Electricity	98	148	334	398	1,891	2,209	4,131	5,217	51.9	67.1	80.9	76.3	11.94
Natural Gas	1,128	810	671	583	13,256	6,819	5,910	5,125	85.1	118.8	113.5	113.7	10.36
Fuel Oil	275	97	92	Q	3,574	1,002	733	290	77.1	97.3	125.1	113.6	22.45
District Heat	463	219	191	114	2,935	1,096	1,169	825	157.9	200.1	163.0	138.6	30.01
Propane	6	5	8	Q	397	171	264	398	15.8	28.3	31.4	105.4	29.76
Other	Q	Q	Q	Q	449	Q	Q	Q	41.2	Q	Q	Q	43.82
Air-Conditioning Energy Source (Solely or in Combination)													
Electricity	1,460	924	1,151	1,046	16,971	9,032	10,752	11,155	86.0	102.3	107.0	93.7	8.63
Natural Gas	55	67	41	63	545	663	348	420	100.5	100.9	116.9	149.5	24.95
District Chilled Water	62	Q	116	28	497	470	781	190	124.1	Q	148.8	148.4	33.44
Other	Q	Q	Q	Q	Q	Q	Q	Q	182.2	Q	Q	Q	10.04

See footnote at end of table.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.284	1.294	1.123	1.200	0.841	0.792	0.965	0.889	1.097	1.099	0.924	0.882	
Water-Heating Energy Source (Solely or in Combination)													
Electricity	459	313	528	461	6,122	3,408	5,661	6,302	75.0	91.7	93.3	73.2	11.23
Natural Gas	944	640	567	554	11,463	5,798	4,488	4,174	82.4	110.4	126.4	132.7	9.94
Fuel Oil	101	49	41	Q	1,216	532	324	Q	83.0	91.9	128.0	Q	23.65
District Heat	414	256	167	Q	2,113	985	1,062	Q	195.7	259.6	157.7	104.3	27.38
Propane	14	Q	11	Q	292	Q	172	400	48.1	Q	63.8	Q	37.58
Other	Q	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	Q	b
Cooking Energy Source (Solely or in Combination)													
Electricity	440	202	331	184	4,099	2,274	2,753	1,724	107.2	89.0	120.3	106.9	14.70
Natural Gas	592	321	422	373	5,864	2,923	2,973	3,006	100.9	109.9	141.8	124.1	13.24
Propane	Q	19	24	Q	247	206	255	216	80.3	91.0	93.3	Q	34.99
Other	Q	Q	Q	Q	804	Q	Q	Q	207.7	Q	Q	Q	33.60
Manufacturing Energy Source (Solely or in Combination)													
Electricity	Q	43	134	66	2,355	409	820	821	106.9	104.4	163.8	80.6	32.05
Natural Gas	72	45	Q	Q	261	255	Q	Q	276.0	178.2	Q	Q	34.77
Other	35	Q	Q	Q	292	Q	Q	Q	120.2	Q	Q	Q	35.35
HEATING AND COOLING													
Percent Heated													
Not Heated	22	21	48	35	2,081	1,018	957	1,364	10.7	20.6	49.9	25.8	23.83
1 to 50	126	68	71	106	3,926	1,556	1,910	1,922	32.0	43.9	37.4	54.9	18.01
51 to 99	285	167	217	223	3,366	1,530	1,537	2,240	84.6	109.0	141.2	99.6	17.00
100	1,558	1,019	1,006	816	15,135	8,064	8,925	7,653	102.9	126.4	112.7	106.7	8.84
Percent Cooled													
Not Cooled	335	208	90	54	6,080	2,111	1,713	1,508	55.1	98.4	52.6	36.1	16.52
1 to 50	579	297	255	205	8,352	3,354	3,066	3,049	69.3	88.6	83.0	67.4	14.87
51 to 99	394	299	364	352	4,136	2,942	2,836	3,224	95.3	101.6	128.2	109.2	11.60
100	683	471	634	568	5,939	3,760	5,714	5,398	114.9	125.3	110.9	105.3	11.89
Computer Area with Separate Air-Conditioning System													
Present in Building	775	491	490	518	5,345	3,209	3,832	4,298	144.9	153.0	127.9	120.5	13.81
Not Present	1,216	784	852	662	19,163	8,958	9,497	8,881	63.5	87.5	89.7	74.6	6.02
LIGHTING AND REFRIGERATION													
Percent Lit When Open													
Not Lit	7	Q	Q	Q	1,373	346	276	364	5.1	Q	Q	Q	26.91
1 to 50	248	103	92	90	5,806	1,554	1,331	2,179	42.8	66.1	69.3	41.3	13.43
51 to 99	520	370	388	348	6,176	3,069	3,517	4,187	84.2	120.4	110.2	83.1	13.03
100	1,216	798	857	738	11,152	7,198	8,204	6,449	109.0	110.8	104.4	114.5	9.71
Lighting Equipment (Solely or in Combination)													
Incandescent Lamps	1,453	847	821	664	16,065	7,833	7,926	6,966	90.5	108.2	103.6	95.3	9.76
Fluorescent Lamps	1,943	1,265	1,313	1,162	22,291	11,537	12,716	12,348	87.2	109.7	103.2	94.1	7.62
High-Intensity Discharge Lamps	667	395	429	489	5,608	3,306	4,258	5,016	118.9	119.5	100.8	97.5	14.11
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	750	586	687	708	7,530	4,541	5,901	6,254	99.6	129.0	116.4	113.2	11.94

See footnotes at end of table.

Table 20. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels (Continued)

Building Characteristics	Sum of Major Fuel Consumption (trillion Btu)				Total Floorspace of Buildings (million square feet)				Energy Intensity for Sum of Major Fuels (thousand Btu/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.284	1.294	1.123	1.260	0.841	0.782	0.865	0.868	1.097	1.080	0.824	0.882	
Refrigeration Equipment (Solely or in Combination)													
Commercial													
Refrigeration Units	952	666	720	635	9,076	5,139	5,493	4,954	104.9	129.6	131.1	128.2	11.46
Freezers	845	663	689	605	7,004	5,032	5,054	4,585	120.6	131.7	136.2	132.0	11.81
Residential													
Refrigerators	1,556	1,022	959	874	17,188	8,693	8,964	9,419	90.5	117.5	107.0	92.8	9.24
Freezers	556	325	339	258	4,918	2,394	2,824	2,285	113.1	135.9	120.2	112.7	17.51
Ice-Making Machines	920	632	781	655	7,502	4,811	5,815	5,315	122.6	131.3	134.3	123.3	11.49
Refrigerated Vending Machines	1,391	966	1,055	936	12,828	8,308	8,904	8,825	108.4	116.2	118.5	106.0	8.98
Water Coolers	1,467	1,062	1,018	908	14,976	9,049	9,515	9,324	98.0	117.3	107.0	97.4	9.40
Other	Q	Q	76	Q	602	224	355	228	206.1	Q	215.2	Q	30.11
ENERGY MANAGEMENT													
Occupant Control													
Any Control of Heating	880	488	488	476	11,150	4,531	5,611	5,752	78.9	107.6	86.9	82.7	10.88
With Thermostats	818	442	448	449	10,165	3,967	5,213	5,428	80.5	111.5	85.9	82.8	11.56
Any Control of Cooling	873	445	520	481	10,692	4,386	5,595	5,642	81.7	101.6	92.9	85.3	10.04
With Thermostats	761	418	482	452	9,375	4,050	5,275	5,343	81.2	103.3	91.4	84.7	10.73
Computerized Energy Management and Control System													
Present in Building	508	318	450	439	3,787	2,946	3,512	4,101	134.1	107.9	128.0	107.0	14.39
Controls Heating and Cooling	507	306	433	422	3,630	2,805	3,388	3,970	139.7	109.1	127.9	106.2	14.64
Controls Lighting	Q	62	108	148	Q	638	975	1,439	141.7	96.6	110.8	102.8	21.66
Controls Other	Q	76	84	55	Q	611	692	484	230.2	124.3	120.7	113.1	23.99
Other Energy Management													
Regular HVAC Maintenance	1,538	1,086	1,134	1,014	14,535	8,802	9,999	9,677	105.8	123.4	113.4	104.8	8.85
Participated in Utility Conservation Program	351	324	368	162	3,632	2,538	2,923	1,734	96.7	127.9	125.9	93.5	13.59

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 21. Electricity Consumption

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor:	0.696	0.875	0.773	1.232	1.232	1.259	0.939	0.992	
All Buildings	4,294	61,563	14.3	2,773	813	189	13.2	11.5	4.69
Building Floorspace (Square Feet)									
1,001 to 5,000	2,360	6,409	2.7	326	95	40	14.9	9.5	4.73
5,001 to 10,000	855	6,297	7.4	246	72	84	11.5	10.1	7.34
10,001 to 25,000	622	9,989	16.1	381	112	180	11.2	11.1	6.37
25,001 to 50,000	243	8,671	35.7	331	97	399	11.2	11.1	6.63
50,001 to 100,000	125	8,918	71.6	433	127	1,018	14.2	13.9	6.63
100,001 to 200,000	60	8,222	136.5	387	113	1,884	13.8	15.2	6.55
200,001 to 500,000	23	6,996	301.3	366	107	4,617	15.3	12.9	13.06
Over 500,000	7	6,062	865.4	303	89	12,681	14.7	9.2	13.19
Year Constructed									
1899 or Before	162	1,568	9.7	25	7	45	4.7	6.1	13.62
1900 to 1919	223	3,849	17.3	75	22	99	5.7	8.3	16.12
1920 to 1945	631	7,880	12.5	211	62	98	7.8	8.0	10.02
1946 to 1959	823	10,185	12.4	379	111	135	10.9	9.5	10.05
1960 to 1969	775	11,921	15.4	589	173	223	14.5	12.8	10.25
1970 to 1979	855	13,172	15.4	730	214	250	16.2	13.6	6.33
1980 to 1983	309	4,209	13.6	295	86	279	20.5	16.6	11.73
1984 to 1986	315	5,628	17.9	303	89	282	15.8	10.6	11.47
1987 to 1989	202	3,150	15.6	167	49	242	15.5	10.6	15.42
BUILDING USE									
Principal Building Activity									
Assembly	614	6,851	11.2	186	55	89	8.0	13.6	13.55
Education	282	8,070	28.6	217	64	225	7.9	8.8	6.28
Food Sales	102	792	7.7	105	31	302	39.0	36.6	17.14
Food Service	241	1,167	4.8	113	33	137	28.3	17.0	10.59
Health Care	80	2,054	25.7	154	45	565	22.0	10.7	12.21
Lodging	140	3,476	24.8	138	40	289	11.6	13.1	12.83
Mercantile and Service	1,276	12,361	9.7	550	161	126	13.0	13.0	7.77
Office	679	11,796	17.4	781	229	337	19.4	8.3	6.82
Parking Garage	45	983	22.0	18	5	118	5.3	15.8	22.84
Public Order and Safety	50	608	12.2	29	8	168	13.8	9.7	25.67
Warehouse	543	8,850	16.3	243	71	131	8.0	16.4	13.36
Other	62	1,528	24.8	201	59	956	38.5	28.0	32.34
Vacant	182	3,027	16.6	39	11	63	3.8	7.8	30.24
Weekly Operating Hours									
39 or Fewer	687	4,747	6.9	71	21	30	4.4	6.1	10.65
40 to 48	1,100	13,810	12.6	440	129	117	9.3	8.5	7.21
49 to 60	978	13,349	13.7	478	140	143	10.5	8.7	5.63
61 to 84	621	10,751	17.3	522	153	246	14.2	10.8	6.53
85 to 167	513	9,377	18.3	485	142	277	15.1	16.0	8.58
168 (Open Continuously)	395	9,529	24.1	779	228	577	23.9	17.7	10.02
Workers									
4 or Fewer	2,261	13,550	6.0	294	86	38	6.4	18.3	5.85
5 to 9	903	7,926	8.8	258	76	84	9.5	11.9	7.63
10 to 19	507	6,443	12.7	238	70	138	10.8	10.7	8.80
20 to 49	381	9,665	25.4	401	117	308	12.1	11.0	7.20
50 to 99	132	7,389	56.1	348	102	774	13.8	12.4	8.58
100 to 249	79	6,771	85.9	478	140	1,778	20.7	12.4	10.48
250 or More	32	9,818	307.8	758	222	6,963	22.6	9.8	11.89

See footnote at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor:	0.835	0.875	0.773	1.232	1.232	1.259	0.933	0.992	
Ownership and Occupancy									
Nongovernment Owned	3,736	47,550	12.7	2,113	619	166	13.0	11.4	4.53
Owner Occupied	2,733	35,437	13.0	1,575	462	169	13.0	11.5	5.44
Single Establishment	2,366	26,590	11.2	1,182	347	146	13.0	13.3	6.49
Multiple Establishment	367	8,847	24.1	393	115	314	13.0	8.2	7.87
Nonowner Occupied	1,002	12,113	12.1	537	157	157	13.0	11.0	7.40
Single Establishment	658	6,179	9.4	265	78	118	12.6	12.0	10.41
Multiple Establishment	256	5,227	20.4	265	78	303	14.8	10.5	10.25
Vacant	89	707	8.0	8	2	26	3.3	4.8	20.88
Government Owned	559	14,013	25.1	660	194	347	13.8	12.1	10.83
Federal	38	1,900	50.5	132	39	1,028	20.4	12.1	27.59
State	131	3,870	29.6	240	70	538	18.2	14.4	21.56
Local	390	8,243	21.1	288	84	217	10.2	10.6	10.33
Multibuilding Facility									
Not on Multibuilding Facility	2,885	36,523	12.7	1,428	418	145	11.5	10.3	4.12
Part of Multibuilding Facility	1,410	25,040	17.8	1,345	394	280	15.7	13.2	7.54
On Facility with Central Plant	201	8,298	41.3	635	186	925	22.4	15.9	18.27
Percent Vacant at Least Three Months									
0	3,507	42,697	12.2	2,062	604	172	14.2	12.7	4.98
1 to 50	374	12,416	33.2	583	171	458	13.8	9.1	7.80
51 to 99	98	3,446	35.1	64	19	192	5.5	10.4	23.83
100	315	3,005	9.5	63	19	59	6.2	8.5	9.61
Months in Use Out of Past 12 Months									
0 to 8	310	3,308	10.7	81	24	77	7.2	10.5	12.68
9 to 11	270	3,775	14.0	76	22	83	5.9	7.0	9.20
12	3,715	54,480	14.7	2,616	767	206	14.1	11.8	4.90
LOCATION									
Census Region									
Northeast	751	13,326	17.7	586	172	228	12.9	10.8	11.34
Midwest	1,001	15,704	15.7	609	178	178	11.4	11.5	7.70
South	1,723	21,215	12.3	975	286	166	13.5	12.3	6.65
West	819	11,318	13.8	604	177	216	15.6	11.1	10.12
Census Division									
Northeast									
New England	177	3,127	17.7	115	34	191	10.8	10.6	13.44
Middle Atlantic	574	10,199	17.8	470	138	240	13.5	10.9	13.88
Midwest									
East North Central	656	10,527	16.1	399	117	179	11.1	11.8	9.76
West North Central	345	5,177	15.0	210	61	178	11.9	11.0	14.42
South									
South Atlantic	692	9,628	13.9	416	122	176	12.7	11.7	10.53
East South Central	381	4,218	11.1	215	63	166	15.0	11.7	16.04
West South Central	651	7,369	11.3	344	101	155	13.7	13.5	11.32
West									
Mountain	300	4,172	13.9	179	52	175	12.6	11.6	19.87
Pacific	519	7,146	13.8	425	125	240	17.4	10.9	12.69
Metropolitan Status									
Metropolitan	2,946	49,835	16.9	2,366	693	235	13.9	11.6	5.36
Nonmetropolitan	1,349	11,728	8.7	407	119	88	10.2	11.3	10.37

See footnote at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor	0.935	0.875	0.773	1.232	1.232	1.259	0.939	0.992	
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	333	4,983	15.0	211	62	186	12.4	11.1	12.24
5,500-7,000 HDD	1,074	17,496	16.3	668	196	182	11.2	11.3	11.16
4,000-5,499 HDD	917	15,045	16.4	706	207	226	13.8	11.1	10.91
Under 4,000 HDD	982	12,573	12.8	663	194	198	15.5	11.1	13.80
2,000 CDD or More and --									
Under 4,000 HDD	989	11,466	11.6	525	154	155	13.4	13.4	9.78
1989 Degree-Days									
Under 2,000 CDD and --									
Over 7,000 HDD	501	7,497	15.0	286	84	167	11.2	10.2	12.75
5,500-7,000 HDD	1,231	21,549	17.5	852	250	203	11.6	11.6	9.71
4,000-5,499 HDD	701	10,118	14.4	539	158	225	15.6	11.4	12.72
Under 4,000 HDD	929	11,722	12.6	594	174	187	14.8	10.8	13.97
2,000 CDD or More and --									
Under 4,000 HDD	932	10,677	11.5	503	147	158	13.8	13.6	9.89
STRUCTURE									
Floors									
1	2,690	22,605	8.4	922	270	100	12.0	12.4	5.44
2	1,028	15,844	15.4	793	233	226	14.7	13.6	7.55
3	401	8,512	21.2	320	94	234	11.0	10.1	16.18
4 to 6	150	8,211	54.7	342	100	668	12.2	10.3	12.19
7 or More	25	6,392	256.9	396	116	4,664	18.2	9.1	10.59
Wall Materials									
Masonry	2,741	41,145	15.0	1,740	510	186	12.4	11.3	5.28
Siding or Shingles	743	4,524	6.1	150	44	59	9.7	9.6	10.81
Metal Panels	503	5,381	10.7	246	72	143	13.4	14.7	14.40
Concrete Panels	231	7,117	30.8	397	116	503	16.3	13.1	12.91
Window Glass	31	1,915	62.1	146	43	1,388	22.3	9.6	21.01
Other	46	1,481	32.4	94	28	602	18.6	10.5	16.88
Roof Materials									
Built-Up	1,545	30,295	19.6	1,484	435	281	14.4	11.2	9.44
Shingles (Not Wood)	1,319	10,590	8.0	341	100	76	9.4	9.6	7.00
Metal Surfacing	827	7,790	9.4	314	92	111	11.8	14.6	12.20
Synthetic or Rubber	211	6,907	32.8	416	122	579	17.7	13.8	11.22
Slate or Tile	187	2,556	13.7	70	20	109	8.0	10.0	19.22
Concrete	70	1,879	26.9	71	21	299	11.1	7.8	27.22
Wooden Materials	100	693	6.9	29	8	85	12.2	12.8	16.09
Other	36	854	23.4	48	14	390	16.6	13.6	27.41
Building Shell Conservation Features (Solely or in Combination)									
Roof or Ceiling Insulation	2,991	44,540	14.9	2,201	645	216	14.5	11.6	4.87
Wall Insulation	1,984	29,414	14.8	1,547	453	228	15.4	11.6	5.72
Storm or Multiple Glazing	1,423	23,991	16.9	1,225	359	252	15.0	11.4	5.78
Tinted, Reflective, or Shading Glass	932	21,906	23.5	1,295	380	407	17.3	11.5	8.12
Exterior or Interior Shadings or Awnings	1,452	26,032	17.9	1,381	405	279	15.6	11.3	8.85
Weather Stripping or Caulking	2,717	44,367	16.3	2,257	662	243	14.9	11.7	5.24
None of the Above	605	6,870	11.4	134	39	65	5.7	11.3	11.20

See footnote at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Flow Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor:	0.835	0.875	0.773	1.232	1.232	1.259	0.933	0.933	
ENERGY SOURCES AND END USES*									
Energy Sources (Solely or in Combination)									
Electricity	4,294	61,563	14.3	2,773	813	189	13.2	11.5	4.69
Natural Gas	2,417	41,115	17.0	1,824	534	221	13.0	11.1	6.42
Fuel Oil	580	12,579	21.7	662	194	334	15.4	11.4	14.19
District Heat	98	6,578	67.0	444	130	1,325	19.8	12.6	19.60
District Chilled Water	24	1,927	79.9	162	47	1,971	24.6	16.2	31.16
Propane	348	4,695	13.5	200	59	168	12.5	12.3	14.88
Other	129	1,537	11.9	45	13	103	8.6	10.1	21.13
Energy End Uses (Solely or in Combination)									
Heated Buildings	3,872	57,826	14.9	2,676	784	203	13.6	11.4	4.91
Air-Conditioned Buildings	3,182	51,757	16.3	2,555	749	235	14.5	11.6	4.81
Buildings with Water Heating	3,180	53,569	16.8	2,602	762	240	14.2	11.7	4.99
Buildings with Cooking	864	23,662	27.4	1,331	390	452	16.5	13.0	7.89
Buildings with Manufacturing	205	5,595	27.3	291	85	417	15.3	13.6	13.22
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	660	20,781	31.5	1,222	358	543	17.2	13.1	6.40
With Water Heating, Without Cooking	1,906	25,896	13.6	1,153	338	177	13.0	10.4	5.92
Without Water Heating or Cooking	484	3,641	7.5	96	28	58	7.7	8.6	10.46
Without Air Conditioning									
With Water Heating and Cooking	138	2,079	15.0	63	19	134	8.9	12.5	25.91
With Water Heating, Without Cooking	373	3,700	9.9	102	30	80	8.1	10.6	18.22
Without Water Heating or Cooking	291	1,509	5.2	27	8	27	5.2	9.0	19.52
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	269	2,282	8.5	22	7	25	2.9	15.6	16.24
All Other Combinations	174	1,675	9.7	88	26	149	15.4	12.6	23.95
Space-Heating Energy Source									
Electricity	1,283	18,702	14.6	1,039	305	237	16.3	13.4	5.92
Main	957	13,448	14.1	800	234	245	17.4	13.1	6.41
With Secondary	93	1,997	21.6	118	35	373	17.3	13.9	17.39
Natural Gas Only	54	1,142	21.0	57	17	308	14.7	10.7	24.73
Other Energy Sources or Combinations	36	787	21.6	54	16	438	20.2	18.6	24.46
With No Secondary	864	11,451	13.2	682	200	231	17.5	13.0	6.35
Secondary	326	5,254	16.1	239	70	215	13.3	14.5	11.91
Other Excluding Electricity	2,589	39,124	15.1	1,637	480	185	12.3	10.4	6.40
Building Not Heated	422	3,737	8.9	97	29	68	7.6	15.0	16.65
Main Space-Heating Energy Source									
Electricity	957	13,448	14.1	800	234	245	17.4	13.1	6.41
Natural Gas	2,078	31,102	15.0	1,287	377	181	12.1	11.0	6.56
Fuel Oil	473	5,577	11.8	182	53	113	9.5	9.3	14.83
District Heat	93	6,020	64.5	355	104	1,115	17.3	11.0	16.11
Propane	208	1,230	5.9	Q	Q	Q	11.6	10.7	23.71
Other	68	761	11.1	14	4	Q	5.4	Q	31.66

See footnote at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor:	0.631	0.653	0.885	1.227	1.227	1.141	0.923	1.004	
Air-Conditioning Energy Source									
Electricity	3,072	47,905	15.6	2,373	695	226	14.5	11.7	4.92
Other Excluding Electricity	111	3,852	34.9	182	53	482	13.8	10.0	15.22
Air-Conditioning Not Performed	1,112	9,806	8.8	218	64	58	6.5	10.7	11.91
Water-Heating Energy Source									
Electricity	1,554	21,493	13.8	1,135	333	214	15.5	12.1	5.42
Other Excluding Electricity	1,626	32,076	19.7	1,466	430	264	13.4	11.5	6.86
Water Heating Not Performed	1,115	7,994	7.2	171	50	45	6.3	9.2	7.85
Cooking Energy Source									
Electricity	387	10,850	28.0	593	174	449	16.0	12.7	8.12
Other Excluding Electricity	477	12,812	26.9	738	216	454	16.9	13.2	10.79
Cooking Not Performed	3,431	37,901	11.0	1,442	423	123	11.1	10.4	5.28
Manufacturing Energy Source									
Electricity	163	4,406	27.1	219	64	394	14.5	13.3	15.28
Other Excluding Electricity	42	1,190	28.3	73	21	508	18.0	14.4	23.97
Manufacturing Not Performed	4,090	55,968	13.7	2,482	727	178	13.0	11.3	4.88
HEATING AND COOLING									
Percent Heated									
Not Heated	433	3,839	8.9	98	29	67	7.5	14.9	10.70
1 to 50	630	9,314	14.8	210	61	97	6.6	12.7	11.05
51 to 99	496	8,668	17.5	496	146	293	16.8	12.2	8.60
100	2,735	39,742	14.5	1,969	577	211	14.5	11.1	5.76
Percent Cooled									
Not Cooled	1,112	9,806	8.8	218	64	58	6.5	10.7	11.91
1 to 50	1,037	17,821	17.2	461	135	130	7.6	11.0	7.46
51 to 99	597	13,133	22.0	783	230	385	17.5	12.0	6.58
100	1,548	20,803	13.4	1,311	384	248	18.5	11.6	7.69
Heating Equipment (Solely or in Combination)									
Furnaces	1,618	15,590	9.6	608	178	110	11.4	10.7	8.83
Boilers	703	19,874	28.3	874	256	364	12.9	10.4	7.53
Individual Space Heaters	1,388	22,537	16.2	942	276	199	12.3	12.0	6.97
Packaged Heating Units	859	15,598	18.2	878	257	300	16.5	13.3	8.60
Heat Pumps	453	8,357	18.5	426	125	276	15.0	10.7	9.23
Air Ducts	1,988	37,263	18.7	2,004	587	296	15.8	11.9	5.91
Heating or Reheating Coils	243	15,682	64.5	1,040	305	1,255	19.4	12.0	9.84
Fan-Coil Units	185	11,839	63.8	682	200	1,077	16.9	12.1	12.23
Steam or Hot Water Radiators or Baseboards	498	15,789	31.7	603	177	355	11.2	9.2	9.77
Other	57	1,476	25.7	117	34	599	23.3	16.3	21.13
Cooling Equipment (Solely or in Combination)									
Central Chillers	201	14,037	69.9	922	270	1,345	19.2	11.4	10.86
Individual Air Conditioners	1,074	19,239	17.9	754	221	206	11.5	11.4	8.57
Packaged Cooling Units	1,979	34,745	17.6	1,804	529	267	15.2	11.8	5.84
Heat Pumps	437	7,827	17.9	467	137	313	17.5	12.6	13.23
Air Ducts	1,710	34,212	20.0	1,877	550	322	16.1	12.0	6.03
Fan-Coil Units	110	10,787	98.1	753	221	2,007	20.5	11.4	12.08
Other	100	1,468	14.6	63	19	185	12.7	11.5	27.68

See footnotes at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor:	0.031	0.063	0.085	1.227	1.227	1.141	0.923	1.004	
Year Main Central Chiller Installed									
1959 or Before	26	1,477	56.0	91	27	1,015	18.1	10.1	19.03
1960 to 1969	52	3,713	72.0	252	74	1,432	19.9	14.1	24.90
1970 to 1979	50	3,536	71.3	231	68	1,368	19.2	11.9	14.72
1980 to 1986	47	3,515	74.4	245	72	1,517	20.4	10.2	19.13
1987 to 1989	26	1,798	68.9	103	30	1,153	16.7	10.0	20.05
Year Packaged Cooling System Installed									
1959 or Before	76	1,736	23.0	79	23	306	13.3	9.6	14.66
1960 to 1969	262	4,844	18.5	276	81	309	16.7	11.9	18.21
1970 to 1979	603	10,469	17.3	547	160	266	15.3	12.6	7.35
1980 to 1986	657	11,339	17.2	599	176	267	15.5	12.1	9.29
1987 to 1989	380	6,358	16.7	303	89	233	14.0	10.8	9.13
Computer Area with Separate Air-Conditioning System									
Present in Building	264	16,678	63.1	1,194	350	1,324	21.0	12.3	8.29
Not Present	4,030	44,885	11.1	1,579	463	115	10.3	11.0	4.67
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	75	757	10.1	8	2	31	3.1	11.1	25.82
1 to 50	999	10,864	10.9	192	56	56	5.2	10.1	8.02
51 to 99	951	16,950	17.8	813	238	250	14.1	11.8	7.99
100	2,268	32,992	14.5	1,760	516	227	15.6	11.5	5.90
Percent Lit When Closed									
Not Lit	2,459	26,439	10.8	947	278	113	10.5	11.1	7.19
1 to 50	1,706	31,819	18.7	1,566	459	269	14.4	11.1	5.60
51 to 99	68	2,308	34.2	203	60	883	25.8	16.8	18.79
100	62	997	16.1	57	17	269	16.7	31.7	27.69
Lighting Equipment (Solely or in Combination)									
Incandescent Lamps	2,403	38,774	16.1	1,747	512	213	13.2	10.9	5.99
Fluorescent Lamps	3,918	58,879	15.0	2,735	801	205	13.6	11.5	4.71
High-Intensity Discharge Lamps	456	18,177	39.9	982	288	631	15.8	13.3	8.79
Other Lamps	24	513	21.5	28	8	348	16.1	10.3	22.54
High-Efficiency Ballasts	1,070	24,161	22.6	1,415	415	388	17.2	12.9	6.99
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	908	24,605	27.1	1,495	438	482	17.8	13.8	7.15
Freezers	707	21,627	30.6	1,424	417	591	19.3	14.2	6.90
Residential									
Refrigerators	2,471	44,179	17.9	2,054	602	244	13.6	10.8	5.35
Freezers	617	12,406	20.1	651	191	309	15.4	12.2	10.22
Ice-Making Machines	771	23,401	30.4	1,540	451	586	19.3	13.5	7.31
Refrigerated Vending Machines	1,513	38,810	25.7	2,122	622	411	16.0	12.1	5.04
Water Coolers	1,745	42,781	24.5	2,147	629	361	14.7	11.6	5.67
Other	56	1,408	25.3	186	54	979	38.7	21.9	25.26
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	2,399	27,033	11.3	1,074	315	131	11.6	10.1	5.05
With Thermostats	2,100	24,762	11.8	986	289	138	11.7	10.1	5.67
Any Control of Cooling	1,977	26,303	13.3	1,094	321	162	12.2	10.3	5.26
With Thermostats	1,756	24,032	13.7	1,010	296	168	12.3	10.3	5.99

See footnotes at end of table.

Table 21. Electricity Consumption (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion kWh)	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	
RSE Column Factor	0.351	0.285	0.383	1.227	1.227	1.141	0.923	1.004	
Reduced Use During Off-Hours									
Heating Only	790	7,126	9.0	216	63	80	8.9	10.4	12.58
Cooling Only	283	4,112	14.5	202	59	209	14.4	14.1	14.56
Heating and Cooling	2,397	38,683	16.1	1,671	490	204	12.7	10.4	5.63
Computerized Energy Management and Control System									
Present in Building	263	14,310	54.3	896	263	997	18.3	12.4	8.03
Controls Heating and Cooling	251	13,767	54.8	866	254	1,010	18.4	12.2	8.26
Controls Lighting	51	3,835	75.3	223	65	1,286	17.1	10.2	15.08
Controls Other	32	2,316	73.5	160	47	1,491	20.3	13.4	13.97
Other Energy Management									
Regular HVAC Maintenance	2,099	42,955	20.5	2,328	682	325	15.9	12.0	5.22
Participated in Utility Conservation Program	324	10,826	33.4	584	171	528	15.8	10.7	7.60
ELECTRICITY DEMAND									
Annual Consumption (kilowatthours)									
10,000 or Less	1,019	4,582	4.5	17	5	5	1.1	1.5	6.38
10,001 to 25,000	913	5,413	5.9	52	15	17	2.8	3.8	4.48
25,001 to 50,000	702	5,544	7.9	86	25	36	4.6	5.6	5.96
50,001 to 100,000	639	7,052	11.0	156	46	71	6.5	7.5	5.27
100,001 to 500,000	762	14,099	18.5	547	160	210	11.4	11.2	4.14
500,001 to 1,000,000	122	5,901	48.4	291	85	699	14.4	11.3	6.84
1,000,001 to 2,000,000	69	5,022	72.8	324	95	1,379	18.9	14.4	6.28
2,000,001 to 5,000,000	50	6,263	124.7	531	156	3,098	24.8	16.3	8.38
Over 5,000,000	18	7,688	416.7	769	225	12,217	29.3	15.4	12.16

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

□ Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 22. Electricity Expenditures

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				RSE Flow Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
All Buildings	4,294	61,563	14.3	55,943	13.0	0.91	0.069	4.94
Building Floorspace (Square Feet)								
1,001 to 5,000	2,360	6,409	2.7	7,592	3.2	1.18	.080	5.80
5,001 to 10,000	855	6,297	7.4	6,232	7.3	.99	.086	8.47
10,001 to 25,000	622	9,989	16.1	7,809	12.6	.78	.070	4.84
25,001 to 50,000	243	8,671	35.7	6,919	28.5	.80	.071	5.82
50,001 to 100,000	125	8,918	71.6	8,042	64.5	.90	.063	6.77
100,001 to 200,000	60	8,222	136.5	7,410	123.0	.90	.065	6.87
200,001 to 500,000	23	6,996	301.3	6,326	272.4	.90	.059	16.70
Over 500,000	7	6,062	865.4	5,613	801.2	.93	.063	12.66
Year Constructed								
1899 or Before	162	1,568	9.7	603	3.7	.38	.083	16.86
1900 to 1919	223	3,849	17.3	1,676	7.5	.44	.076	14.88
1920 to 1945	631	7,880	12.5	4,772	7.6	.61	.077	8.89
1946 to 1959	823	10,185	12.4	7,333	8.9	.72	.066	7.99
1960 to 1969	775	11,921	15.4	11,667	15.1	.98	.068	7.78
1970 to 1979	855	13,172	15.4	14,815	17.3	1.12	.069	7.78
1980 to 1983	309	4,209	13.6	5,570	18.0	1.32	.065	8.68
1984 to 1986	315	5,628	17.9	6,363	20.2	1.13	.072	9.41
1987 to 1989	202	3,150	15.6	3,143	15.5	1.00	.064	10.66
BUILDING USE								
Principal Building Activity								
Assembly	614	6,851	11.2	4,648	7.6	.68	.085	16.77
Education	282	8,070	28.6	4,391	15.6	.54	.069	7.36
Food Sales	102	792	7.7	1,992	19.5	2.52	.065	13.76
Food Service	241	1,167	4.8	2,520	10.5	2.16	.076	6.72
Health Care	80	2,054	25.7	2,670	33.4	1.30	.059	11.84
Lodging	140	3,476	24.8	2,593	18.5	.75	.064	10.64
Mercantile and Service	1,276	12,361	9.7	11,116	8.7	.90	.069	5.66
Office	679	11,796	17.4	15,757	23.2	1.34	.069	6.14
Parking Garage	45	983	22.0	357	8.0	.36	.068	18.22
Public Order and Safety	50	608	12.2	582	11.7	.96	.069	26.96
Warehouse	543	8,850	16.3	4,836	8.9	.55	.068	10.14
Other	62	1,528	24.8	3,558	57.8	2.33	.060	23.44
Vacant	182	3,027	16.6	924	5.1	.31	.080	16.86
Weekly Operating Hours								
39 or Fewer	687	4,747	6.9	1,718	2.5	.36	.083	7.84
40 to 48	1,100	13,810	12.6	9,871	9.0	.71	.077	6.66
49 to 60	978	13,349	13.7	10,146	10.4	.76	.072	6.86
61 to 84	621	10,751	17.3	10,899	17.6	1.01	.071	7.16
85 to 167	513	9,377	18.3	9,480	18.5	1.01	.067	8.22
168 (Open Continuously)	395	9,529	24.1	13,829	35.0	1.45	.061	7.89
Workers								
4 or Fewer	2,261	13,550	6.0	6,835	3.0	.50	.079	4.84
5 to 9	903	7,926	8.8	5,464	6.0	.69	.072	5.80
10 to 19	507	6,443	12.7	4,993	9.9	.77	.072	6.86
20 to 49	381	9,665	25.4	8,968	23.5	.93	.076	6.87
50 to 99	132	7,389	56.1	7,018	53.3	.95	.069	7.45
100 to 249	79	6,771	85.9	8,910	113.1	1.32	.064	8.17
250 or More	32	9,818	307.8	13,754	431.2	1.40	.062	9.29

See footnote at end of table.

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				RSE Flow Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
RSE Column Factor:	0.979	1.028	0.906	1.384	1.385	1.068	0.697	
Ownership and Occupancy								
Nongovernment Owned	3,736	47,550	12.7	43,117	11.5	0.91	0.070	3.74
Owner Occupied	2,733	35,437	13.0	31,565	11.5	.89	.068	4.39
Single Establishment	2,366	26,590	11.2	23,444	9.9	.88	.068	5.21
Multiple Establishment	367	8,847	24.1	8,122	22.1	.92	.071	7.35
Nonowner Occupied	1,002	12,113	12.1	11,552	11.5	.95	.073	5.86
Single Establishment	658	6,179	9.4	5,594	8.5	.91	.072	8.07
Multiple Establishment	256	5,227	20.4	5,765	22.6	1.10	.074	8.38
Vacant	89	707	8.0	193	2.2	.27	.083	15.53
Government Owned	559	14,013	25.1	12,826	23.0	.92	.066	10.12
Federal	38	1,900	50.5	2,172	57.8	1.14	.056	25.96
State	131	3,870	29.6	4,112	31.4	1.06	.058	14.85
Local	390	8,243	21.1	6,542	16.8	.79	.077	12.40
Multibuilding Facility								
Not on Multibuilding Facility	2,885	36,523	12.7	29,810	10.3	.82	.071	3.76
Part of Multibuilding Facility	1,410	25,040	17.8	26,133	18.5	1.04	.066	6.62
On Facility with Central Plant	201	8,298	41.3	11,397	56.7	1.37	.061	15.21
Percent Vacant at Least Three Months								
0	3,507	42,697	12.2	41,630	11.9	.98	.069	4.43
1 to 50	374	12,416	33.2	11,792	31.6	.95	.069	7.13
51 to 99	98	3,446	35.1	1,175	12.0	.34	.062	20.74
100	315	3,005	9.5	1,346	4.3	.45	.072	8.07
Months in Use Out of Past 12 Months								
0 to 8	310	3,308	10.7	1,721	5.6	.52	.073	10.16
9 to 11	270	3,775	14.0	1,730	6.4	.46	.077	7.94
12	3,715	54,480	14.7	52,492	14.1	.96	.068	4.24
LOCATION								
Census Region								
Northeast	751	13,326	17.7	13,188	17.6	.99	.077	6.99
Midwest	1,001	15,704	15.7	11,697	11.7	.74	.066	7.11
South	1,723	21,215	12.3	18,409	10.7	.87	.064	7.37
West	819	11,318	13.8	12,649	15.4	1.12	.071	7.55
Census Division								
Northeast								
New England	177	3,127	17.7	2,662	15.0	.85	.079	10.60
Middle Atlantic	574	10,199	17.8	10,527	18.3	1.03	.076	11.01
Midwest								
East North Central	656	10,527	16.1	7,964	12.1	.76	.068	9.26
West North Central	345	5,177	15.0	3,733	10.8	.72	.061	11.71
South								
South Atlantic	692	9,628	13.9	8,817	12.7	.92	.072	13.38
East South Central	381	4,218	11.1	3,558	9.3	.84	.056	11.59
West South Central	651	7,369	11.3	6,034	9.3	.82	.060	9.38
West								
Mountain	300	4,172	13.9	3,344	11.2	.80	.064	16.27
Pacific	519	7,146	13.8	9,305	17.9	1.30	.075	9.52
Metropolitan Status								
Metropolitan	2,946	49,835	16.9	48,494	16.5	.97	.070	4.71
Nonmetropolitan	1,349	11,728	8.7	7,449	5.5	.64	.062	7.29

See footnote at end of table.

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
RSE Column Factor:	0.979	1.028	0.906	1.384	1.385	1.068	0.537	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	333	4,983	15.0	3,669	11.0	0.74	0.059	9.79
5,500-7,000 HDD	1,074	17,496	16.3	13,671	12.7	.78	.070	8.77
4,000-5,499 HDD	917	15,045	16.4	14,043	15.3	.93	.068	10.61
Under 4,000 HDD	982	12,573	12.8	13,271	13.5	1.06	.068	10.67
2,000 CDD or More and --								
Under 4,000 HDD	989	11,466	11.6	11,289	11.4	.98	.073	11.17
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	501	7,497	15.0	5,424	10.8	.72	.065	10.31
5,500-7,000 HDD	1,231	21,549	17.5	17,111	13.9	.79	.069	8.18
4,000-5,499 HDD	701	10,118	14.4	10,277	14.7	1.02	.065	11.99
Under 4,000 HDD	929	11,722	12.6	12,407	13.4	1.06	.071	10.87
2,000 CDD or More and --								
Under 4,000 HDD	932	10,677	11.5	10,724	11.5	1.00	.073	11.47
STRUCTURE								
Floors								
1	2,690	22,605	8.4	20,426	7.6	.90	.076	5.83
2	1,028	15,844	15.4	15,188	14.8	.96	.065	5.86
3	401	8,512	21.2	6,240	15.5	.73	.067	12.62
4 to 6	150	8,211	54.7	6,270	41.8	.76	.063	8.72
7 or More	25	6,392	256.9	7,819	314.3	1.22	.067	10.17
Wall Materials								
Masonry	2,741	41,145	15.0	35,242	12.9	.86	.069	4.27
Siding or Shingles	743	4,524	6.1	3,211	4.3	.71	.073	8.33
Metal Panels	503	5,381	10.7	4,640	9.2	.86	.064	10.77
Concrete Panels	231	7,117	30.8	8,253	35.7	1.16	.071	14.27
Window Glass	31	1,915	62.1	3,032	98.4	1.58	.071	18.89
Other	46	1,481	32.4	1,565	34.2	1.06	.057	17.14
Roof Materials								
Built-Up	1,545	30,295	19.6	30,350	19.6	1.00	.070	5.80
Shingles (Not Wood)	1,319	10,590	8.0	7,617	5.8	.72	.076	6.20
Metal Surfacing	827	7,790	9.4	5,975	7.2	.77	.065	8.89
Synthetic or Rubber	211	6,907	32.8	7,549	35.9	1.09	.062	8.65
Slate or Tile	187	2,556	13.7	1,420	7.6	.56	.069	14.80
Concrete	70	1,879	26.9	1,655	23.6	.88	.079	28.50
Wooden Materials	100	693	6.9	695	7.0	1.00	.082	13.23
Other	36	854	23.4	682	18.7	.80	.048	24.48
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	2,991	44,540	14.9	43,841	14.7	.98	.068	4.40
Wall Insulation	1,984	29,414	14.8	30,482	15.4	1.04	.067	5.45
Storm or Multiple Glazing	1,423	23,991	16.9	23,489	16.5	.98	.065	4.79
Tinted, Reflective, or Shading Glass	932	21,906	23.5	25,819	27.7	1.18	.068	5.92
Exterior or Interior Shadings or Awnings	1,452	26,032	17.9	26,840	18.5	1.03	.066	5.20
Weather Stripping or Caulking	2,717	44,367	16.3	44,930	16.5	1.01	.068	4.65
None of the Above	605	6,870	11.4	2,926	4.8	.43	.074	9.62

See footnote at end of table.

ELECTRICITY

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
RSE Column Factor	0.878	1.029	0.908	1.994	1.348	1.248	0.637	
ENERGY SOURCES AND END USES^a								
Energy Sources								
(Solely or in Combination)								
Electricity	4,294	61,563	14.3	55,943	13.0	0.91	0.069	4.04
Natural Gas	2,417	41,115	17.0	36,376	15.1	.88	.068	4.95
Fuel Oil	580	12,579	21.7	12,980	22.4	1.03	.067	11.81
District Heat	98	6,578	67.0	8,192	83.5	1.25	.063	17.78
District Chilled Water	24	1,927	79.9	2,791	115.8	1.45	.059	28.63
Propane	348	4,695	13.5	4,051	11.6	.86	.069	12.21
Other	129	1,537	11.9	814	6.3	.53	.062	17.48
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	3,872	57,826	14.9	52,965	13.7	.92	.068	3.59
Air-Conditioned Buildings	3,182	51,757	16.3	51,497	16.2	.99	.069	4.28
Buildings with Water Heating	3,180	53,569	16.8	52,097	16.4	.97	.068	4.28
Buildings with Cooking	864	23,662	27.4	25,083	29.0	1.06	.064	6.28
Buildings with Manufacturing	205	5,595	27.3	5,464	26.7	.98	.064	10.59
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and								
Cooking	660	20,781	31.5	22,847	34.6	1.10	.064	5.84
With Water Heating,								
Without Cooking								
1,906	25,896	13.6	23,807	12.5	.92	.070	4.81	
Without Water Heating or								
Cooking								
484	3,641	7.5	2,137	4.4	.59	.076	6.22	
Without Air Conditioning								
With Water Heating and								
Cooking								
138	2,079	15.0	1,118	8.1	.54	.060	17.24	
With Water Heating,								
Without Cooking								
373	3,700	9.9	2,143	5.7	.58	.072	12.99	
Without Water Heating or								
Cooking								
291	1,509	5.2	604	2.1	.40	.077	14.93	
Buildings Without Heating, Air								
Conditioning, Water Heating,								
or Cooking								
269	2,282	8.5	483	1.8	.21	.073	11.91	
All Other Combinations								
174	1,675	9.7	2,804	Q	1.67	.109	25.29	
Space-Heating Energy Source								
Electricity	1,283	18,702	14.6	20,037	15.6	1.07	.066	5.29
Main								
957	13,448	14.1	15,183	15.9	1.13	.065	5.79	
With Secondary								
93	1,997	21.6	2,141	23.1	1.07	.062	12.91	
Natural Gas Only								
54	1,142	21.0	1,089	20.0	.95	.065	16.23	
Other Energy Sources or								
Combinations								
36	787	21.6	937	25.8	1.19	.059	18.17	
With No Secondary								
864	11,451	13.2	13,041	15.1	1.14	.065	8.81	
Secondary								
326	5,254	16.1	4,855	14.9	.92	.069	5.97	
Other Excluding Electricity								
2,589	39,124	15.1	32,928	12.7	.84	.069	4.99	
Building Not Heated								
422	3,737	8.9	2,978	7.1	.80	.104	19.53	
Main Space-Heating Energy Source								
Electricity	957	13,448	14.1	15,183	15.9	1.13	.065	5.79
Natural Gas	2,078	31,102	15.0	25,959	12.5	.83	.069	5.19
Fuel Oil	473	5,577	11.8	4,176	8.8	.75	.078	11.81
District Heat	93	6,020	64.5	6,720	72.0	1.12	.065	14.88
Propane	208	1,230	5.9	918	4.4	.75	.064	20.53
Other	68	761	11.1	217	3.2	.29	.053	22.44

See footnote at end of table.

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				PSE Per Floor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
Air-Conditioning Energy Source								
Electricity	3,072	47,905	15.6	47,887	15.6	1.00	0.069	4.38
Other Excluding Electricity	111	3,852	34.9	3,610	32.7	.94	.068	12.48
Air-Conditioning Not Performed	1,112	9,806	8.8	4,446	4.0	.45	.069	6.45
Water-Heating Energy Source								
Electricity	1,554	21,493	13.8	22,779	14.7	1.06	.068	6.07
Other Excluding Electricity	1,626	32,076	19.7	29,318	18.0	.91	.068	8.29
Water Heating Not Performed	1,115	7,994	7.2	3,846	3.5	.48	.077	8.01
Cooking Energy Source								
Electricity	387	10,850	28.0	10,762	27.8	.99	.062	7.11
Other Excluding Electricity	477	12,812	26.9	14,321	30.1	1.12	.066	8.58
Cooking Not Performed	3,431	37,901	11.0	30,860	9.0	.81	.073	4.31
Manufacturing Energy Source								
Electricity	163	4,406	27.1	4,174	25.7	.95	.065	12.74
Other Excluding Electricity	42	1,190	28.3	1,289	30.7	1.08	.060	17.28
Manufacturing Not Performed	4,090	55,968	13.7	50,479	12.3	.90	.069	4.16
HEATING AND COOLING								
Percent Heated								
Not Heated	433	3,839	8.9	3,004	6.9	.78	.104	10.20
1 to 50	630	9,314	14.8	4,551	7.2	.49	.074	6.75
51 to 99	496	8,668	17.5	9,476	19.1	1.09	.065	6.48
100	2,735	39,742	14.5	38,912	14.2	.98	.067	4.53
Percent Cooled								
Not Cooled	1,112	9,806	8.8	4,446	4.0	.45	.069	6.45
1 to 50	1,037	17,821	17.2	10,013	9.7	.56	.074	6.19
51 to 99	597	13,133	22.0	14,698	24.6	1.12	.064	6.98
100	1,548	20,803	13.4	26,785	17.3	1.29	.070	6.92
Heating Equipment (Solely or in Combination)								
Furnaces	1,618	15,590	9.6	12,750	7.9	.82	.072	6.41
Boilers	703	19,874	28.3	17,399	24.7	.88	.068	6.76
Individual Space Heaters	1,388	22,537	16.2	18,116	13.1	.80	.066	6.01
Packaged Heating Units	859	15,598	18.2	17,625	20.5	1.13	.068	4.88
Heat Pumps	453	8,357	18.5	8,338	18.4	1.00	.067	6.37
Air Ducts	1,988	37,263	18.7	38,855	19.5	1.04	.066	4.55
Heating or Reheating Coils	243	15,682	64.5	19,240	79.2	1.23	.063	7.38
Fan-Coil Units	185	11,839	63.8	12,509	67.4	1.06	.063	6.88
Steam or Hot Water Radiators or Baseboards	498	15,789	31.7	12,068	24.2	.76	.068	6.11
Other	57	1,476	25.7	2,172	37.8	1.47	.063	12.98
Cooling Equipment (Solely or in Combination)								
Central Chillers	201	14,037	69.9	17,935	89.3	1.28	.066	7.48
Individual Air Conditioners	1,074	19,239	17.9	15,127	14.1	.79	.068	6.76
Packaged Cooling Units	1,979	34,745	17.6	36,119	18.3	1.04	.068	6.38
Heat Pumps	437	7,827	17.9	8,941	20.5	1.14	.065	6.35
Air Ducts	1,710	34,212	20.0	36,720	21.5	1.07	.067	6.35
Fan-Coil Units	110	10,787	98.1	14,109	128.4	1.31	.064	6.35
Other	100	1,468	14.6	1,220	12.2	.83	.066	6.35

See footnotes at end of table.

ELECTRICITY

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				Rate per kWh
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
Non-Cooling System	0,475	1,001	1,930	1,372	1,222	1,022	0.027	16.22
Year Main Central Chiller Installed								
1959 or Before	26	1,477	56.0	1,805	68.5	1.22	0.067	20.75
1960 to 1969	52	3,713	72.0	4,563	88.5	1.23	.062	18.57
1970 to 1979	50	3,536	71.3	4,982	100.5	1.41	.073	19.28
1980 to 1986	47	3,515	74.4	4,714	99.7	1.34	.066	17.52
1987 to 1989	26	1,798	68.9	1,872	71.8	1.04	.062	16.22
Year Packaged Cooling System Installed								
1959 or Before	76	1,736	23.0	1,605	21.2	.92	.069	13.21
1960 to 1969	262	4,844	18.5	5,334	20.4	1.10	.066	16.98
1970 to 1979	603	10,469	17.3	10,706	17.7	1.02	.067	16.77
1980 to 1986	657	11,339	17.2	12,326	18.7	1.09	.070	17.86
1987 to 1989	380	6,358	16.7	6,148	16.2	.97	.069	17.17
Computer Area with Separate Air-Conditioning System								
Present in Building	264	16,678	63.1	22,153	83.8	1.33	.063	8.40
Not Present	4,030	44,885	11.1	33,790	8.4	.75	.073	4.48
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	75	757	10.1	194	2.6	.26	.083	19.75
1 to 50	999	10,864	10.9	4,399	4.4	.40	.078	8.94
51 to 99	951	16,950	17.8	16,071	16.9	.95	.067	8.28
100	2,268	32,992	14.5	35,279	15.6	1.07	.068	8.48
Percent Lit When Closed								
Not Lit	2,459	26,439	10.8	19,499	7.9	.74	.070	5.77
1 to 50	1,706	31,819	18.7	30,817	18.1	.97	.067	4.59
51 to 99	68	2,308	34.2	4,547	67.4	1.97	.076	20.58
100	62	997	16.1	1,079	17.4	1.08	.065	22.97
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	2,403	38,774	16.1	34,173	14.2	.88	.067	4.73
Fluorescent Lamps	3,918	58,879	15.0	55,091	14.1	.94	.069	4.08
High-Intensity Discharge Lamps	456	18,177	39.9	17,752	38.9	.98	.062	7.13
Other Lamps	24	513	21.5	515	21.6	1.00	.062	19.33
High-Efficiency Ballasts	1,070	24,161	22.6	27,603	25.8	1.14	.067	6.56
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	908	24,605	27.1	28,475	31.4	1.16	.065	5.93
Freezers	707	21,627	30.6	26,809	37.9	1.24	.064	5.57
Residential								
Refrigerators	2,471	44,179	17.9	40,310	16.3	.91	.067	4.15
Freezers	617	12,406	20.1	12,487	20.2	1.01	.065	7.98
Ice-Making Machines	771	23,401	30.4	28,829	37.4	1.23	.064	5.85
Refrigerated Vending Machines	1,513	38,810	25.7	41,893	27.7	1.08	.067	4.82
Water Coolers	1,745	42,781	24.5	42,198	24.2	.99	.067	4.97
Other	56	1,408	25.3	3,164	56.9	2.25	.058	19.53
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	2,399	27,033	11.3	22,127	9.2	.82	.070	4.20
With Thermostats	2,100	24,762	11.8	20,314	9.7	.82	.070	4.05
Any Control of Cooling	1,977	26,303	13.3	22,388	11.3	.85	.070	4.42
With Thermostats	1,756	24,032	13.7	20,626	11.7	.86	.070	4.83

See footnotes at end of table.

Table 22. Electricity Expenditures (Continued)

Building Characteristics	All Buildings Using Electricity			Electricity Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)	
RSE Column Factor:	0.076	1.001	1.039	1.372	1.322	1.050	0.517	
Reduced Use During Off-Hours								
Heating Only	790	7,126	9.0	4,326	5.5	0.61	0.068	9.12
Cooling Only	283	4,112	14.5	4,718	16.6	1.15	.080	18.81
Heating and Cooling	2,397	38,683	16.1	34,156	14.3	.88	.070	4.45
Computerized Energy Management and Control System								
Present in Building	263	14,310	54.3	16,984	64.5	1.19	.065	6.24
Controls Heating and Cooling	251	13,767	54.8	16,402	65.3	1.19	.065	6.81
Controls Lighting	51	3,835	75.3	4,200	82.5	1.10	.064	12.83
Controls Other	32	2,316	73.5	3,131	99.4	1.35	.067	12.36
Other Energy Management								
Regular HVAC Maintenance	2,099	42,955	20.5	45,993	21.9	1.07	.067	4.60
Participated in Utility Conservation Program	324	10,826	33.4	11,619	35.9	1.07	.068	6.85
ELECTRICITY DEMAND								
Annual Consumption (kilowatthours)								
10,000 or Less	1,019	4,582	4.5	546	.5	.12	.109	5.43
10,001 to 25,000	913	5,413	5.9	1,460	1.6	.27	.096	4.32
25,001 to 50,000	702	5,544	7.9	2,281	3.3	.41	.090	6.25
50,001 to 100,000	639	7,052	11.0	3,854	6.0	.55	.084	4.80
100,001 to 500,000	762	14,099	18.5	11,895	15.6	.84	.074	3.85
500,001 to 1,000,000	122	5,901	48.4	6,205	50.9	1.05	.073	5.86
1,000,001 to 2,000,000	69	5,022	72.8	5,935	86.1	1.18	.062	7.43
2,000,001 to 5,000,000	50	6,263	124.7	10,479	208.6	1.67	.067	10.64
Over 5,000,000	18	7,688	416.7	13,289	720.4	1.73	.059	10.04

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

□ Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 23. Electricity Consumption and Conditional Energy Intensity by Census Region

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.443	1.104	1.026	1.340	1.034	0.893	0.830	0.955	1.155	0.822	0.682	0.964	
All Buildings	172	178	286	177	13,326	15,704	21,215	11,318	12.9	11.4	13.5	15.6	8.36
Building Floorspace (Square Feet)													
1,001 to 5,000	14	20	44	18	985	1,531	2,681	1,212	13.7	13.0	16.3	15.1	10.78
5,001 to 10,000	11	13	35	13	1,239	1,414	2,403	1,240	8.9	8.9	14.6	10.8	15.96
10,001 to 25,000	22	24	41	25	1,966	2,206	3,796	2,021	11.2	10.7	10.8	12.5	15.91
25,001 to 50,000	22	21	33	21	1,711	2,018	3,241	1,701	12.9	10.3	10.2	12.5	18.93
50,001 to 100,000	15	29	44	38	1,403	2,334	3,556	1,624	11.0	12.5	12.3	23.6	19.71
100,001 to 200,000	30	29	30	25	2,059	2,232	2,211	1,719	14.4	13.0	13.4	14.7	16.74
200,001 to 500,000	29	23	36	20	1,508	2,585	2,071	832	19.0	9.0	17.3	23.6	27.10
Over 500,000	29	20	24	15	2,454	1,384	1,256	Q	12.0	14.8	18.9	15.8	25.50
Year Constructed													
1899 or Before	3	2	1	Q	701	401	308	Q	4.3	5.9	3.8	Q	24.63
1900 to 1919	9	4	4	5	1,326	1,577	501	446	7.0	2.7	7.3	10.8	28.01
1920 to 1945	24	21	9	8	2,557	2,370	2,103	850	9.2	8.8	4.5	9.3	18.22
1946 to 1959	27	19	45	19	2,178	2,223	3,835	1,950	12.5	8.5	11.8	9.9	18.03
1960 to 1969	46	37	51	39	2,735	3,229	3,918	2,039	16.9	11.4	13.0	19.0	15.42
1970 to 1979	29	48	83	54	1,998	3,112	5,153	2,909	14.5	15.3	16.2	18.6	13.78
1980 to 1983	12	16	41	18	439	890	1,865	1,015	28.1	17.5	21.9	17.4	20.92
1984 to 1986	15	18	31	25	831	1,217	2,424	1,156	18.4	14.5	12.8	21.5	19.46
1987 to 1989	6	Q	20	9	561	685	1,110	794	9.8	20.9	18.2	11.3	26.18
BUILDING USE													
Principal Building Activity													
Assembly	10	10	26	9	1,501	1,408	2,768	1,174	Q	7.1	9.5	7.3	21.41
Education	14	16	20	13	1,888	2,215	2,332	1,634	7.3	7.4	8.7	7.9	14.79
Food Sales	Q	Q	11	Q	Q	Q	278	Q	Q	Q	39.6	Q	21.45
Food Service	6	6	15	6	284	339	370	173	21.7	19.1	39.4	33.2	24.40
Health Care	8	21	11	6	378	912	472	292	20.1	22.6	23.4	20.1	18.68
Lodging	6	12	15	8	549	982	1,215	730	10.7	11.9	12.4	10.7	20.63
Mercantile and Service	40	38	58	25	2,647	3,057	4,775	1,882	15.1	12.5	12.1	13.4	12.58
Office	44	38	80	67	2,703	2,275	3,817	3,001	16.3	16.7	20.9	22.4	12.70
Parking Garage	1	2	Q	Q	160	384	Q	Q	5.9	4.3	Q	Q	31.48
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Warehouse	23	22	17	9	1,738	2,570	3,183	1,358	13.2	8.6	5.4	6.6	26.56
Other	Q	Q	Q	Q	Q	Q	820	369	Q	Q	30.0	Q	41.67
Vacant	5	2	3	1	740	Q	805	301	7.0	1.7	3.6	4.6	31.15
Weekly Operating Hours													
39 or Fewer	3	4	9	4	793	1,081	2,189	684	4.3	3.6	4.2	6.2	16.25
40 to 48	20	22	67	20	2,575	2,761	6,383	2,091	7.8	7.9	10.5	9.5	13.07
49 to 60	32	29	48	31	2,785	3,207	4,422	2,936	11.4	9.2	10.9	10.4	14.01
61 to 84	35	35	56	27	2,983	2,801	3,150	1,817	11.7	12.6	17.7	14.8	15.01
85 to 167	34	41	41	27	2,368	3,082	2,244	1,683	14.2	13.3	18.2	15.8	16.26
168 (Open Continuously)	48	47	65	69	1,823	2,773	2,826	2,107	26.2	16.9	22.9	32.6	15.88
Workers													
4 or Fewer	15	16	39	16	2,381	3,735	5,194	2,240	6.1	4.4	7.6	7.0	12.10
5 to 9	11	16	35	13	1,371	1,811	3,449	1,296	8.2	8.6	10.2	10.4	16.51
10 to 19	16	17	22	15	1,252	1,433	2,290	1,468	12.6	11.6	9.7	10.2	18.44
20 to 49	20	28	48	22	2,265	2,196	3,538	1,666	8.7	12.9	13.5	13.1	15.32
50 to 99	22	20	38	22	1,781	2,188	2,261	1,160	12.3	8.9	16.9	19.1	18.03
100 to 249	41	35	38	26	1,656	2,050	1,623	1,441	25.0	17.2	23.2	17.9	18.09
250 or More	47	47	65	63	2,619	2,292	2,860	2,047	17.9	20.4	22.8	30.8	18.73

See footnotes at end of table.

Table 23. Electricity Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.443	1.104	1.025	1.340	1.094	0.893	0.830	0.955	1.155	0.822	0.882	0.964	
Ownership and Occupancy													
Nongovernment Owned	130	148	211	130	10,178	12,394	16,325	8,653	12.8	11.9	12.9	15.0	8.92
Owner Occupied	102	118	152	90	8,177	9,904	11,602	5,754	12.5	11.9	13.1	15.6	10.11
Single Establishment	72	91	117	67	5,630	7,595	9,093	4,272	12.8	11.9	12.9	15.6	12.12
Multiple Establishment	30	27	35	23	2,547	2,309	2,509	1,482	11.7	11.8	14.0	15.5	15.15
Nonowner Occupied	28	30	59	40	2,001	2,490	4,723	2,899	14.1	12.0	12.5	13.8	14.31
Single Establishment	13	12	33	19	874	1,166	2,824	1,314	15.3	10.3	11.7	14.6	21.00
Multiple Establishment	15	17	25	20	991	1,165	1,575	1,496	14.8	14.8	16.1	13.5	16.12
Vacant	Q	1	1	Q	Q	159	323	Q	Q	3.8	2.6	Q	35.55
Government Owned	41	31	74	47	3,147	3,310	4,891	2,665	13.1	9.3	15.2	17.7	18.03
Federal	Q	Q	23	Q	Q	Q	913	Q	Q	Q	25.5	17.2	28.06
State	20	11	17	Q	910	887	1,325	748	22.3	12.1	12.7	Q	23.50
Local	19	19	34	12	2,055	2,341	2,652	1,196	9.4	8.0	12.9	10.3	17.39
Multibuilding Facility													
Not on Multibuilding Facility	93	98	147	81	8,756	10,269	11,997	5,502	10.6	9.6	12.2	14.7	9.13
Part of Multibuilding Facility	79	80	139	96	4,570	5,436	9,218	5,816	17.3	14.8	15.1	16.5	14.48
On Facility with Central Plant	36	41	61	48	1,717	2,066	2,566	1,949	20.8	19.8	23.7	24.8	27.61
Percent Vacant at Least Three Months													
0	123	128	216	137	8,845	10,605	15,495	7,752	13.9	12.1	13.9	17.7	9.41
1 to 50	40	44	57	30	3,074	3,395	3,693	2,254	12.9	13.0	15.4	13.4	13.45
51 to 99	Q	3	3	Q	673	1,203	758	Q	9.0	Q	4.2	7.7	30.47
100	3	3	10	3	733	501	1,271	500	4.1	5.6	7.7	6.1	22.55
Months in Use Out of Past 12 Months													
0 to 8	3	6	10	5	584	749	1,414	560	5.4	7.7	7.2	8.2	25.01
9 to 11	5	4	8	5	1,130	704	1,180	760	4.2	5.9	7.0	6.8	17.00
12	164	169	267	167	11,611	14,251	18,621	9,997	14.1	11.8	14.4	16.7	8.97
LOCATION													
Metropolitan Status													
Metropolitan	147	145	235	167	11,370	12,491	15,847	10,127	12.9	11.6	14.8	16.5	8.39
Nonmetropolitan	Q	34	51	9	1,956	3,213	5,368	1,191	12.8	10.5	9.5	7.9	14.47
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	11	42	NC	Q	953	3,360	NC	669	11.5	12.6	NC	12.7	19.08
5,500-7,000 HDD	72	95	NC	29	6,215	9,006	NC	2,275	11.6	10.6	NC	12.6	16.44
4,000-5,499 HDD	89	41	59	19	6,157	3,338	4,343	1,207	14.4	12.2	13.5	15.6	15.74
Under 4,000 HDD	NC	NC	97	97	NC	NC	6,997	5,575	NC	NC	13.9	17.4	17.23
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	130	24	NC	NC	9,875	1,591	NC	NC	13.2	15.0	16.44
STRUCTURE													
Floors													
1	43	54	123	50	3,566	4,718	10,193	4,128	11.9	11.5	12.1	12.1	12.05
2	49	50	77	56	3,081	3,793	5,805	3,166	16.0	13.2	13.3	17.7	13.43
3	24	17	27	Q	2,246	2,825	2,160	1,281	10.6	6.0	12.4	Q	16.10
4 to 6	20	29	27	24	2,389	2,530	1,601	1,690	8.3	11.4	17.1	14.3	20.01
7 or More	36	28	31	21	2,044	1,838	1,456	1,053	17.8	15.5	21.0	19.5	18.40
Wall Materials													
Masonry	110	130	176	94	9,596	11,717	13,947	5,885	11.4	11.1	12.7	15.9	9.78
Siding or Shingles	8	8	14	14	1,249	965	1,247	1,061	6.4	8.2	11.4	13.0	21.52
Metal Panels	Q	16	26	11	643	1,373	2,577	788	30.5	11.5	10.0	13.9	23.59
Concrete Panels	14	14	48	40	880	1,053	2,492	2,692	15.3	13.6	19.2	15.0	21.85
Window Glass	Q	7	10	13	Q	310	352	589	21.2	21.0	27.0	21.5	25.19
Other	7	Q	12	5	294	Q	599	302	23.2	Q	19.6	17.4	28.65

See footnotes at end of table.

Table 23. Electricity Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1.443	1.104	1.028	1.340	1.034	0.860	0.930	0.858	1.165	0.922	0.882	0.954	
Roof Materials													
Built-Up	70	88	161	116	5,643	7,945	10,574	6,132	12.4	11.0	15.2	18.9	10.84
Shingles (Not Wood)	23	20	32	25	2,814	2,237	3,268	2,271	8.2	8.7	9.7	11.2	14.68
Metal Surfacing	28	16	35	12	1,484	1,648	3,581	1,077	18.9	9.8	9.9	11.4	19.47
Synthetic or Rubber	31	39	42	11	1,789	2,402	2,148	568	17.2	16.2	19.4	18.6	20.90
Slate or Tile	Q	2	6	6	665	493	806	592	Q	Q	7.5	11.0	29.14
Concrete	Q	5	6	2	Q	407	587	265	12.9	11.2	10.0	9.3	29.56
Wooden Materials	Q	2	Q	2	Q	206	Q	241	Q	10.3	Q	9.7	29.87
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	122	151	241	131	8,810	11,489	15,804	8,437	13.9	13.2	15.2	15.5	8.78
Wall Insulation	93	117	158	85	5,970	8,107	9,954	5,383	15.6	14.5	15.9	15.8	10.83
Storm or Multiple Glazing	84	122	101	52	6,107	8,803	6,350	2,731	13.8	13.8	15.9	19.0	11.52
Tinted, Reflective, or Shading Glass	70	82	136	92	3,713	4,955	7,878	5,360	18.8	16.5	17.2	17.2	11.38
Exterior or Interior Shadings or Awnings	80	85	148	92	5,761	6,320	9,234	4,718	13.8	13.4	16.0	19.5	11.34
Weather Stripping or Caulking	140	157	236	128	9,831	11,955	14,887	7,693	14.3	13.1	15.9	16.7	9.13
None of the Above	10	6	15	9	1,411	2,002	2,365	1,092	6.8	2.9	6.3	8.2	22.72
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	172	178	286	177	13,326	15,704	21,215	11,318	12.9	11.4	13.5	15.6	8.35
Natural Gas	109	141	152	133	8,515	12,801	11,648	8,151	12.7	11.0	13.1	16.3	11.04
Fuel Oil	65	51	41	37	5,105	3,197	2,844	1,432	12.7	16.0	14.5	25.8	22.82
District Heat	38	24	Q	Q	2,236	1,509	1,583	Q	17.0	15.7	23.2	25.3	26.45
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	14	16	18	Q	1,073	1,061	1,738	Q	13.3	15.3	10.3	12.3	21.86
Other	3	4	4	Q	365	552	456	Q	Q	Q	7.8	Q	33.11
Energy End Uses (Solely or in Combination)													
Heated Buildings	170	176	266	172	12,940	15,056	19,168	10,662	13.2	11.7	13.9	16.1	8.56
Air-Conditioned Buildings	141	167	277	164	10,334	13,147	18,955	9,320	13.7	12.7	14.6	17.6	8.91
Buildings with Water Heating	166	170	260	166	12,447	14,198	16,923	10,002	13.4	12.0	15.4	16.6	8.72
Buildings with Cooking	88	84	133	85	5,870	6,485	7,194	4,114	15.0	12.9	18.5	20.7	12.51
Buildings with Manufacturing	12	21	31	21	1,026	1,532	1,732	1,304	11.8	14.0	17.7	16.3	24.53
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking	76	81	123	78	4,965	5,902	6,543	3,371	15.3	13.8	18.8	23.1	13.28
With Water Heating, Without Cooking	64	80	118	75	5,163	6,695	8,997	5,041	12.5	11.9	13.2	14.9	12.23
Without Water Heating or Cooking	1	6	17	5	176	519	2,328	618	4.2	10.9	7.2	8.0	22.97
Without Air Conditioning													
With Water Heating and Cooking	Q	2	Q	4	849	568	Q	604	Q	4.2	Q	7.2	28.42
With Water Heating, Without Cooking	14	6	3	6	1,423	909	582	786	10.1	6.5	5.6	7.9	25.94
Without Water Heating or Cooking	Q	2	2	1	336	453	556	165	9.5	3.4	3.6	6.6	27.66
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	1	2	3	1	338	525	1,025	394	2.9	2.9	2.6	3.6	27.98
All Other Combinations	Q	Q	19	6	Q	Q	1,125	340	Q	Q	16.8	17.2	28.74

See footnotes at end of table.

Table 23. Electricity Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1.445	1.104	1.026	1.247	1.054	0.893	0.935	0.955	1.185	0.922	0.982	0.984	
Space-Heating Energy Source													
Electricity	43	43	147	70	2,558	2,808	8,956	4,379	16.9	15.5	16.5	16.1	10.99
Main	25	34	117	59	1,351	1,746	6,911	3,441	18.6	19.4	16.9	17.2	12.71
With Secondary	Q	7	15	Q	Q	332	871	Q	Q	22.1	17.7	Q	26.80
Natural Gas Only	Q	Q	6	Q	Q	Q	419	Q	Q	Q	15.5	Q	31.16
Other Energy Sources or Combinations	Q	Q	Q	Q	Q	Q	385	Q	Q	Q	18.4	Q	41.53
With No Secondary	20	26	101	52	948	1,414	6,039	3,050	21.4	18.7	16.8	17.1	12.81
Secondary	18	10	31	11	1,207	1,062	2,045	938	15.1	9.1	15.1	12.1	22.40
Other Excluding Electricity	127	133	118	101	10,382	12,248	10,212	6,282	12.3	10.9	11.6	16.1	11.44
Building Not Heated	1	2	20	5	385	649	2,047	656	3.1	3.2	9.8	8.0	23.82
Main Space-Heating Energy Source													
Electricity	25	34	117	59	1,351	1,746	6,911	3,441	18.6	19.4	16.9	17.2	12.71
Natural Gas	66	118	97	96	5,317	11,346	8,609	5,830	12.5	10.4	11.3	16.5	12.37
Fuel Oil	42	4	6	Q	3,839	518	1,117	Q	10.8	8.5	5.8	Q	20.31
District Heat	37	16	36	16	2,180	1,120	1,557	1,163	16.8	14.1	23.3	13.4	26.12
Propane	Q	Q	4	Q	Q	370	608	Q	Q	Q	6.1	Q	30.94
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	3.2	Q	36.86
Air-Conditioning Energy Source													
Electricity	127	155	264	151	9,308	12,292	18,062	8,243	13.6	12.6	14.6	18.3	9.42
Other Excluding Electricity	15	12	13	13	1,027	855	893	1,077	14.5	14.4	14.4	12.3	23.77
Air-Conditioning Not Performed	30	11	9	13	2,991	2,557	2,260	1,998	10.1	4.5	4.0	6.6	15.49
Water-Heating Energy Source													
Electricity	62	57	149	65	4,029	4,384	9,136	3,945	15.5	13.0	16.3	16.4	11.05
Other Excluding Electricity	104	113	111	102	8,418	9,814	7,787	6,057	12.4	11.5	14.3	16.8	12.03
Water Heating Not Performed	5	9	25	11	879	1,507	4,292	1,316	6.0	5.8	5.9	8.2	17.31
Cooking Energy Source													
Electricity	31	44	74	25	2,705	2,923	3,666	1,555	11.6	14.9	20.2	16.1	14.15
Other Excluding Electricity	57	40	59	60	3,164	3,561	3,528	2,559	17.9	11.2	16.8	23.5	17.42
Cooking Not Performed	84	95	152	92	7,456	9,220	14,021	7,204	11.2	10.3	10.9	12.7	10.89
Manufacturing Energy Source													
Electricity	8	10	27	19	682	1,047	1,560	1,116	11.7	9.8	17.4	16.7	27.68
Other Excluding Electricity	4	Q	Q	3	344	485	Q	188	11.9	23.1	Q	13.6	28.27
Manufacturing Not Performed	160	157	255	156	12,299	14,172	19,483	10,013	13.0	11.1	13.1	15.5	8.43
HEATING AND COOLING													
Percent Heated													
Not Heated	1	2	20	5	413	667	2,080	679	3.3	3.1	9.6	7.8	22.60
1 to 50	10	Q	20	15	1,766	2,396	3,338	1,814	5.8	6.7	5.9	8.4	19.47
51 to 99	19	20	66	41	1,215	1,796	3,549	2,108	15.3	11.3	18.5	19.5	17.11
100	141	140	180	115	9,933	10,845	12,248	6,716	14.2	12.9	14.7	17.2	9.38
Percent Cooled													
Not Cooled	30	11	9	13	2,991	2,557	2,260	1,998	10.1	4.5	4.0	6.6	15.49
1 to 50	44	34	40	16	4,866	5,302	5,288	2,364	9.1	6.5	7.5	7.0	14.47
51 to 99	41	61	79	48	2,462	3,489	4,834	2,347	16.6	17.6	16.3	20.6	13.07
100	56	71	158	99	3,006	4,356	8,834	4,608	18.7	16.3	17.9	21.5	12.71

See footnotes at end of table.

Table 23. Electricity Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.443	1.104	1.025	1.940	1.054	0.893	0.820	0.355	1.155	0.822	0.582	0.564	
LIGHTING													
Percent Lit When Open													
Not Lit	Q	Q	1	Q	Q	190	268	Q	Q	3.7	1.9	Q	41.22
1 to 50	10	13	19	13	1,765	3,175	4,080	1,843	5.8	4.2	4.8	7.2	15.61
51 to 99	39	55	83	61	3,806	4,529	5,520	3,096	10.3	12.1	15.0	19.7	19.51
100	121	109	183	102	7,590	7,810	11,347	6,245	16.0	14.0	16.1	16.3	10.63

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 24. Electricity Expenditures by Census Region

Building Characteristics	Total Electricity Expenditures (million dollars)				Electricity Expenditures (dollars)								EPC Rate Factor
					per kWh				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
1989 Census Region	1,080	1,449	1,497	1,749	0.700	0.476	0.489	0.493	1.349	1.108	1.055	1.281	
All Buildings	13,188	11,697	18,409	12,649	0.08	0.07	0.06	0.07	0.99	0.74	0.87	1.12	7.28
Building Floorspace (Square Feet)													
1,001 to 5,000	1,368	1,589	3,105	1,530	.10	.08	.07	.08	1.39	1.04	1.16	1.26	7.53
5,001 to 10,000	1,035	854	3,209	1,134	.09	.07	.09	.08	.84	.60	1.34	.91	14.01
10,001 to 25,000	1,557	1,596	2,665	1,992	.07	.07	.07	.08	.79	.72	.70	.99	11.19
25,001 to 50,000	1,928	1,460	2,040	1,491	.09	.07	.06	.07	1.13	.72	.63	.88	11.52
50,001 to 100,000	1,078	1,829	2,713	2,421	.07	.06	.06	.06	.77	.78	.76	1.49	14.78
100,001 to 200,000	2,074	1,772	1,674	1,890	.07	.06	.06	.07	1.01	.79	.76	1.10	10.24
200,001 to 500,000	1,693	1,435	1,867	1,331	.06	.06	.05	.07	1.12	.56	.90	1.60	10.79
Over 500,000	2,455	1,160	1,136	861	.08	.06	.05	.06	1.00	.84	.91	.89	10.47
Year Constructed													
1899 or Before	305	170	86	Q	.10	.07	.07	Q	.44	.42	.28	Q	14.52
1900 to 1919	882	337	206	250	.09	.08	.06	.05	.67	.21	.41	.56	21.52
1920 to 1945	2,021	1,451	683	618	.09	.07	.07	.08	.79	.61	.32	.73	13.21
1946 to 1959	1,926	1,278	2,863	1,266	.07	.07	.06	.07	.88	.58	.75	.65	13.96
1960 to 1969	3,211	2,497	3,236	2,723	.07	.07	.06	.07	1.17	.77	.83	1.33	11.12
1970 to 1979	2,149	3,041	5,681	3,944	.07	.06	.07	.07	1.08	.98	1.10	1.36	11.39
1980 to 1983	865	910	2,466	1,329	.07	.06	.06	.08	1.97	1.02	1.32	1.31	19.82
1984 to 1986	1,363	1,170	2,009	1,821	.09	.07	.06	.07	1.64	.96	.83	1.57	14.02
1987 to 1989	465	842	1,179	657	.08	.06	.06	.07	.83	1.23	1.06	.83	10.52
BUILDING USE													
Principal Building Activity													
Assembly	Q	688	2,469	603	.09	.07	.09	.07	Q	.49	Q	.51	14.04
Education	1,129	1,147	1,309	805	.08	.07	.06	.06	.60	.52	.56	.49	10.87
Food Sales	Q	Q	653	Q	Q	Q	.06	Q	Q	Q	2.35	Q	11.30
Food Service	579	465	979	497	.09	.07	.07	.09	2.04	1.37	2.64	2.88	12.77
Health Care	508	1,040	661	461	.07	.05	.06	.08	1.35	1.14	1.40	1.58	14.13
Lodging	333	772	894	594	.06	.07	.06	.08	.61	.79	.74	.81	10.84
Mercantile and Service	2,836	2,673	3,685	1,921	.07	.07	.06	.08	1.07	.87	.77	1.02	9.99
Office	3,694	2,444	4,747	4,872	.08	.06	.06	.07	1.37	1.07	1.24	1.62	8.53
Parking Garage	90	117	Q	Q	.10	.07	Q	Q	.56	.31	Q	Q	16.79
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	1,524	1,417	1,136	759	.07	.06	.07	.09	.88	.55	.36	.56	16.28
Other	Q	Q	Q	Q	Q	Q	.06	.06	Q	Q	1.70	Q	22.08
Vacant	424	159	228	113	.08	.08	.08	.08	.57	.13	.28	.37	20.00
Weekly Operating Hours													
39 or Fewer	308	328	731	351	.09	.08	.08	.08	.39	.30	.33	.51	12.16
40 to 48	1,767	1,538	5,047	1,519	.09	.07	.08	.08	.69	.56	.79	.73	11.44
49 to 60	2,666	2,094	3,113	2,272	.08	.07	.06	.07	.96	.65	.70	.77	9.92
61 to 84	2,999	2,552	3,293	2,055	.09	.07	.06	.08	1.01	.91	1.05	1.13	10.73
85 to 167	2,650	2,482	2,497	1,851	.08	.06	.06	.07	1.12	.81	1.11	1.10	10.73
168 (Open Continuously)	2,798	2,702	3,728	4,600	.06	.06	.06	.07	1.54	.97	1.32	2.18	12.94
Workers													
4 or Fewer	1,413	1,322	2,790	1,310	.10	.08	.07	.08	.59	.35	.54	.58	8.06
5 to 9	889	1,097	2,310	1,169	.08	.07	.07	.09	.65	.61	.67	.90	10.87
10 to 19	1,098	1,122	1,559	1,214	.07	.07	.07	.08	.88	.78	.68	.83	12.19
20 to 49	1,647	1,900	3,814	1,607	.08	.07	.08	.07	.73	.87	1.08	.96	10.40
50 to 99	1,797	1,357	2,361	1,503	.08	.07	.06	.07	1.01	.62	1.04	1.30	11.37
100 to 249	2,665	2,166	2,209	1,870	.06	.06	.06	.07	1.61	1.06	1.36	1.30	12.48
250 or More	3,680	2,733	3,365	3,976	.08	.06	.05	.06	1.40	1.19	1.18	1.94	12.96

See footnotes at end of table.

Table 24. Electricity Expenditures by Census Region (Continued)

Building Characteristics	Total Electricity Expenditures (million dollars)				Electricity Expenditures (dollars)								RSE Row Factor
					per kWh				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.839	1.449	1.427	1.743	0.739	0.476	0.469	0.483	1.349	1.106	1.009	1.261	
Ownership and Occupancy													
Nongovernment Owned	10,307	9,824	13,288	9,698	0.08	0.07	0.06	0.07	1.01	0.79	0.81	1.12	6.35
Owner Occupied	8,019	7,652	9,452	6,442	.08	.06	.06	.07	.98	.77	.81	1.12	7.25
Single Establishment	5,329	5,821	7,454	4,839	.07	.06	.06	.07	.95	.77	.82	1.13	8.24
Multiple Establishment	2,690	1,831	1,998	1,603	.09	.07	.06	.07	1.06	.79	.80	1.08	10.72
Nonowner Occupied	2,288	2,172	3,836	3,256	.08	.07	.06	.08	1.14	.87	.81	1.12	9.40
Single Establishment	1,076	838	2,083	1,597	.08	.07	.06	.08	1.23	.72	.74	1.22	12.42
Multiple Establishment	1,188	1,290	1,682	1,605	.08	.07	.07	.08	1.20	1.11	1.07	1.07	11.72
Vacant	Q	45	70	Q	Q	.07	.08	Q	Q	.28	.22	Q	22.01
Government Owned	2,882	1,872	5,121	2,951	.07	.06	.07	.06	.92	.57	1.05	1.11	16.27
Federal	Q	Q	1,265	Q	Q	Q	.05	.05	Q	Q	1.39	.95	19.00
State	1,249	578	913	Q	.06	.05	.05	.06	1.37	.65	.69	Q	19.11
Local	1,501	1,201	2,943	896	.08	.06	.09	.07	.73	.51	1.11	.75	15.70
Multibuilding Facility													
Not on Multibuilding Facility	7,752	6,872	9,316	5,870	.08	.07	.06	.07	.89	.67	.78	1.07	6.85
Part of Multibuilding Facility	5,436	4,825	9,093	6,778	.07	.06	.07	.07	1.19	.89	.99	1.17	12.26
On Facility with Central Plant	2,118	2,221	4,171	2,887	.06	.05	.07	.06	1.23	1.08	1.63	1.48	19.09
Percent Vacant at Least Three Months													
0	9,096	8,379	14,259	9,895	.07	.07	.07	.07	1.03	.79	.92	1.28	8.22
1 to 50	3,487	2,851	3,238	2,216	.09	.06	.06	.07	1.13	.84	.88	.98	9.25
51 to 99	373	258	233	Q	.06	.08	.07	.05	.55	Q	.31	.38	18.61
100	233	208	679	226	.08	.07	.07	.07	.32	.42	.53	.45	15.79
Months in Use Out of Past 12 Months													
0 to 8	250	398	729	345	.08	.07	.07	.08	.43	.53	.52	.62	17.12
9 to 11	356	343	608	423	.07	.08	.07	.08	.32	.49	.52	.56	11.92
12	12,582	10,956	17,073	11,881	.08	.07	.06	.07	1.08	.77	.92	1.19	7.60
LOCATION													
Metropolitan Status													
Metropolitan	11,661	9,644	15,155	12,034	.08	.07	.06	.07	1.03	.77	.96	1.19	7.96
Nonmetropolitan	1,528	2,053	3,254	615	.06	.06	.06	.07	.78	.64	.61	.52	12.22
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	822	2,314	NC	Q	.08	.05	NC	.06	.86	.69	NC	Q	10.95
5,500-7,000 HDD	5,286	6,707	NC	1,678	.07	.07	NC	.06	.85	.74	NC	.74	11.59
4,000-5,499 HDD	7,081	2,675	3,440	848	.08	.07	.06	.05	1.15	.80	.79	.70	9.74
Under 4,000 HDD	NC	NC	5,668	7,603	NC	NC	.06	.08	NC	NC	.81	1.36	10.93
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	9,302	1,987	NC	NC	.07	.08	NC	NC	.94	1.25	13.38
STRUCTURE													
Floors													
1	3,310	3,935	9,046	4,135	.08	.07	.07	.08	.93	.83	.89	1.00	9.62
2	3,390	3,170	4,678	3,949	.07	.06	.06	.07	1.10	.84	.81	1.25	9.57
3	1,889	1,147	1,571	Q	.08	.07	.06	.06	.84	.41	.73	Q	15.99
4 to 6	1,451	1,774	1,466	1,579	.07	.06	.05	.07	.61	.70	.92	.93	13.93
7 or More	3,148	1,671	1,647	1,353	.09	.06	.05	.07	1.54	.91	1.13	1.28	11.92
Wall Materials													
Masonry	8,751	8,571	11,101	6,819	.08	.07	.06	.07	.91	.73	.80	1.16	7.10
Siding or Shingles	723	583	945	960	.09	.07	.07	.07	.58	.60	.76	.90	14.09
Metal Panels	1,181	1,010	1,651	798	.06	.06	.06	.07	1.84	.74	.64	1.01	16.67
Concrete Panels	1,007	847	3,567	2,832	.07	.06	.07	.07	1.14	.80	1.43	1.05	19.37
Window Glass	Q	Q	518	862	.09	.07	.05	.07	1.82	1.44	1.47	1.46	18.86
Other	321	Q	627	378	.05	Q	.05	.07	1.09	Q	1.05	1.25	20.26

See footnotes at end of table.

Table 24. Electricity Expenditures by Census Region (Continued)

Building Characteristics	Total Electricity Expenditures (million dollars)				Electricity Expenditures (dollars)								RSE Row Factor
					per kWh				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.839	1.449	1.427	1.743	0.739	0.476	0.489	0.483	1.349	1.106	1.009	1.261	
Roof Materials													
Built-Up	5,831	5,938	10,564	8,017	0.08	0.07	0.07	0.07	1.03	0.75	1.00	1.31	9.48
Shingles (Not Wood)	1,971	1,487	2,198	1,961	.08	.08	.07	.08	.70	.66	.67	.86	10.64
Metal Surfacing	1,712	981	2,331	952	.06	.06	.07	.08	1.15	.60	.65	.88	12.14
Synthetic or Rubber	2,320	2,293	2,260	676	.08	.06	.05	.06	1.30	.95	1.05	1.19	12.89
Slate or Tile	307	182	388	544	.05	.08	.06	.08	.46	Q	.48	.92	18.66
Concrete	Q	292	416	176	.10	.06	.07	.07	1.24	.72	.71	.66	22.77
Wooden Materials	Q	160	Q	226	Q	.08	Q	.10	Q	.77	Q	.94	18.48
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	9,307	9,717	15,448	9,369	.08	.06	.06	.07	1.06	.85	.98	1.11	7.50
Wall Insulation	6,714	7,370	10,476	5,924	.07	.06	.07	.07	1.12	.91	1.05	1.10	8.97
Storm or Multiple Glazing	6,395	7,622	5,978	3,494	.08	.06	.06	.07	1.05	.87	.94	1.28	8.08
Tinted, Reflective, or Shading Glass	5,229	5,073	8,837	6,681	.08	.06	.07	.07	1.41	1.02	1.12	1.25	9.75
Exterior or Interior Shadings or Awnings	6,222	5,403	8,992	6,223	.08	.06	.06	.07	1.08	.85	.97	1.32	7.72
Weather Stripping or Caulking	10,781	10,157	15,065	8,927	.08	.06	.06	.07	1.10	.85	1.01	1.16	8.04
None of the Above	734	457	989	746	.08	.08	.07	.08	.52	.23	.42	.68	14.42
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	13,188	11,697	18,409	12,649	.08	.07	.06	.07	.99	.74	.87	1.12	7.25
Natural Gas	8,193	9,462	9,305	9,417	.08	.07	.06	.07	.96	.74	.80	1.16	8.16
Fuel Oil	5,150	2,814	2,369	2,647	.08	.06	.06	.07	1.01	.88	.83	1.85	14.14
District Heat	3,145	1,324	Q	1,829	.08	.06	.05	.06	1.41	.88	1.20	1.46	16.23
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	1,195	989	1,232	635	.08	.06	.07	.06	1.11	.93	.71	.77	16.75
Other	167	289	226	Q	.05	.06	.06	Q	.46	Q	.50	Q	16.53
Energy End Uses (Solely or in Combination)													
Heated Buildings	13,083	11,549	16,183	12,150	.08	.07	.06	.07	1.01	.77	.84	1.14	6.24
Air-Conditioned Buildings	11,183	10,807	17,803	11,703	.08	.06	.06	.07	1.08	.82	.94	1.26	7.50
Buildings with Water Heating	12,734	11,092	16,524	11,747	.08	.07	.06	.07	1.02	.78	.98	1.17	7.66
Buildings with Cooking	6,395	5,245	7,936	5,507	.07	.06	.06	.06	1.09	.81	1.10	1.34	9.01
Buildings with Manufacturing	1,004	1,330	1,722	1,408	.08	.06	.06	.07	.98	.87	.99	1.08	14.93
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking	5,729	5,030	7,119	4,969	.08	.06	.06	.06	1.15	.85	1.09	1.47	9.31
With Water Heating, Without Cooking	5,360	5,349	7,321	5,778	.08	.07	.06	.08	1.04	.80	.81	1.15	7.81
Without Water Heating or Cooking	73	389	1,238	436	.10	.07	.07	.09	.42	.75	.53	.71	13.41
Without Air Conditioning													
With Water Heating and Cooking	612	195	Q	266	.05	.08	Q	.06	.72	.34	Q	.44	22.10
With Water Heating, Without Cooking	1,009	473	197	464	.07	.08	.06	.07	.71	.52	.34	.59	19.17
Without Water Heating or Cooking	Q	110	140	87	.08	.07	.07	.08	.80	.24	.25	.53	20.26
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	82	104	191	106	.08	.07	.07	.08	.24	.20	.19	.27	20.20
All Other Combinations	Q	Q	Q	543	Q	Q	.11	.09	Q	Q	Q	1.60	18.36

See footnotes at end of table.

Table 24. Electricity Expenditures by Census Region (Continued)

Building Characteristics	Total Electricity Expenditures (million dollars)				Electricity Expenditures (dollars)								RSE Row Factor
					per kWh				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.839	1.448	1.427	1.743	0.739	0.476	0.469	0.463	1.349	1.106	1.008	1.261	
Space-Heating Energy Source													
Electricity	3,193	2,846	8,966	5,032	0.07	0.07	0.06	0.07	1.25	1.01	1.00	1.15	8.30
Main	1,697	2,140	7,096	4,249	.07	.06	.06	.07	1.26	1.23	1.03	1.23	9.34
With Secondary	Q	494	892	Q	Q	.07	.06	Q	Q	1.49	1.02	Q	15.13
Natural Gas Only	Q	Q	408	Q	Q	Q	.06	Q	Q	Q	.97	Q	14.24
Other Energy Sources or Combinations	Q	Q	Q	Q	Q	Q	.05	Q	Q	Q	.96	Q	16.16
With No Secondary	1,340	1,647	6,204	3,851	.07	.06	.06	.07	1.41	1.16	1.03	1.26	9.75
Secondary	1,496	705	1,870	784	.08	.07	.06	.07	1.24	.66	.91	.83	15.24
Other Excluding Electricity	9,890	8,703	7,217	7,117	.08	.07	.06	.07	.95	.71	.71	1.13	7.93
Building Not Heated	105	148	Q	499	.09	.07	.11	.09	.27	.23	Q	.76	17.72
Main Space-Heating Energy Source													
Electricity	1,697	2,140	7,096	4,249	.07	.06	.06	.07	1.26	1.23	1.03	1.23	9.34
Natural Gas	4,882	8,021	6,132	6,924	.07	.07	.06	.07	.92	.71	.71	1.19	8.18
Fuel Oil	3,394	283	446	Q	.08	.06	.07	Q	.88	.55	.40	Q	13.64
District Heat	3,004	909	1,901	906	.08	.06	.05	.06	1.38	.81	1.22	.78	17.16
Propane	Q	Q	266	Q	Q	.05	.07	Q	Q	1.19	.44	Q	16.76
Other	Q	Q	Q	Q	Q	Q	.07	Q	Q	Q	.22	Q	14.19
Air-Conditioning Energy Source													
Electricity	9,980	9,950	17,078	10,878	.08	.06	.06	.07	1.07	.81	.95	1.32	7.59
Other Excluding Electricity	1,203	857	725	825	.08	.07	.06	.06	1.17	1.00	.81	.77	16.93
Air-Conditioning Not Performed	2,005	889	606	946	.07	.08	.07	.07	.67	.35	.27	.47	12.21
Water-Heating Energy Source													
Electricity	4,770	3,786	9,831	4,393	.08	.07	.07	.07	1.18	.86	1.08	1.11	9.61
Other Excluding Electricity	7,965	7,306	6,693	7,354	.08	.06	.06	.07	.95	.74	.86	1.21	8.77
Water Heating Not Performed	454	605	1,885	902	.09	.07	.07	.08	.52	.40	.44	.69	10.96
Cooking Energy Source													
Electricity	2,221	2,593	4,324	1,625	.07	.06	.06	.06	.82	.89	1.18	1.05	10.22
Other Excluding Electricity	4,174	2,653	3,612	3,882	.07	.07	.06	.06	1.32	.74	1.02	1.52	12.03
Cooking Not Performed	6,793	6,451	10,473	7,142	.08	.07	.07	.08	.91	.70	.75	.99	8.59
Manufacturing Energy Source													
Electricity	679	736	1,532	1,227	.08	.07	.06	.07	.99	.70	.98	1.10	16.93
Other Excluding Electricity	325	Q	Q	181	.08	.05	Q	.07	.94	1.22	Q	.96	15.06
Manufacturing Not Performed	12,185	10,367	16,687	11,241	.08	.07	.07	.07	.99	.73	.86	1.12	7.55
HEATING AND COOLING													
Percent Heated													
Not Heated	124	150	Q	501	.09	.07	.11	.09	.30	.23	Q	.74	16.99
1 to 50	847	1,021	1,375	1,308	.08	.06	.07	.09	.48	.43	.41	.72	12.46
51 to 99	1,385	1,337	3,855	2,899	.07	.07	.06	.07	1.14	.74	1.09	1.38	10.71
100	10,833	9,189	10,949	7,941	.08	.07	.06	.07	1.09	.85	.89	1.18	6.96
Percent Cooled													
Not Cooled	2,005	889	606	946	.07	.08	.07	.07	.67	.35	.27	.47	12.21
1 to 50	3,524	2,525	2,665	1,299	.08	.07	.07	.08	.72	.48	.50	.55	9.40
51 to 99	2,955	3,654	4,778	3,311	.07	.06	.06	.07	1.20	1.05	.99	1.41	6.69
100	4,705	4,628	10,360	7,093	.08	.07	.07	.07	1.57	1.06	1.17	1.54	10.63

See footnotes at end of table.

Table 24. Electricity Expenditures by Census Region (Continued)

Building Characteristics	Total Electricity Expenditures (million dollars)				Electricity Expenditures (dollars)								RSE Row Factor
					per kWh				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.839	1.449	1.427	1.743	0.739	0.476	0.469	0.463	1.349	1.109	1.059	1.221	
LIGHTING													
Percent Lit When Open													
Not Lit	Q	45	44	Q	Q	0.06	0.09	Q	Q	0.24	0.16	Q	28.70
1 to 50	979	905	1,417	1,099	0.09	.07	.07	0.08	0.55	.28	.35	0.60	10.79
51 to 99	3,227	3,612	4,984	4,247	.08	.07	.06	.07	.85	.80	.90	1.37	9.44
100	8,932	7,134	11,964	7,248	.07	.07	.07	.07	1.18	.91	1.05	1.16	8.99

Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 25. Electricity Consumption and Conditional Energy Intensity by Building Size

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
All Buildings	168	336	310	12,706	27,577	21,280	13.2	12.2	14.5	0.84
Year Constructed										
1899 or Before	3	4	Q	540	979	Q	5.4	4.3	Q	21.75
1900 to 1919	5	9	8	685	1,587	Q	7.6	5.5	Q	21.98
1920 to 1945	17	24	21	1,986	3,383	2,511	8.3	7.2	8.3	15.33
1946 to 1959	26	38	47	2,477	4,430	3,277	10.5	8.5	14.4	12.85
1960 to 1969	27	77	69	2,118	5,511	4,293	12.6	14.0	16.1	13.28
1970 to 1979	48	83	83	2,518	5,628	5,025	19.0	14.8	16.5	10.23
1980 to 1983	18	41	28	893	1,932	1,384	19.7	21.0	20.4	15.31
1984 to 1986	14	36	39	923	2,631	2,074	15.3	13.6	18.8	15.13
1987 to 1989	11	24	14	565	1,496	1,088	18.8	16.2	13.0	22.17
BUILDING USE										
Principal Building Activity										
Assembly	20	22	13	2,183	3,274	1,394	9.1	6.8	9.0	24.77
Education	7	30	27	680	4,063	3,327	10.0	7.4	8.0	13.62
Food Sales	11	16	Q	256	378	Q	41.2	41.5	Q	21.36
Food Service	27	6	NC	680	486	NC	39.5	12.6	NC	18.23
Health Care	3	6	36	198	345	1,511	16.0	17.5	23.7	17.70
Lodging	4	23	13	401	1,795	1,279	11.1	13.0	9.8	17.88
Mercantile and Service	47	61	54	3,868	5,412	3,080	12.0	11.2	17.5	11.55
Office	32	86	111	1,781	4,755	5,260	17.8	18.2	21.1	10.75
Parking Garage	2	Q	3	145	Q	657	11.0	Q	4.6	27.83
Public Order and Safety	2	Q	Q	164	Q	Q	9.1	Q	Q	23.55
Warehouse	9	37	25	1,615	4,770	2,465	5.4	7.8	10.3	19.79
Other	3	Q	Q	149	989	Q	23.1	41.9	Q	44.13
Vacant	2	3	6	585	931	Q	4.2	2.8	4.3	27.85
Weekly Operating Hours										
39 or Fewer	11	8	2	2,252	2,077	419	4.8	3.9	4.4	18.34
40 to 48	37	61	31	3,405	7,135	3,270	10.9	8.6	9.3	13.31
49 to 60	27	53	60	2,842	6,512	3,995	9.5	8.1	15.1	11.66
61 to 84	29	60	64	1,693	4,366	4,691	17.0	13.8	13.7	11.67
85 to 167	35	57	50	1,446	3,727	4,204	24.2	15.4	11.8	14.15
168 (Open Continuously)	29	96	103	1,068	3,760	4,701	27.1	25.6	21.9	12.66
Workers										
4 or Fewer	63	21	2	6,949	5,089	Q	9.1	4.1	1.4	12.53
5 to 9	44	30	2	3,064	3,986	877	14.2	7.6	Q	15.30
10 to 19	32	36	2	1,770	4,066	607	18.0	8.8	3.5	15.38
20 to 49	27	75	15	861	6,946	1,858	31.5	10.8	8.1	15.71
50 to 99	Q	76	25	Q	4,186	3,173	Q	18.1	7.8	12.41
100 to 249	Q	69	71	Q	2,815	3,924	Q	24.4	18.1	12.71
250 or More	NC	Q	193	NC	489	9,329	NC	Q	20.7	11.35
Ownership and Occupancy										
Nongovernment Owned	142	257	220	11,211	21,576	14,763	12.7	11.9	14.9	6.71
Owner Occupied	108	180	174	8,354	15,606	11,476	12.9	11.5	15.2	7.90
Single Establishment	98	147	102	7,162	12,457	6,970	13.6	11.8	14.6	9.54
Multiple Establishment	10	33	72	1,192	3,149	4,506	8.6	10.4	16.0	10.89
Nonowner Occupied	34	77	46	2,856	5,970	3,287	12.0	12.9	14.0	10.54
Single Establishment	24	39	15	1,855	3,044	1,280	13.0	12.7	11.7	15.98
Multiple Establishment	9	38	31	684	2,658	1,885	13.2	14.2	16.4	15.93
Vacant	1	1	Q	318	267	Q	3.5	3.5	Q	24.57
Government Owned	25	79	89	1,495	6,001	6,517	17.0	13.1	13.7	18.99
Federal	Q	12	25	Q	534	Q	Q	22.8	19.4	31.12
State	4	33	33	308	1,645	1,917	12.7	20.4	17.2	20.32
Local	20	33	31	1,112	3,822	3,309	18.0	8.6	9.5	15.91

See footnotes at end of table.

Table 25. Electricity Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	1.021	1.151	1.405	0.717	0.720	1.316	0.860	0.987	1.019	
Multibuilding Facility										
Not on Multibuilding Facility	107	170	142	8,498	16,579	11,447	12.6	10.2	12.4	7.01
Part of Multibuilding Facility	61	166	168	4,208	10,999	9,833	14.5	15.1	17.1	10.88
On Facility with Central Plant	16	79	91	405	3,209	4,683	39.6	24.5	19.5	23.27
LOCATION										
Census Region										
Northeast	25	59	88	2,224	5,080	6,021	11.1	11.7	14.6	14.16
Midwest	32	73	73	2,945	6,558	6,201	11.0	11.2	11.7	12.01
South	79	118	89	5,084	10,592	5,538	15.5	11.1	16.1	11.07
West	32	85	60	2,452	5,347	3,519	12.9	15.9	17.1	12.97
Census Division										
Northeast										
New England	6	14	14	510	1,405	1,212	10.9	9.9	11.9	18.73
Middle Atlantic	19	46	73	1,714	3,675	4,810	11.1	12.4	15.2	17.19
Midwest										
East North Central	20	50	48	1,868	4,475	4,184	10.6	11.1	11.4	16.07
West North Central	13	24	25	1,078	2,083	2,017	11.7	11.4	12.4	17.12
South										
South Atlantic	31	54	37	2,074	5,048	2,506	15.1	10.7	14.6	15.88
East South Central	19	27	17	1,057	2,131	1,030	18.1	12.7	16.4	23.89
West South Central	28	37	36	1,954	3,413	2,002	14.5	10.8	17.7	16.88
West										
Mountain	11	18	Q	851	2,075	Q	13.3	8.9	18.2	19.20
Pacific	20	67	38	1,601	3,272	2,272	12.8	20.3	16.5	15.23
Metropolitan Status										
Metropolitan	126	282	286	8,504	21,788	19,543	14.8	12.9	14.6	7.47
Nonmetropolitan	42	54	24	4,202	5,789	1,737	10.0	9.3	13.6	15.02
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	10	36	16	915	2,902	1,165	11.3	12.3	13.8	16.87
5,500-7,000 HDD	37	74	85	3,157	7,292	7,048	11.7	10.1	12.1	14.35
4,000-5,499 HDD	30	78	99	2,705	6,044	6,297	11.0	12.9	15.7	15.06
Under 4,000 HDD	41	84	69	2,893	5,365	4,314	14.3	15.6	16.0	16.00
2,000 CDD or More and --										
Under 4,000 HDD	49	65	40	3,036	5,974	2,456	16.2	10.8	16.2	15.38
ENERGY SOURCES AND END USES *										
Energy Sources (Solely or in Combination)										
Electricity	168	336	310	12,706	27,577	21,280	13.2	12.2	14.5	6.84
Natural Gas	95	200	239	7,373	17,397	16,345	12.9	11.5	14.6	8.45
Fuel Oil	16	53	125	1,519	4,467	6,592	10.6	11.9	18.9	17.81
District Heat	Q	50	75	Q	1,877	4,553	Q	26.7	16.4	21.98
District Chilled Water	Q	Q	Q	Q	Q	1,372	Q	Q	17.6	24.72
Propane	11	27	20	1,040	1,946	1,708	10.8	13.8	11.9	20.96
Other	3	5	Q	385	619	Q	8.8	7.7	Q	30.83

See footnotes at end of table.

Table 25. Electricity Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	1.021	1.151	1.405	0.717	0.720	1.316	0.980	0.967	1.010	
Energy End Uses (Solely or in Combination)										
Heated Buildings	152	326	306	11,369	25,827	20,630	13.4	12.6	14.8	6.84
Air-Conditioned Buildings	146	315	288	9,372	23,045	19,340	15.5	13.7	14.9	6.88
Buildings with Water Heating	146	315	302	9,273	24,101	20,195	15.7	13.0	15.0	7.10
Buildings with Cooking	53	129	209	2,307	8,263	13,092	22.8	15.6	15.9	9.90
Buildings with Manufacturing	8	39	39	489	2,593	2,514	15.8	15.0	15.4	22.41
Space-Heating Energy Source										
Electricity	60	149	95	3,514	9,596	5,592	17.2	15.5	17.1	8.80
Main	51	106	78	2,561	6,449	4,437	19.9	16.4	17.6	9.89
With Secondary	4	15	16	250	898	850	15.0	16.3	19.0	23.16
Natural Gas Only	3	11	Q	171	629	Q	16.2	17.2	Q	32.79
Other Energy Sources or Combinations	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
With No Secondary	47	91	62	2,311	5,551	3,588	20.4	16.4	17.2	10.56
Secondary	9	43	17	953	3,146	1,155	9.9	13.7	15.1	17.27
Other Excluding Electricity	92	178	210	7,855	16,231	15,038	11.7	10.9	14.0	8.45
Building Not Heated	15	9	4	1,337	1,750	650	11.5	5.3	6.0	23.53
Main Space-Heating Energy Source										
Electricity	51	106	78	2,561	6,449	4,437	19.9	16.4	17.6	9.89
Natural Gas	77	152	148	6,485	14,108	10,508	11.8	10.8	14.1	9.58
Fuel Oil	14	20	19	1,306	2,735	1,536	10.5	7.4	12.7	22.64
District Heat	Q	33	66	147	1,721	4,151	35.3	18.9	16.0	23.11
Propane	5	Q	Q	652	539	Q	7.0	17.8	Q	26.86
Other	1	Q	Q	216	Q	Q	4.1	Q	Q	28.40
Air-Conditioning Energy Source										
Electricity	141	300	255	9,058	21,868	16,979	15.5	13.7	15.0	7.08
Other Excluding Electricity	5	15	33	314	1,177	2,361	15.8	12.9	14.0	18.07
Air-Conditioning Not Performed	22	21	21	3,334	4,532	1,940	6.6	4.6	11.0	15.78
Water-Heating Energy Source										
Electricity	76	138	118	4,623	9,892	6,979	16.4	14.0	17.0	9.14
Other Excluding Electricity	70	176	184	4,650	14,210	13,216	15.0	12.4	13.9	9.04
Water Heating Not Performed	22	21	7	3,433	3,476	1,085	6.4	6.1	6.6	14.44
Cooking Energy Source										
Electricity	25	57	92	956	3,999	5,895	26.4	14.2	15.6	11.30
Other Excluding Electricity	27	72	117	1,351	4,264	7,197	20.3	17.0	16.2	13.61
Cooking Not Performed	115	207	101	10,399	19,315	8,187	11.1	10.7	12.3	8.80
Manufacturing Energy Source										
Electricity	6	25	33	390	1,898	2,117	16.6	12.9	15.6	25.23
Other Excluding Electricity	Q	Q	6	Q	695	397	Q	20.7	14.5	26.86
Manufacturing Not Performed	160	297	271	12,218	24,984	18,766	13.1	11.9	14.4	6.81
HEATING AND COOLING Percent Heated										
Not Heated	15	9	4	1,376	1,802	661	11.3	5.2	5.9	23.27
1 to 50	17	31	13	1,837	4,633	2,843	9.3	6.7	4.6	18.04
51 to 99	26	51	69	1,521	3,382	3,766	17.1	14.9	18.3	13.53
100	109	244	223	7,972	17,760	14,010	13.7	13.8	15.9	7.51

See footnotes at end of table.

Table 25. Electricity Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	1.021	1.151	1.495	0.717	0.720	1.316	0.850	0.867	1.019	
Percent Cooled										
Not Cooled	22	21	21	3,334	4,532	1,940	6.6	4.6	11.0	15.78
1 to 50	30	65	41	3,174	8,964	5,683	9.4	7.2	7.2	12.42
51 to 99	33	79	118	1,664	5,071	6,399	19.6	15.6	18.4	10.55
100	83	171	130	4,535	9,011	7,258	18.4	19.0	17.9	10.33
LIGHTING										
Percent Lit When Open										
Not Lit	1	1	Q	248	297	Q	2.6	4.9	Q	37.16
1 to 50	20	23	13	3,082	5,559	2,223	6.6	4.2	5.7	13.97
51 to 99	40	104	95	2,836	7,446	6,668	14.0	13.9	14.2	11.17
100	107	207	202	6,539	14,275	12,178	16.4	14.5	16.6	8.15
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	86	205	221	7,010	16,759	15,005	12.2	12.2	14.7	7.56
Fluorescent Lamps	162	331	308	11,473	26,372	21,034	14.1	12.6	14.7	6.75
High-Intensity Discharge Lamps	16	97	176	1,108	5,849	11,220	14.1	16.5	15.7	11.78
Other Lamps	Q	Q	5	Q	Q	280	Q	Q	19.2	19.05
High-Efficiency Ballasts	58	173	184	2,710	11,039	10,412	21.5	15.7	17.6	9.97
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	94	123	98	7,249	12,144	7,639	12.9	10.1	12.9	8.82
With Thermostats	81	115	93	6,339	11,196	7,228	12.8	10.2	12.9	9.54
Any Control of Cooling	85	127	109	5,911	12,023	8,370	14.3	10.6	13.0	8.57
With Thermostats	72	119	105	5,269	10,747	8,016	13.7	11.1	13.1	8.03
Reduced Use During Off-Hours										
Heating Only	20	22	21	2,289	3,239	1,598	8.9	6.6	13.3	16.31
Cooling Only	18	24	17	859	1,932	1,321	21.1	12.3	13.1	25.41
Heating and Cooling	86	186	218	7,189	16,421	15,073	12.0	11.3	14.5	7.85
Computerized Energy Management and Control System										
Present in Building	13	80	170	516	4,309	9,485	24.5	18.5	17.9	11.00
Controls Heating and Cooling	12	76	166	492	4,176	9,098	24.5	18.2	18.2	11.24
Controls Lighting	Q	19	44	Q	882	2,887	Q	21.2	15.2	16.09
Controls Other	Q	12	34	Q	576	1,716	Q	21.7	19.8	15.21
Other Energy Management										
Regular HVAC Maintenance	103	287	292	5,869	19,483	17,603	17.5	14.7	16.6	7.51
Participated in Utility Conservation Program	12	65	94	839	4,319	5,668	14.1	15.0	16.7	11.32

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labeled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 26. Electricity Consumption and Conditional Energy Intensity for Selected Principal Building Activities

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.347	1.246	1.096	1.007	1.034	0.896	0.885	0.943	0.929	
All Buildings	161	229	423	12,361	11,796	37,406	13.0	19.4	11.3	8.52
Building Floorspace (Square Feet)										
1,001 to 5,000	29	16	50	2,116	961	3,333	13.5	17.2	15.1	8.69
5,001 to 10,000	18	15	39	1,753	821	3,724	10.2	18.5	10.5	14.66
10,001 to 25,000	25	31	56	2,639	1,721	5,628	9.5	18.0	9.9	13.19
25,001 to 50,000	18	29	50	1,395	1,459	5,817	12.9	20.0	8.6	16.05
50,001 to 100,000	18	26	83	1,378	1,575	5,965	12.8	16.6	13.9	16.77
100,001 to 200,000	24	28	61	1,417	1,465	5,340	17.1	19.2	11.5	15.89
200,001 to 500,000	Q	42	48	692	1,695	4,610	24.9	24.6	10.5	22.69
Over 500,000	12	41	35	972	2,101	2,989	12.8	19.6	11.8	24.68
Year Constructed										
1899 or Before	2	2	4	428	289	851	3.7	6.1	4.6	25.03
1900 to 1919	4	4	14	514	552	2,784	6.9	7.9	5.1	25.22
1920 to 1945	8	17	37	1,322	1,166	5,392	5.9	14.4	6.9	15.00
1946 to 1959	17	31	63	1,694	1,849	6,642	9.8	17.0	9.5	15.23
1960 to 1969	45	36	92	2,455	1,731	7,735	18.5	20.6	11.8	15.88
1970 to 1979	50	56	108	3,462	2,425	7,284	14.4	23.3	14.8	11.64
1980 to 1983	15	29	43	873	1,174	2,162	17.2	24.3	19.8	16.29
1984 to 1986	10	41	38	896	1,860	2,872	10.9	22.1	13.2	14.81
1987 to 1989	12	13	24	717	750	1,683	16.1	17.4	14.5	22.31
BUILDING USE										
Weekly Operating Hours										
39 or Fewer	2	Q	17	286	Q	4,345	6.7	Q	4.0	17.96
40 to 48	13	50	67	2,105	3,366	8,339	6.0	14.7	8.0	10.68
49 to 60	24	72	45	3,368	4,022	5,960	7.0	17.9	7.5	11.15
61 to 84	56	44	53	3,900	2,385	4,466	14.4	18.4	11.8	13.42
85 to 167	37	14	91	1,934	780	6,663	19.3	17.7	13.7	14.05
168 (Open Continuously)	29	48	151	768	1,127	7,633	38.0	42.9	19.7	18.65
Workers										
4 or Fewer	24	6	56	3,003	502	10,045	8.0	11.8	5.6	11.36
5 to 9	22	13	41	2,127	759	5,041	10.1	17.5	8.1	14.65
10 to 19	15	15	40	1,417	1,114	3,913	10.7	13.1	10.2	16.06
20 to 49	24	22	71	1,943	1,492	6,230	12.4	15.1	11.4	14.29
50 to 99	28	24	49	1,393	1,338	4,657	20.4	18.0	10.6	16.82
100 to 249	30	34	75	1,321	1,728	3,721	22.8	20.0	20.3	17.01
250 or More	18	114	90	1,157	4,862	3,799	15.4	23.5	23.7	18.96
Ownership and Occupancy										
Nongovernment Owned										
Owner Occupied	156	185	279	11,962	9,444	26,145	13.0	19.5	10.7	7.09
Single Establishment	95	128	239	7,983	6,638	20,816	11.8	19.4	11.5	8.72
Multiple Establishment	57	68	221	4,943	3,046	18,602	11.6	22.4	11.9	10.66
Nonowner Occupied	37	60	18	3,040	3,593	2,215	12.2	16.8	8.0	11.76
Single Establishment	61	56	40	3,979	2,805	5,329	15.4	20.0	7.5	12.01
Multiple Establishment	20	30	28	1,740	1,216	3,222	11.5	24.3	8.7	15.57
Vacant	41	27	10	2,238	1,589	1,399	18.5	16.7	6.9	19.06
Government Owned	--	--	2	--	--	707	--	--	3.3	24.16
Federal	5	44	144	399	2,353	11,261	13.2	18.9	12.8	16.58
State	Q	19	Q	Q	803	Q	Q	23.8	18.5	24.52
Local	Q	11	59	Q	618	3,181	Q	17.3	18.5	32.99
LOCATION										
Census Region										
Northeast	40	44	88	2,647	2,703	7,976	15.1	16.3	11.0	15.80
Midwest	38	38	102	3,057	2,275	10,372	12.5	16.7	9.9	11.25
South	58	80	148	4,775	3,817	12,623	12.1	20.9	11.7	9.83
West	25	67	85	1,882	3,001	6,435	13.4	22.4	13.2	12.92

See footnotes at end of table.

Table 26. Electricity Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor	1.247	1.248	1.000	1.007	1.004	0.998	0.855	0.843	0.820	
Census Division										
Northeast										
New England	9	10	15	608	693	1,827	15.0	13.7	8.3	18.79
Middle Atlantic	31	35	72	2,039	2,011	6,149	15.2	17.2	11.8	18.56
Midwest										
East North Central	23	26	68	1,850	1,615	7,063	12.4	16.0	9.7	19.79
West North Central	15	12	34	1,207	661	3,310	12.6	18.4	10.3	18.31
South										
South Atlantic	24	36	62	2,048	1,767	5,813	11.7	20.2	10.7	13.55
East South Central	9	21	33	897	977	2,344	10.1	21.9	13.9	24.52
West South Central	25	23	53	1,830	1,073	4,466	13.5	21.2	11.9	15.48
West										
Mountain	7	19	26	797	707	2,667	9.1	27.1	9.7	24.13
Pacific	18	48	59	1,084	2,293	3,768	16.6	20.9	15.6	17.45
Metropolitan Status										
Metropolitan	125	209	359	8,987	10,693	30,156	14.0	19.6	11.9	6.89
Nonmetropolitan	36	20	64	3,374	1,104	7,250	10.6	17.8	8.8	15.41
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	16	11	35	1,322	662	2,999	12.0	17.2	11.6	19.56
5,500-7,000 HDD	42	53	100	3,327	2,873	11,296	12.7	18.5	8.9	14.38
4,000-5,499 HDD	36	59	112	2,637	3,100	9,308	13.7	18.9	12.0	13.75
Under 4,000 HDD	32	71	91	2,515	3,513	6,545	12.7	20.3	13.9	14.00
2,000 CDD or More and --										
Under 4,000 HDD	35	34	84	2,559	1,649	7,257	13.6	20.9	11.6	13.02
ENERGY SOURCES AND END USES *										
Energy Sources (Solely or in Combination)										
Electricity	161	229	423	12,361	11,796	37,406	13.0	19.4	11.3	6.52
Natural Gas	115	131	288	8,788	7,214	25,112	13.1	18.2	11.5	9.28
Fuel Oil	18	60	116	1,616	2,909	8,054	10.9	20.7	14.4	16.87
District Heat	Q	46	83	Q	2,316	4,148	Q	19.8	20.0	27.99
District Chilled Water	Q	Q	Q	Q	Q	1,221	Q	Q	30.9	37.01
Propane	11	Q	46	910	Q	3,660	12.4	Q	12.6	20.83
Other	Q	Q	8	516	Q	899	7.0	Q	8.8	36.19
Energy End Uses (Solely or in Combination)										
Heated Buildings	158	226	400	12,040	11,677	34,109	13.1	19.4	11.7	6.89
Air-Conditioned Buildings	143	227	379	10,803	11,629	29,325	13.2	19.5	12.9	5.44
Buildings with Water Heating	144	218	400	10,161	11,190	32,218	14.2	19.5	12.4	7.09
Buildings with Cooking	81	90	219	4,035	3,912	15,715	20.1	23.0	14.0	12.00
Buildings with Manufacturing	10	21	55	853	968	3,774	11.1	21.5	14.6	18.54

See footnotes at end of table.

Table 26. Electricity Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.347	1.248	1.096	1.007	1.034	0.696	0.855	0.943	0.929	
Energy End-Use Combinations										
Heated Buildings										
With Air Conditioning										
With Water Heating and Cooking										
	72	87	199	3,865	3,746	13,170	18.7	23.3	15.1	11.90
Without Water Heating, Without Cooking										
	57	128	154	5,281	7,241	13,374	10.7	17.6	11.5	8.13
Without Air Conditioning										
With Water Heating and Cooking										
	10	8	10	1,393	472	1,776	7.4	16.9	5.5	17.69
Without Water Heating, Without Cooking										
	Q	Q	11	Q	Q	1,961	Q	Q	5.8	16.83
Without Water Heating or Cooking										
	7	Q	21	843	Q	2,761	8.6	Q	7.5	22.60
Without Water Heating, Air Conditioning, Water Heating, or Cooking										
	4	Q	4	529	Q	970	7.0	Q	4.2	25.52
All Other Combinations										
	Q	Q	6	Q	Q	2,188	Q	Q	2.7	18.42
	4	4	18	299	170	1,205	12.5	22.1	15.2	29.56
Space-Heating Energy Source										
Electricity	69	103	133	4,530	4,545	9,627	15.3	22.6	13.8	8.98
Main										
	55	94	86	3,330	3,908	6,210	16.4	24.0	13.8	10.02
With Secondary										
	9	Q	17	599	418	981	14.4	21.9	17.1	27.30
Natural Gas Only										
	5	Q	10	393	Q	639	12.4	Q	15.6	36.76
Other Energy Sources or Combinations										
	Q	Q	Q	Q	Q	342	Q	Q	19.9	32.65
With No Secondary										
	46	85	69	2,731	3,490	5,230	16.9	24.3	13.2	8.95
Secondary										
	14	9	47	1,200	638	3,416	12.0	13.8	13.7	17.78
Other Excluding Electricity										
	89	124	267	7,510	7,132	24,482	11.8	17.4	10.9	9.38
Building Not Heated										
	3	Q	23	321	Q	3,297	9.6	Q	6.9	22.26
Main Space-Heating Energy Source										
Electricity	55	94	86	3,330	3,908	6,210	16.4	24.0	13.8	10.02
Natural Gas										
	89	83	205	6,961	4,809	19,332	12.8	17.2	10.6	10.25
Fuel Oil										
	10	8	36	1,099	723	3,756	8.8	10.5	9.6	19.66
District Heat										
	Q	44	59	Q	2,254	3,653	Q	19.6	16.0	21.84
Propane										
	3	Q	Q	362	Q	842	8.2	Q	13.1	30.86
Other										
	1	Q	3	290	Q	429	2.9	Q	7.5	36.84
Air-Conditioning Energy Source										
Electricity	139	211	346	10,448	10,595	26,861	13.3	20.0	12.9	6.51
Other Excluding Electricity										
	4	15	34	355	1,034	2,463	12.0	14.6	13.8	20.56
Air-Conditioning Not Performed										
	18	2	43	1,557	167	8,081	11.8	14.9	5.3	22.16
Water-Heating Energy Source										
Electricity	77	123	133	5,785	5,522	10,187	13.2	22.3	13.1	8.40
Other Excluding Electricity										
	68	95	267	4,376	5,668	22,032	15.5	16.7	12.1	10.71
Water Heating Not Performed										
	17	11	22	2,199	607	5,168	7.6	18.3	4.3	13.20
Cooking Energy Source										
Electricity	30	40	104	1,537	1,690	7,623	19.5	23.5	13.7	11.66
Other Excluding Electricity										
	51	50	115	2,498	2,222	8,093	20.4	22.5	14.2	17.69
Cooking Not Performed										
	80	139	203	8,326	7,884	21,691	9.6	17.7	9.4	7.26
Manufacturing Energy Source										
Electricity	6	20	38	575	871	2,960	10.7	23.0	12.8	24.05
Other Excluding Electricity										
	3	Q	17	278	Q	814	12.0	Q	21.2	28.27
Manufacturing Not Performed										
	152	208	368	11,508	10,828	33,632	13.2	19.2	10.9	6.84

See footnotes at end of table.

Table 26. Electricity Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor	1.32	1.25	1.29	1.07	1.04	0.95	0.85	0.84	0.82	
HEATING AND COOLING										
Percent Heated										
Not Heated	3	Q	23	324	Q	3,390	9.5	Q	6.8	22.09
1 to 50	13	6	43	1,905	495	6,914	6.8	11.4	6.2	15.85
51 to 99	27	61	58	2,011	3,039	3,618	13.5	20.0	15.9	13.46
100	118	160	299	8,121	8,137	23,484	14.5	19.6	12.7	8.03
Percent Cooled										
Not Cooled	18	2	43	1,557	167	8,081	11.8	14.9	5.3	22.16
1 to 50	29	10	96	3,848	984	12,989	7.4	10.5	7.4	13.34
51 to 99	44	86	99	2,640	4,425	6,068	16.6	19.5	16.4	10.84
100	70	130	184	4,315	6,220	10,268	16.3	20.9	17.9	10.05
Computer Area with Separate Air-Conditioning System										
Present in Building	29	159	162	1,823	6,566	8,289	15.6	24.2	19.6	11.01
Not Present	133	70	260	10,538	5,231	29,117	12.6	13.4	8.9	7.30
LIGHTING AND REFRIGERATION										
Percent Lit When Open										
Not Lit	Q	Q	2	Q	Q	734	Q	Q	3.2	27.47
1 to 50	9	13	35	1,911	1,035	7,917	4.6	12.2	4.4	14.21
51 to 99	44	81	113	3,287	4,582	9,082	13.4	17.7	12.5	12.79
100	108	135	272	7,145	6,174	19,674	15.2	21.9	13.8	8.47
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	91	148	273	6,816	7,980	23,978	13.4	18.5	11.4	8.07
Fluorescent Lamps	160	229	412	12,212	11,733	34,934	13.1	19.5	11.8	6.59
High-Intensity Discharge Lamps	45	75	168	2,893	3,488	11,796	15.5	21.4	14.3	14.59
Other Lamps	Q	Q	4	Q	Q	202	Q	Q	21.3	28.46
High-Efficiency Ballasts	86	130	199	5,287	5,626	13,248	16.2	23.2	15.0	10.39
Refrigeration Equipment (Solely or in Combination)										
Commercial										
Refrigeration Units	99	92	247	5,221	4,080	15,303	18.9	22.5	16.2	10.59
Freezers	92	87	239	4,634	3,751	13,242	19.8	23.2	18.0	10.71
Residential										
Refrigerators	98	205	299	7,774	10,142	26,262	12.6	20.2	11.4	7.89
Freezers	24	35	132	1,647	1,628	9,130	14.3	21.6	14.5	14.59
Ice-Making Machines	80	117	254	4,498	4,959	13,944	17.9	23.6	18.2	10.06
Refrigerated Vending Machines	126	191	305	8,104	8,978	21,728	15.5	21.3	14.0	7.51
Water Coolers	102	201	326	7,800	9,882	25,098	13.1	20.4	13.0	7.59
Other	Q	15	Q	Q	312	859	Q	47.2	Q	25.23

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

ELECTRICITY

Table 27. Electricity Consumption and Conditional Energy Intensity by Year Constructed

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor	1.077	1.289	1.112	1.304	0.820	0.824	0.825	0.827	0.883	1.082	0.787	0.824	
All Buildings	202	173	214	224	23,483	11,921	13,172	12,987	8.6	14.5	16.2	17.3	7.26
Building Floorspace (Square Feet)													
1,001 to 5,000	30	16	25	23	2,970	1,105	1,204	1,129	10.3	14.9	20.8	20.7	9.68
5,001 to 10,000	20	10	23	19	2,718	1,013	1,314	1,252	7.4	10.1	17.3	15.1	14.04
10,001 to 25,000	20	26	29	36	3,620	1,981	2,163	2,224	5.5	13.4	13.3	16.4	13.57
25,001 to 50,000	25	16	28	29	3,408	1,641	1,860	1,763	7.3	9.6	14.9	16.3	15.75
50,001 to 100,000	30	35	27	35	3,351	1,889	1,606	2,072	9.0	18.3	16.7	17.0	18.47
100,001 to 200,000	21	30	34	28	2,191	2,233	2,254	1,543	9.4	13.6	15.3	18.1	18.84
200,001 to 500,000	30	29	18	30	2,785	1,518	1,190	1,502	10.9	19.2	14.7	20.1	23.50
Over 500,000	25	9	31	23	2,439	541	1,581	1,501	10.4	17.5	19.5	15.4	26.58
BUILDING USE													
Principal Building Activity													
Assembly	18	10	20	7	3,269	1,249	1,482	850	5.4	7.9	13.3	8.6	20.34
Education	24	17	17	5	3,962	2,201	1,314	593	6.0	7.8	12.8	9.2	14.89
Food Sales	5	Q	Q	7	263	Q	Q	169	18.0	Q	Q	43.1	23.75
Food Service	7	6	10	10	436	282	268	181	16.9	19.9	37.5	55.1	22.93
Health Care	15	7	15	8	802	355	586	310	19.0	20.7	24.9	25.4	19.59
Lodging	9	8	11	13	1,038	1,042	578	818	8.7	7.9	18.2	15.5	21.28
Mercantile and Service	30	45	50	36	3,957	2,455	3,462	2,486	7.5	18.5	14.4	14.6	12.17
Office	54	36	56	83	3,856	1,731	2,425	3,785	14.1	20.6	23.3	21.9	12.37
Parking Garage	Q	Q	Q	2	Q	Q	Q	427	Q	Q	Q	4.9	27.05
Public Order and Safety	3	Q	Q	Q	292	Q	Q	Q	8.6	Q	Q	Q	41.05
Warehouse	18	9	16	29	2,958	1,653	2,092	2,146	6.0	5.2	7.6	13.6	23.30
Other	12	Q	Q	Q	404	Q	Q	654	29.4	Q	Q	29.6	32.78
Vacant	7	1	Q	2	2,113	275	Q	469	3.3	5.1	Q	4.7	29.74
Weekly Operating Hours													
39 or Fewer	7	5	5	4	2,424	808	893	623	2.8	5.9	6.1	5.8	18.44
40 to 48	44	21	35	29	6,151	2,385	2,646	2,628	7.2	9.0	13.1	11.0	12.93
49 to 60	42	25	29	45	5,093	2,304	2,807	3,146	8.2	10.9	10.2	14.3	12.40
61 to 84	32	35	41	45	3,562	2,204	2,453	2,532	9.0	15.7	16.7	17.8	14.46
85 to 167	28	36	43	35	3,416	2,302	2,112	1,548	8.1	15.8	20.3	22.7	16.07
168 (Open Continuously)	50	50	62	67	2,837	1,918	2,262	2,511	17.5	26.3	27.2	26.5	18.20
Workers													
4 or Fewer	29	14	21	22	6,458	2,069	2,547	2,477	4.5	6.8	8.4	8.8	11.38
5 to 9	21	11	21	22	3,365	1,358	1,688	1,515	6.3	8.3	12.4	14.6	17.03
10 to 19	17	17	17	19	2,582	1,394	1,150	1,317	6.6	11.9	15.0	14.3	17.05
20 to 49	21	27	38	32	3,371	2,186	2,088	2,020	6.2	12.4	18.0	15.8	13.75
50 to 99	23	27	29	23	2,472	2,042	1,703	1,172	9.1	13.0	17.3	19.9	18.21
100 to 249	37	31	29	43	2,020	1,473	1,563	1,715	18.5	21.3	18.4	24.8	19.20
250 or More	54	46	59	63	3,214	1,400	2,432	2,771	16.8	32.7	24.2	22.9	20.00
Ownership and Occupancy													
Nongovernment Owned													
Owner Occupied	130	122	161	206	16,780	8,905	10,251	11,614	7.8	13.7	15.7	17.8	7.71
Single Establishment	104	90	120	147	13,138	6,843	7,440	8,016	8.0	13.2	16.2	18.3	9.45
Multiple Establishment	26	32	41	59	3,642	2,062	2,811	3,598	7.1	15.2	14.5	16.6	12.74
Nonowner Occupied	23	22	33	38	2,798	1,428	2,040	2,581	8.1	15.4	16.0	14.7	14.27
Single Establishment	14	13	18	33	2,069	1,050	1,385	1,676	6.9	12.0	12.8	19.7	17.31
Multiple Establishment	11	18	22	27	1,168	914	1,315	1,829	9.0	19.9	16.8	14.6	18.49
Vacant	1	Q	Q	Q	404	Q	Q	Q	2.0	Q	Q	Q	24.91
Government Owned													
Federal	72	51	53	18	6,703	3,016	2,921	1,373	10.7	16.9	18.2	12.9	18.15
State	Q	Q	Q	Q	Q	Q	Q	Q	17.8	Q	Q	Q	8.42
Local	22	Q	17	6	1,539	834	1,007	489	14.1	Q	17.3	11.7	30.85
	26	21	29	9	3,803	1,968	1,720	753	6.8	10.6	16.7	12.0	17.02

See footnote at end of table.

**Table 27. Electricity Consumption and Conditional Energy Intensity
by Year Constructed (Continued)**

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.077	1.398	1.112	1.304	0.828	0.824	0.823	0.827	0.993	1.082	0.787	0.824	
Multibuilding Facility													
Not on Multibuilding Facility	97	85	114	123	14,710	6,934	7,390	7,489	6.6	12.2	15.4	16.4	7.81
Part of Multibuilding Facility	105	88	100	102	8,773	4,987	5,782	5,499	11.9	17.6	17.3	18.5	12.97
On Facility with Central Plant	48	52	48	38	3,106	1,898	2,233	1,060	15.4	27.4	21.7	35.5	24.47
Percent Vacant at Least Three Months													
0	144	140	168	152	15,678	8,940	10,000	8,079	9.2	15.7	16.8	18.9	8.81
1 to 50	41	25	43	61	4,009	2,013	2,580	3,814	10.3	12.3	16.9	16.1	12.71
51 to 99	11	5	Q	2	2,542	400	Q	363	4.5	11.5	Q	6.0	28.70
100	5	3	2	8	1,255	568	450	732	4.0	5.9	4.9	11.0	20.07
Months in Use Out of Past 12 Months													
0 to 8	4	3	2	15	1,516	465	256	1,071	2.6	6.2	9.1	13.6	23.67
9 to 11	8	6	4	3	1,697	993	698	387	4.8	6.4	6.4	8.6	17.87
12	190	163	207	206	20,270	10,463	12,217	11,529	9.4	15.6	17.0	17.9	8.00
LOCATION													
Census Region													
Northeast	63	46	29	33	6,762	2,735	1,998	1,831	9.4	16.9	14.5	18.1	19.15
Midwest	46	37	48	48	6,570	3,229	3,112	2,793	7.0	11.4	15.3	17.1	11.99
South	60	51	83	92	6,747	3,918	5,153	5,398	8.8	13.0	16.2	17.0	10.56
West	33	39	54	51	3,404	2,039	2,909	2,965	9.6	19.0	18.6	17.3	17.14
Census Division													
Northeast													
New England	13	9	6	7	1,513	717	473	424	8.5	11.9	12.4	15.6	22.99
Middle Atlantic	50	38	23	27	5,248	2,018	1,525	1,407	9.6	18.7	15.2	18.8	23.73
Midwest													
East North Central	29	26	29	33	4,776	2,177	1,828	1,746	6.0	12.1	15.8	18.9	14.09
West North Central	17	10	19	15	1,794	1,052	1,284	1,047	9.7	10.0	14.6	14.0	21.79
South													
South Atlantic	27	24	34	36	3,016	1,656	2,143	2,814	9.1	14.4	16.1	12.9	15.20
East South Central	14	8	15	26	1,450	776	954	1,038	9.6	10.1	15.8	25.3	24.41
West South Central	18	19	34	30	2,281	1,486	2,055	1,546	8.0	12.9	16.5	19.1	16.64
West													
Mountain	14	4	13	20	1,572	578	904	1,118	9.2	7.7	14.3	18.3	24.36
Pacific	18	34	41	31	1,832	1,461	2,005	1,848	10.0	23.5	20.4	16.8	18.91
Metropolitan Status													
Metropolitan	168	144	184	198	18,230	9,853	10,701	11,051	9.2	14.6	17.2	17.9	6.66
Nonmetropolitan	34	29	30	26	5,253	2,069	2,471	1,936	6.5	14.0	12.3	13.3	14.98
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	15	15	13	20	2,033	1,065	971	914	7.5	13.7	12.9	21.5	17.90
5,500-7,000 HDD	58	45	41	52	8,241	3,587	2,796	2,872	7.0	12.5	14.6	18.2	14.66
4,000-5,499 HDD	73	39	53	42	6,695	2,596	3,199	2,554	10.9	14.9	16.6	16.6	16.13
Under 4,000 HDD	34	46	58	56	3,608	2,247	3,516	3,202	9.3	20.5	16.6	17.5	17.70
2,000 CDD or More and --													
Under 4,000 HDD	23	28	49	53	2,906	2,426	2,690	3,445	7.9	11.6	18.3	15.5	14.37

See footnote at end of table.

Table 27. Electricity Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Floor Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.077	1.288	1.112	1.284	0.528	0.587	0.589	0.587	0.528	0.587	0.587	0.587	0.587
STRUCTURE													
Floors													
1	44	61	91	75	5,986	5,070	6,348	5,200	7.3	12.0	14.3	14.4	10.07
2	52	48	54	79	5,404	3,443	3,194	3,803	9.6	13.9	16.9	20.7	13.88
3	40	Q	14	14	5,676	1,044	912	880	7.1	Q	15.1	16.1	18.19
4 to 6	33	16	19	32	4,239	1,267	1,043	1,661	7.7	12.5	18.5	19.4	20.57
7 or More	33	23	36	24	2,177	1,097	1,674	1,444	15.3	20.5	21.5	16.7	17.44
Wall Materials													
Masonry	148	122	122	118	18,675	8,585	7,415	6,470	7.9	14.2	16.5	18.3	8.58
Siding or Shingles	12	6	13	14	1,721	625	1,359	819	7.0	9.1	9.2	16.7	18.00
Metal Panels	10	20	21	21	653	1,122	1,804	1,802	16.0	17.9	11.6	11.5	28.09
Concrete Panels	16	18	38	44	1,526	1,159	1,845	2,587	10.5	15.5	20.6	17.1	21.52
Window Glass	Q	5	16	20	Q	270	504	995	Q	18.1	31.1	20.5	28.38
Other	Q	Q	5	7	Q	Q	245	314	Q	Q	18.4	21.8	23.44
Roof Materials													
Built-Up	100	106	129	100	11,982	6,383	6,828	5,101	8.3	16.5	18.9	19.6	18.32
Shingles (Not Wood)	37	19	21	22	5,542	1,929	1,480	1,639	6.7	10.0	14.3	13.5	12.34
Metal Surfacing	Q	19	21	32	1,324	1,501	2,292	2,673	Q	12.5	9.2	11.9	18.70
Synthetic or Rubber	21	17	32	52	1,759	1,289	1,710	2,149	11.8	13.1	18.6	24.4	16.27
Slate or Tile	8	Q	3	4	1,687	Q	259	285	4.6	Q	11.2	15.7	27.53
Concrete	4	4	3	Q	339	313	298	929	10.8	12.8	11.3	10.7	38.80
Wooden Materials	3	Q	Q	Q	337	Q	Q	Q	9.7	Q	Q	Q	27.18
Other	Q	Q	Q	Q	512	Q	Q	Q	17.5	Q	Q	Q	47.84
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	153	106	184	202	14,330	8,382	10,864	10,963	10.7	12.6	16.9	18.4	7.78
Wall Insulation	75	80	117	182	7,153	5,410	7,353	9,498	10.5	14.7	15.9	19.2	10.15
Storm or Multiple Glazing	74	56	93	136	7,461	4,471	5,309	6,750	9.9	12.5	17.5	20.1	10.55
Tinted, Reflective, or Shading Glass	65	61	114	139	5,031	3,690	6,087	7,098	12.9	16.7	18.8	19.5	16.84
Exterior or Interior Shadings or Awnings	102	84	108	111	9,610	4,654	5,631	6,138	10.6	18.0	19.2	18.1	11.43
Weather Stripping or Caulking	155	134	172	200	14,867	8,604	10,143	10,753	10.4	15.6	17.0	18.6	8.81
None of the Above	15	10	9	5	3,973	1,204	848	845	3.9	8.2	10.9	5.8	28.25
ENERGY SOURCES AND END USES*													
Energy Sources (Solely or in Combination)													
Electricity	202	173	214	224	23,483	11,921	13,172	12,987	8.6	14.5	16.2	17.3	7.88
Natural Gas	141	124	135	134	17,039	8,460	8,097	7,519	8.3	14.7	16.7	17.9	10.14
Fuel Oil	54	33	50	57	5,722	2,275	2,399	2,182	9.5	14.4	20.7	26.3	18.55
District Heat	51	35	24	Q	3,281	1,214	1,227	Q	15.5	28.6	19.7	Q	29.00
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Propane	14	11	16	18	1,790	831	1,020	1,054	7.5	12.7	15.8	17.4	28.17
Other	5	2	2	4	611	Q	247	287	7.9	Q	9.0	13.8	37.89
Energy End Uses (Solely or in Combination)													
Heated Buildings	198	168	202	216	22,462	11,177	12,368	11,819	8.8	15.0	16.3	18.3	7.71
Air-Conditioned Buildings	173	155	205	216	18,425	10,050	11,610	11,671	9.4	15.4	17.6	18.5	7.70
Buildings with Water Heating	187	162	200	214	20,420	10,469	11,298	11,383	9.2	15.5	17.7	18.8	8.88
Buildings with Cooking	96	91	110	93	9,376	4,727	5,213	4,346	10.2	19.2	21.2	21.5	11.82
Buildings with Manufacturing	31	11	19	24	2,652	786	1,079	1,078	11.8	13.4	17.6	22.7	34.46

See footnote at end of table.

Table 27. Electricity Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Flow Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.077	1.398	1.112	1.304	0.820	0.924	0.929	0.927	0.893	1.082	0.797	0.924	
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and													
Cooking	88	78	105	87	7,930	4,147	4,778	3,926	11.1	18.8	22.0	22.1	12.81
Without Water Heating,													
Without Cooking	73	66	81	118	8,669	4,979	5,614	6,635	8.4	13.2	14.5	17.7	9.75
Without Water Heating or													
Cooking	11	7	6	4	1,653	683	757	548	6.4	10.4	8.3	7.7	21.02
Without Air Conditioning													
With Water Heating and													
Cooking	7	Q	Q	Q	1,332	424	Q	Q	5.1	Q	Q	Q	23.90
With Water Heating,													
Without Cooking	18	5	3	3	2,288	674	469	269	7.9	8.1	6.1	12.7	26.98
Without Water Heating or													
Cooking	2	1	4	1	543	256	492	218	3.3	4.8	8.1	3.9	27.64
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking													
	2	1	1	2	773	479	423	607	2.9	2.3	3.0	3.3	26.88
All Other Combinations	2	4	Q	8	294	279	472	631	5.9	15.0	25.1	12.8	23.36
Space-Heating Energy Source													
Electricity	49	49	95	112	4,409	3,292	5,014	5,986	11.0	15.0	18.9	18.6	11.10
Main													
	21	36	82	96	1,891	2,209	4,131	5,217	10.9	16.2	19.8	18.5	12.11
With Secondary													
Natural Gas Only	Q	Q	9	4	Q	Q	438	267	Q	Q	20.4	16.8	39.25
Other Energy Sources or Combinations													
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
With No Secondary													
	16	31	70	83	1,513	1,859	3,516	4,563	10.8	16.5	20.0	18.1	12.59
Secondary													
	28	14	13	15	2,518	1,083	883	769	11.1	12.5	15.2	19.7	20.80
Other Excluding Electricity													
	150	118	107	104	18,054	7,885	7,354	5,832	8.3	15.0	14.6	17.9	10.29
Building Not Heated													
	4	5	Q	8	1,020	744	804	1,169	3.6	6.5	14.8	7.0	24.25
Main Space-Heating Energy Source													
Electricity	21	36	82	96	1,891	2,209	4,131	5,217	10.9	16.2	19.8	18.5	12.11
Natural Gas													
	102	103	85	88	13,256	6,814	5,910	5,122	7.7	15.1	14.4	17.1	10.45
Fuel Oil													
	27	10	11	Q	3,553	1,002	733	290	7.5	10.2	14.5	Q	21.23
District Heat													
	44	18	22	Q	2,935	1,096	1,164	Q	15.0	16.7	19.1	Q	22.91
Propane													
	2	1	2	Q	397	171	264	398	4.3	8.3	7.8	22.7	29.07
Other													
	Q	Q	Q	Q	443	Q	Q	Q	6.4	Q	Q	Q	45.19
Air-Conditioning Energy Source													
Electricity	156	141	192	207	16,971	9,032	10,746	11,155	9.2	15.6	17.9	18.5	8.15
Other Excluding Electricity													
	17	14	13	10	1,454	1,018	864	516	11.8	13.7	14.6	18.7	22.99
Air-Conditioning Not Performed													
	29	18	9	8	5,057	1,871	1,561	1,316	5.8	9.4	6.0	5.8	16.14
Water-Heating Energy Source													
Electricity	62	54	109	108	6,122	3,408	5,661	6,302	10.2	15.8	19.2	17.1	9.88
Other Excluding Electricity													
	125	109	91	106	14,297	7,061	5,637	5,081	8.7	15.4	16.1	20.9	11.22
Water Heating Not Performed													
	15	10	15	10	3,063	1,453	1,873	1,605	4.9	7.0	7.8	6.5	14.81

See footnote at end of table.

Table 27. Electricity Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Flow Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor	1.004	1.853	1.027	1.247	0.822	0.822	0.822	0.822	0.819	1.012	0.822	0.821	
Cooking Energy Source													
Electricity	52	31	56	35	4,099	2,274	2,753	1,724	12.7	13.4	20.5	20.1	13.46
Other Excluding Electricity	44	60	54	59	5,278	2,454	2,460	2,621	8.3	24.6	21.9	22.4	17.29
Cooking Not Performed	106	82	104	131	14,106	7,194	7,959	8,642	7.5	11.4	13.0	15.1	6.89
Manufacturing Energy Source													
Electricity	27	7	14	Q	2,355	409	820	821	11.7	16.8	17.5	18.7	20.30
Other Excluding Electricity	4	4	5	Q	297	377	259	Q	13.3	9.7	17.8	Q	33.12
Manufacturing Not Performed	171	162	195	200	20,830	11,136	12,092	11,910	8.2	14.6	16.1	16.8	7.99
HEATING AND COOLING													
Percent Heated													
Not Heated	4	5	Q	8	1,085	777	805	1,172	3.5	6.3	14.7	7.0	23.35
1 to 50	15	11	12	23	3,926	1,556	1,910	1,922	3.9	7.2	6.5	11.8	16.84
51 to 99	34	28	37	47	3,366	1,524	1,537	2,240	10.2	18.3	23.8	20.8	14.31
100	149	129	153	147	15,107	8,064	8,920	7,653	9.8	15.9	17.2	19.2	8.23
Percent Cooled													
Not Cooled	29	18	9	8	5,057	1,871	1,561	1,316	5.8	9.4	6.0	5.8	18.14
1 to 50	43	29	27	36	8,352	3,354	3,066	3,049	5.2	8.8	8.8	11.7	13.42
51 to 99	52	48	64	65	4,136	2,937	2,836	3,224	12.6	16.4	22.7	20.1	11.82
100	77	77	113	116	5,937	3,760	5,708	5,398	13.0	20.6	19.8	21.5	12.35
Computer Area with Separate Air-Conditioning System													
Present in Building	89	75	84	102	5,345	3,204	3,832	4,297	16.7	23.3	21.9	23.8	13.54
Not Present	113	98	130	122	18,138	8,718	9,339	8,690	6.2	11.2	13.9	14.0	8.24
LIGHTING AND REFRIGERATION													
Percent Lit When Open													
Not Lit	0	Q	Q	Q	350	Q	Q	Q	1.0	Q	Q	Q	28.16
1 to 50	18	11	11	17	5,804	1,549	1,331	2,179	3.1	6.8	8.3	7.7	14.00
51 to 99	54	56	56	72	6,176	3,069	3,517	4,187	8.7	18.2	16.0	17.2	13.39
100	130	105	146	134	11,152	7,193	8,198	6,449	11.7	14.7	17.8	20.8	8.56
Lighting Equipment (Solely or in Combination)													
Incandescent Lamps	146	114	125	127	16,065	7,823	7,920	6,966	9.1	14.6	15.8	18.2	9.49
Fluorescent Lamps	198	171	211	221	22,289	11,532	12,710	12,348	8.9	14.9	16.6	17.9	7.87
High-Intensity Discharge Lamps	72	53	70	94	5,608	3,300	4,253	5,016	12.8	16.0	16.4	18.7	14.59
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	84	77	118	136	7,530	4,500	5,901	6,231	11.1	17.1	19.9	21.9	11.29
Refrigeration Equipment (Solely or in Combination)													
Commercial													
Refrigeration Units	99	99	120	119	9,051	5,125	5,483	4,946	11.0	19.4	21.9	24.1	11.28
Freezers	87	100	115	115	6,979	5,023	5,049	4,576	12.5	20.0	22.8	25.1	14.48
Residential													
Refrigerators	157	135	145	165	17,149	8,688	8,949	9,393	9.2	15.5	16.2	17.6	8.75
Freezers	47	50	49	46	4,918	2,389	2,814	2,285	9.5	20.8	17.4	19.9	17.14
Ice-Making Machines	103	97	128	123	7,485	4,806	5,803	5,307	13.8	20.2	22.1	23.2	11.89
Refrigerated Vending Machines	149	126	170	177	12,816	8,302	8,891	8,801	11.6	15.2	19.1	20.1	8.18
Water Coolers	154	142	163	171	14,936	9,043	9,502	9,300	10.3	15.6	17.2	18.4	9.21
Other	10	Q	17	Q	602	224	355	Q	16.8	Q	47.6	Q	29.68

See footnotes at end of table.

Table 27. Electricity Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Total Floorspace of Buildings Using Electricity (million square feet)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.004	1.553	1.037	1.347	0.852	0.899	0.934	0.929	0.910	1.212	0.894	0.901	
ENERGY MANAGEMENT													
Occupant Control													
Any Control of Heating	87	65	79	83	11,150	4,525	5,605	5,752	7.8	14.3	14.2	14.4	10.03
With Thermostats	80	59	72	78	10,165	3,962	5,207	5,428	7.9	14.8	13.8	14.3	10.61
Any Control of Cooling	86	63	86	86	10,692	4,380	5,589	5,642	8.0	14.3	15.4	15.3	10.05
With Thermostats	77	60	78	81	9,375	4,045	5,269	5,343	8.2	14.8	14.8	15.2	10.64
Computerized Energy Management and Control System													
Present in Building	58	44	76	85	3,787	2,926	3,506	4,092	15.2	15.1	21.6	20.8	12.75
Controls Heating and Cooling	57	41	73	82	3,630	2,784	3,382	3,970	15.8	14.8	21.6	20.7	12.65
Controls Lighting	Q	9	18	31	Q	618	975	1,439	9.2	15.0	18.1	21.7	18.15
Controls Other	Q	12	13	12	Q	611	692	484	Q	20.3	18.5	25.8	22.33
Other Energy Management													
Regular HVAC Maintenance	159	147	180	196	14,487	8,796	9,994	9,677	11.0	16.7	18.0	20.3	8.75
Participated in Utility Conservation Program	43	42	55	31	3,632	2,538	2,923	1,734	11.8	16.6	18.9	17.8	13.15

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		
		with	without		with	without		with	without	
RSE Column Factor:	1.026	1.344	1.296	0.788	1.099	0.932	0.777	0.674	1.030	
All Buildings	695	285	411	47,905	16,691	31,213	14.5	17.1	13.2	5.91
Building Floorspace (Square Feet)										
1,001 to 5,000	78	35	43	4,441	1,545	2,896	17.6	22.6	14.9	7.39
5,001 to 10,000	63	22	40	4,617	1,547	3,070	13.6	14.4	13.1	11.89
10,001 to 25,000	99	53	46	7,739	3,275	4,464	12.8	16.3	10.2	10.42
25,001 to 50,000	87	45	42	6,914	2,784	4,130	12.6	16.2	10.2	11.82
50,001 to 100,000	113	41	72	7,214	2,572	4,642	15.7	16.1	15.5	14.99
100,001 to 200,000	92	36	56	6,297	2,025	4,271	14.6	17.7	13.1	11.51
200,001 to 500,000	92	28	65	5,883	1,565	4,317	15.7	17.6	15.0	19.72
Over 500,000	71	24	47	4,800	1,378	3,422	14.8	17.5	13.8	21.37
Year Constructed										
1899 or Before	6	2	4	1,188	304	884	4.7	6.1	4.3	20.72
1900 to 1919	18	4	14	3,011	524	2,487	5.9	7.2	5.6	27.80
1920 to 1945	51	13	38	5,403	973	4,430	9.4	13.7	8.5	15.94
1946 to 1959	81	24	57	7,370	1,723	5,647	11.0	14.1	10.1	12.11
1960 to 1969	141	46	96	9,032	2,951	6,082	15.6	15.5	15.7	13.47
1970 to 1979	192	90	102	10,746	4,549	6,198	17.9	19.7	16.5	8.84
1980 to 1983	79	47	32	3,564	2,034	1,530	22.1	23.0	20.9	14.73
1984 to 1986	82	41	41	4,953	2,354	2,600	16.6	17.4	15.8	14.96
1987 to 1989	46	18	28	2,638	1,281	1,357	17.5	14.3	20.5	18.99
BUILDING USE										
Principal Building Activity										
Assembly	45	17	28	4,961	1,433	3,528	9.1	12.0	7.9	20.11
Education	44	13	32	5,439	980	4,458	8.1	12.8	7.1	10.82
Food Sales	29	14	15	716	278	438	40.2	48.7	34.8	23.14
Food Service	29	9	20	1,034	323	711	28.0	28.0	27.9	17.37
Health Care	41	8	33	1,804	379	1,425	22.6	20.6	23.2	12.85
Lodging	32	16	16	2,722	1,064	1,658	11.7	14.8	9.7	13.88
Mercantile and Service	139	67	71	10,448	4,330	6,118	13.3	15.5	11.7	8.22
Office	211	99	113	10,595	4,340	6,256	20.0	22.8	18.0	8.23
Parking Garage	3	Q	Q	422	Q	Q	6.1	Q	Q	31.93
Public Order and Safety	6	Q	5	482	Q	389	13.4	Q	11.8	32.15
Warehouse	53	17	36	5,845	2,145	3,701	9.1	7.9	9.7	20.18
Other	55	Q	Q	1,325	598	727	41.1	34.9	Q	37.41
Vacant	9	2	7	2,112	551	Q	4.3	4.0	4.4	30.42
Weekly Operating Hours										
39 or Fewer	15	6	9	2,750	842	1,908	5.4	7.1	4.6	15.92
40 to 48	112	42	69	10,751	3,385	7,366	10.4	12.5	9.4	10.80
49 to 60	125	51	74	11,084	4,330	6,754	11.3	11.8	10.9	10.28
61 to 84	136	66	69	8,896	3,549	5,348	15.2	18.7	12.9	11.82
85 to 167	118	42	76	7,086	1,945	5,141	16.7	21.6	14.8	12.90
168 (Open Continuously)	190	77	113	7,338	2,641	4,696	25.9	29.1	24.1	12.35
Workers										
4 or Fewer	63	29	34	7,995	2,718	5,277	7.9	10.5	6.5	10.93
5 to 9	68	37	31	6,090	2,282	3,808	11.1	16.0	8.1	10.84
10 to 19	61	24	37	5,315	2,024	3,291	11.5	11.8	11.3	12.89
20 to 49	104	40	64	8,329	2,897	5,432	12.5	13.9	11.8	11.49
50 to 99	93	48	45	6,320	2,144	4,176	14.7	22.6	10.7	12.83
100 to 249	109	48	61	5,649	2,133	3,516	19.3	22.4	17.5	11.31
250 or More	197	59	138	8,206	2,492	5,714	24.0	23.7	24.2	14.83

See footnote at end of table.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		
		with	without		with	without		with	without	
RSE Column Factor:	1.026	1.344	1.286	0.759	1.099	0.932	0.777	0.874	1.030	
Ownership and Occupancy										
Nongovernment Owned	543	247	296	38,261	14,668	23,593	14.2	16.8	12.6	5.77
Owner Occupied	401	172	229	28,270	9,926	18,344	14.2	17.3	12.5	5.76
Single Establishment	295	116	178	20,654	6,458	14,197	14.3	18.0	12.6	5.89
Multiple Establishment	106	55	50	7,615	3,468	4,147	13.9	16.0	12.2	5.86
Nonowner Occupied	143	75	68	9,991	4,742	5,249	14.3	15.9	12.9	5.61
Single Establishment	71	35	36	4,988	2,321	2,668	14.2	15.3	13.3	12.95
Multiple Establishment	70	39	30	4,636	2,321	2,315	15.1	17.0	13.2	12.68
Vacant	2	Q	2	367	Q	266	4.9	Q	5.8	28.43
Government Owned	152	38	114	9,644	2,023	7,621	15.8	18.7	15.0	14.10
Federal	31	Q	20	1,314	Q	995	23.7	Q	20.5	27.92
State	54	6	48	2,581	381	2,200	20.9	17.0	21.6	28.45
Local	67	21	46	5,749	1,324	4,426	11.6	15.5	10.5	15.21
Multibuilding Facility										
Not on Multibuilding Facility	373	174	200	29,798	10,514	19,284	12.5	16.5	10.4	5.57
Part of Multibuilding Facility	322	111	211	18,107	6,178	11,929	17.8	18.0	17.7	9.31
On Facility with Central Plant	145	36	109	5,183	1,016	4,166	27.9	35.5	26.1	20.37
LOCATION										
Census Region										
Northeast	127	39	88	9,308	2,076	7,232	13.6	18.6	12.1	13.91
Midwest	155	37	118	12,292	2,288	10,004	12.6	16.1	11.8	10.96
South	264	143	121	18,062	8,445	9,617	14.6	16.9	12.6	8.12
West	151	66	84	8,243	3,883	4,360	18.3	17.1	19.3	12.47
Census Division										
Northeast										
New England	26	8	18	1,773	407	1,366	14.7	19.2	13.4	16.77
Middle Atlantic	100	31	70	7,534	1,668	5,866	13.3	18.5	11.9	16.43
Midwest										
East North Central	98	23	75	8,120	1,428	6,691	12.1	16.0	11.3	15.11
West North Central	56	14	42	4,172	859	3,313	13.5	16.4	12.8	14.68
South										
South Atlantic	114	69	44	8,201	4,370	3,831	13.8	15.9	11.5	11.61
East South Central	59	29	29	3,501	1,513	1,988	16.7	19.3	14.8	18.44
West South Central	92	44	47	6,360	2,562	3,798	14.4	17.3	12.5	14.34
West										
Mountain	42	22	20	2,830	1,436	1,394	14.7	15.1	14.3	22.47
Pacific	109	45	64	5,413	2,446	2,966	20.1	18.3	21.6	16.24
Metropolitan Status										
Metropolitan	598	240	358	39,578	13,732	25,846	15.1	17.5	13.8	6.27
Nonmetropolitan	97	44	53	8,327	2,960	5,367	11.7	15.0	9.8	10.86
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	52	13	39	3,325	718	2,607	15.7	18.3	15.0	17.67
5,500-7,000 HDD	152	40	112	12,284	2,549	9,735	12.4	15.6	11.5	12.61
4,000-5,499 HDD	171	76	95	11,849	3,638	8,211	14.5	21.0	11.5	11.71
Under 4,000 HDD	175	77	98	10,317	4,809	5,508	17.0	16.0	17.8	14.01
2,000 CDD or More and --										
Under 4,000 HDD	145	79	66	10,130	4,978	5,152	14.3	15.8	12.9	11.76

See footnote at end of table.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		
		with	without		with	without		with	without	
RSE Column Factor:	1.026	1.344	1.286	0.786	1.099	0.932	0.777	0.874	1.030	
1989 Degree-Days										
Under 2,000 CDD and --										
Over 7,000 HDD	71	19	52	5,009	1,064	3,945	14.1	17.4	13.3	17.43
5,500-7,000 HDD	200	56	144	16,089	3,433	12,656	12.4	16.3	11.4	11.44
4,000-5,499 HDD	127	71	57	7,769	3,405	4,364	16.4	20.8	13.0	13.00
Under 4,000 HDD	158	63	96	9,474	3,947	5,528	16.7	15.9	17.3	16.26
2,000 CDD or More and --										
Under 4,000 HDD	139	77	62	9,563	4,842	4,720	14.5	15.9	13.2	11.97
STRUCTURE										
Floors										
1	237	110	127	17,523	6,998	10,526	13.5	15.7	12.1	7.53
2	199	94	105	12,861	5,226	7,636	15.5	18.0	13.7	8.62
3	83	29	54	6,412	1,632	4,781	13.0	17.8	11.4	21.13
4 to 6	76	24	52	5,885	1,637	4,248	12.9	14.7	12.3	15.97
7 or More	100	28	72	5,223	1,199	4,024	19.1	23.0	17.9	12.92
Wall Materials										
Masonry	443	174	269	32,716	10,586	22,130	13.5	16.5	12.1	6.60
Siding or Shingles	33	18	15	3,039	1,142	1,898	10.8	15.5	7.9	16.79
Metal Panels	58	27	31	3,805	1,737	2,068	15.2	15.6	14.8	17.02
Concrete Panels	99	43	56	5,408	2,370	3,038	18.4	18.2	18.5	16.86
Window Glass	37	14	24	1,632	486	1,147	22.9	28.0	20.7	23.35
Other	25	9	16	1,304	371	933	19.3	23.5	17.6	22.08
Roof Materials										
Built-Up	379	154	225	24,352	8,895	15,457	15.6	17.3	14.5	8.03
Shingles (Not Wood)	85	36	49	8,223	2,514	5,709	10.3	14.3	8.6	10.05
Metal Surfacing	66	35	31	5,283	2,436	2,847	12.5	14.5	10.8	13.60
Synthetic or Rubber	111	41	70	5,642	1,629	4,013	19.6	25.0	17.4	14.79
Slate or Tile	17	5	11	1,846	402	1,444	9.0	12.7	7.9	25.75
Concrete	18	5	Q	1,351	370	Q	13.2	12.3	13.5	21.99
Wooden Materials	7	Q	4	461	Q	321	15.0	Q	14.0	20.27
Other	14	Q	7	747	Q	440	18.5	Q	16.8	31.60
Building Shell Conservation										
Features (Solely or in Combination)										
Roof or Ceiling Insulation	563	242	320	36,344	13,808	22,535	15.5	17.5	14.2	5.58
Wall Insulation	397	178	218	24,353	9,860	14,493	16.3	18.1	15.1	6.52
Storm or Multiple Glazing	316	141	175	20,002	7,492	12,510	15.8	18.8	14.0	7.34
Tinted, Reflective, or Shading										
Glass	338	145	193	18,779	7,848	10,930	18.0	18.5	17.6	6.75
Exterior or Interior Shadings										
or Awnings	360	131	229	22,021	7,070	14,951	16.3	18.5	15.3	7.22
Weather Stripping or Caulking	581	236	344	36,287	13,160	23,127	16.0	18.0	14.9	5.97
None of the Above	25	11	14	3,687	979	2,708	6.9	11.3	5.3	20.54
ENERGY SOURCES AND END USES*										
Energy Sources										
(Solely or in Combination)										
Electricity	695	285	411	47,905	16,691	31,213	14.5	17.1	13.2	5.61
Natural Gas	454	122	331	33,819	8,104	25,714	13.4	15.1	12.9	7.74
Fuel Oil	164	37	127	9,737	1,829	7,908	16.9	20.1	16.1	15.12
District Heat	99	Q	82	4,125	Q	3,692	24.0	Q	22.2	22.32
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	47	19	28	3,434	1,292	2,142	13.8	15.0	13.0	18.24
Other	11	Q	7	1,045	Q	808	10.3	Q	9.2	34.51

See footnote at end of table.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)		
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating	
		with	without		with	without		with	without
Energy End Uses (Solely or in Combination)									
Heated Buildings	675	285	390	46,658	16,691	29,966	14.5	17.1	13.0
Air-Conditioned Buildings	695	285	411	47,905	16,691	31,213	14.5	17.1	13.2
Buildings with Water Heating	660	268	392	43,830	15,271	28,560	15.1	17.6	13.7
Buildings with Cooking	341	122	218	19,559	5,914	13,644	17.4	20.7	16.0
Buildings with Manufacturing	69	25	44	4,350	1,272	3,079	15.9	19.8	14.2
Space-Heating Energy Source									
Electricity	285	285	--	16,691	16,691	--	17.1	17.1	--
Main	222	222	--	12,238	12,238	--	18.1	18.1	--
With Secondary	33	33	--	1,809	1,809	--	18.3	18.3	--
Natural Gas Only	16	16	--	1,028	1,028	--	15.8	15.8	--
Other Energy Sources or Combinations	15	15	--	713	713	--	21.0	21.0	--
With No Secondary	189	189	--	10,430	10,430	--	18.1	18.1	--
Secondary	63	63	--	4,453	4,453	--	14.2	14.2	--
Other Excluding Electricity	390	--	390	29,966	--	29,966	13.0	--	13.0
Building Not Heated	21	--	21	1,247	--	1,247	16.7	--	16.7
Main Space-Heating Energy Source									
Electricity	222	222	--	12,238	12,238	--	18.1	18.1	--
Natural Gas	327	37	291	26,072	3,365	22,707	12.6	11.0	12.8
Fuel Oil	34	4	29	3,535	456	3,080	9.5	9.8	9.5
District Heat	75	Q	58	3,682	Q	3,234	20.5	Q	17.9
Propane	Q	Q	Q	982	Q	723	13.0	Q	15.9
Other	3	Q	Q	446	Q	372	7.2	Q	Q
Ability to Switch Main Heating Fuel									
No Alternate	507	238	269	35,440	13,798	21,642	14.3	17.3	12.4
Alternate Main Heating Fuel									
Electricity	25	14	11	3,105	862	2,243	8.1	16.0	5.0
Natural Gas	28	21	7	1,671	1,083	589	16.5	19.4	11.1
Fuel Oil	97	8	90	4,597	425	4,172	21.2	17.7	21.5
Propane	10	2	9	1,175	248	928	8.8	7.5	9.2
Other	3	Q	Q	274	Q	Q	10.2	Q	Q

See footnote at end of table.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		
		with	without		with	without		with	without	
RSE Column Factor	1.027	1.311	1.293	0.746	1.121	0.957	0.788	0.832	1.098	
Water-Heating Energy Source										
Electricity	313	194	119	18,743	10,323	8,419	16.7	18.8	14.1	6.92
Other Excluding Electricity	347	74	273	25,088	4,947	20,140	13.8	14.9	13.6	8.69
Water Heating Not Performed	35	16	19	4,075	1,421	2,654	8.7	11.5	7.1	11.42
Cooking Energy Source										
Electricity	161	70	91	9,414	3,164	6,250	17.1	22.1	14.5	9.86
Other Excluding Electricity	180	52	128	10,145	2,750	7,395	17.7	19.1	17.2	13.73
Cooking Not Performed	355	162	192	28,346	10,777	17,569	12.5	15.1	11.0	8.92
Manufacturing Energy Source										
Electricity	50	20	30	3,369	1,025	2,344	14.9	19.6	12.8	19.16
Other Excluding Electricity	19	5	Q	981	246	735	19.2	20.4	18.8	35.61
Manufacturing Not Performed	627	260	367	43,555	15,420	28,135	14.4	16.8	13.0	5.89
HEATING AND COOLING										
Percent Heated										
Not Heated	21	--	21	1,257	--	1,257	16.7	--	16.7	30.72
1 to 50	51	22	29	7,472	3,108	4,365	6.9	7.2	6.7	18.81
51 to 99	136	63	73	7,706	3,059	4,646	17.6	20.6	15.7	11.19
100	487	199	288	31,470	10,524	20,945	15.5	18.9	13.7	6.71
Percent Cooled										
Not Cooled	--	--	--	--	--	--	--	--	--	--
1 to 50	129	42	86	17,018	4,567	12,451	7.6	9.2	6.9	10.56
51 to 99	219	90	129	12,331	4,629	7,702	17.7	19.5	16.7	8.42
100	348	152	196	18,556	7,496	11,060	18.8	20.3	17.7	8.19
Year Main Central Chiller Installed										
1959 or Before	24	Q	13	1,268	Q	901	18.6	Q	14.1	21.98
1960 to 1969	63	11	51	2,742	631	2,111	22.8	17.6	24.4	24.49
1970 to 1979	61	20	41	3,124	955	2,169	19.7	21.2	19.0	21.29
1980 to 1986	70	20	50	3,415	841	2,575	20.6	23.8	19.5	18.83
1987 to 1989	28	12	16	1,724	549	1,175	16.3	22.3	13.5	23.09
Year Packaged Cooling System Installed										
1959 or Before	21	Q	12	1,622	Q	1,229	13.1	Q	9.8	17.68
1960 to 1969	72	22	49	4,136	1,466	2,670	17.4	15.3	18.5	21.21
1970 to 1979	151	65	86	9,805	3,639	6,166	15.4	17.9	14.0	9.80
1980 to 1986	171	74	97	10,957	3,833	7,124	15.6	19.4	13.6	11.43
1987 to 1989	84	26	58	5,990	1,903	4,087	14.0	13.8	14.1	11.55
Computer Area with Separate Air-Conditioning System										
Present in Building	311	113	198	14,302	4,742	9,560	21.7	23.7	20.7	9.31
Not Present	385	172	213	33,603	11,949	21,654	11.4	14.4	9.8	6.25
LIGHTING										
Percent Lit When Open										
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	47	22	24	7,716	2,749	4,967	6.0	8.1	4.9	12.78
51 to 99	212	83	130	13,983	4,757	9,226	15.2	17.4	14.0	10.53
100	436	180	256	26,042	9,144	16,899	16.7	19.6	15.2	6.68

See footnotes at end of table.

Table 28. Electricity Consumption and Conditional Energy Intensity for Buildings Cooled with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		All Buildings Cooled with Electricity	Electric Heating		
		with	without		with	without		with	without	
RSE Column Factor	1.027	1.311	1.293	0.746	1.121	0.957	0.788	0.832	1.006	
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	275	133	143	22,356	9,285	13,071	12.3	14.3	10.9	6.63
With Thermostats	253	121	132	20,638	8,577	12,061	12.3	14.2	10.9	7.45
Any Control of Cooling	301	132	169	24,953	9,230	15,723	12.1	14.3	10.8	6.42
With Thermostats	277	123	153	22,731	8,573	14,157	12.2	14.4	10.8	7.17
Reduced Use During Off-Hours										
Heating Only	19	7	11	1,394	435	959	13.5	17.0	12.0	17.66
Cooling Only	56	14	42	3,973	778	3,196	14.2	18.3	13.2	18.04
Heating and Cooling	454	187	268	35,801	12,695	23,106	12.7	14.7	11.6	6.31
Computerized Energy Management and Control System										
Present in Building	228	82	146	11,535	3,587	7,948	19.8	22.8	18.4	8.96
Controls Heating and Cooling	220	80	140	11,034	3,441	7,593	19.9	23.1	18.5	9.06
Controls Lighting	56	21	35	2,960	1,075	1,885	18.8	19.2	18.5	15.15
Controls Other	42	11	31	1,928	473	1,455	21.7	22.4	21.5	14.67
Other Energy Management										
Regular HVAC Maintenance	590	233	357	35,172	12,167	23,005	16.8	19.2	15.5	5.92
Participated in Utility Conservation Program	146	53	93	8,368	2,605	5,762	17.4	20.3	16.1	9.67

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.985	1.009	1.791	0.808	0.899	1.312	0.648	0.668	1.940	
All Buildings	305	234	70	18,702	13,448	5,254	16.3	17.4	13.3	7.16
Building Floorspace (Square Feet)										
1,001 to 5,000	37	33	5	1,815	1,412	404	20.6	23.3	11.3	11.34
5,001 to 10,000	23	18	5	1,698	1,150	549	13.5	15.7	8.9	14.75
10,001 to 25,000	58	44	14	3,817	2,790	1,027	15.1	15.7	13.5	15.56
25,001 to 50,000	47	34	13	3,013	1,896	1,117	15.5	18.0	11.4	21.45
50,001 to 100,000	44	28	17	2,766	1,763	1,003	16.0	15.7	16.5	16.18
100,001 to 200,000	40	32	9	2,341	1,724	617	17.3	18.3	14.3	16.75
200,001 to 500,000	28	23	Q	1,781	1,420	Q	15.8	16.4	Q	23.57
Over 500,000	27	23	Q	1,470	1,294	Q	18.2	17.8	Q	31.88
Year Constructed										
1899 or Before	2	Q	1	379	Q	245	5.2	Q	3.6	27.67
1900 to 1919	5	1	4	601	157	444	8.6	7.6	9.0	34.08
1920 to 1945	15	6	Q	1,323	662	661	11.2	9.5	12.9	27.56
1946 to 1959	27	12	15	2,106	938	1,168	12.6	12.9	12.4	22.09
1960 to 1969	49	36	14	3,292	2,209	1,083	15.0	16.2	12.5	14.53
1970 to 1979	95	82	13	5,014	4,131	883	18.9	19.8	15.2	12.19
1980 to 1983	48	40	Q	2,143	1,820	323	22.6	21.8	27.0	19.35
1984 to 1986	45	41	4	2,518	2,255	263	17.7	18.1	14.2	17.32
1987 to 1989	19	16	Q	1,325	1,142	Q	14.0	13.9	Q	26.46
BUILDING USE										
Principal Building Activity										
Assembly	20	10	10	1,877	1,024	853	10.5	9.4	11.9	22.87
Education	15	11	4	1,119	672	447	13.1	15.8	9.1	19.44
Food Sales	14	14	Q	298	277	Q	48.3	50.9	Q	27.41
Food Service	9	8	Q	333	196	Q	28.1	40.1	Q	27.27
Health Care	8	6	Q	422	296	Q	19.1	19.2	Q	23.31
Lodging	21	18	Q	1,338	1,072	Q	15.3	17.0	Q	21.72
Mercantile and Service	69	55	14	4,530	3,330	1,200	15.3	16.4	12.0	12.73
Office	103	94	9	4,545	3,908	638	22.6	24.0	13.8	11.99
Parking Garage	1	1	Q	322	247	Q	3.5	3.5	Q	37.65
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	19	12	7	2,499	1,650	848	7.5	7.4	7.7	23.78
Other	Q	Q	Q	601	Q	Q	34.8	Q	Q	42.03
Vacant	3	3	Q	721	485	Q	4.4	5.2	Q	31.63
Weekly Operating Hours										
39 or Fewer	7	4	2	1,090	620	470	6.0	6.7	4.9	24.62
40 to 48	46	31	15	3,744	2,531	1,213	12.3	12.4	12.1	14.13
49 to 60	55	43	12	4,791	3,362	1,429	11.5	12.6	8.7	13.07
61 to 84	70	53	17	3,794	2,884	910	18.4	18.3	18.9	16.85
85 to 167	44	37	7	2,210	1,664	545	20.0	22.5	12.6	13.80
168 (Open Continuously)	83	66	16	3,073	2,387	685	27.0	27.8	24.1	15.17
Workers										
4 or Fewer	33	27	6	3,536	2,510	1,026	9.3	10.9	5.4	13.89
5 to 9	38	26	Q	2,581	1,704	877	14.8	15.3	13.9	16.13
10 to 19	26	21	5	2,333	1,670	663	11.1	12.8	6.9	15.37
20 to 49	43	35	8	3,188	2,194	994	13.6	16.0	8.4	15.30
50 to 99	50	35	15	2,220	1,446	774	22.5	24.3	19.2	18.54
100 to 249	52	34	18	2,251	1,576	674	23.0	21.4	26.8	15.79
250 or More	62	56	6	2,592	2,347	245	23.9	23.7	26.1	16.04

See footnote at end of table.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.985	1.000	1.781	0.608	0.896	1.312	0.446	0.598	1.340	
Ownership and Occupancy										
Nongovernment Owned	263	210	53	16,238	11,982	4,255	16.2	17.5	12.5	7.06
Owner Occupied	182	140	42	11,139	8,044	3,096	16.4	17.4	13.7	9.12
Single Establishment	125	89	36	7,354	4,974	2,380	16.9	17.8	15.2	11.55
Multiple Establishment	58	52	6	3,785	3,070	716	15.3	16.8	8.6	14.92
Nonowner Occupied	80	69	11	5,099	3,939	1,160	15.7	17.6	9.2	15.33
Single Establishment	36	31	5	2,427	1,697	730	14.9	18.5	6.4	22.97
Multiple Establishment	44	38	6	2,549	2,157	392	17.2	17.5	15.2	16.93
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	42	25	17	2,464	1,466	998	17.0	17.0	17.1	17.02
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
State	8	5	Q	569	332	Q	13.3	14.5	Q	35.85
Local	23	16	7	1,547	956	590	15.1	16.8	12.3	21.29
Multibuilding Facility										
Not on Multibuilding Facility	185	151	34	11,517	8,128	3,389	16.0	18.6	10.0	7.63
Part of Multibuilding Facility	120	84	36	7,185	5,320	1,865	16.7	15.7	19.4	12.22
On Facility with Central Plant	40	19	21	1,424	828	596	28.3	23.5	34.9	27.40
LOCATION										
Census Region										
Northeast	43	25	18	2,558	1,351	1,207	16.9	18.6	15.1	16.48
Midwest	43	34	10	2,808	1,746	1,062	15.5	19.4	9.1	14.37
South	147	117	31	8,956	6,911	2,045	16.5	16.9	15.1	12.29
West	70	59	11	4,379	3,441	938	16.1	17.2	12.1	15.74
Census Division										
Northeast										
New England	9	6	Q	629	358	Q	15.0	17.2	Q	27.01
Middle Atlantic	34	19	15	1,929	993	936	17.5	19.1	15.9	18.67
Midwest										
East North Central	28	23	6	1,773	1,071	701	16.1	21.5	7.8	17.87
West North Central	15	11	4	1,036	675	361	14.4	16.0	11.4	21.42
South										
South Atlantic	71	55	16	4,700	3,700	1,000	15.1	14.8	16.3	18.65
East South Central	30	21	Q	1,566	1,071	494	19.1	19.8	17.4	23.64
West South Central	46	41	6	2,690	2,139	551	17.3	19.0	10.7	19.47
West										
Mountain	22	20	2	1,578	1,236	341	14.1	16.2	6.7	21.58
Pacific	48	39	9	2,802	2,205	597	17.2	17.7	15.2	18.50
Metropolitan Status										
Metropolitan	258	198	60	15,275	11,229	4,046	16.9	17.6	14.8	7.67
Nonmetropolitan	47	37	10	3,426	2,219	1,208	13.7	16.5	8.4	15.90
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	14	11	3	963	575	388	15.0	19.2	8.8	26.67
5,500-7,000 HDD	47	31	16	3,243	1,697	1,546	14.5	18.5	10.2	13.91
4,000-5,499 HDD	83	59	24	4,204	2,806	1,398	19.7	20.9	17.1	17.08
Under 4,000 HDD	79	60	19	5,140	3,935	1,205	15.4	15.2	16.1	15.89
2,000 CDD or More and --										
Under 4,000 HDD	81	74	8	5,152	4,435	718	15.7	16.6	10.5	14.78

See footnote at end of table.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)		
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity	
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating
	1989	1988	1987	1989	1988	1987	1989	1988	1987
1989 Degree-Days									
Under 2,000 CDD and --									
Over 7,000 HDD	20	13	7	1,394	708	687	14.2	18.3	10.1
5,500-7,000 HDD	65	48	17	4,211	2,646	1,565	15.4	18.2	10.6
4,000-5,499 HDD	76	55	21	3,823	2,620	1,203	19.8	20.8	17.7
Under 4,000 HDD	65	47	18	4,256	3,149	1,108	15.2	14.9	16.2
2,000 CDD or More and --									
Under 4,000 HDD	79	72	7	5,017	4,325	691	15.8	16.7	10.5
STRUCTURE									
Floors									
1	114	98	16	7,714	6,002	1,712	14.7	16.3	9.3
2	100	68	32	5,746	4,003	1,743	17.4	16.9	18.6
3	30	20	11	1,967	1,046	921	15.5	18.9	11.6
4 to 6	30	22	8	1,916	1,169	747	15.9	19.1	10.8
7 or More	30	27	Q	1,359	1,228	Q	21.9	21.8	Q
Wall Materials									
Masonry	184	141	43	11,797	7,956	3,841	15.6	17.8	11.2
Siding or Shingles	20	18	2	1,419	1,111	308	14.3	16.0	7.9
Metal Panels	29	19	9	1,964	1,588	376	14.6	12.3	24.7
Concrete Panels	44	30	14	2,457	1,811	645	18.0	16.4	22.3
Window Glass	18	17	Q	654	605	Q	27.0	28.4	Q
Other	9	9	Q	412	377	Q	22.7	23.8	Q
Roof Materials									
Built-Up	166	132	33	9,693	6,956	2,737	17.1	19.0	12.2
Shingles (Not Wood)	39	31	9	2,947	1,976	971	13.3	15.5	9.0
Metal Surfacing	37	25	12	2,754	2,061	693	13.5	12.2	17.2
Synthetic or Rubber	42	29	14	1,882	1,366	516	22.4	21.0	26.3
Slate or Tile	6	4	Q	490	324	Q	11.5	12.4	Q
Concrete	5	5	Q	395	357	Q	13.2	13.7	Q
Wooden Materials	3	Q	Q	203	Q	Q	14.2	Q	Q
Other	Q	Q	Q	339	Q	Q	19.0	Q	Q
Building Shell Conservation Features (Solely or in Combination)									
Roof or Ceiling Insulation	257	197	59	15,050	11,048	4,002	17.0	17.8	14.8
Wall Insulation	189	148	40	10,696	8,122	2,574	17.6	18.2	15.7
Storm or Multiple Glazing	149	126	23	8,202	6,053	2,149	18.2	20.8	10.8
Tinted, Reflective, or Shading Glass	151	128	23	8,273	6,761	1,512	18.3	19.0	15.0
Exterior or Interior Shadings or Awnings	138	109	29	7,692	5,714	1,978	18.0	19.1	14.8
Weather Stripping or Caulking	252	199	53	14,613	10,939	3,674	17.3	18.2	14.6
None of the Above	13	10	3	1,288	854	433	10.4	11.6	8.0
ENERGY SOURCES AND END USES^a									
Energy Sources (Solely or in Combination)									
Electricity	305	234	70	18,702	13,448	5,254	16.3	17.4	13.3
Natural Gas	134	90	45	9,136	5,109	4,027	14.7	17.6	11.1
Fuel Oil	39	27	12	2,010	1,174	836	19.2	23.0	13.9
District Heat	Q	Q	Q	606	Q	Q	32.8	Q	Q
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q
Propane	22	19	3	1,499	1,046	453	14.4	17.7	6.7
Other	4	Q	Q	285	Q	Q	13.1	Q	Q

See footnote at end of table.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.985	1.009	1.781	0.608	0.599	1.312	0.646	0.698	1.340	
Energy End Uses (Solely or in Combination)										
Heated Buildings	305	234	70	18,702	13,448	5,254	16.3	17.4	13.3	7.16
Air-Conditioned Buildings	295	229	66	17,246	12,509	4,737	17.1	18.3	13.9	7.24
Buildings with Water Heating	287	218	69	16,801	11,790	5,011	17.1	18.5	13.7	7.20
Buildings with Cooking	131	104	27	6,520	4,691	1,829	20.1	22.1	14.8	10.97
Buildings with Manufacturing	27	15	Q	1,418	881	537	18.7	17.3	21.1	26.48
Space-Heating Energy Source										
Electricity	305	234	70	18,702	13,448	5,254	16.3	17.4	13.3	7.16
Main	234	234	--	13,448	13,448	--	17.4	17.4	--	6.73
With Secondary	35	35	--	1,997	1,997	--	17.3	17.3	--	18.46
Natural Gas Only	17	17	--	1,142	1,142	--	14.7	14.7	--	29.35
Other Energy Sources or Combinations	16	16	--	787	787	--	20.2	20.2	--	28.94
With No Secondary	200	200	--	11,451	11,451	--	17.5	17.5	--	8.68
Secondary	70	--	70	5,254	--	5,254	13.3	--	13.3	11.53
Other Excluding Electricity	--	--	--	--	--	--	--	--	--	--
Building Not Heated	--	--	--	--	--	--	--	--	--	--
Main Space-Heating Energy Source										
Electricity	234	234	--	13,448	13,448	--	17.4	17.4	--	6.73
Natural Gas	45	Q	39	4,012	Q	3,719	11.3	Q	10.6	11.36
Fuel Oil	5	Q	5	581	Q	566	9.1	Q	9.3	22.99
District Heat	19	Q	17	573	Q	523	32.5	Q	33.0	31.57
Propane	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	NC	Q	Q	NC	Q	Q	NC	Q	98.99
Ability to Switch Main Heating Fuel										
No Alternate	256	210	47	15,488	11,802	3,686	16.5	17.8	12.6	7.45
Alternate Main Heating Fuel										
Electricity	14	Q	13	970	Q	895	14.8	Q	14.8	20.37
Natural Gas	21	15	Q	1,226	991	Q	17.5	15.6	Q	25.43
Fuel Oil	8	5	3	433	240	193	17.5	20.1	14.2	30.60
Propane	2	Q	Q	277	Q	Q	8.3	Q	Q	41.96
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Air-Conditioning Energy Source										
Electricity	285	222	63	16,691	12,238	4,453	17.1	18.1	14.2	7.68
Other Excluding Electricity	10	Q	3	555	Q	284	18.6	Q	10.7	27.95
Air-Conditioning Not Performed	9	6	4	1,455	939	516	6.5	5.9	7.6	25.52

See footnote at end of table.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RBE Row Factor
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
	1984	1981	1988	1,811	1,951	1,325	1,895	1,873	1,377	
Water-Heating Energy Source										
Electricity	201	171	30	11,046	9,116	1,930	18.2	18.7	15.4	8.33
Other Excluding Electricity	86	47	39	5,755	2,674	3,081	15.0	17.7	12.6	11.77
Water Heating Not Performed	18	16	1	1,900	1,658	242	9.4	9.9	5.6	18.52
Cooking Energy Source										
Electricity	73	56	16	3,381	2,490	891	21.5	22.7	18.2	13.15
Other Excluding Electricity	58	47	11	3,139	2,201	938	18.6	21.5	11.7	18.34
Cooking Not Performed	173	131	43	12,182	8,757	3,425	14.2	14.9	12.5	9.58
Manufacturing Energy Source										
Electricity	22	13	Q	1,154	755	399	18.6	17.5	20.8	28.57
Other Excluding Electricity	5	Q	Q	264	Q	Q	19.2	Q	Q	52.23
Manufacturing Not Performed	278	219	59	17,284	12,567	4,717	16.1	17.4	12.4	7.57
HEATING AND COOLING										
Percent Heated										
Not Heated	--	--	--	--	--	--	--	--	--	--
1 to 50	26	22	5	3,876	2,945	932	6.8	7.3	5.1	14.18
51 to 99	64	48	16	3,160	2,289	872	20.4	21.1	18.4	14.54
100	214	165	49	11,654	8,204	3,450	18.4	20.1	14.3	5.88
Percent Cooled										
Not Cooled	9	6	4	1,455	939	516	6.5	5.9	7.6	23.52
1 to 50	43	25	19	4,748	2,833	1,915	9.1	8.7	9.7	10.86
51 to 99	91	76	15	4,710	3,501	1,208	19.3	21.7	12.4	11.49
100	161	128	33	7,788	6,175	1,614	20.7	20.8	20.2	9.66
Heating Equipment (Solely or in Combination)										
Furnaces	59	39	20	4,529	2,376	2,153	13.1	16.4	9.5	13.22
Boilers	52	30	22	3,145	1,371	1,774	16.5	21.7	12.4	12.77
Individual Space Heaters	134	93	41	8,596	5,448	3,148	15.6	17.2	13.0	11.97
Packaged Heating Units	127	98	30	7,384	5,636	1,748	17.2	17.3	16.9	10.93
Heat Pumps	85	66	19	5,158	3,886	1,273	16.4	16.9	14.9	14.12
Air Ducts	219	166	52	12,281	8,924	3,356	17.8	18.6	15.6	8.08
Heating or Reheating Coils	106	76	30	4,453	3,328	1,124	23.7	22.9	26.4	15.20
Fan-Coil Units	43	20	23	1,775	845	930	24.4	23.5	25.2	22.49
Steam or Hot Water Radiators or Baseboards	22	8	14	1,671	354	1,317	13.0	22.6	10.5	19.16
Other	12	12	Q	446	329	Q	27.2	35.4	Q	37.57
Cooling Equipment (Solely or in Combination)										
Central Chillers	77	57	21	3,434	2,441	993	22.5	23.3	20.7	17.93
Individual Air Conditioners	71	45	26	4,779	2,747	2,032	14.8	16.4	12.7	12.68
Packaged Cooling Units	204	154	50	11,630	8,277	3,353	17.5	18.6	14.8	9.16
Heat Pumps	77	58	19	4,799	3,518	1,280	16.0	16.5	14.6	14.90
Air Ducts	208	157	51	11,482	8,429	3,052	18.1	18.6	16.7	8.38
Fan-Coil Units	63	47	16	2,396	1,724	672	26.4	27.3	23.9	14.33
Other	6	6	Q	Q	Q	Q	11.7	12.5	Q	51.98
Year Main Central Chiller Installed										
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	Q	6
1960 to 1969	12	6	6	653	320	333	18.2	19.6	16.9	59.11
1970 to 1979	22	18	Q	1,000	790	Q	21.8	23.1	Q	41.87
1980 to 1986	20	19	Q	852	751	Q	23.6	25.0	Q	22.05
1987 to 1989	12	Q	Q	557	385	Q	22.1	21.7	Q	38.28

See footnotes at end of table.

Table 29. Electricity Consumption and Conditional Energy Intensity for Buildings Heated with Electricity (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Total Floorspace of Buildings Using Electricity (million square feet)			Electricity Energy Intensity (kWh/sq. ft.)			RSE Row Factor
	All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		All Buildings Heated with Electricity	Buildings with Electricity		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.924	1.011	1.000	0.811	0.931	1.328	0.608	0.673	1.377	
Year Packaged Cooling System Installed										
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	23	17	5	1,537	1,043	493	14.9	16.8	11.1	22.14
1970 to 1979	69	58	11	3,815	2,888	928	18.2	20.2	11.8	12.56
1980 to 1986	76	59	17	3,941	2,954	987	19.2	19.9	17.0	16.07
1987 to 1989	27	18	9	1,943	1,227	716	13.7	14.7	11.9	21.45
Computer Area with Separate Air-Conditioning System										
Present in Building	117	91	27	4,986	3,701	1,285	23.5	24.5	20.7	12.16
Not Present	187	144	43	13,716	9,747	3,968	13.7	14.8	10.9	6.59
LIGHTING										
Percent Lit When Open										
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	25	19	5	3,293	2,099	1,195	7.6	9.3	4.6	17.51
51 to 99	88	66	22	5,161	3,618	1,544	17.1	18.2	14.4	13.05
100	191	149	42	10,183	7,689	2,494	18.8	19.4	16.9	9.06
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	140	110	29	10,133	7,233	2,900	13.8	15.2	10.2	9.81
With Thermostats	127	100	27	9,290	6,714	2,576	13.7	14.9	10.5	10.74
Any Control of Cooling	135	107	27	9,466	6,871	2,595	14.2	15.6	10.6	10.07
With Thermostats	126	100	26	8,782	6,499	2,283	14.3	15.3	11.5	10.67
Reduced Use During Off-Hours										
Heating Only	14	10	4	1,664	1,077	586	8.6	9.3	7.4	20.96
Cooling Only	15	10	4	800	492	308	18.3	21.0	13.9	24.19
Heating and Cooling	195	154	42	13,144	9,624	3,520	14.9	16.0	11.8	7.49
Computerized Energy Management and Control System										
Present in Building	86	64	21	3,854	2,798	1,056	22.3	23.0	20.3	13.40
Controls Heating and Cooling	83	62	21	3,708	2,666	1,042	22.5	23.4	20.3	13.65
Controls Lighting	22	17	Q	1,147	893	Q	18.9	19.2	Q	17.85
Controls Other	12	10	Q	553	431	Q	21.0	23.3	Q	20.56
Other Energy Management										
Regular HVAC Maintenance	249	191	57	13,344	9,766	3,578	18.6	19.6	16.0	7.63
Participated in Utility Conservation Program	58	43	15	2,919	2,094	825	20.0	20.6	18.2	16.00

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 30. Electricity Peak Demand-Metered Buildings

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Row Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor:	0.669	0.709	1.022	0.293	0.300	1.233	1.029	1.285	1.483	
All Buildings	4,294	61,563	813	2,217	43,532	661	2,078	18,031	151	5.99
Building Floor-space (Square Feet)										
1,001 to 5,000	2,360	6,409	95	999	2,777	60	1,360	3,632	36	8.34
5,001 to 10,000	855	6,297	72	468	3,469	53	387	2,828	19	9.18
10,001 to 25,000	622	9,989	112	406	6,649	89	216	3,340	23	8.92
25,001 to 50,000	243	8,671	97	176	6,309	79	67	2,362	19	9.34
50,001 to 100,000	125	8,918	127	94	6,707	108	30	2,211	19	12.13
100,001 to 200,000	60	8,222	113	49	6,768	94	11	1,453	20	14.21
200,001 to 500,000	23	6,996	107	17	5,103	95	6	1,893	13	20.54
Over 500,000	7	6,062	89	7	5,751	85	0	311	4	18.18
Year Constructed										
1899 or Before	162	1,568	7	65	970	5	97	598	2	19.54
1900 to 1919	223	3,849	22	101	2,129	16	122	1,720	6	18.62
1920 to 1945	631	7,880	62	284	5,547	50	346	2,332	11	11.05
1946 to 1959	823	10,185	111	400	6,837	88	423	3,349	23	11.01
1960 to 1969	775	11,921	173	420	8,835	141	355	3,086	31	10.29
1970 to 1979	855	13,172	214	514	9,940	175	341	3,232	39	8.19
1980 to 1983	309	4,209	86	189	3,343	73	120	866	13	12.93
1984 to 1986	315	5,628	89	143	3,607	72	172	2,021	17	13.29
1987 to 1989	202	3,150	49	100	2,324	39	102	825	10	16.62
BUILDING USE										
Principal Building Activity										
Assembly	614	6,851	55	263	4,086	42	351	2,765	13	13.21
Education	282	8,070	64	167	6,122	52	115	1,948	11	11.90
Food Sales	102	792	31	69	662	28	33	129	3	23.48
Food Service	241	1,167	33	164	935	25	77	232	8	13.87
Health Care	80	2,054	45	35	1,642	39	45	412	6	17.80
Lodging	140	3,476	40	94	2,834	35	46	642	6	14.74
Mercantile and Service	1,276	12,361	161	604	7,948	119	672	4,412	43	8.57
Office	679	11,796	229	384	9,291	193	295	2,505	36	6.11
Parking Garage	45	983	5	27	756	4	18	227	Q	28.75
Public Order and Safety	50	608	8	19	473	7	30	135	2	28.66
Warehouse	543	8,850	71	274	6,202	58	269	2,648	13	13.99
Other	62	1,528	59	37	964	Q	25	565	8	35.03
Vacant	182	3,027	11	81	1,618	9	102	Q	2	21.31
Weekly Operating Hours										
39 or Fewer	687	4,747	21	236	2,388	13	452	2,359	8	11.89
40 to 48	1,100	13,810	129	561	9,571	105	539	4,239	24	8.99
49 to 60	978	13,349	140	505	9,208	114	473	4,141	26	7.71
61 to 84	621	10,751	153	355	8,114	120	266	2,636	33	8.70
85 to 167	513	9,377	142	316	6,784	118	197	2,594	24	11.85
168 (Open Continuously)	395	9,529	228	244	7,467	192	151	2,061	37	10.54
Weekly Operating Schedule										
Open 1 to 23 Hours										
Monday through Friday	1,186	17,966	195	643	12,937	162	543	5,028	32	8.22
Monday through Saturday	1,041	11,216	115	517	7,802	91	523	3,414	24	8.44
Monday through Sunday	787	11,833	185	458	8,743	148	330	3,091	37	10.05
Open 24 Hours (Continuously)	395	9,529	228	244	7,467	192	151	2,061	37	10.54
Other	885	11,020	90	355	6,583	69	530	4,436	22	12.82

See footnote at end of table.

Table 30. Electricity Peak Demand-Metered Buildings (Continued)

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Power Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor:	0.669	0.709	1.022	0.933	0.906	1.233	1.039	1.285	1.489	
Workers										
4 or Fewer	2,261	13,550	86	966	6,639	56	1,296	6,911	30	7.36
5 to 9	903	7,926	76	494	5,240	54	409	2,686	22	6.34
10 to 19	507	6,443	70	301	4,212	51	206	2,231	19	10.44
20 to 49	381	9,665	117	268	7,400	95	113	2,265	23	8.84
50 to 99	132	7,389	102	101	5,830	84	31	1,560	18	12.47
100 to 249	79	6,771	140	61	5,461	121	18	1,310	19	14.33
250 or More	32	9,818	222	27	8,750	200	5	1,068	22	16.85
Ownership and Occupancy										
Nongovernment Owned	3,736	47,550	619	1,881	32,539	493	1,855	15,011	126	5.85
Owner Occupied	2,733	35,437	462	1,368	24,146	375	1,366	11,291	87	6.65
Single Establishment	2,366	26,590	347	1,192	17,742	282	1,174	8,848	65	7.46
Multiple Establishment	367	8,847	115	176	6,404	93	191	2,443	22	11.34
Nonowner Occupied	1,002	12,113	157	513	8,393	118	489	3,720	39	8.74
Single Establishment	658	6,179	78	336	4,350	58	322	1,829	20	11.70
Multiple Establishment	256	5,227	78	140	3,611	59	116	1,616	19	14.61
Vacant	89	707	2	38	431	2	51	276	Q	22.86
Government Owned	559	14,013	194	336	10,993	168	223	3,020	25	11.07
Federal	38	1,900	39	28	Q	34	10	152	Q	42.26
State	131	3,870	70	85	3,011	62	45	859	8	21.86
Local	390	8,243	84	222	6,234	72	168	2,009	12	11.48
Percent Vacant at Least Three Months										
0	3,507	42,697	604	1,818	30,238	493	1,689	12,458	112	5.68
1 to 50	374	12,416	171	192	9,084	137	181	3,332	34	10.39
51 to 99	98	3,446	19	54	2,288	17	45	Q	2	20.06
100	315	3,005	19	153	1,922	14	163	1,083	4	12.70
Months in Use Out of Past 12 Months										
0 to 8	310	3,308	24	165	2,298	17	145	1,010	6	14.80
9 to 11	270	3,775	22	135	2,571	17	135	1,203	6	12.85
12	3,715	54,480	767	1,917	38,662	627	1,798	15,818	139	5.81
LOCATION										
Census Region										
Northeast	751	13,326	172	446	10,052	143	305	3,274	29	12.77
Midwest	1,001	15,704	178	482	11,040	151	519	4,665	27	11.73
South	1,723	21,215	286	942	15,179	239	782	6,036	47	8.44
West	819	11,318	177	347	7,262	129	472	4,056	48	14.80
Census Division										
Northeast										
New England	177	3,127	34	109	2,069	27	68	1,058	7	15.00
Middle Atlantic	574	10,199	138	336	7,983	116	238	2,216	22	15.86
Midwest										
East North Central	656	10,527	117	336	7,277	99	320	3,250	18	14.82
West North Central	345	5,177	61	146	3,762	52	199	1,415	9	18.10
South										
South Atlantic	692	9,628	122	394	7,244	109	298	2,384	13	15.12
East South Central	381	4,218	63	200	2,880	54	181	1,338	9	14.25
West South Central	651	7,369	101	349	5,056	76	302	2,313	24	18.87
West										
Mountain	300	4,172	52	167	3,412	46	133	760	7	25.40
Pacific	519	7,146	125	180	3,849	83	339	3,296	42	14.51

See footnote at end of table.

Table 30. Electricity Peak Demand-Metered Buildings (Continued)

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Row Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor:	0.669	0.708	1.622	0.933	0.906	1.233	1.039	1.285	1.463	
Metropolitan Status										
Metropolitan	2,946	49,835	693	1,630	36,288	568	1,315	13,547	125	6.59
Nonmetropolitan	1,349	11,728	119	586	7,244	93	763	4,484	26	12.79
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	333	4,983	62	145	3,340	52	188	1,643	10	16.02
5,500-7,000 HDD	1,074	17,496	196	635	13,034	171	438	4,462	25	13.95
4,000-5,499 HDD	917	15,045	207	410	10,682	170	506	4,363	37	14.48
Under 4,000 HDD	982	12,573	194	454	8,353	147	528	4,220	47	15.78
2,000 CDD or More and --										
Under 4,000 HDD	989	11,466	154	572	8,123	121	417	3,343	33	14.72
ENERGY SOURCES AND END USES*										
Energy Sources (Solely or in Combination)										
Electricity	4,294	61,563	813	2,217	43,532	661	2,078	18,031	151	5.69
Natural Gas	2,417	41,115	534	1,311	29,768	428	1,106	11,347	106	7.71
Fuel Oil	580	12,579	194	305	9,536	164	276	3,043	30	14.69
District Heat	98	6,578	130	76	5,529	116	22	1,048	14	27.23
District Chilled Water	24	1,927	47	17	1,462	40	Q	464	Q	45.26
Propane	348	4,695	59	173	3,338	51	175	1,357	7	17.42
Other	129	1,537	13	55	1,188	11	74	350	2	22.60
Energy End Uses (Solely or in Combination)										
Heated Buildings	3,872	57,826	784	2,035	41,371	637	1,837	16,455	147	5.92
Air-Conditioned Buildings	3,182	51,757	749	1,770	37,841	614	1,412	13,916	135	6.19
Buildings with Water Heating	3,180	53,569	762	1,787	38,953	624	1,393	14,617	138	6.04
Buildings with Cooking	864	23,662	390	553	18,464	338	311	5,198	52	9.56
Buildings with Manufacturing	205	5,595	85	120	4,497	76	85	1,098	10	15.99
Energy End-Use Combinations										
Heated Buildings										
With Air Conditioning										
With Water Heating and Cooking	660	20,781	358	446	16,371	309	213	4,410	49	10.77
With Water Heating, Without Cooking	1,906	25,896	338	1,059	18,173	262	847	7,723	76	7.12
Without Water Heating or Cooking	484	3,641	28	193	2,263	21	290	1,377	7	14.46
Without Air Conditioning										
With Water Heating and Cooking	138	2,079	19	62	1,407	Q	76	672	3	21.23
With Water Heating, Without Cooking	373	3,700	30	150	2,209	20	223	1,491	10	14.83
Without Water Heating or Cooking	291	1,509	8	115	768	5	176	741	2	18.41
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	269	2,282	7	97	1,185	5	171	1,097	2	16.90
All Other Combinations	174	1,675	26	93	1,156	23	80	519	3	25.83

See footnote at end of table.

Table 30. Electricity Peak Demand-Metered Buildings (Continued)

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Row Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor	0.669	0.709	1.022	0.993	0.906	1.295	1.095	1.255	1.493	
Space-Heating Energy Source										
Electricity	1,283	18,702	305	720	13,674	250	563	5,027	54	8.24
Main	957	13,448	234	533	10,049	193	424	3,399	41	8.07
With Secondary	93	1,997	35	55	1,603	29	37	395	5	22.34
Natural Gas Only	54	1,142	17	34	858	14	20	285	Q	29.35
Other Energy Sources or Combinations	36	787	16	19	720	15	17	67	1	34.41
With No Secondary	864	11,451	200	478	8,447	164	387	3,004	36	8.71
Secondary	326	5,254	70	187	3,625	57	139	1,629	13	14.26
Other Excluding Electricity	2,589	39,124	480	1,315	27,696	387	1,274	11,428	92	7.10
Building Not Heated	422	3,737	29	181	2,162	24	241	1,576	4	16.04
Main Space-Heating Energy Source										
Electricity	957	13,448	234	533	10,049	193	424	3,399	41	8.07
Natural Gas	2,078	31,102	377	1,095	21,618	295	983	9,484	82	8.21
Fuel Oil	473	5,577	53	237	3,775	45	235	1,803	9	15.25
District Heat	93	6,020	104	72	4,987	90	21	1,033	14	22.21
Propane	208	1,230	Q	74	614	Q	133	616	2	24.16
Other	68	761	4	33	563	3	36	198	1	33.66
Air-Conditioning Energy Source										
Electricity	3,072	47,905	695	1,705	34,836	570	1,367	13,069	126	6.30
Other Excluding Electricity	111	3,852	53	66	3,005	44	45	847	9	19.73
Air-Conditioning Not Performed	1,112	9,806	64	446	5,691	47	666	4,115	17	10.17
Water-Heating Energy Source										
Electricity	1,554	21,493	333	863	15,716	276	690	5,777	56	6.97
Other Excluding Electricity	1,626	32,076	430	923	23,236	348	703	8,839	82	7.54
Water Heating Not Performed	1,115	7,994	50	430	4,580	37	685	3,414	13	9.80
Cooking Energy Source										
Electricity	387	10,850	174	239	9,034	153	148	1,816	21	10.42
Other Excluding Electricity	477	12,812	216	314	9,431	185	163	3,382	32	12.60
Cooking Not Performed	3,431	37,901	423	1,664	25,068	324	1,767	12,833	99	6.20
Manufacturing Energy Source										
Electricity	163	4,406	64	90	3,560	56	73	846	8	18.65
Other Excluding Electricity	42	1,190	21	30	937	20	12	253	1	29.62
Manufacturing Not Performed	4,090	55,968	727	2,097	39,035	586	1,993	16,932	142	5.82
HEATING AND COOLING										
Percent Heated										
Not Heated	433	3,839	29	187	2,231	24	245	1,608	5	15.78
1 to 50	630	9,314	61	327	6,107	46	303	3,207	15	13.16
51 to 99	496	8,668	146	272	6,378	118	225	2,290	28	10.84
100	2,735	39,742	577	1,430	28,816	473	1,305	10,926	104	6.62
Percent Cooled										
Not Cooled	1,112	9,806	64	446	5,691	47	666	4,115	17	10.17
1 to 50	1,037	17,821	135	565	12,102	108	473	5,719	28	9.59
51 to 99	597	13,133	230	361	10,209	194	235	2,924	36	8.89
100	1,548	20,803	384	844	15,531	313	704	5,273	71	9.11
Computer Area with Separate Air-Conditioning System										
Present in Building	264	16,678	350	194	13,844	306	71	2,834	44	9.65
Not Present	4,030	44,885	463	2,023	29,688	355	2,007	15,197	108	5.91

See footnote at end of table.

Table 30. Electricity Peak Demand-Metered Buildings (Continued)

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Flow Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor:	0.897	0.749	0.887	0.868	0.898	1.055	1.179	1.521	1.480	
LIGHTING AND REFRIGERATION										
Percent Lit When Open										
Not Lit	75	757	2	28	416	1	47	341	1	27.43
1 to 50	999	10,864	56	496	6,714	44	504	4,150	13	10.23
51 to 99	951	16,950	238	493	12,254	188	458	4,696	50	8.83
100	2,268	32,992	516	1,200	24,148	428	1,069	8,844	88	7.51
Refrigeration Equipment (Solely or in Combination)										
Commercial										
Refrigeration Units	908	24,605	438	592	19,032	367	316	5,572	71	8.82
Freezers	707	21,627	417	471	17,318	352	235	4,309	65	8.90
Residential										
Refrigerators	2,471	44,179	602	1,320	31,880	494	1,151	12,299	108	6.22
Freezers	617	12,406	191	343	9,409	152	274	2,997	38	10.44
Ice-Making Machines	771	23,401	451	539	18,531	385	232	4,869	66	9.14
Refrigerated Vending Machines	1,513	38,810	622	950	30,229	521	563	8,581	101	8.35
Water Coolers	1,745	42,781	629	1,064	32,822	533	682	9,959	97	6.70
Other	56	1,408	54	35	1,149	52	21	259	3	28.02
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	2,399	27,033	315	1,160	17,469	242	1,239	9,563	72	6.70
With Thermostats	2,100	24,762	289	1,026	16,064	224	1,073	8,698	65	7.14
Any Control of Cooling	1,977	26,303	321	1,037	17,866	255	940	8,438	66	7.05
With Thermostats	1,756	24,032	296	925	16,343	235	831	7,688	61	7.65
Reduced Use During Off-Hours										
Heating Only	790	7,126	63	334	4,318	46	456	2,807	17	11.02
Cooling Only	283	4,112	59	155	3,023	51	128	1,089	8	17.40
Heating and Cooling	2,397	38,683	490	1,275	27,698	393	1,122	10,985	97	7.00
Computerized Energy Management and Control System										
Present in Building	263	14,310	263	184	11,750	221	80	2,560	41	10.96
Controls Heating and Cooling	251	13,767	254	175	11,259	213	77	2,507	40	11.16
Controls Lighting	51	3,835	65	39	3,115	53	12	720	13	21.81
Controls Other	32	2,316	47	27	2,050	41	4	266	6	23.01
ELECTRICITY DEMAND										
Annual Consumption (kilowatthours)										
10,000 or Less	1,019	4,582	5	281	1,612	1	739	2,971	4	9.70
10,001 to 25,000	913	5,413	15	375	2,505	6	538	2,908	9	8.24
25,001 to 50,000	702	5,544	25	394	3,099	14	307	2,445	11	9.15
50,001 to 100,000	639	7,052	46	390	4,592	28	249	2,460	17	9.39
100,001 to 500,000	762	14,099	160	557	10,441	120	205	3,658	41	7.20
500,001 to 1,000,000	122	5,901	85	104	4,927	72	18	974	13	11.78
1,000,001 to 2,000,000	69	5,022	95	57	4,211	78	12	811	17	14.77
2,000,001 to 5,000,000	50	6,263	156	43	5,098	133	8	1,165	22	16.87
Over 5,000,000	18	7,688	225	16	7,047	207	2	641	18	18.10

See footnotes at end of table.

Table 30. Electricity Peak Demand-Metered Buildings (Continued)

Building Characteristics	Buildings Using Electricity			Demand-Metered Buildings			Buildings Not Demand-Metered			RSE Row Factor
	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	Number of Buildings (thousand)	Total Floor-space (million square feet)	Total Electricity Consumed (billion kWh)	
RSE Column Factor	0.007	0.749	0.007	0.008	0.669	0.005	0.175	1.521	1.460	
Peak Electricity Demand (kilowatts)										
10 or Less	398	2,130	5	398	2,130	5	--	--	--	16.01
11 to 25	638	4,225	24	638	4,225	24	--	--	--	11.19
26 to 50	484	5,758	42	484	5,758	42	--	--	--	13.32
51 to 100	316	5,294	54	316	5,294	54	--	--	--	11.62
101 to 250	225	7,249	100	225	7,249	100	--	--	--	11.31
251 to 1,000	128	10,287	196	128	10,287	196	--	--	--	10.75
Over 1,000	26	8,589	241	26	8,589	241	--	--	--	24.37
Season of Peak Electricity Demand										
Summer Peaking	1,231	25,125	447	1,231	25,125	447	--	--	--	9.62
Winter Peaking	690	13,907	173	690	13,907	173	--	--	--	8.29
Summer and Winter Peaking	295	4,500	41	295	4,500	41	--	--	--	16.67

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

° Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.642	0.666	1.019	1.566	0.616	0.946	0.927	2.052	
All Buildings	2,217	1,231	690	295	43,532	25,125	13,907	4,500	8.01
Building Floorspace (Square Feet)									
1,001 to 5,000	999	548	306	145	2,777	1,546	852	378	11.65
5,001 to 10,000	468	267	126	74	3,469	2,009	917	543	12.57
10,001 to 25,000	406	219	144	42	6,649	3,589	2,373	687	12.97
25,001 to 50,000	176	103	56	18	6,309	3,634	2,033	642	14.84
50,001 to 100,000	94	55	32	Q	6,707	3,937	2,230	Q	14.06
100,001 to 200,000	49	24	19	Q	6,768	3,405	2,520	Q	19.02
200,001 to 500,000	17	10	6	Q	5,103	2,842	1,927	Q	23.47
Over 500,000	7	5	1	Q	5,751	4,163	1,055	Q	27.66
Year Constructed									
1899 or Before	65	29	Q	Q	970	413	Q	Q	32.46
1900 to 1919	101	53	30	Q	2,129	1,409	585	Q	26.70
1920 to 1945	284	153	86	46	5,547	3,018	1,740	789	19.17
1946 to 1959	400	231	119	50	6,837	3,975	2,005	Q	16.76
1960 to 1969	420	243	112	64	8,835	4,753	2,883	1,200	12.29
1970 to 1979	514	281	174	59	9,940	6,295	2,931	714	12.42
1980 to 1983	189	96	71	22	3,343	1,728	1,304	311	16.81
1984 to 1986	143	82	48	Q	3,607	2,149	1,337	Q	21.64
1987 to 1989	100	62	29	Q	2,324	1,386	718	Q	24.49
BUILDING USE									
Principal Building Activity									
Assembly	263	147	69	47	4,086	2,392	828	866	19.12
Education	167	89	70	Q	6,122	3,020	2,759	Q	17.61
Food Sales	69	47	Q	Q	662	553	Q	Q	32.90
Food Service	164	118	Q	Q	935	622	Q	Q	20.77
Health Care	35	24	Q	Q	1,642	1,373	Q	Q	23.48
Lodging	94	51	37	Q	2,834	1,409	1,265	Q	21.67
Mercantile and Service	604	327	189	87	7,948	4,555	2,326	1,067	12.68
Office	384	219	119	46	9,291	6,214	2,528	550	13.32
Parking Garage	27	Q	Q	Q	756	Q	Q	Q	44.00
Public Order and Safety	19	13	Q	NC	473	307	Q	NC	42.76
Warehouse	274	129	99	46	6,202	2,798	2,454	950	20.54
Other	37	21	Q	Q	964	759	Q	Q	53.60
Vacant	81	34	37	Q	1,618	828	615	Q	26.32
Weekly Operating Hours									
39 or Fewer	236	123	81	32	2,388	1,186	922	280	19.67
40 to 48	561	301	187	74	9,571	5,557	3,034	980	13.00
49 to 60	505	257	182	66	9,208	5,189	3,089	930	12.97
61 to 84	355	219	81	54	8,114	4,575	2,449	1,091	15.41
85 to 167	316	186	82	47	6,784	4,027	2,028	728	18.91
168 (Open Continuously)	244	144	77	23	7,467	4,591	2,386	490	13.41
Weekly Operating Schedule									
Open 1 to 23 Hours									
Monday through Friday	643	338	238	67	12,937	7,234	4,563	1,140	11.68
Monday through Saturday	517	283	141	93	7,802	4,211	2,565	1,025	15.04
Monday through Sunday	458	278	120	60	8,743	5,271	2,193	1,279	15.90
Open 24 Hours (Continuously)	244	144	77	23	7,467	4,591	2,386	490	13.41
Other	355	188	115	52	6,583	3,817	2,200	566	18.26

See footnote at end of table.

Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace (Continued)

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.842	0.868	1.019	1.588	0.818	0.848	0.927	2.052	
Workers									
4 or Fewer	966	504	311	150	6,639	3,607	2,148	883	12.29
5 to 9	494	276	144	74	5,240	2,810	1,593	838	15.36
10 to 19	301	177	96	27	4,212	2,254	1,573	385	16.42
20 to 49	268	159	80	30	7,400	3,829	2,485	1,087	14.32
50 to 99	101	57	35	Q	5,830	2,805	2,481	Q	16.72
100 to 249	61	38	19	Q	5,461	3,215	1,874	Q	18.56
250 or More	27	19	7	Q	8,750	6,605	1,752	Q	23.17
Ownership and Occupancy									
Nongovernment Owned	1,881	1,051	566	264	32,539	18,491	10,261	3,787	6.65
Owner Occupied	1,368	789	403	176	24,146	14,193	7,239	2,715	10.10
Single Establishment	1,192	674	357	161	17,742	10,255	5,418	2,069	10.57
Multiple Establishment	176	115	45	Q	6,404	3,938	1,821	Q	16.61
Nonowner Occupied	513	262	163	87	8,393	4,298	3,022	1,072	14.50
Single Establishment	336	178	98	60	4,350	2,450	1,331	569	17.64
Multiple Establishment	140	69	48	Q	3,611	1,730	1,463	Q	23.56
Vacant	38	Q	Q	Q	431	Q	Q	Q	33.62
Government Owned	336	179	125	32	10,993	6,634	3,646	713	13.86
Federal	28	22	Q	Q	Q	Q	Q	Q	52.15
State	85	49	33	Q	3,011	1,903	908	Q	26.45
Local	222	108	87	27	6,234	3,141	2,613	481	16.01
Percent Vacant at Least Three Months									
0	1,818	1,022	546	250	30,238	17,479	9,684	3,075	6.56
1 to 50	192	97	70	25	9,084	5,500	2,682	902	17.64
51 to 99	54	28	19	Q	2,288	1,351	635	Q	35.32
100	153	84	55	Q	1,922	796	905	Q	23.24
Months in Use Out of Past 12 Months									
0 to 8	165	84	57	Q	2,298	1,002	790	Q	22.90
9 to 11	135	71	48	Q	2,571	1,029	1,433	Q	23.16
12	1,917	1,075	585	257	38,662	23,094	11,684	3,884	6.25
LOCATION									
Census Region									
Northeast	446	231	169	46	10,052	5,344	3,572	1,135	14.50
Midwest	482	281	118	Q	11,040	6,580	3,292	1,168	17.13
South	942	530	281	131	15,179	8,925	4,735	1,519	12.73
West	347	188	123	36	7,262	4,276	2,308	677	15.66
Census Division									
Northeast									
New England	109	58	38	Q	2,069	1,100	800	Q	23.76
Middle Atlantic	336	173	130	33	7,983	4,244	2,772	Q	14.30
Midwest									
East North Central	336	198	71	Q	7,277	4,234	2,222	Q	22.15
West North Central	146	84	47	Q	3,762	2,346	1,069	Q	25.53
South									
South Atlantic	394	199	138	56	7,244	3,693	2,691	860	19.62
East South Central	200	122	51	Q	2,880	1,976	711	Q	33.99
West South Central	349	209	92	48	5,056	3,257	1,333	466	20.72
West									
Mountain	167	93	65	Q	3,412	2,258	1,022	Q	27.27
Pacific	180	95	58	26	3,849	2,018	1,286	546	22.46

See footnote at end of table.

ELECTRICITY

Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace (Continued)

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.842	0.892	1.019	1.589	0.815	0.846	0.827	2.059	
Metropolitan Status									
Metropolitan	1,630	926	492	212	36,288	21,610	11,050	3,629	9.50
Nonmetropolitan	586	305	198	83	7,244	3,515	2,858	871	18.09
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	145	71	62	Q	3,340	1,920	1,170	Q	22.45
5,500-7,000 HDD	635	348	183	105	13,034	7,201	4,424	1,408	17.09
4,000-5,499 HDD	410	216	151	43	10,682	6,213	3,417	1,052	18.54
Under 4,000 HDD	454	251	143	60	8,353	4,858	2,347	1,148	21.88
2,000 CDD or More and --									
Under 4,000 HDD	572	345	151	77	8,123	4,933	2,550	640	21.20
ENERGY SOURCES AND END USES^a									
Energy Sources (Solely or in Combination)									
Electricity	2,217	1,231	690	295	43,532	25,125	13,907	4,500	8.21
Natural Gas	1,311	810	316	185	29,768	18,518	7,987	3,263	10.29
Fuel Oil	305	162	106	37	9,536	5,891	2,968	676	18.91
District Heat	76	48	21	Q	5,529	4,247	925	Q	41.53
District Chilled Water	17	Q	Q	Q	1,462	Q	Q	Q	72.13
Propane	173	109	44	Q	3,338	1,934	1,220	Q	28.73
Other	55	20	27	Q	1,188	439	652	Q	37.12
Energy End Uses (Solely or in Combination)									
Heated Buildings	2,035	1,144	637	255	41,371	24,245	12,970	4,156	8.19
Air-Conditioned Buildings	1,770	1,072	490	208	37,841	23,392	10,943	3,506	8.43
Buildings with Water Heating	1,787	1,027	537	223	38,953	23,029	12,119	3,804	8.19
Buildings with Cooking	553	340	149	63	18,464	11,242	5,585	1,637	13.70
Buildings with Manufacturing	120	58	49	Q	4,497	2,863	1,270	Q	21.39
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	446	290	110	47	16,371	10,393	4,542	1,435	16.11
With Water Heating, Without Cooking	1,059	626	313	119	18,173	11,034	5,484	1,655	10.88
Without Water Heating or Cooking	193	113	54	26	2,263	1,338	674	251	22.88
Without Air Conditioning									
With Water Heating and Cooking	62	25	32	Q	1,407	479	828	Q	29.48
With Water Heating, Without Cooking	150	46	73	31	2,209	643	1,084	Q	20.47
Without Water Heating or Cooking	115	38	55	Q	768	285	303	Q	28.58
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	97	40	39	Q	1,185	293	710	Q	33.91
All Other Combinations	93	53	16	Q	1,156	661	282	Q	29.16

See footnote at end of table.

Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace (Continued)

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor	0.642	0.599	1.018	1.286	0.618	0.546	0.927	2.052	
Space-Heating Energy Source									
Electricity	720	322	320	78	13,674	6,373	6,190	1,112	11.65
Main	533	227	254	53	10,049	4,302	5,021	727	13.65
With Secondary	55	28	23	Q	1,603	760	651	Q	31.72
Natural Gas Only	34	19	Q	Q	858	363	Q	Q	42.85
Other Energy Sources or Combinations	19	Q	Q	Q	720	Q	Q	Q	50.67
With No Secondary	478	198	230	49	8,447	3,542	4,370	535	14.13
Secondary	187	95	67	Q	3,625	2,071	1,169	Q	19.33
Other Excluding Electricity	1,315	822	317	176	27,696	17,872	6,780	3,044	8.88
Building Not Heated	181	87	53	41	2,162	880	938	344	21.28
Main Space-Heating Energy Source									
Electricity	533	227	254	53	10,049	4,302	5,021	727	13.65
Natural Gas	1,095	688	251	156	21,618	13,585	5,530	2,503	11.48
Fuel Oil	237	128	81	29	3,775	1,890	1,412	472	21.67
District Heat	72	46	20	Q	4,987	3,859	772	Q	28.78
Propane	74	52	Q	Q	614	423	Q	Q	51.81
Other	33	Q	Q	Q	563	Q	Q	Q	48.20
Air-Conditioning Energy Source									
Electricity	1,705	1,027	476	201	34,836	21,396	10,311	3,129	8.73
Other Excluding Electricity	66	45	Q	Q	3,005	1,997	Q	Q	31.58
Air-Conditioning Not Performed	446	159	200	87	5,691	1,733	2,964	994	15.16
Water-Heating Energy Source									
Electricity	863	439	320	104	15,716	8,671	5,555	1,490	10.22
Other Excluding Electricity	923	588	217	119	23,236	14,358	6,564	2,314	10.30
Water Heating Not Performed	430	204	153	72	4,580	2,096	1,788	695	16.60
Cooking Energy Source									
Electricity	239	145	78	Q	9,034	5,210	3,070	Q	16.95
Other Excluding Electricity	314	195	71	47	9,431	6,033	2,515	883	17.10
Cooking Not Performed	1,664	891	541	232	25,068	13,883	8,322	2,863	9.54
Manufacturing Energy Source									
Electricity	90	44	39	Q	3,560	2,366	951	Q	25.82
Other Excluding Electricity	30	14	Q	Q	937	497	Q	Q	37.61
Manufacturing Not Performed	2,097	1,173	641	283	39,035	22,262	12,638	4,135	8.22
HEATING AND COOLING									
Percent Heated									
Not Heated	187	88	59	41	2,231	900	981	350	26.79
1 to 50	327	176	96	55	6,107	3,286	2,070	750	17.21
51 to 99	272	164	81	27	6,378	3,998	1,984	396	16.89
100	1,430	803	455	173	28,816	16,941	8,872	3,004	8.85
Percent Cooled									
Not Cooled	446	159	200	87	5,691	1,733	2,964	994	15.16
1 to 50	565	322	171	71	12,102	6,311	4,314	1,476	12.15
51 to 99	361	240	90	31	10,209	6,561	2,795	Q	14.08
100	844	510	229	105	15,531	10,521	3,834	1,176	12.72

See footnote at end of table.

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Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace (Continued)

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor	0.908	0.825	1.038	1.590	0.827	0.944	0.871	2.003	
Computer Area with Separate Air-Conditioning System									
Present in Building	194	121	63	10	13,844	9,374	3,939	531	13.32
Not Present	2,023	1,110	627	286	29,688	15,751	9,969	3,968	8.62
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	28	Q	Q	Q	416	Q	Q	Q	36.58
1 to 50	496	256	164	76	6,714	3,199	2,606	908	15.51
51 to 99	493	302	139	52	12,254	7,545	3,556	1,154	13.33
100	1,200	667	372	161	24,148	14,279	7,505	2,364	9.43
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	592	378	145	69	19,032	11,924	5,598	1,510	11.42
Freezers	471	299	114	58	17,318	10,902	5,104	1,312	11.70
Residential									
Refrigerators	1,320	751	404	165	31,880	19,009	9,999	2,872	9.24
Freezers	343	211	90	42	9,409	5,804	2,600	1,006	15.42
Ice-Making Machines	539	332	153	54	18,531	12,048	5,101	1,383	11.33
Refrigerated Vending Machines	950	558	289	103	30,229	18,139	9,393	2,697	9.12
Water Coolers	1,064	620	325	119	32,822	19,571	10,076	3,176	8.61
Other	35	21	Q	Q	1,149	662	Q	Q	27.81
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	1,160	653	358	148	17,469	10,167	5,106	2,196	9.76
With Thermostats	1,026	572	324	130	16,064	9,289	4,747	2,029	9.68
Any Control of Cooling	1,037	627	288	122	17,866	10,765	5,281	1,820	10.26
With Thermostats	925	563	259	103	16,343	9,913	4,746	1,684	10.45
Reduced Use During Off-Hours									
Heating Only	334	115	152	66	4,318	1,478	2,104	737	14.48
Cooling Only	155	84	45	Q	3,023	1,614	816	Q	20.88
Heating and Cooling	1,275	778	349	148	27,698	17,281	8,159	2,258	10.13
Computerized Energy Management and Control System									
Present in Building	184	112	55	Q	11,750	7,987	3,006	Q	16.30
Controls Heating and Cooling	175	109	50	Q	11,259	7,839	2,792	Q	16.45
Controls Lighting	39	21	14	Q	3,115	2,040	844	Q	37.14
Controls Other	27	12	12	Q	2,050	1,272	489	Q	34.64
ELECTRICITY DEMAND									
Annual Consumption (kilowatthours)									
10,000 or Less	281	107	106	68	1,612	672	527	412	21.23
10,001 to 25,000	375	186	116	73	2,505	1,103	949	453	16.88
25,001 to 50,000	394	225	118	51	3,099	1,693	948	457	18.79
50,001 to 100,000	390	244	111	35	4,592	2,523	1,193	876	16.65
100,001 to 500,000	557	335	169	53	10,441	5,281	4,210	950	10.71
500,001 to 1,000,000	104	58	36	Q	4,927	2,643	1,804	Q	15.79
1,000,001 to 2,000,000	57	34	20	Q	4,211	2,237	1,610	Q	22.27
2,000,001 to 5,000,000	43	30	10	Q	5,098	3,554	1,265	Q	21.64
Over 5,000,000	16	12	4	Q	7,047	5,418	1,400	Q	27.82

See footnotes at end of table.

Table 31. Season of Peak Electricity Demand for Number of Buildings and Floorspace (Continued)

Building Characteristics	Number of Buildings (thousand)				Total Floorspace (million square feet)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.608	0.825	1.038	1.599	0.827	0.944	0.971	2.093	
Peak Electricity Demand (kilowatts)									
10 or Less	398	157	135	106	2,130	688	798	643	19.60
11 to 25	638	369	186	83	4,225	2,396	1,236	593	14.66
26 to 50	484	298	139	47	5,758	3,102	1,597	1,059	15.90
51 to 100	316	183	102	31	5,294	2,779	2,042	473	14.56
101 to 250	225	128	79	Q	7,249	3,772	2,855	Q	13.23
251 to 1,000	128	76	43	9	10,287	5,867	3,613	808	15.55
Over 1,000	26	19	6	Q	8,589	6,522	1,766	Q	30.22

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^{NC} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand

Building Characteristics	Total Electricity Consumption (billion kWh)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.003	1.100	1.091	1.500	0.623	0.782	0.928	1.500	
All Buildings	661	447	173	41	15.2	17.8	12.5	9.1	8.22
Building Floorspace (Square Feet)									
1,001 to 5,000	60	37	17	6	21.5	23.7	19.8	16.1	12.91
5,001 to 10,000	53	39	9	5	15.3	19.3	10.2	9.1	18.99
10,001 to 25,000	89	48	34	7	13.3	13.4	14.3	9.6	18.19
25,001 to 50,000	79	54	18	7	12.4	14.7	8.7	11.3	18.30
50,001 to 100,000	108	81	23	Q	16.1	20.6	10.2	Q	19.59
100,001 to 200,000	94	56	32	Q	13.9	16.3	12.8	Q	20.02
200,001 to 500,000	95	61	Q	Q	18.6	21.6	15.2	Q	28.18
Over 500,000	85	72	11	Q	14.7	17.3	10.5	Q	25.51
Year Constructed									
1899 or Before	5	3	Q	Q	5.4	6.4	Q	Q	30.57
1900 to 1919	16	11	Q	Q	7.7	8.1	Q	Q	28.30
1920 to 1945	50	35	8	8	9.1	11.7	4.5	9.5	16.11
1946 to 1959	88	66	19	4	12.9	16.7	9.3	Q	22.63
1960 to 1969	141	97	33	11	16.0	20.3	11.5	9.5	18.33
1970 to 1979	175	117	48	10	17.7	18.6	16.5	13.8	12.48
1980 to 1983	73	44	25	4	21.8	25.3	19.4	12.4	24.87
1984 to 1986	72	45	26	Q	20.0	20.8	19.6	Q	27.01
1987 to 1989	39	29	7	Q	16.9	21.3	10.0	Q	26.87
BUILDING USE									
Principal Building Activity									
Assembly	42	27	7	7	10.2	11.2	8.9	Q	25.00
Education	52	29	21	Q	8.5	9.7	7.6	Q	12.38
Food Sales	28	23	Q	Q	42.0	41.4	Q	Q	24.92
Food Service	25	19	Q	Q	27.3	30.6	Q	Q	19.58
Health Care	39	32	Q	Q	24.0	23.5	Q	Q	19.76
Lodging	35	18	15	Q	12.2	12.8	12.1	Q	20.01
Mercantile and Service	119	74	30	15	14.9	16.1	13.1	13.6	14.94
Office	193	124	63	7	20.8	19.9	24.9	12.2	14.71
Parking Garage	4	Q	Q	Q	5.1	Q	Q	Q	38.15
Public Order and Safety	7	5	Q	NC	13.9	17.2	Q	NC	42.78
Warehouse	58	40	15	3	9.4	14.5	6.0	3.1	28.03
Other	Q	Q	Q	Q	52.3	62.4	Q	Q	35.09
Vacant	9	6	3	Q	5.9	7.8	4.4	Q	29.41
Weekly Operating Hours									
39 or Fewer	13	7	5	1	5.3	6.2	5.1	2.1	19.80
40 to 48	105	75	26	4	11.0	13.4	8.7	4.5	15.32
49 to 60	114	72	35	7	12.4	13.8	11.5	7.6	15.98
61 to 84	120	78	35	7	14.8	16.9	14.3	Q	15.50
85 to 167	118	80	26	12	17.4	19.9	12.9	16.3	18.97
168 (Open Continuously)	192	136	46	10	25.7	29.6	19.2	20.1	21.98
Weekly Operating Schedule									
Open 1 to 23 Hours									
Monday through Friday	162	113	42	8	12.5	15.6	9.1	6.9	12.82
Monday through Saturday	91	55	30	6	11.6	13.0	11.8	5.7	15.30
Monday through Sunday	148	94	40	15	16.9	17.8	18.1	Q	14.53
Open 24 Hours (Continuously)	192	136	46	10	25.7	29.6	19.2	20.1	21.98
Other	69	50	16	3	10.5	13.2	7.2	4.7	21.25

See footnote at end of table.

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	Demand- Metered Buildings	Season of Peak Electricity Demand			Demand- Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.803	1.108	1.001	1.560	0.623	0.762	0.928	1.500	
Workers									
4 or Fewer	56	32	19	6	8.5	8.8	8.7	6.6	13.06
5 to 9	54	34	15	5	10.3	12.2	9.3	5.8	18.79
10 to 19	51	31	15	5	12.1	13.6	9.8	12.4	18.79
20 to 49	95	63	26	6	12.8	16.5	10.5	Q	18.21
50 to 99	84	50	24	Q	14.5	17.8	9.7	Q	17.88
100 to 249	121	86	31	Q	22.1	26.7	16.3	Q	21.68
250 or More	200	151	44	Q	22.9	22.9	24.8	Q	20.76
Ownership and Occupancy									
Nongovernment Owned	493	317	140	36	15.2	17.1	13.7	9.5	10.16
Owner Occupied	375	246	103	27	15.5	17.3	14.2	9.8	11.00
Single Establishment	282	187	74	20	15.9	18.3	13.7	9.7	13.69
Multiple Establishment	93	58	28	Q	14.5	14.8	15.4	Q	12.38
Nonowner Occupied	118	71	38	9	14.1	16.6	12.4	8.8	18.48
Single Establishment	58	42	14	2	13.3	17.3	10.4	2.7	22.52
Multiple Establishment	59	28	23	Q	16.3	16.1	15.8	Q	18.89
Vacant	2	Q	Q	Q	4.0	Q	Q	Q	38.38
Government Owned	168	130	33	5	15.3	19.6	9.1	7.0	17.23
Federal	34	Q	Q	Q	19.2	19.6	Q	Q	22.04
State	62	53	8	Q	20.7	27.8	9.1	Q	32.23
Local	72	46	23	4	11.6	14.6	8.7	7.4	20.33
Percent Vacant at Least Three Months									
0	493	338	127	28	16.3	19.3	13.1	9.2	10.89
1 to 50	137	90	36	11	15.1	16.4	13.3	12.4	16.99
51 to 99	17	Q	4	Q	7.5	9.0	7.0	Q	32.63
100	14	7	6	Q	7.5	9.0	6.8	Q	23.80
Months in Use Out of Past 12 Months									
0 to 8	17	9	6	Q	7.6	9.1	8.0	Q	29.62
9 to 11	17	8	7	Q	6.5	8.1	5.2	Q	18.66
12	627	430	159	38	16.2	18.6	13.6	9.8	9.81
LOCATION									
Census Region									
Northeast	143	101	31	10	14.2	19.0	8.8	Q	17.09
Midwest	151	98	46	7	13.7	14.9	13.9	6.4	16.94
South	239	166	57	15	15.7	18.6	12.1	10.1	12.49
West	129	82	39	8	17.7	19.2	16.7	11.7	18.88
Census Division									
Northeast									
New England	27	19	7	Q	13.2	17.3	8.8	Q	19.39
Middle Atlantic	116	82	24	9	14.5	19.4	8.8	Q	20.11
Midwest									
East North Central	99	62	31	Q	13.6	14.7	14.0	7.1	17.22
West North Central	52	36	15	Q	13.8	15.2	Q	Q	17.28
South									
South Atlantic	109	71	31	7	15.0	19.1	11.5	8.2	16.39
East South Central	54	45	7	Q	18.6	22.6	Q	Q	30.87
West South Central	76	51	19	7	15.1	15.5	14.3	14.4	20.42
West									
Mountain	46	28	Q	Q	13.4	12.2	16.0	Q	32.27
Pacific	83	55	22	6	21.5	27.0	17.3	11.2	24.22

See footnote at end of table.

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.803	1.100	1.091	1.580	0.823	0.762	0.925	1.500	
Metropolitan Status									
Metropolitan	568	387	145	36	15.7	17.9	13.1	9.8	10.33
Nonmetropolitan	93	60	28	5	12.9	17.0	9.8	6.3	18.22
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	52	35	15	Q	15.6	18.1	13.1	Q	26.65
5,500-7,000 HDD	171	106	53	11	13.1	14.7	12.0	8.1	20.06
4,000-5,499 HDD	170	119	43	8	15.9	19.2	12.6	Q	14.60
Under 4,000 HDD	147	108	29	10	17.6	22.2	12.5	8.9	19.01
2,000 CDD or More and --									
Under 4,000 HDD	121	79	32	10	14.9	16.0	12.7	15.1	17.77
ENERGY SOURCES AND END USES^a									
Energy Sources (Solely or in Combination)									
Electricity	661	447	173	41	15.2	17.8	12.5	9.1	9.40
Natural Gas	428	311	90	28	14.4	16.8	11.3	8.5	12.78
Fuel Oil	164	118	42	Q	17.2	20.1	14.1	6.0	26.04
District Heat	116	98	13	Q	21.0	23.1	13.6	Q	29.63
District Chilled Water	40	Q	Q	Q	27.5	Q	Q	Q	45.82
Propane	51	34	14	Q	15.3	17.7	11.5	Q	24.82
Other	11	Q	3	Q	9.1	16.4	4.9	Q	41.10
Energy End Uses (Solely or in Combination)									
Heated Buildings	637	429	169	39	15.4	17.7	13.1	9.3	9.26
Air-Conditioned Buildings	614	417	159	38	16.2	17.8	14.5	10.9	9.16
Buildings with Water Heating	624	425	161	38	16.0	18.5	13.3	9.9	9.82
Buildings with Cooking	338	238	81	19	18.3	21.2	14.4	Q	14.08
Buildings with Manufacturing	76	58	15	Q	16.8	20.3	11.7	Q	24.99
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	309	220	73	17	18.9	21.2	16.0	Q	14.27
With Water Heating, Without Cooking	262	168	76	18	14.4	15.3	13.8	10.7	11.37
Without Water Heating or Cooking	21	12	7	2	9.2	9.3	9.9	6.5	22.44
Without Air Conditioning									
With Water Heating and Cooking	Q	Q	5	Q	11.3	Q	5.9	Q	24.54
With Water Heating, Without Cooking	20	Q	6	1	9.2	Q	5.5	2.5	26.91
Without Water Heating or Cooking	5	3	2	Q	7.2	10.3	6.8	Q	38.18
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking									
All Other Combinations	23	17	4	Q	19.9	25.6	13.3	Q	37.67

See footnote at end of table.

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor	0.802	1.106	1.001	1.580	0.523	0.762	0.829	1.500	
Space-Heating Energy Source									
Electricity	250	125	108	17	18.3	19.6	17.4	15.5	10.11
Main	193	89	94	10	19.2	20.6	18.8	14.1	11.63
With Secondary	29	19	9	Q	18.2	24.4	14.4	Q	23.58
Natural Gas Only	14	Q	Q	Q	15.9	26.2	Q	Q	36.65
Other Energy Sources or Combinations	15	Q	Q	Q	20.7	Q	Q	Q	32.53
With No Secondary	164	70	85	9	19.4	19.8	19.4	16.8	16.00
Secondary	57	37	13	Q	15.7	17.7	11.4	Q	23.47
Other Excluding Electricity	387	304	62	22	14.0	17.0	9.1	7.1	14.00
Building Not Heated	24	18	4	Q	11.2	20.4	4.2	Q	37.37
Main Space-Heating Energy Source									
Electricity	193	89	94	10	19.2	20.6	18.8	14.1	11.63
Natural Gas	295	215	59	21	13.6	15.8	10.6	8.5	14.06
Fuel Oil	45	34	9	2	11.8	17.8	6.5	3.6	23.64
District Heat	90	75	9	Q	18.1	19.5	12.0	Q	23.85
Propane	Q	Q	Q	Q	19.8	25.4	Q	Q	51.74
Other	3	Q	Q	Q	6.0	Q	Q	Q	61.39
Air-Conditioning Energy Source									
Electricity	570	386	148	36	16.4	18.0	14.4	11.5	6.63
Other Excluding Electricity	44	32	Q	Q	14.7	15.9	Q	Q	21.07
Air-Conditioning Not Performed	47	30	15	3	8.3	17.2	4.9	2.9	22.00
Water-Heating Energy Source									
Electricity	276	165	91	20	17.6	19.0	16.4	13.5	10.35
Other Excluding Electricity	348	260	70	18	15.0	18.1	10.6	7.6	13.66
Water Heating Not Performed	37	22	12	3	8.2	10.4	6.9	4.6	18.41
Cooking Energy Source									
Electricity	153	107	41	Q	17.0	20.5	13.2	Q	12.60
Other Excluding Electricity	185	131	40	13	19.6	21.8	15.9	14.9	20.68
Cooking Not Performed	324	209	93	22	12.9	15.0	11.1	7.7	10.73
Manufacturing Energy Source									
Electricity	56	44	10	Q	15.6	18.5	10.6	Q	26.34
Other Excluding Electricity	20	Q	Q	Q	21.4	29.3	Q	Q	46.13
Manufacturing Not Performed	586	389	158	38	15.0	17.5	12.5	9.3	9.73
HEATING AND COOLING									
Percent Heated									
Not Heated	24	18	4	Q	10.9	20.0	4.2	Q	36.63
1 to 50	46	29	13	4	7.6	8.9	6.4	5.0	22.65
51 to 99	118	80	31	7	18.5	20.0	15.8	16.5	15.84
100	473	320	125	29	16.4	18.9	14.1	9.5	11.21
Percent Cooled									
Not Cooled	47	30	15	3	8.3	17.2	4.9	2.9	22.00
1 to 50	108	68	32	8	8.9	10.8	7.3	5.3	12.94
51 to 99	194	134	50	10	19.0	20.4	17.9	Q	12.95
100	313	215	77	21	20.1	20.5	20.1	17.6	13.73

See footnote at end of table.

ELECTRICITY

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)				Electricity Energy Intensity (kWh/sq. ft.)				RSE Row Factor
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer	Winter	Summer and Winter	
RSE Column Factor:	0.756	0.990	1.193	1.576	0.609	0.749	0.952	1.535	
Computer Area with Separate Air-Conditioning System									
Present in Building	306	222	77	7	22.1	23.7	19.6	12.7	15.03
Not Present	355	225	96	34	12.0	14.3	9.6	8.6	9.40
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	1	Q	Q	Q	3.5	Q	Q	Q	49.64
1 to 50	44	21	20	3	6.5	6.6	7.6	3.1	17.98
51 to 99	188	133	47	8	15.4	17.7	13.3	Q	14.54
100	428	292	105	30	17.7	20.5	14.0	12.9	10.88
Refrigeration Equipment (Solely or In Combination)									
Commercial									
Refrigeration Units	367	262	84	20	19.3	22.0	15.0	13.5	10.87
Freezers	352	251	82	20	20.3	23.0	16.1	15.0	12.20
Residential									
Refrigerators	494	341	129	23	15.5	17.9	12.9	8.2	11.25
Freezers	152	115	30	7	16.2	19.8	11.5	7.3	12.67
Ice-Making Machines	385	272	90	24	20.8	22.6	17.6	17.1	22.39
Refrigerated Vending Machines	521	353	137	Q	17.2	19.5	14.6	Q	29.84
Water Coolers	533	368	137	27	16.2	18.8	13.6	8.5	10.27
Other	52	36	12	Q	44.9	54.5	32.8	Q	15.83
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	242	153	73	Q	13.9	15.1	14.2	Q	18.05
With Thermostats	224	141	68	Q	14.0	15.2	14.3	Q	28.06
Any Control of Cooling	255	164	74	Q	14.2	15.2	14.1	Q	20.81
With Thermostats	235	151	69	14	14.4	15.3	14.6	8.4	20.77
Reduced Use During Off-Hours									
Heating Only	46	28	15	3	10.7	19.1	7.3	3.6	14.92
Cooling Only	51	36	13	2	16.9	22.2	15.6	4.1	11.59
Heating and Cooling	393	263	110	20	14.2	15.2	13.5	Q	14.25
Computerized Energy Management and Control System									
Present in Building	221	162	50	10	18.8	20.2	16.5	13.5	9.78
Controls Heating and Cooling	213	157	49	Q	19.0	20.1	17.5	Q	14.22
Controls Lighting	53	40	11	Q	16.9	19.6	12.6	Q	19.01
Controls Other	41	28	9	Q	20.0	22.0	17.4	Q	14.83
ELECTRICITY DEMAND									
Annual Consumption (kilowatthours)									
10,000 or Less	1	1	1	Q	.9	.9	1.0	Q	22.15
10,001 to 25,000	6	3	2	1	2.5	2.9	2.0	2.7	17.53
25,001 to 50,000	14	8	4	2	4.6	4.9	4.5	3.9	12.84
50,001 to 100,000	28	18	8	3	6.2	7.0	6.7	Q	14.77
100,001 to 500,000	120	73	37	10	11.5	13.7	8.7	11.0	14.37
500,001 to 1,000,000	72	40	25	Q	14.7	15.3	14.0	Q	18.37
1,000,001 to 2,000,000	78	47	26	5	18.6	21.1	16.4	13.4	13.05
2,000,001 to 5,000,000	133	96	29	Q	26.1	27.1	22.8	Q	21.73
Over 5,000,000	207	161	Q	Q	29.4	29.7	Q	Q	10.45

See footnotes at end of table.

Table 32. Electricity Consumption and Conditional Energy Intensity by Season of Peak Demand (Continued)

Building Characteristics	Total Electricity Consumption (billion kWh)			Electricity Energy Intensity (kWh/sq. ft.)			RSE %		
	Demand-Metered Buildings	Season of Peak Electricity Demand			Demand-Metered Buildings	Season of Peak Electricity Demand			
		Summer	Winter	Summer and Winter		Summer		Winter	Summer and Winter
All Commercial Buildings	6,730	6,690	1,133	1,292	6,609	8.748	9.395	1.666	19.77
Peak Electricity Demand (kilowatts)									
10 or Less	5	Q	2	Q	2.1	Q	1.9	Q	19.77
11 to 25	24	Q	Q	3	5.7	Q	Q	4.9	19.77
26 to 50	42	27	10	4	7.2	8.8	6.5	3.7	19.77
51 to 100	54	32	17	5	10.2	11.5	8.4	10.7	19.77
101 to 250	100	56	36	8	13.8	14.9	12.5	13.2	19.77
251 to 1,000	196	129	53	15	19.1	22.0	14.6	Q	19.77
Over 1,000	241	187	49	5	28.1	28.6	27.9	16.5	19.77

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^{NC} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

ELECTRICITY

Table 33. Peak Electricity Demand Category for Number of Buildings
(Thousand)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.566	0.903	1.001	0.991	1.026	1.020	1.069	1.732	
All Buildings	2,217	398	638	484	316	225	128	26	9.90
Building Floorspace (Square Feet)									
1,001 to 5,000	999	298	390	195	92	Q	Q	NC	12.31
5,001 to 10,000	468	62	150	144	73	31	Q	Q	16.64
10,001 to 25,000	406	25	79	108	93	83	18	Q	16.75
25,001 to 50,000	176	11	Q	25	42	57	28	Q	17.52
50,001 to 100,000	94	2	Q	Q	13	26	36	Q	16.12
100,001 to 200,000	49	0	Q	Q	Q	8	28	4	16.62
200,001 to 500,000	17	NC	NC	Q	Q	Q	6	9	20.34
Over 500,000	7	NC	NC	Q	Q	Q	Q	5	25.16
Year Constructed									
1899 or Before	65	12	Q	Q	Q	Q	Q	Q	33.73
1900 to 1919	101	32	40	15	Q	Q	Q	Q	29.35
1920 to 1945	284	71	88	65	31	17	11	1	20.72
1946 to 1959	400	91	137	80	44	31	12	5	18.99
1960 to 1969	420	74	125	76	59	57	25	5	16.75
1970 to 1979	514	76	121	128	88	56	39	6	14.76
1980 to 1983	189	23	48	44	33	24	15	3	24.18
1984 to 1986	143	16	34	35	19	25	13	2	23.40
1987 to 1989	100	5	26	26	22	Q	9	Q	30.15
BUILDING USE									
Principal Building Activity									
Assembly	263	42	65	67	52	26	10	Q	21.41
Education	167	18	17	38	37	34	20	2	21.82
Food Sales	69	Q	Q	Q	Q	Q	Q	Q	35.08
Food Service	164	Q	37	59	42	Q	Q	NC	23.90
Health Care	35	Q	Q	Q	Q	Q	4	2	26.05
Lodging	94	Q	Q	19	13	16	10	Q	23.80
Mercantile and Service	604	123	221	131	70	35	22	3	15.88
Office	384	54	106	68	51	58	38	9	15.35
Parking Garage	27	Q	Q	Q	Q	Q	Q	Q	54.60
Public Order and Safety	19	NC	Q	Q	Q	Q	Q	Q	55.33
Warehouse	274	93	79	46	27	19	6	Q	22.70
Other	37	Q	Q	Q	Q	Q	Q	Q	69.72
Vacant	81	32	26	Q	Q	Q	Q	Q	29.39
Weekly Operating Hours									
39 or Fewer	236	81	65	45	28	12	Q	Q	21.48
40 to 48	561	104	174	122	83	52	22	Q	14.37
49 to 60	505	99	178	112	50	40	21	6	14.79
61 to 84	355	51	106	65	54	47	26	5	18.05
85 to 167	316	37	58	95	63	32	25	Q	18.55
168 (Open Continuously)	244	26	57	44	38	43	30	6	16.55
Weekly Operating Schedule									
Open 1 to 23 Hours									
Monday through Friday	643	100	182	136	96	82	39	8	14.31
Monday through Saturday	517	117	200	104	45	30	17	4	16.88
Monday through Sunday	458	51	109	124	96	44	28	6	16.16
Open 24 Hours (Continuously)	244	26	57	44	38	43	30	6	16.55
Other	355	104	90	75	42	27	14	2	19.77
Workers									
4 or Fewer	966	297	371	173	91	25	Q	Q	14.44
5 to 9	494	71	178	149	59	28	Q	Q	14.68
10 to 19	301	19	64	106	68	35	9	Q	19.82
20 to 49	268	9	Q	49	82	84	22	Q	16.28
50 to 99	101	2	Q	Q	14	40	33	Q	19.43
100 to 249	61	0	NC	Q	Q	13	38	Q	17.83
250 or More	27	NC	Q	Q	Q	Q	9	16	19.19

See footnote at end of table.

Table 33. Peak Electricity Demand Category for Number of Buildings (Continued)
(Thousand)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.566	0.903	1.001	0.991	1.026	1.020	1.069	1.732	
Ownership and Occupancy									
Nongovernment Owned	1,881	346	575	423	258	170	93	16	10.31
Owner Occupied	1,368	223	419	326	192	126	68	13	11.39
Single Establishment	1,192	197	375	280	171	107	53	9	12.67
Multiple Establishment	176	26	44	46	21	19	15	4	20.68
Nonowner Occupied	513	122	156	97	67	44	25	3	16.73
Single Establishment	336	77	118	64	45	22	10	Q	19.08
Multiple Establishment	140	28	Q	Q	Q	20	15	2	24.71
Vacant	38	Q	Q	Q	Q	Q	Q	Q	35.90
Government Owned	336	53	63	62	58	55	35	10	16.76
Federal	28	Q	Q	Q	Q	Q	Q	Q	61.33
State	85	15	Q	18	Q	18	9	2	29.03
Local	222	36	43	39	41	37	23	Q	19.67
Percent Vacant at Least Three Months									
0	1,818	306	547	414	255	186	92	19	10.05
1 to 50	192	38	43	27	28	24	26	7	19.81
51 to 99	54	10	Q	Q	Q	Q	Q	Q	38.71
100	153	45	35	33	26	Q	7	Q	25.64
Months in Use Out of Past 12 Months									
0 to 8	165	56	38	Q	22	Q	Q	Q	25.03
9 to 11	135	20	32	36	25	16	7	Q	27.08
12	1,917	322	568	416	269	200	114	26	9.19
LOCATION									
Census Region									
Northeast	446	82	148	97	60	31	22	5	17.50
Midwest	482	103	136	97	55	50	35	7	18.01
South	942	166	256	223	137	102	49	9	15.45
West	347	47	99	67	65	43	22	5	21.14
Census Division									
Northeast									
New England	109	23	33	Q	19	9	Q	Q	28.80
Middle Atlantic	336	59	115	78	41	22	17	4	19.82
Midwest									
East North Central	336	81	106	53	34	32	23	6	23.68
West North Central	146	23	29	43	21	18	11	1	26.30
South									
South Atlantic	394	63	120	82	58	40	24	Q	23.75
East South Central	200	44	43	42	35	20	13	Q	30.52
West South Central	349	58	92	99	44	41	12	Q	26.24
West									
Mountain	167	19	55	40	32	12	7	Q	29.59
Pacific	180	28	44	27	32	31	15	3	26.47
Metropolitan Status									
Metropolitan	1,630	281	464	341	232	178	109	25	10.94
Nonmetropolitan	586	118	174	143	84	47	19	Q	18.22
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	145	15	Q	47	24	18	11	Q	27.85
5,500-7,000 HDD	635	124	206	136	72	58	32	6	18.31
4,000-5,499 HDD	410	77	115	78	65	35	32	8	19.78
Under 4,000 HDD	454	76	138	78	75	53	29	5	23.28
2,000 CDD or More and --									
Under 4,000 HDD	572	106	150	146	80	62	24	Q	23.33

See footnote at end of table.

Table 33. Peak Electricity Demand Category for Number of Buildings (Continued)
(Thousand)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.500	0.500	1.001	0.997	1.026	1.020	1.069	1.733	
ENERGY SOURCES AND END USES*									
Energy Sources									
(Solely or in Combination)									
Electricity	2,217	398	638	484	316	225	128	26	9.30
Natural Gas	1,311	210	362	317	198	130	78	15	10.60
Fuel Oil	305	54	104	55	39	20	23	9	25.66
District Heat	76	Q	Q	Q	Q	Q	Q	5	31.96
District Chilled Water	17	Q	Q	Q	Q	Q	Q	Q	79.20
Propane	173	29	57	35	25	16	8	Q	36.21
Other	55	Q	Q	Q	Q	Q	Q	Q	38.31
Energy End Uses									
(Solely or in Combination)									
Heated Buildings	2,035	324	585	461	300	216	124	25	9.48
Air-Conditioned Buildings	1,770	209	516	426	265	208	121	25	9.79
Buildings with Water Heating	1,787	224	503	428	282	204	120	26	9.45
Buildings with Cooking	553	29	125	144	98	87	53	16	14.80
Buildings with Manufacturing	120	16	21	27	Q	14	16	Q	24.02
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	446	13	92	121	82	74	49	15	15.00
With Water Heating, Without Cooking	1,059	134	329	253	161	109	64	8	12.00
Without Water Heating or Cooking	193	46	74	37	16	17	Q	Q	26.57
Without Air Conditioning									
With Water Heating and Cooking	62	Q	Q	Q	Q	Q	Q	Q	33.94
With Water Heating, Without Cooking	150	54	39	27	21	Q	Q	Q	22.66
Without Water Heating or Cooking	115	65	Q	Q	Q	Q	Q	Q	26.46
Buildings without Heating, Air Conditioning, Water Heating, or Cooking	97	56	25	Q	Q	Q	Q	Q	29.99
All Other Combinations	93	21	31	Q	Q	Q	Q	Q	33.28
Space-Heating Energy Source									
Electricity	720	69	183	176	128	98	56	9	10.60
Main	533	39	127	132	106	80	43	6	16.80
With Secondary	55	Q	Q	Q	Q	Q	6	Q	31.99
Natural Gas Only	34	Q	Q	Q	Q	Q	Q	Q	43.75
Other Energy Heating Sources or Combinations									
With No Secondary	19	Q	Q	Q	Q	Q	Q	Q	54.16
Secondary	478	32	115	120	95	73	37	5	17.71
Other Excluding Electricity	187	30	56	44	22	18	13	Q	23.98
Building Not Heated	1,315	255	402	284	171	119	68	16	10.00
Building Not Heated	181	74	53	24	16	9	Q	Q	35.12
Main Space-Heating Energy Source									
Electricity	533	39	127	132	106	80	43	6	16.80
Natural Gas	1,095	196	323	257	149	107	54	10	11.67
Fuel Oil	237	45	90	49	34	9	9	2	27.15
District Heat	72	9	Q	9	9	Q	18	4	29.56
Propane	74	Q	Q	Q	Q	Q	Q	Q	35.91
Other	33	Q	Q	Q	Q	Q	Q	NC	55.54

See footnote at end of table.

Table 33. Peak Electricity Demand Category for Number of Buildings (Continued)
(Thousand)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Flow Factor
RSE Column Factor	0.566	0.803	1.001	0.891	1.026	1.029	1.066	1.732	
Air-Conditioning Energy Source									
Electricity	1,705	207	499	409	250	201	115	23	10.01
Other Excluding Electricity	66	2	Q	Q	15	Q	6	3	28.41
Air-Conditioning Not Performed	446	189	122	59	51	17	7	Q	18.84
Water-Heating Energy Source									
Electricity	863	107	253	216	123	95	58	11	12.66
Other Excluding Electricity	923	118	250	212	159	109	61	15	11.28
Water Heating Not Performed	430	174	136	56	34	22	8	Q	21.46
Cooking Energy Source									
Electricity	239	9	48	60	41	44	29	9	19.36
Other Excluding Electricity	314	20	77	84	58	43	25	7	18.25
Cooking Not Performed	1,664	370	513	340	218	138	75	10	16.92
Manufacturing Energy Source									
Electricity	90	11	Q	23	Q	Q	14	Q	25.77
Other Excluding Electricity	30	4	Q	Q	Q	Q	Q	Q	43.92
Manufacturing Not Performed	2,097	383	617	457	296	212	112	21	9.35
HEATING AND COOLING									
Percent Heated									
Not Heated	187	77	55	24	17	9	Q	Q	25.40
1 to 50	327	91	108	57	40	22	7	Q	20.34
51 to 99	272	17	76	72	51	29	21	6	18.89
100	1,430	213	399	331	209	166	96	16	10.25
Percent Cooled									
Not Cooled	446	189	122	59	51	17	7	Q	18.84
1 to 50	565	100	195	129	62	51	24	3	14.12
51 to 99	361	22	84	99	65	45	36	11	17.19
100	844	87	237	198	138	112	61	12	13.54
Computer Area with Separate Air-Conditioning System									
Present in Building	194	1	Q	26	30	44	51	17	18.28
Not Present	2,023	397	614	459	286	181	77	9	10.89
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	28	Q	Q	Q	Q	Q	Q	Q	40.93
1 to 50	496	143	177	87	55	23	10	Q	18.48
51 to 99	493	61	123	120	85	61	35	8	14.00
100	1,200	178	330	275	176	142	82	17	11.20
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	592	28	115	172	117	83	59	18	13.76
Freezers	471	20	76	128	99	74	55	18	14.09
Residential									
Refrigerators	1,320	173	390	292	192	157	94	21	10.19
Freezers	343	27	92	95	58	44	21	6	17.49
Ice-Making Machines	539	23	94	145	103	91	62	21	13.71
Refrigerated Vending Machines	950	75	205	224	165	155	102	24	10.06
Water Coolers	1,064	99	245	256	170	162	107	25	16.42
Other	35	Q	Q	Q	Q	Q	9	Q	36.85

See footnote at end of table.

Table 33. Peak Electricity Demand Category for Number of Buildings (Continued)
(Thousand)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	1,160	200	373	278	151	98	54	6	11.06
With Thermostats	1,026	172	331	244	132	92	50	6	11.66
Any Control of Cooling	1,037	140	331	259	131	111	58	7	11.44
With Thermostats	925	120	298	230	119	101	52	7	12.14
Reduced Use During Off-Hours									
Heating Only	334	109	93	55	50	18	8	Q	17.66
Cooling Only	155	24	39	40	24	19	7	Q	23.75
Heating and Cooling	1,275	164	397	320	179	123	74	17	11.19
Computerized Energy Management and Control System									
Present in Building	184	3	21	35	33	41	37	13	18.23
Controls Heating and Cooling	175	3	20	33	31	40	35	13	18.59
Controls Lighting	39	0	Q	Q	Q	Q	9	3	26.95
Controls Other	27	NC	NC	Q	Q	Q	6	2	51.75
ELECTRICITY DEMAND									
Annual Consumption (kilowatthours)									
10,000 or Less	281	225	40	Q	Q	NC	NC	NC	16.61
10,001 to 25,000	375	138	203	29	Q	Q	Q	Q	16.64
25,001 to 50,000	394	33	259	84	16	Q	Q	Q	15.15
50,001 to 100,000	390	2	123	204	53	Q	Q	NC	16.90
100,001 to 500,000	557	0	Q	155	235	142	12	Q	13.72
500,001 to 1,000,000	104	NC	Q	NC	Q	66	33	Q	17.19
1,000,001 to 2,000,000	57	NC	NC	NC	NC	Q	49	Q	20.01
2,000,001 to 5,000,000	43	NC	NC	NC	NC	Q	33	9	20.66
Over 5,000,000	16	NC	NC	NC	NC	Q	Q	16	18.30
Season of Peak Electricity Demand									
Summer Peaking	1,231	157	369	298	183	128	76	19	12.64
Winter Peaking	690	135	186	139	102	79	43	6	15.40
Summer and Winter Peaking	295	106	83	47	31	Q	9	Q	23.21

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^{NC} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: * To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. * See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

**Table 34. Peak Electricity Demand Category for Floorspace
(Million Square Feet)**

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor:	0.515	0.879	1.102	1.246	1.121	0.990	0.902	1.005	
All Buildings	43,532	2,130	4,225	5,758	5,294	7,249	10,287	8,589	9.15
Building Floorspace (Square Feet)									
1,001 to 5,000	2,777	748	1,070	606	275	Q	Q	NC	11.86
5,001 to 10,000	3,469	428	1,068	1,099	561	238	Q	Q	16.16
10,001 to 25,000	6,649	349	1,213	1,721	1,527	1,490	339	Q	16.60
25,001 to 50,000	6,309	463	Q	865	1,440	1,960	1,120	Q	17.99
50,001 to 100,000	6,707	140	Q	Q	875	1,812	2,611	Q	16.90
100,001 to 200,000	6,768	3	Q	Q	Q	942	3,993	690	18.99
200,001 to 500,000	5,103	NC	NC	Q	Q	Q	1,451	2,796	21.64
Over 500,000	5,751	NC	NC	Q	Q	Q	Q	4,618	30.10
Year Constructed									
1899 or Before	970	111	Q	Q	Q	Q	Q	Q	44.68
1900 to 1919	2,129	119	406	363	Q	Q	Q	Q	32.49
1920 to 1945	5,547	317	611	994	851	753	1,112	909	24.32
1946 to 1959	6,837	493	794	1,234	714	844	1,169	Q	21.96
1960 to 1969	8,835	473	812	788	1,091	2,060	2,292	1,320	15.93
1970 to 1979	9,940	380	764	1,250	1,043	1,733	2,877	1,892	16.53
1980 to 1983	3,343	92	245	369	471	501	867	799	22.77
1984 to 1986	3,607	110	233	293	308	668	958	Q	24.88
1987 to 1989	2,324	35	170	190	333	Q	584	647	29.41
BUILDING USE									
Principal Building Activity									
Assembly	4,086	231	407	1,169	677	680	791	Q	26.17
Education	6,122	82	221	472	852	1,403	2,259	Q	18.81
Food Sales	662	Q	Q	Q	Q	Q	Q	Q	50.12
Food Service	935	Q	121	360	209	Q	Q	NC	26.66
Health Care	1,642	Q	Q	Q	Q	Q	360	1,016	21.84
Lodging	2,834	Q	Q	241	563	709	637	Q	27.10
Mercantile and Service	7,948	461	1,346	1,211	864	1,062	1,732	Q	17.42
Office	9,291	312	541	527	754	1,270	2,424	3,462	16.12
Parking Garage	756	Q	Q	Q	Q	Q	Q	Q	48.24
Public Order and Safety	473	NC	Q	Q	Q	Q	Q	Q	62.32
Warehouse	6,202	755	771	1,237	925	1,030	908	Q	26.05
Other	964	Q	Q	Q	Q	Q	Q	Q	70.71
Vacant	1,618	Q	365	Q	Q	Q	Q	Q	32.17
Weekly Operating Hours									
39 or Fewer	2,388	346	444	533	358	352	Q	Q	24.00
40 to 48	9,571	496	1,193	1,516	1,441	1,739	2,220	966	17.85
49 to 60	9,208	533	1,218	1,650	1,215	1,432	1,459	1,702	18.43
61 to 84	8,114	234	567	929	822	1,236	2,062	2,263	19.59
85 to 167	6,784	344	348	778	693	978	2,255	Q	20.44
168 (Open Continuously)	7,467	177	455	352	764	1,513	2,002	2,205	18.33
Weekly Operating Schedule									
Open 1 to 23 Hours									
Monday through Friday	12,937	402	1,201	1,491	2,017	2,776	3,255	1,794	19.86
Monday through Saturday	7,802	535	1,392	1,334	801	987	1,407	1,345	17.44
Monday through Sunday	8,743	330	534	1,303	1,035	1,046	1,984	2,511	20.66
Open 24 Hours (Continuously)	7,467	177	455	352	764	1,513	2,002	2,205	18.33
Other	6,583	685	642	1,278	677	928	1,638	735	21.17
Workers									
4 or Fewer	6,639	1,227	2,009	1,534	945	701	Q	Q	15.89
5 to 9	5,240	468	1,294	1,751	698	725	Q	Q	20.24
10 to 19	4,212	201	571	1,131	1,043	832	425	Q	20.01
20 to 49	7,400	164	Q	1,159	1,725	2,596	1,333	Q	18.67
50 to 99	5,830	44	Q	Q	784	1,722	2,854	Q	21.07
100 to 249	5,461	27	NC	Q	Q	587	3,864	856	20.01
250 or More	8,750	NC	Q	Q	Q	Q	1,349	7,229	23.42

See footnote at end of table.

Table 34. Peak Electricity Demand Category for Floorspace (Continued)
(Million Square Feet)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.515	0.578	1.102	1.248	1.121	0.900	0.992	1.865	
Ownership and Occupancy									
Nongovernment Owned	32,539	1,836	3,661	5,009	4,080	5,179	6,917	5,857	10.58
Owner Occupied	24,146	1,212	2,592	3,913	3,013	3,707	4,761	4,948	11.57
Single Establishment	17,742	1,011	2,298	3,246	2,683	2,914	3,241	2,350	12.50
Multiple Establishment	6,404	201	293	667	330	794	1,520	2,599	22.17
Nonowner Occupied	8,393	624	1,069	1,096	1,067	1,472	2,156	908	19.00
Single Establishment	4,350	393	740	812	564	683	874	Q	24.08
Multiple Establishment	3,611	168	Q	Q	Q	743	1,238	609	28.04
Vacant	431	Q	Q	Q	Q	Q	Q	Q	42.82
Government Owned	10,993	294	564	749	1,214	2,070	3,370	2,732	16.98
Federal	Q	Q	Q	Q	Q	Q	Q	Q	b
State	3,011	106	Q	232	Q	778	978	551	33.27
Local	6,234	176	414	431	844	1,220	2,238	910	19.59
Percent Vacant at Least Three Months									
0	30,238	1,588	3,239	4,606	3,992	5,704	6,907	4,201	10.09
1 to 50	9,084	311	370	474	749	967	2,492	3,722	21.89
51 to 99	2,288	69	Q	Q	Q	Q	Q	Q	43.01
100	1,922	162	371	310	310	Q	491	Q	27.47
Months in Use Out of Past 12 Months									
0 to 8	2,298	254	451	Q	290	Q	Q	Q	31.26
9 to 11	2,571	93	185	369	405	648	825	Q	27.67
12	38,662	1,783	3,588	4,833	4,599	6,347	9,092	8,419	9.71
LOCATION									
Census Region									
Northeast	10,052	419	860	1,749	1,070	1,349	2,260	2,344	19.89
Midwest	11,040	478	1,029	972	1,332	1,876	3,268	2,084	16.59
South	15,179	984	1,541	2,199	1,953	2,710	3,120	2,673	18.47
West	7,262	249	794	838	939	1,313	1,639	Q	19.28
Census Division									
Northeast									
New England	2,069	82	222	Q	385	344	454	Q	27.91
Middle Atlantic	7,983	337	639	1,527	685	1,005	1,806	1,984	23.81
Midwest									
East North Central	7,277	359	837	512	729	1,099	2,264	1,477	20.27
West North Central	3,762	119	192	460	604	777	1,004	607	28.51
South									
South Atlantic	7,244	277	778	971	963	1,329	1,761	1,164	22.02
East South Central	2,880	Q	252	341	445	398	523	Q	26.01
West South Central	5,056	347	511	887	544	983	836	Q	28.03
West									
Mountain	3,412	90	464	559	557	422	620	Q	30.66
Pacific	3,849	160	331	279	382	891	1,019	788	25.93
Metropolitan Status									
Metropolitan	36,288	1,512	3,239	4,089	4,319	5,812	9,098	8,219	10.85
Nonmetropolitan	7,244	618	986	1,669	975	1,437	1,189	Q	20.08
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	3,340	48	Q	625	536	685	903	Q	24.74
5,500-7,000 HDD	13,034	528	1,621	1,511	1,570	2,052	3,134	2,619	17.31
4,000-5,499 HDD	10,682	470	740	1,333	1,059	1,457	2,764	2,859	21.38
Under 4,000 HDD	8,353	398	834	922	936	1,488	1,838	Q	24.58
2,000 CDD or More and --									
Under 4,000 HDD	8,123	686	869	1,367	1,193	1,568	1,649	790	24.10

See footnote at end of table.

Table 34. Peak Electricity Demand Category for Floorspace (Continued)
(Million Square Feet)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.516	0.879	1.102	1.246	1.121	0.900	0.992	1.605	
ENERGY SOURCES AND END USES*									
Energy Sources (Solely or in Combination)									
Electricity	43,532	2,130	4,225	5,758	5,294	7,249	10,287	8,589	9.26
Natural Gas	29,768	1,076	2,647	4,262	3,511	4,352	7,441	6,479	11.75
Fuel Oil	9,536	237	745	803	893	993	2,691	3,173	21.24
District Heat	5,529	85	Q	Q	Q	Q	1,436	2,778	30.65
District Chilled Water	1,462	Q	Q	Q	Q	Q	Q	Q	89.34
Propane	3,338	110	317	299	434	462	647	Q	26.44
Other	1,188	Q	Q	Q	Q	Q	Q	Q	48.90
Energy End Uses (Solely or in Combination)									
Heated Buildings	41,371	1,614	3,831	5,476	5,049	6,901	9,998	8,501	9.38
Air-Conditioned Buildings	37,841	1,064	3,315	4,643	4,436	6,120	9,822	8,441	9.89
Buildings with Water Heating	38,953	1,196	3,302	5,079	4,707	6,479	9,772	8,418	9.50
Buildings with Cooking	18,464	119	727	1,772	1,506	2,802	5,041	6,497	14.90
Buildings with Manufacturing	4,497	87	204	394	Q	595	1,109	Q	31.10
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	16,371	68	445	1,417	1,219	2,287	4,582	6,352	16.34
With Water Heating, Without Cooking	18,173	745	2,204	2,637	2,766	3,239	4,679	1,904	13.75
Without Water Heating or Cooking	2,263	206	535	443	360	396	Q	Q	29.30
Without Air Conditioning									
With Water Heating and Cooking	1,407	Q	Q	Q	Q	Q	Q	Q	36.84
With Water Heating, Without Cooking	2,209	307	296	610	383	Q	Q	Q	22.60
Without Water Heating or Cooking	768	247	Q	Q	Q	Q	Q	Q	26.86
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	1,185	463	235	Q	Q	Q	Q	Q	37.80
All Other Combinations	1,156	58	171	Q	Q	Q	Q	Q	34.78
Space-Heating Energy Source									
Electricity	13,674	485	994	1,491	1,699	2,679	3,652	2,674	14.01
Main	10,049	230	611	940	1,246	2,088	2,719	2,216	16.93
With Secondary	1,603	Q	Q	Q	Q	Q	495	Q	33.13
Natural Gas Only	858	Q	Q	Q	Q	Q	Q	Q	50.49
Other Energy Sources or Combinations	720	Q	Q	Q	Q	Q	Q	Q	62.97
With No Secondary	8,447	169	532	832	1,101	1,814	2,224	1,775	17.08
Secondary	3,625	255	384	551	453	591	933	Q	24.47
Other Excluding Electricity	27,696	1,129	2,836	3,985	3,350	4,223	6,346	5,827	11.38
Building Not Heated	2,162	516	394	282	244	348	Q	Q	29.50
Main Space-Heating Energy Source									
Electricity	10,049	230	611	940	1,246	2,088	2,719	2,216	16.93
Natural Gas	21,618	952	2,343	3,475	2,744	3,538	5,133	3,433	12.73
Fuel Oil	3,775	198	583	700	702	468	744	380	25.24
District Heat	4,987	85	Q	249	251	567	1,308	2,417	32.23
Propane	614	Q	Q	Q	Q	Q	Q	Q	81.70
Other	563	Q	Q	Q	Q	Q	Q	NC	58.89

See footnote at end of table.

Table 34. Peak Electricity Demand Category for Floorspace (Continued)
(Million Square Feet)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.215	0.079	1.192	1.266	1.121	0.900	0.992	1.005	
Air-Conditioning Energy Source									
Electricity	34,836	1,000	3,149	4,508	4,169	5,876	9,054	7,080	10.09
Other Excluding Electricity	3,005	64	Q	Q	267	Q	768	Q	31.42
Air-Conditioning Not Performed	5,691	1,066	910	1,115	858	1,129	465	Q	18.79
Water-Heating Energy Source									
Electricity	15,716	550	1,445	1,879	1,778	2,816	3,846	3,402	12.50
Other Excluding Electricity	23,236	646	1,857	3,199	2,929	3,663	5,926	5,015	12.20
Water Heating Not Performed	4,580	934	923	679	587	771	515	Q	21.29
Cooking Energy Source									
Electricity	9,034	20	312	793	816	1,422	2,720	2,951	21.30
Other Excluding Electricity	9,431	99	416	979	690	1,380	2,322	3,545	18.74
Cooking Not Performed	25,068	2,011	3,497	3,986	3,788	4,447	5,246	2,092	11.78
Manufacturing Energy Source									
Electricity	3,560	57	Q	296	Q	Q	876	Q	35.32
Other Excluding Electricity	937	30	Q	Q	Q	Q	Q	Q	33.97
Manufacturing Not Performed	39,035	2,043	4,020	5,364	4,820	6,654	9,178	6,956	9.23
HEATING AND COOLING									
Percent Heated									
Not Heated	2,231	530	427	286	263	348	Q	Q	28.50
1 to 50	6,107	488	1,065	1,205	901	1,286	731	Q	22.14
51 to 99	6,378	115	435	732	723	646	1,614	2,114	18.73
100	28,816	997	2,298	3,535	3,408	4,969	7,652	5,957	10.75
Percent Cooled									
Not Cooled	5,691	1,066	910	1,115	858	1,129	465	Q	18.79
1 to 50	12,102	546	1,701	2,128	1,850	2,228	2,607	1,040	18.42
51 to 99	10,209	195	416	1,147	852	1,252	2,983	3,364	15.85
100	15,531	323	1,197	1,367	1,734	2,640	4,232	4,037	14.63
Computer Area with Separate Air-Conditioning System									
Present in Building	13,844	17	Q	449	703	1,594	4,703	6,205	15.88
Not Present	29,688	2,113	4,052	5,309	4,591	5,655	5,584	2,384	11.05
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	416	Q	Q	Q	Q	Q	Q	Q	43.34
1 to 50	6,714	952	1,518	1,545	1,098	766	604	Q	23.00
51 to 99	12,254	447	692	1,881	1,451	2,044	2,759	2,980	15.88
100	24,148	655	1,892	2,278	2,719	4,364	6,871	5,369	11.89
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	19,032	214	585	1,454	1,579	2,773	5,496	6,930	13.30
Freezers	17,318	140	367	1,033	1,218	2,489	5,184	6,888	14.71
Residential									
Refrigerators	31,880	1,004	2,654	3,856	3,912	5,273	7,882	7,298	10.21
Freezers	9,409	130	592	1,530	866	1,600	1,949	2,742	19.81
Ice-Making Machines	18,531	172	468	1,212	1,410	2,852	5,159	7,259	14.08
Refrigerated Vending Machines	30,229	460	1,539	2,490	3,197	5,139	9,155	8,250	10.82
Water Coolers	32,822	720	2,012	3,780	3,605	5,575	9,044	8,085	10.73
Other	1,149	Q	Q	Q	Q	Q	425	Q	39.88

See footnote at end of table.

Table 34. Peak Electricity Demand Category for Floorspace (Continued)
(Million Square Feet)

Building Characteristics	Demand-Metered Buildings	10 kW or Less	11 to 25 kW	26 to 50 kW	51 to 100 kW	101 to 250 kW	251 to 1,000 kW	Over 1,000 kW	RSE Row Factor
RSE Column Factor	0.880	0.920	0.930	0.890	0.880	0.940	0.900	0.880	
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	17,469	1,000	2,014	3,373	2,112	2,691	3,437	2,842	3.11
With Thermostats	16,064	863	1,828	3,069	1,875	2,507	3,121	2,801	3.26
Any Control of Cooling	17,866	717	1,902	3,027	2,053	3,115	3,888	3,164	3.59
With Thermostats	16,343	546	1,712	2,613	1,886	2,851	3,625	3,109	3.79
Reduced Use During Off-Hours									
Heating Only	4,318	534	522	902	744	877	582	Q	3.52
Cooling Only	3,023	82	266	Q	360	608	663	Q	10.35
Heating and Cooling	27,698	860	2,657	3,485	3,266	3,912	6,696	6,823	2.88
Computerized Energy Management and Control System									
Present in Building	11,750	39	104	327	673	1,435	3,757	5,415	4.35
Controls Heating and Cooling	11,259	39	100	303	635	1,411	3,396	5,375	4.47
Controls Lighting	3,115	8	Q	Q	Q	Q	1,032	1,679	6.59
Controls Other	2,050	NC	NC	Q	Q	Q	725	927	11.28
ELECTRICITY DEMAND									
Annual Consumption (kilowatthours)									
10,000 or Less	1,612	1,073	367	Q	Q	NC	NC	NC	4.15
10,001 to 25,000	2,505	859	1,179	386	Q	Q	Q	Q	5.17
25,001 to 50,000	3,099	190	1,767	880	182	Q	Q	Q	5.54
50,001 to 100,000	4,592	6	796	3,022	678	Q	Q	NC	6.70
100,001 to 500,000	10,441	2	Q	1,342	4,244	4,080	650	Q	5.28
500,001 to 1,000,000	4,927	NC	Q	NC	Q	2,747	1,994	Q	6.17
1,000,001 to 2,000,000	4,211	NC	NC	NC	NC	Q	3,775	Q	6.59
2,000,001 to 5,000,000	5,098	NC	NC	NC	NC	Q	3,777	1,294	5.72
Over 5,000,000	7,047	NC	NC	NC	NC	Q	Q	6,984	5.93
Season of Peak Electricity Demand									
Summer Peaking	25,125	688	2,396	3,102	2,779	3,772	5,867	6,522	4.40
Winter Peaking	13,907	798	1,236	1,597	2,042	2,855	3,613	1,766	5.71
Summer and Winter Peaking	4,500	643	593	1,059	473	Q	808	Q	10.22

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

NC No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 35. Distribution of Peak Watts per Square Foot

Building Characteristics	All Demand-Metered Buildings			Peak Watts per Square Foot		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
All Buildings	2,217	43,532	661	2.26	4.64	8.60
Building Floorspace (Square Feet)						
1,001 to 5,000	999	2,777	60	3.67	6.32	11.88
5,001 to 10,000	468	3,469	53	2.17	3.80	6.90
10,001 to 25,000	406	6,649	89	1.53	3.00	6.21
25,001 to 50,000	176	6,309	79	1.27	2.81	6.16
50,001 to 100,000	94	6,707	108	1.17	2.93	5.66
100,001 to 200,000	49	6,768	94	1.23	3.16	5.03
200,001 to 500,000	17	5,103	95	1.90	3.89	5.78
Over 500,000	7	5,751	85	1.38	3.30	5.07
Year Constructed						
1899 or Before	65	970	5	.95	2.42	5.14
1900 to 1919	101	2,129	16	1.50	3.07	5.33
1920 to 1945	284	5,547	50	2.13	3.75	6.90
1946 to 1959	400	6,837	88	1.90	4.00	7.83
1960 to 1969	420	8,835	141	2.56	4.82	8.75
1970 to 1979	514	9,940	175	2.45	5.33	9.81
1980 to 1983	189	3,343	73	3.00	5.83	11.20
1984 to 1986	143	3,607	72	3.00	5.45	9.89
1987 to 1989	100	2,324	39	3.08	5.09	13.17
BUILDING USE						
Principal Building Activity						
Assembly	263	4,086	42	2.22	4.77	9.33
Education	167	6,122	52	2.03	4.15	7.45
Food Sales	69	662	28	6.40	9.67	16.50
Food Service	164	935	25	5.71	11.33	21.67
Health Care	35	1,642	39	4.88	6.43	8.60
Lodging	94	2,834	35	2.39	3.82	6.50
Mercantile and Service	604	7,948	119	2.40	4.38	7.59
Office	384	9,291	193	3.38	6.07	9.69
Parking Garage	27	756	4	.83	3.40	5.31
Public Order and Safety	19	473	7	2.26	4.00	6.04
Warehouse	274	6,202	58	1.09	1.86	3.67
Other	37	964	50	2.50	8.75	16.54
Vacant	81	1,618	9	1.33	2.55	3.50
Weekly Operating Hours						
39 or Fewer	236	2,388	13	1.68	3.75	6.86
40 to 48	561	9,571	105	2.08	4.13	7.50
49 to 60	505	9,208	114	2.00	3.75	6.67
61 to 84	355	8,114	120	2.55	5.08	9.77
85 to 167	316	6,784	118	3.25	6.35	12.00
168 (Open Continuously)	244	7,467	192	2.87	6.12	13.17
Workers						
4 or Fewer	966	6,639	56	2.00	4.29	8.33
5 to 9	494	5,240	54	2.33	4.77	9.20
10 to 19	301	4,212	51	2.55	4.78	9.00
20 to 49	268	7,400	95	2.41	4.71	7.89
50 to 99	101	5,830	84	2.37	4.81	7.85
100 to 249	61	5,461	121	3.41	5.28	8.10
250 or More	27	8,750	200	3.92	5.78	7.19

See footnotes at end of table.

Table 35. Distribution of Peak Watts per Square Foot (Continued)

Building Characteristics	All Demand-Metered Buildings			Peak Watts per Square Foot		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Ownership and Occupancy						
Nongovernment Owned	1,881	32,539	493	2.27	4.67	8.96
Owner Occupied	1,368	24,146	375	2.31	4.77	9.29
Single Establishment	1,192	17,742	282	2.39	4.92	9.65
Multiple Establishment	176	6,404	93	2.12	4.17	6.90
Nonowner Occupied	513	8,393	118	2.22	4.39	8.22
Single Establishment	336	4,350	58	2.27	4.72	9.33
Multiple Establishment	140	3,611	59	2.22	4.62	7.22
Vacant	38	431	2	1.72	2.73	3.75
Government Owned	336	10,993	168	2.10	4.40	7.45
Federal	28	1,748	34	2.57	4.72	7.75
State	85	3,011	62	2.31	4.65	6.92
Local	222	6,234	72	1.93	4.35	7.73
Percent Vacant at Least Three Months						
0	1,818	30,238	493	2.39	4.95	9.20
1 to 50	192	9,084	137	1.79	3.52	6.00
51 to 99	54	2,288	17	.75	2.50	3.73
100	153	1,922	14	1.92	3.33	7.80
Months in Use Out of Past 12 Months						
0 to 8	165	2,298	17	1.72	3.33	7.80
9 to 11	135	2,571	17	2.25	4.00	7.83
12	1,917	38,662	627	2.30	4.75	8.75
LOCATION						
Census Region						
Northeast	446	10,052	143	2.16	4.08	7.15
Midwest	482	11,040	151	1.82	4.00	7.22
South	942	15,179	239	2.62	5.39	9.67
West	347	7,262	129	2.06	4.21	8.40
Census Division						
Northeast						
New England	109	2,069	27	2.13	4.17	7.15
Middle Atlantic	336	7,983	116	2.20	4.07	7.15
Midwest						
East North Central	336	7,277	99	1.69	3.73	6.67
West North Central	146	3,762	52	2.12	4.27	8.06
South						
South Atlantic	394	7,244	109	2.40	5.00	8.80
East South Central	200	2,880	54	2.93	5.44	10.29
West South Central	349	5,056	76	2.82	5.45	10.00
West						
Mountain	167	3,412	46	1.77	3.07	6.57
Pacific	180	3,849	83	2.67	5.00	9.86
Metropolitan Status						
Metropolitan	1,630	36,288	568	2.22	4.57	8.59
Nonmetropolitan	586	7,244	93	2.36	4.75	8.75
Climate Zone: 45-Year Average						
Under 2,000 CDD and --						
Over 7,000 HDD	145	3,340	52	2.12	4.55	8.00
5,500-7,000 HDD	635	13,034	171	1.85	4.00	6.70
4,000-5,499 HDD	410	10,682	170	2.22	4.61	8.97
Under 4,000 HDD	454	8,353	147	2.42	5.42	9.27
2,000 CDD or More and --						
Under 4,000 HDD	572	8,123	121	2.63	5.22	9.67

See footnotes at end of table.

Table 35. Distribution of Peak Watts per Square Foot (Continued)

Building Characteristics	All Demand-Metered Buildings			Peak Watts per Square Foot		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
ENERGY SOURCES AND END USES *						
Energy Sources						
(Solely or in Combination)						
Electricity	2,217	43,532	661	2.26	4.64	8.60
Natural Gas	1,311	29,768	428	2.28	4.50	7.83
Fuel Oil	305	9,536	164	2.13	3.59	6.13
District Heat	76	5,529	116	2.05	4.39	7.47
District Chilled Water	17	1,462	40	3.21	4.19	6.90
Propane	173	3,338	51	2.55	4.75	8.24
Other	55	1,188	11	1.11	2.44	4.68
Energy End Uses						
(Solely or in Combination)						
Heated Buildings	2,035	41,371	637	2.40	4.78	8.77
Air-Conditioned Buildings	1,770	37,841	614	2.78	5.22	9.33
Buildings with Water Heating	1,787	38,953	624	2.51	5.00	9.26
Buildings with Cooking	553	18,464	338	3.13	6.25	11.59
Buildings with Manufacturing	120	4,497	76	2.09	4.17	7.68
Energy End-Use Combinations						
Heated Buildings						
With Air Conditioning						
With Water Heating and Cooking	446	16,371	309	3.75	6.75	11.93
With Water Heating, Without Cooking	1,059	18,173	262	2.57	4.85	8.77
Without Water Heating or Cooking	193	2,263	21	2.00	4.09	7.65
Without Air Conditioning						
With Water Heating and Cooking	62	1,407	16	1.90	3.00	5.71
With Water Heating, Without Cooking	150	2,209	20	1.08	2.29	4.21
Without Water Heating or Cooking	115	768	5	1.75	2.50	5.71
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	97	1,185	5	.67	1.25	4.06
All Other Combinations	93	1,156	23	2.62	3.92	10.80
Space-Heating Energy Source						
Electricity	720	13,674	250	3.25	6.57	11.33
Main	533	10,049	193	4.00	7.50	13.21
With Secondary	55	1,603	29	2.71	5.14	8.67
Natural Gas Only	34	858	14	3.92	5.82	10.00
Other Energy Sources or Combinations	19	720	15	1.67	4.00	6.17
With No Secondary	478	8,447	164	4.10	8.00	13.75
Secondary	187	3,625	57	2.24	4.00	7.04
Other Excluding Electricity	1,315	27,696	387	2.15	4.17	7.18
Building Not Heated	181	2,162	24	1.00	2.62	5.29
Main Space-Heating Energy Source						
Electricity	533	10,049	193	4.00	7.50	13.21
Natural Gas	1,095	21,618	295	2.20	4.31	7.30
Fuel Oil	237	3,775	45	2.17	3.67	6.19
District Heat	72	4,987	90	2.05	4.37	7.47
Propane	74	614	12	2.79	4.78	8.00
Other	33	563	3	1.11	1.57	3.04
Air-Conditioning Energy Source						
Electricity	1,705	34,836	570	2.77	5.22	9.33
Other Excluding Electricity	66	3,005	44	2.92	5.08	9.33
Air-Conditioning Not Performed	446	5,691	47	1.19	2.40	5.00

See footnotes at end of table.

Table 35. Distribution of Peak Watts per Square Foot (Continued)

Building Characteristics	All Demand-Metered Buildings			Peak Watts per Square Foot		
	Number of Buildings (thousand)	Total Floorpace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Water-Heating Energy Source						
Electricity	863	15,716	276	2.73	5.32	10.00
Other Excluding Electricity	923	23,236	348	2.40	4.72	8.00
Water Heating Not Performed	430	4,580	37	1.27	3.17	6.22
Cooking Energy Source						
Electricity	239	9,034	153	3.53	6.21	11.67
Other Excluding Electricity	314	9,431	185	2.90	6.32	11.51
Cooking Not Performed	1,664	25,068	324	2.00	4.14	7.68
Manufacturing Energy Source						
Electricity	90	3,560	56	1.61	4.04	8.75
Other Excluding Electricity	30	937	20	2.24	4.17	6.72
Manufacturing Not Performed	2,097	39,035	586	2.27	4.67	8.64
HEATING AND COOLING						
Percent Heated						
Not Heated	187	2,231	24	1.00	2.50	5.23
1 to 50	327	6,107	46	1.50	2.60	4.72
51 to 99	272	6,378	118	2.76	5.55	9.81
100	1,430	28,816	473	2.75	5.33	9.27
Percent Cooled						
Not Cooled	446	5,691	47	1.19	2.40	5.00
1 to 50	565	12,102	108	1.77	3.06	5.29
51 to 99	361	10,209	194	3.47	5.85	10.42
100	844	15,531	313	4.07	6.80	10.95
Computer Area with Separate Air-Conditioning System						
Present in Building	194	13,844	306	2.96	5.26	8.75
Not Present	2,023	29,688	355	2.22	4.55	8.58
LIGHTING AND REFRIGERATION						
Percent Lit When Open						
Not Lit	28	416	1	.55	1.25	2.50
1 to 50	496	6,714	44	1.50	3.00	5.38
51 to 99	493	12,254	188	2.53	5.00	9.33
100	1,200	24,148	428	2.71	5.42	9.38
Refrigeration Equipment (Solely or in Combination)						
Commercial						
Refrigeration Units	592	19,032	367	3.50	6.80	13.33
Freezers	471	17,318	352	3.83	7.30	16.67
Residential						
Refrigerators	1,320	31,880	494	2.33	4.50	7.69
Freezers	343	9,409	152	2.86	5.28	9.38
Ice-Making Machines	539	18,531	385	3.50	7.00	13.97
Refrigerated Vending Machines	950	30,229	521	2.67	5.01	9.00
Water Coolers	1,064	32,822	533	2.26	4.50	7.92
Other	35	1,149	52	7.02	13.71	23.19
ENERGY MANAGEMENT						
Occupant Control						
Any Control of Heating	1,160	17,469	242	2.50	5.00	8.89
With Thermostats	1,026	16,064	224	2.50	5.00	8.77
Any Control of Cooling	1,037	17,866	255	2.78	5.08	9.26
With Thermostats	925	16,343	235	2.86	5.17	9.20

See footnotes at end of table.

Table 35. Distribution of Peak Watts per Square Foot (Continued)

Building Characteristics	All Demand-Metered Buildings			Peak Watts per Square Foot		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Reduced Use During Off-Hours						
Heating Only	334	4,318	46	1.70	3.08	6.67
Cooling Only	155	3,023	51	2.79	4.77	10.25
Heating and Cooling	1,275	27,698	393	2.50	4.85	8.54
Computerized Energy Management and Control System						
Present in Building	184	11,750	221	3.37	5.47	8.40
Controls Heating and Cooling	175	11,259	213	3.47	5.50	8.40
Controls Lighting	39	3,115	53	4.00	6.76	9.21
Controls Other	27	2,050	41	3.80	5.32	7.75
ELECTRICITY DEMAND						
Annual Consumption (kilowatthours)						
10,000 or less	281	1,612	1	.76	1.82	3.33
10,001 to 25,000	375	2,505	6	1.80	3.43	5.64
25,001 to 50,000	394	3,099	14	2.23	4.17	6.67
50,001 to 100,000	390	4,592	28	2.92	5.47	9.13
100,001 to 500,000	557	10,441	120	3.62	6.90	15.67
500,001 to 1,000,000	104	4,927	72	4.00	6.70	10.47
1,000,001 to 2,000,000	57	4,211	78	4.53	7.38	14.40
2,000,001 to 5,000,000	43	5,098	133	4.54	6.55	11.41
Over 5,000,000	16	7,047	207	4.73	5.93	10.05

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

Note: • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 36. Distribution of Electricity Load Factors

Building Characteristics	All Demand-Metered Buildings			Load Factor		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
All Buildings	2,217	43,532	661	0.163	0.241	0.355
Building Floorspace (Square Feet)						
1,001 to 5,000	999	2,777	60	.144	.211	.334
5,001 to 10,000	468	3,469	53	.157	.240	.322
10,001 to 25,000	406	6,649	89	.184	.254	.349
25,001 to 50,000	176	6,309	79	.209	.282	.385
50,001 to 100,000	94	6,707	108	.230	.338	.444
100,001 to 200,000	49	6,768	94	.271	.372	.479
200,001 to 500,000	17	5,103	95	.368	.458	.551
Over 500,000	7	5,751	85	.400	.506	.628
Year Constructed						
1899 or Before	65	970	5	.178	.228	.318
1900 to 1919	101	2,129	16	.128	.186	.291
1920 to 1945	284	5,547	50	.164	.228	.323
1946 to 1959	400	6,837	88	.151	.217	.316
1960 to 1969	420	8,835	141	.162	.243	.349
1970 to 1979	514	9,940	175	.179	.259	.409
1980 to 1983	189	3,343	73	.163	.252	.384
1984 to 1986	143	3,607	72	.182	.262	.383
1987 to 1989	100	2,324	39	.219	.299	.429
BUILDING USE						
Principal Building Activity						
Assembly	263	4,086	42	.085	.137	.220
Education	167	6,122	52	.149	.202	.261
Food Sales	69	662	28	.445	.503	.600
Food Service	164	935	25	.301	.351	.420
Health Care	35	1,642	39	.206	.235	.402
Lodging	94	2,834	35	.253	.341	.437
Mercantile and Service	604	7,948	119	.183	.238	.354
Office	384	9,291	193	.204	.264	.357
Parking Garage	27	756	4	.147	.235	.402
Public Order and Safety	19	473	7	.130	.210	.414
Warehouse	274	6,202	58	.134	.208	.274
Other	37	964	50	.219	.266	.463
Vacant	81	1,618	9	.091	.150	.230
Weekly Operating Hours						
39 or Fewer	236	2,388	13	.072	.125	.186
40 to 48	561	9,571	105	.144	.205	.268
49 to 60	505	9,208	114	.172	.227	.282
61 to 84	355	8,114	120	.215	.295	.385
85 to 167	316	6,784	118	.240	.342	.445
168 (Open Continuously)	244	7,467	192	.278	.413	.529
Workers						
4 or Fewer	966	6,639	56	.132	.193	.301
5 to 9	494	5,240	54	.174	.243	.338
10 to 19	301	4,212	51	.211	.264	.359
20 to 49	268	7,400	95	.216	.282	.408
50 to 99	101	5,830	84	.258	.357	.459
100 to 249	61	5,461	121	.325	.414	.501
250 or More	27	8,750	200	.402	.458	.589

See footnotes at end of table.

Table 36. Distribution of Electricity Load Factors (Continued)

Building Characteristics	All Demand-Metered Buildings			Load Factor		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Ownership and Occupancy						
Nongovernment Owned	1,881	32,539	493	0.164	0.241	0.355
Owner Occupied	1,368	24,146	375	.166	.250	.361
Single Establishment	1,192	17,742	282	.163	.247	.364
Multiple Establishment	176	6,404	93	.207	.259	.353
Nonowner Occupied	513	8,393	118	.161	.225	.341
Single Establishment	336	4,350	58	.160	.216	.330
Multiple Establishment	140	3,611	59	.207	.262	.425
Vacant	38	431	2	.082	.145	.173
Government Owned	336	10,993	168	.157	.234	.347
Federal	28	1,748	34	.236	.409	.608
State	85	3,011	62	.155	.305	.418
Local	222	6,234	72	.150	.215	.284
Percent Vacant at Least Three Months						
0	1,818	30,238	493	.168	.246	.364
1 to 50	192	9,084	137	.186	.255	.385
51 to 99	54	2,288	17	.122	.203	.295
100	153	1,922	14	.118	.162	.255
Months in Use Out of Past 12 Months						
0 to 8	165	2,298	17	.123	.178	.279
9 to 11	135	2,571	17	.126	.164	.228
12	1,917	38,662	627	.173	.251	.371
LOCATION						
Census Region						
Northeast	446	10,052	143	.182	.251	.385
Midwest	482	11,040	151	.164	.239	.340
South	942	15,179	239	.148	.233	.349
West	347	7,262	129	.174	.255	.386
Census Division						
Northeast						
New England	109	2,069	27	.165	.212	.341
Middle Atlantic	336	7,983	116	.193	.258	.391
Midwest						
East North Central	336	7,277	99	.150	.233	.329
West North Central	146	3,762	52	.186	.261	.369
South						
South Atlantic	394	7,244	109	.139	.232	.344
East South Central	200	2,880	54	.173	.244	.392
West South Central	349	5,056	76	.145	.223	.342
West						
Mountain	167	3,412	46	.166	.244	.355
Pacific	180	3,849	83	.188	.284	.421
Metropolitan Status						
Metropolitan	1,630	36,288	568	.168	.249	.362
Nonmetropolitan	586	7,244	93	.148	.219	.337
Climate Zone: 45-Year Average						
Under 2,000 CDD and --						
Over 7,000 HDD	145	3,340	52	.203	.244	.380
5,500-7,000 HDD	635	13,034	171	.165	.245	.357
4,000-5,499 HDD	410	10,682	170	.163	.239	.359
Under 4,000 HDD	454	8,353	147	.161	.241	.355
2,000 CDD or More and --						
Under 4,000 HDD	572	8,123	121	.150	.232	.343

See footnotes at end of table.

Table 36. Distribution of Electricity Load Factors (Continued)

Building Characteristics	All Demand-Metered Buildings			Load Factor		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
ENERGY SOURCES AND END USES *						
Energy Sources (Solely or in Combination)						
Electricity	2,217	43,532	661	0.163	0.241	0.355
Natural Gas	1,311	29,768	428	.168	.244	.352
Fuel Oil	305	9,536	164	.173	.251	.358
District Heat	76	5,529	116	.264	.432	.550
District Chilled Water	17	1,462	40	.257	.372	.535
Propane	173	3,338	51	.152	.257	.416
Other	55	1,188	11	.123	.210	.273
Energy End Uses (Solely or in Combination)						
Heated Buildings	2,035	41,371	637	.165	.243	.354
Air-Conditioned Buildings	1,770	37,841	614	.176	.254	.371
Buildings with Water Heating	1,787	38,953	624	.177	.255	.368
Buildings with Cooking	553	18,464	338	.206	.313	.433
Buildings with Manufacturing	120	4,497	76	.185	.249	.378
Energy End-Use Combinations						
Heated Buildings						
With Air Conditioning						
With Water Heating and Cooking						
	446	16,371	309	.208	.322	.444
With Water Heating, Without Cooking						
	1,059	18,173	262	.174	.246	.337
Without Water Heating or Cooking						
	193	2,263	21	.135	.205	.268
Without Air Conditioning						
With Water Heating and Cooking						
	62	1,407	16	.137	.212	.293
With Water Heating, Without Cooking						
	150	2,209	20	.134	.207	.299
Without Water Heating or Cooking						
	115	768	5	.125	.176	.213
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking						
	97	1,185	5	.109	.169	.263
All Other Combinations	93	1,156	23	.208	.319	.449
Space-Heating Energy Source						
Electricity	720	13,674	250	.164	.253	.363
Main	533	10,049	193	.177	.253	.363
With Secondary	55	1,603	29	.171	.274	.349
Natural Gas Only	34	858	14	.227	.275	.371
Other Energy Sources or Combinations	19	720	15	.102	.266	.342
With No Secondary	478	8,447	164	.177	.253	.364
Secondary	187	3,625	57	.150	.239	.364
Other Excluding Electricity	1,315	27,696	387	.166	.239	.351
Building Not Heated	181	2,162	24	.132	.216	.375
Main Space-Heating Energy Source						
Electricity	533	10,049	193	.177	.253	.363
Natural Gas	1,095	21,618	295	.162	.235	.344
Fuel Oil	237	3,775	45	.169	.240	.316
District Heat	72	4,987	90	.253	.432	.560
Propane	74	614	12	.116	.201	.413
Other	33	563	3	.123	.179	.266
Air-Conditioning Energy Source						
Electricity	1,705	34,836	570	.175	.253	.367
Other Excluding Electricity	66	3,005	44	.220	.291	.398
Air-Conditioning Not Performed	446	5,691	47	.126	.186	.273

See footnotes at end of table.

Table 36. Distribution of Electricity Load Factors (Continued)

Building Characteristics	All Demand-Metered Buildings			Load Factor		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Water-Heating Energy Source						
Electricity	863	15,716	276	0.170	0.250	0.352
Other Excluding Electricity	923	23,236	348	.182	.264	.383
Water Heating Not Performed	430	4,580	37	.131	.186	.262
Cooking Energy Source						
Electricity	239	9,034	153	.205	.320	.475
Other Excluding Electricity	314	9,431	185	.206	.313	.420
Cooking Not Performed	1,664	25,068	324	.151	.224	.316
Manufacturing Energy Source						
Electricity	90	3,560	56	.199	.255	.371
Other Excluding Electricity	30	937	20	.170	.234	.446
Manufacturing Not Performed	2,097	39,035	586	.162	.240	.354
HEATING AND COOLING						
Percent Heated						
Not Heated	187	2,231	24	.122	.210	.360
1 to 50	327	6,107	46	.140	.220	.303
51 to 99	272	6,378	118	.209	.270	.417
100	1,430	28,816	473	.166	.243	.355
Percent Cooled						
Not Cooled	446	5,691	47	.126	.186	.273
1 to 50	565	12,102	108	.168	.235	.332
51 to 99	361	10,209	194	.211	.281	.420
100	844	15,531	313	.175	.256	.381
Computer Area with Separate Air-Conditioning System						
Present in Building	194	13,844	306	.262	.365	.465
Not Present	2,023	29,688	355	.155	.230	.341
LIGHTING AND REFRIGERATION						
Percent Lit When Open						
Not Lit	28	416	1	.087	.095	.224
1 to 50	496	6,714	44	.132	.198	.282
51 to 99	493	12,254	188	.190	.255	.367
100	1,200	24,148	428	.176	.253	.383
Refrigeration Equipment (Solely or in Combination)						
Commercial						
Refrigeration Units	592	19,032	367	.231	.354	.466
Freezers	471	17,318	352	.250	.372	.480
Residential						
Refrigerators	1,320	31,880	494	.173	.250	.348
Freezers	343	9,409	152	.185	.266	.392
Ice-Making Machines	539	18,531	385	.235	.341	.456
Refrigerated Vending Machines	950	30,229	521	.211	.293	.414
Water Coolers	1,064	32,822	533	.182	.253	.362
Other	35	1,149	52	.316	.441	.528
ENERGY MANAGEMENT						
Occupant Control						
Any Control of Heating	1,160	17,469	242	.162	.234	.339
With Thermostats	1,026	16,064	224	.165	.237	.343
Any Control of Cooling	1,037	17,866	255	.171	.248	.355
With Thermostats	925	16,343	235	.175	.251	.355

See footnotes at end of table.

Table 36. Distribution of Electricity Load Factors (Continued)

Building Characteristics	All Demand-Metered Buildings			Load Factor		
	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	25th Percentile	Median	75th Percentile
Reduced Use During Off-Hours						
Heating Only	334	4,318	46	0.139	0.203	0.293
Cooling Only	155	3,023	51	.208	.295	.411
Heating and Cooling	1,275	27,698	393	.161	.235	.327
Computerized Energy Management and Control System						
Present in Building	184	11,750	221	.239	.338	.470
Controls Heating and Cooling	175	11,259	213	.236	.337	.467
Controls Lighting	39	3,115	53	.264	.384	.466
Controls Other	27	2,050	41	.253	.349	.507
ELECTRICITY DEMAND						
Annual Consumption (kilowatthours)						
10,000 or less	281	1,612	1	.074	.129	.180
10,001 to 25,000	375	2,505	6	.119	.163	.212
25,001 to 50,000	394	3,099	14	.169	.220	.281
50,001 to 100,000	390	4,592	28	.204	.265	.342
100,001 to 500,000	557	10,441	120	.244	.330	.436
500,001 to 1,000,000	104	4,927	72	.296	.381	.480
1,000,001 to 2,000,000	57	4,211	78	.341	.448	.534
2,000,001 to 5,000,000	43	5,098	133	.438	.497	.630
Over 5,000,000	16	7,047	207	.409	.530	.623

Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

Note: • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 37. Electricity Conditional Energy Intensity and Distribution of Building-Level Intensities

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	Total Consumed per Square Foot (thousand kWh)	Distribution of Building-Level Intensities (kWh/sq. ft.)		
					25th Percentile	Median	75th Percentile
All Buildings	4,294	61,563	813	13.2	3.6	8.6	19.6
Building Floorspace (Square Feet)							
1,001 to 5,000	2,360	6,409	95	14.9	4.5	11.3	26.9
5,001 to 10,000	855	6,297	72	11.5	3.4	7.8	15.0
10,001 to 25,000	622	9,989	112	11.2	2.7	6.6	15.3
25,001 to 50,000	243	8,671	97	11.2	2.4	6.7	17.0
50,001 to 100,000	125	8,918	127	14.2	2.8	8.2	17.9
100,001 to 200,000	60	8,222	113	13.8	2.9	10.2	19.6
200,001 to 500,000	23	6,996	107	15.3	5.5	14.3	21.5
Over 500,000	7	6,062	89	14.7	3.2	13.4	21.4
Year Constructed							
1899 or Before	162	1,568	7	4.7	1.8	4.7	9.8
1900 to 1919	223	3,849	22	5.7	2.7	4.7	9.5
1920 to 1945	631	7,880	62	7.8	2.8	6.6	17.0
1946 to 1959	823	10,185	111	10.9	3.0	7.4	15.3
1960 to 1969	775	11,921	173	14.5	4.2	8.6	18.4
1970 to 1979	855	13,172	214	16.2	4.5	10.6	25.5
1980 to 1983	309	4,209	86	20.5	5.5	11.3	33.0
1984 to 1986	315	5,628	89	15.8	5.0	12.0	24.8
1987 to 1989	202	3,150	49	15.5	4.9	13.9	32.0
BUILDING USE							
Principal Building Activity							
Assembly	614	6,851	55	8.0	2.1	5.7	12.4
Education	282	8,070	64	7.9	3.6	7.1	12.1
Food Sales	102	792	31	39.0	28.7	46.2	72.5
Food Service	241	1,167	33	28.3	16.6	31.4	55.9
Health Care	80	2,054	45	22.0	7.0	18.2	23.1
Lodging	140	3,476	40	11.6	7.0	10.7	19.3
Mercantile and Service	1,276	12,361	161	13.0	3.9	8.5	17.9
Office	679	11,796	229	19.4	7.7	13.3	24.2
Parking Garage	45	983	5	5.3	2.2	5.1	8.4
Public Order and Safety	50	608	8	13.8	4.2	5.1	21.6
Warehouse	543	8,850	71	8.0	1.4	3.5	7.1
Other	62	1,528	59	38.5	1.8	12.7	49.8
Vacant	182	3,027	11	3.8	1.5	3.1	6.2
Weekly Operating Hours							
39 or Fewer	687	4,747	21	4.4	1.4	3.5	8.1
40 to 48	1,100	13,810	129	9.3	3.0	7.1	13.1
49 to 60	978	13,349	140	10.5	3.5	6.9	14.1
61 to 84	621	10,751	153	14.2	5.0	13.2	26.2
85 to 167	513	9,377	142	15.1	8.0	17.6	37.2
168 (Open Continuously)	395	9,529	228	23.9	7.2	18.5	40.6
Workers							
4 or Fewer	2,261	13,550	86	6.4	2.7	6.5	15.8
5 to 9	903	7,926	76	9.5	4.0	8.9	21.5
10 to 19	507	6,443	70	10.8	4.5	10.6	21.5
20 to 49	381	9,665	117	12.1	5.8	11.3	21.1
50 to 99	132	7,389	102	13.8	6.0	14.5	26.3
100 to 249	79	6,771	140	20.7	11.2	18.3	32.0
250 or More	32	9,818	222	22.6	15.1	21.4	29.4

See footnotes at end of table.

Table 37. Electricity Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	Total Consumed per Square Foot (thousand kWh)	Distribution of Building-Level Intensities (kWh/sq. ft.)		
					25th Percentile	Median	75th Percentile
Ownership and Occupancy							
Nongovernment Owned	3,736	47,550	619	13.0	3.6	8.6	20.5
Owner Occupied	2,733	35,437	462	13.0	3.6	8.9	21.4
Single Establishment	2,366	26,590	347	13.0	3.6	9.0	23.1
Multiple Establishment	367	8,847	115	13.0	4.0	8.6	18.4
Nonowner Occupied	1,002	12,113	157	13.0	3.5	7.9	17.7
Single Establishment	658	6,179	78	12.6	3.6	7.9	19.6
Multiple Establishment	256	5,227	78	14.8	4.3	11.3	19.0
Vacant	89	707	2	3.3	1.7	2.7	5.2
Government Owned	559	14,013	194	13.8	3.7	8.7	17.2
Federal	38	1,900	39	20.4	9.3	13.5	26.9
State	131	3,870	70	18.2	5.2	10.3	18.7
Local	390	8,243	84	10.2	3.0	7.7	13.6
Percent Vacant at Least Three Months							
0	3,507	42,697	604	14.2	3.9	9.2	21.2
1 to 50	374	12,416	171	13.8	2.9	7.9	15.4
51 to 99	98	3,446	19	5.5	1.3	3.7	8.0
100	315	3,005	19	6.2	2.5	6.0	11.3
Months in Use Out of Past 12 Months							
0 to 8	310	3,308	24	7.2	2.1	5.7	13.5
9 to 11	270	3,775	22	5.9	3.3	6.9	10.2
12	3,715	54,480	767	14.1	3.7	9.2	21.0
LOCATION							
Census Region							
Northeast	751	13,326	172	12.9	3.6	7.9	17.6
Midwest	1,001	15,704	178	11.4	2.8	7.5	17.5
South	1,723	21,215	286	13.5	3.9	9.3	21.1
West	819	11,318	177	15.6	3.6	9.5	24.0
Census Division							
Northeast							
New England	177	3,127	34	10.8	3.9	7.9	15.3
Middle Atlantic	574	10,199	138	13.5	3.5	8.0	19.1
Midwest							
East North Central	656	10,527	117	11.1	2.7	6.9	15.9
West North Central	345	5,177	61	11.9	3.5	9.4	21.0
South							
South Atlantic	692	9,628	122	12.7	3.5	8.7	20.4
East South Central	381	4,218	63	15.0	4.8	10.3	21.4
West South Central	651	7,369	101	13.7	5.1	10.0	21.3
West							
Mountain	300	4,172	52	12.6	2.8	6.9	20.5
Pacific	519	7,146	125	17.4	4.5	12.0	27.0
Metropolitan Status							
Metropolitan	2,946	49,835	693	13.9	3.7	9.0	20.2
Nonmetropolitan	1,349	11,728	119	10.2	3.2	7.6	18.2
Climate Zone: 45-Year Average							
Under 2,000 CDD and --							
Over 7,000 HDD	333	4,983	62	12.4	3.6	8.8	21.0
5,500-7,000 HDD	1,074	17,496	196	11.2	3.0	7.5	17.2
4,000-5,499 HDD	917	15,045	207	13.8	3.4	8.8	20.3
Under 4,000 HDD	982	12,573	194	15.5	3.8	10.7	24.1
2,000 CDD or More and --							
Under 4,000 HDD	989	11,466	154	13.4	4.0	9.1	20.4

See footnotes at end of table.

Table 37. Electricity Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	Total Consumed per Square Foot (thousand kWh)	Distribution of Building-Level Intensities (kWh/sq. ft.)		
					25th Percentile	Median	75th Percentile
ENERGY SOURCES AND END USES *							
Energy Sources							
(Solely or in Combination)							
Electricity	4,294	61,563	813	13.2	3.6	8.6	19.6
Natural Gas	2,417	41,115	534	13.0	3.6	8.5	19.0
Fuel Oil	580	12,579	194	15.4	3.5	6.9	15.9
District Heat	98	6,578	130	19.8	5.7	12.2	32.8
District Chilled Water	24	1,927	47	24.6	9.3	16.5	18.9
Propane	348	4,695	59	12.5	3.6	10.2	24.1
Other	129	1,537	13	8.6	1.5	4.3	7.9
Energy End Uses							
(Solely or in Combination)							
Heated Buildings	3,872	57,826	784	13.6	3.8	9.0	20.1
Air-Conditioned Buildings	3,182	51,757	749	14.5	4.7	10.5	22.3
Buildings with Water Heating	3,180	53,569	762	14.2	4.3	10.1	21.9
Buildings with Cooking	864	23,662	390	16.5	6.8	16.1	32.7
Buildings with Manufacturing	205	5,595	85	15.3	3.6	8.0	21.5
Energy End-Use Combinations							
Heated Buildings							
With Air Conditioning							
With Water Heating and Cooking	660	20,781	358	17.2	7.6	17.9	35.2
With Water Heating, Without Cooking	1,906	25,896	338	13.0	4.4	9.4	18.8
Without Water Heating or Cooking	484	3,641	28	7.7	2.9	6.5	11.4
Without Air Conditioning							
With Water Heating and Cooking	138	2,079	19	8.9	3.0	4.5	10.7
With Water Heating, Without Cooking	373	3,700	30	8.1	1.4	3.7	9.1
Without Water Heating or Cooking	291	1,509	8	5.2	2.3	3.9	7.4
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	269	2,282	7	2.9	.7	1.6	4.5
All Other Combinations	174	1,675	26	15.4	4.1	10.7	26.0
Space-Heating Energy Source							
Electricity	1,283	18,702	305	16.3	5.7	12.3	26.6
Main	957	13,448	234	17.4	6.8	14.8	29.7
With Secondary	93	1,997	35	17.3	4.3	8.4	24.4
Natural Gas Only	54	1,142	17	14.7	6.5	13.5	33.7
Other Energy Sources or Combinations	36	787	16	20.2	2.8	4.3	13.8
With No Secondary	864	11,451	200	17.5	6.9	15.3	31.2
Secondary	326	5,254	70	13.3	3.5	7.5	18.4
Other Excluding Electricity	2,589	39,124	480	12.3	3.3	7.8	17.3
Building Not Heated	422	3,737	29	7.6	1.2	4.1	12.8
Main Space-Heating Energy Source							
Electricity	957	13,448	234	17.4	6.8	14.8	29.7
Natural Gas	2,078	31,102	377	12.1	3.3	8.0	17.5
Fuel Oil	473	5,577	53	9.5	3.5	6.8	14.9
District Heat	93	6,020	104	17.3	5.7	11.9	32.8
Propane	208	1,230	14	11.6	3.1	7.3	24.0
Other	68	761	4	5.4	1.5	3.2	6.0
Air-Conditioning Energy Source							
Electricity	3,072	47,905	695	14.5	4.7	10.4	22.0
Other Excluding Electricity	111	3,852	53	13.8	5.5	11.0	27.5
Air-Conditioning Not Performed	1,112	9,806	64	6.5	1.5	3.6	8.5

See footnotes at end of table.

Table 37. Electricity Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	Total Consumed per Square Foot (thousand kWh)	Distribution of Building-Level Intensities (kWh/sq. ft.)		
					25th Percentile	Median	75th Percentile
Water-Heating Energy Source							
Electricity	1,554	21,493	333	15.5	4.3	10.5	23.1
Other Excluding Electricity	1,626	32,076	430	13.4	4.1	9.9	21.0
Water Heating Not Performed	1,115	7,994	50	6.3	1.9	4.5	9.7
Cooking Energy Source							
Electricity	387	10,850	174	16.0	7.6	16.9	37.2
Other Excluding Electricity	477	12,812	216	16.9	5.9	15.5	31.7
Cooking Not Performed	3,431	37,901	423	11.1	3.1	7.4	15.9
Manufacturing Energy Source							
Electricity	163	4,406	64	14.5	3.2	8.0	21.4
Other Excluding Electricity	42	1,190	21	18.0	4.5	8.5	24.3
Manufacturing Not Performed	4,090	55,968	727	13.0	3.6	8.8	19.6
HEATING AND COOLING							
Percent Heated							
Not Heated	433	3,839	29	7.5	1.2	4.0	12.6
1 to 50	630	9,314	61	6.6	2.4	4.4	9.0
51 to 99	496	8,668	146	16.8	5.5	12.7	31.4
100	2,735	39,742	577	14.5	4.5	10.2	21.7
Percent Cooled							
Not Cooled	1,112	9,806	64	6.5	1.5	3.6	8.5
1 to 50	1,037	17,821	135	7.6	2.9	6.0	11.1
51 to 99	597	13,133	230	17.5	6.5	14.6	30.9
100	1,548	20,803	384	18.5	7.3	14.0	26.2
Computer Area with Separate Air-Conditioning System							
Present in Building	264	16,678	350	21.0	8.0	15.7	28.3
Not Present	4,030	44,885	463	10.3	3.5	8.2	18.6
LIGHTING AND REFRIGERATION							
Percent Lit When Open							
Not Lit	75	757	2	3.1	.7	1.1	2.4
1 to 50	999	10,864	56	5.2	2.4	4.5	9.1
51 to 99	951	16,950	238	14.1	4.9	10.8	21.7
100	2,268	32,992	516	15.6	4.5	10.8	24.1
Refrigeration Equipment (Solely or in Combination)							
Commercial							
Refrigeration Units	908	24,605	438	17.8	8.5	18.8	42.1
Freezers	707	21,627	417	19.3	9.6	21.9	49.6
Residential							
Refrigerators	2,471	44,179	602	13.6	4.0	8.7	18.2
Freezers	617	12,406	191	15.4	5.8	10.5	22.8
Ice-Making Machines	771	23,401	451	19.3	8.1	18.8	40.8
Refrigerated Vending Machines	1,513	38,810	622	16.0	5.7	12.5	24.9
Water Coolers	1,745	42,781	629	14.7	4.1	8.9	19.2
Other	56	1,408	54	38.7	21.8	40.6	91.3
ENERGY MANAGEMENT							
Occupant Control							
Any Control of Heating	2,399	27,033	315	11.6	3.9	8.7	19.2
With Thermostats	2,100	24,762	289	11.7	3.9	8.8	19.2
Any Control of Cooling	1,977	26,303	321	12.2	4.5	9.6	20.8
With Thermostats	1,756	24,032	296	12.3	4.5	9.7	20.4

See footnotes at end of table.

Table 37. Electricity Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Electricity Consumed (billion kWh)	Total Consumed per Square Foot (thousand kWh)	Distribution of Building-Level Intensities (kWh/sq. ft.)		
					25th Percentile	Median	75th Percentile
Reduced Use During Off-Hours							
Heating Only	790	7,126	63	8.9	2.6	5.3	12.7
Cooling Only	283	4,112	59	14.4	4.7	11.4	26.2
Heating and Cooling	2,397	38,683	490	12.7	4.1	8.8	18.3
Computerized Energy Management and Control System							
Present in Building	263	14,310	263	18.3	8.2	15.9	27.8
Controls Heating and Cooling	251	13,767	254	18.4	8.2	15.9	27.5
Controls Lighting	51	3,835	65	17.1	13.4	17.6	33.7
Controls Other	32	2,316	47	20.3	10.7	19.8	26.1
ELECTRICITY DEMAND							
Annual Consumption (kilowatthours)							
10,000 or Less	1,019	4,582	5	1.1	.6	1.5	3.1
10,001 to 25,000	913	5,413	15	2.8	2.5	4.1	7.4
25,001 to 50,000	702	5,544	25	4.6	4.0	7.2	13.4
50,001 to 100,000	639	7,052	46	6.5	6.5	11.6	22.1
100,001 to 500,000	762	14,099	160	11.4	9.0	18.3	41.0
500,001 to 1,000,000	122	5,901	85	14.4	12.7	21.0	37.1
1,000,001 to 2,000,000	69	5,022	95	18.9	14.4	24.1	57.5
2,000,001 to 5,000,000	50	6,263	156	24.8	19.6	29.8	54.8
Over 5,000,000	18	7,688	225	29.3	20.7	29.1	46.9

▪ Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

Note: • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 38. Natural Gas Consumption

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor:	0.781	0.882	0.783	1.233	1.233	1.119	0.989	1.109	
All Buildings	2,420	41,143	17.0	2,073	2,015	833	49.0	42.0	6.00
Building Floorspace (Square Feet)									
1,001 to 5,000	1,225	3,423	2.8	302	294	240	85.8	51.7	5.24
5,001 to 10,000	532	3,955	7.4	265	258	485	65.2	55.2	8.04
10,001 to 25,000	355	5,752	16.2	278	270	760	46.9	47.6	5.99
25,001 to 50,000	153	5,451	35.7	309	300	1,966	55.1	52.8	8.21
50,001 to 100,000	88	6,207	70.8	249	242	2,758	38.9	37.6	8.44
100,001 to 200,000	45	6,018	134.6	238	231	5,175	38.5	40.9	12.81
200,001 to 500,000	17	5,054	301.6	228	222	13,239	43.9	39.4	20.16
Over 500,000	6	5,284	865.1	203	198	32,366	37.4	23.1	24.23
Year Constructed									
1899 or Before	98	1,004	10.3	53	51	523	50.8	77.4	20.66
1900 to 1919	152	3,068	20.1	123	120	787	39.1	54.8	25.53
1920 to 1945	396	5,741	14.5	244	237	598	41.3	44.9	14.48
1946 to 1959	512	7,238	14.1	411	399	780	55.2	49.8	11.71
1960 to 1969	454	8,467	18.7	458	445	980	52.5	48.9	9.47
1970 to 1979	420	8,103	19.3	441	428	1,021	52.9	40.4	12.10
1980 to 1983	138	2,189	15.9	117	114	826	52.1	40.4	13.66
1984 to 1986	148	3,460	23.4	141	138	929	39.7	23.5	15.74
1987 to 1989	102	1,873	18.3	85	83	808	44.1	23.9	19.32
BUILDING USE									
Principal Building Activity									
Assembly	345	4,304	12.5	174	169	489	39.2	78.1	10.37
Education	199	6,640	33.4	323	314	1,583	47.3	55.7	13.52
Food Sales	60	548	9.2	27	27	444	48.4	43.0	18.71
Food Service	188	818	4.4	128	124	662	152.0	83.2	10.53
Health Care	40	1,602	39.7	186	181	4,487	113.1	57.4	20.82
Lodging	101	2,541	25.1	187	182	1,796	71.7	69.1	15.24
Mercantile and Service	732	8,790	12.0	417	405	554	46.1	44.7	9.40
Office	394	7,220	18.3	238	231	587	32.0	13.4	10.12
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	28	440	15.7	25	24	850	54.2	37.1	30.30
Warehouse	207	5,135	24.8	206	201	971	39.1	78.3	18.09
Other	26	932	35.3	102	99	3,742	106.1	62.3	26.28
Vacant	84	1,891	22.6	49	48	569	Q	47.7	38.88
Weekly Operating Hours									
39 or Fewer	323	2,620	8.1	100	97	300	37.0	51.6	10.49
40 to 48	650	9,163	14.1	388	377	580	41.1	37.9	7.75
49 to 60	560	8,481	15.1	326	317	566	37.4	32.0	9.01
61 to 84	377	7,952	21.1	342	332	882	41.8	32.9	10.11
85 to 167	297	6,574	22.1	360	350	1,178	53.3	56.0	15.47
168 (Open Continuously)	213	6,353	29.9	557	541	2,547	85.2	54.8	12.00
Workers									
4 or Fewer	1,113	6,720	6.0	300	291	262	43.3	113.2	6.31
5 to 9	556	5,180	9.3	218	212	381	40.8	50.9	8.64
10 to 19	352	4,457	12.7	248	241	686	54.1	53.5	8.14
20 to 49	242	6,618	27.3	332	323	1,333	48.8	48.3	8.18
50 to 99	82	5,352	65.6	253	246	3,017	46.0	48.1	13.10
100 to 249	53	5,043	95.9	358	348	6,611	69.0	46.6	13.72
250 or More	23	7,773	333.9	364	354	15,213	45.6	20.3	16.58

See footnote at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					1989 Per Year
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
Ownership and Occupancy									
Nongovernment Owned	2,104	31,713	15.1	1,601	1,556	740	49.1	42.3	4.08
Owner Occupied	1,561	23,640	15.1	1,292	1,256	804	53.1	46.2	7.30
Single Establishment	1,318	17,151	13.0	1,083	1,052	798	61.3	61.9	8.35
Multiple Establishment	244	6,490	26.6	210	204	838	31.4	20.0	11.50
Nonowner Occupied	543	8,072	14.9	309	300	553	37.2	31.3	11.04
Single Establishment	363	4,279	11.8	176	171	470	39.9	37.0	14.07
Multiple Establishment	146	3,515	24.0	102	99	677	28.2	21.1	14.39
Vacant	33	278	8.4	Q	Q	Q	Q	113.8	24.39
Government Owned	316	9,431	29.9	472	459	1,452	48.6	40.9	11.34
Federal	13	Q	72.1	Q	Q	Q	74.1	40.7	65.26
State	78	2,317	29.8	112	109	1,399	47.0	29.2	23.15
Local	225	6,202	27.5	290	282	1,252	45.5	48.4	11.05
Multibuilding Facility									
Not on Multibuilding Facility	1,755	26,127	14.9	1,168	1,135	647	43.4	39.7	1.34
Part of Multibuilding Facility	665	15,016	22.6	905	880	1,322	58.6	45.4	8.51
On Facility with Central Plant	77	4,626	59.8	423	411	5,311	88.9	52.6	23.15
Percent Vacant at Least Three Months									
0	2,009	27,476	13.7	1,562	1,518	755	55.2	48.9	8.84
1 to 50	208	9,223	44.3	324	315	1,512	34.2	22.6	14.91
51 to 99	63	2,854	45.0	Q	Q	1,608	35.7	63.5	10.75
100	139	1,590	11.4	82	80	573	50.1	55.9	20.49
Months in Use Out of Past 12 Months									
0 to 8	126	1,744	13.8	72	70	554	40.1	50.2	18.61
9 to 11	152	2,640	17.3	138	135	883	51.0	59.6	15.25
12	2,141	36,759	17.2	1,863	1,810	845	49.2	40.8	8.25
LOCATION									
Census Region									
Northeast	355	8,517	24.0	353	343	967	40.3	33.6	13.65
Midwest	734	12,815	17.5	831	808	1,100	63.0	65.0	8.85
South	806	11,660	14.5	498	484	600	41.5	36.1	12.15
West	525	8,151	15.5	391	380	725	46.7	31.9	11.89
Census Division									
Northeast									
New England	53	1,236	23.5	39	38	727	31.0	26.2	22.53
Middle Atlantic	302	7,281	24.1	314	305	1,009	41.9	34.8	15.61
Midwest									
East North Central	499	8,797	17.6	561	545	1,093	62.0	68.5	15.52
West North Central	236	4,018	17.0	270	262	1,113	65.3	58.9	17.15
South									
South Atlantic	187	4,235	22.7	198	192	1,029	45.4	39.2	25.72
East South Central	168	2,034	12.1	126	122	726	60.1	40.7	23.80
West South Central	451	5,391	12.0	174	169	375	31.4	30.8	14.61
West									
Mountain	204	3,121	15.3	197	191	935	61.2	57.1	18.49
Pacific	320	5,030	15.7	195	189	590	37.6	22.0	11.89
Metropolitan Status									
Metropolitan	1,738	34,274	19.7	1,608	1,562	899	45.6	37.7	8.41
Nonmetropolitan	682	8,869	10.1	465	452	683	65.8	69.5	12.67

See footnote at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor	0.781	0.882	0.783	1.239	1.233	1.119	0.989	1.103	
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	188	3,064	16.3	252	245	1,303	80.1	72.3	13.21
5,500-7,000 HDD	726	13,903	19.1	850	827	1,138	59.5	60.2	9.84
4,000-5,499 HDD	444	9,668	21.8	407	396	892	40.9	33.0	16.71
Under 4,000 HDD	555	8,436	15.2	350	340	612	40.3	26.8	14.95
2,000 CDD or More and --									
Under 4,000 HDD	507	6,073	12.0	213	207	409	34.1	33.6	14.30
1989 Degree-Days									
Under 2,000 CDD and --									
Over 7,000 HDD	313	5,123	16.4	375	365	1,166	71.2	62.7	11.87
5,500-7,000 HDD	809	16,611	20.5	953	926	1,145	55.8	58.6	10.79
4,000-5,499 HDD	282	5,961	21.1	209	203	721	34.1	22.8	15.38
Under 4,000 HDD	559	7,906	14.2	339	329	589	41.6	27.8	15.30
2,000 CDD or More and --									
Under 4,000 HDD	457	5,542	12.1	197	191	418	34.5	34.1	14.88
STRUCTURE									
Floors									
1	1,397	13,819	9.9	732	711	509	51.5	53.0	7.93
2	635	10,979	17.3	560	545	857	49.6	47.3	9.21
3	272	5,721	21.0	252	245	903	42.9	40.1	10.83
4 to 6	101	6,046	59.9	331	322	3,192	53.3	43.1	16.48
7 or More	15	4,578	298.7	197	192	12,493	41.8	20.3	22.00
Wall Materials									
Masonry	1,718	29,332	17.1	1,509	1,466	853	50.0	45.2	6.45
Siding or Shingles	348	2,353	6.8	120	117	335	49.6	48.8	12.96
Metal Panels	205	2,657	13.0	185	180	878	67.7	68.0	21.06
Concrete Panels	109	4,894	44.9	180	175	1,609	35.8	27.2	21.46
Window Glass	15	1,239	81.3	49	47	3,093	Q	Q	35.94
Other	25	668	27.0	30	29	1,184	43.9	23.0	31.33
Roof Materials									
Built-Up	992	21,965	22.2	1,052	1,022	1,031	46.5	36.8	8.29
Shingles (Not Wood)	733	7,011	9.6	333	324	442	46.2	51.0	10.40
Metal Surfacing	334	3,801	11.4	226	220	658	57.9	60.0	17.69
Synthetic or Rubber	142	4,428	31.3	259	251	1,775	56.8	42.2	11.66
Slate or Tile	125	1,857	14.8	86	84	670	45.2	64.2	16.52
Concrete	19	1,036	53.3	23	22	1,149	Q	Q	31.50
Wooden Materials	53	483	9.2	29	28	529	57.7	65.1	20.66
Other	22	562	25.6	Q	Q	Q	112.4	110.3	28.99
Building Shell Conservation Features (Solely or in Combination)									
Roof or Ceiling Insulation	1,732	29,746	17.2	1,571	1,527	882	51.3	40.3	6.60
Wall Insulation	1,114	19,641	17.6	1,096	1,065	956	54.2	40.6	8.34
Storm or Multiple Glazing	854	17,079	20.0	959	932	1,091	54.6	41.7	7.05
Tinted, Reflective, or Shading									
Glass	552	15,468	28.0	769	747	1,354	48.3	32.3	9.33
Exterior or Interior Shadings									
or Awnings	905	18,408	20.3	878	853	943	46.3	34.2	8.08
Weather Stripping or Caulking	1,590	30,246	19.0	1,553	1,509	949	49.9	39.8	6.42
None of the Above	260	3,880	14.9	141	138	529	35.4	62.1	20.82

See footnote at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor	0.781	0.882	0.783	1.233	1.235	1.119	0.289	1.103	
ENERGY SOURCES AND END USES*									
Energy Sources (Solely or in Combination)									
Electricity	2,417	41,115	17.0	2,068	2,010	832	48.9	41.9	6.01
Natural Gas	2,420	41,143	17.0	2,073	2,015	833	49.0	42.0	6.00
Fuel Oil	142	7,865	55.2	427	415	2,914	52.8	36.5	16.59
District Heat	27	3,415	127.2	Q	Q	5,948	46.8	25.9	34.82
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	31	1,615	51.7	145	141	Q	87.0	88.4	33.03
Other	36	775	21.6	29	28	779	36.1	42.8	25.94
Energy End Uses (Solely or in Combination)									
Heated Buildings	2,392	40,802	17.1	2,051	1,994	833	48.9	41.9	6.03
Air-Conditioned Buildings	1,969	36,677	18.6	1,780	1,730	879	47.2	38.7	6.44
Buildings with Water Heating	2,029	38,433	18.9	1,960	1,905	939	49.6	41.7	6.09
Buildings with Cooking	582	18,868	32.4	975	947	1,629	50.2	40.8	7.96
Buildings with Manufacturing	121	3,777	31.2	286	278	2,296	73.7	66.2	21.47
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking									
	472	16,906	35.8	845	821	1,738	48.5	37.8	6.81
With Water Heating, Without Cooking									
	1,225	17,389	14.2	851	827	675	47.6	40.0	6.03
Without Water Heating or Cooking									
	247	1,976	8.0	67	65	265	33.1	36.3	19.08
Without Air Conditioning									
With Water Heating and Cooking									
	83	1,575	18.9	119	115	1,386	73.3	111.6	27.87
With Water Heating, Without Cooking									
	223	2,242	10.1	125	121	546	54.2	66.3	11.04
Without Water Heating or Cooking									
	130	543	4.2	41	40	306	73.1	124.6	16.86
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking									
	Q	Q	Q	Q	Q	Q	Q	Q	b
All Other Combinations	39	495	12.6	25	24	610	48.3	42.4	25.84
Space-Heating Energy Source									
Natural Gas	2,158	33,017	15.3	1,856	1,804	836	54.6	49.1	6.07
Main	2,079	31,110	15.0	1,778	1,728	831	55.5	50.5	6.25
With Secondary	307	7,887	25.7	560	544	1,774	69.0	63.5	12.81
Electricity Only	224	3,620	16.2	156	152	677	41.9	47.4	15.22
Other Energy Sources or Combinations	80	4,134	51.5	360	349	4,350	84.5	66.3	16.47
With No Secondary	1,772	23,222	13.1	1,218	1,184	668	51.0	46.2	6.23
Secondary	79	1,907	24.1	78	76	961	39.9	30.2	21.74
Other Excluding Natural Gas	235	7,785	33.2	195	189	808	24.3	17.4	19.84
Building Not Heated	28	341	12.4	22	21	762	61.6	59.9	30.71
Main Space-Heating Energy Source									
Electricity	224	5,109	22.8	170	165	736	32.2	25.3	16.27
Natural Gas	2,079	31,110	15.0	1,778	1,728	831	55.5	50.5	6.25
Fuel Oil	74	1,985	26.9	25	24	322	12.0	11.6	19.25
District Heat	23	2,933	127.1	Q	Q	Q	36.5	19.7	33.41
Propane	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor:	0.769	0.963	0.976	1.204	1.204	1.061	0.996	1.123	
Air-Conditioning Energy Source									
Natural Gas	97	1,976	20.5	128	124	1,284	62.8	56.9	14.63
Other Excluding Natural Gas	1,872	34,701	18.5	1,653	1,606	858	46.3	37.7	6.62
Air-Conditioning Not Performed	451	4,467	9.9	293	285	630	63.7	88.5	14.42
Water-Heating Energy Source									
Natural Gas	1,391	25,923	18.6	1,451	1,410	1,014	54.4	49.4	6.03
Other Excluding Natural Gas	637	12,510	19.6	509	494	776	39.5	28.9	12.62
Water Heating Not Performed	391	2,710	6.9	113	110	281	40.6	47.1	14.59
Cooking Energy Source									
Natural Gas	462	14,766	32.0	744	723	1,565	49.0	37.8	8.90
Other Excluding Natural Gas	120	4,103	34.3	231	225	1,877	54.7	54.4	21.05
Cooking Not Performed	1,838	22,275	12.1	1,098	1,067	581	47.9	43.1	7.26
Manufacturing Energy Source									
Natural Gas	23	838	36.1	116	113	4,875	135.0	113.5	26.53
Other Excluding Natural Gas	98	2,939	30.0	170	165	1,686	56.2	51.5	27.26
Manufacturing Not Performed	2,299	37,366	16.3	1,787	1,736	755	46.5	39.7	5.44
HEATING AND COOLING									
Percent Heated									
Not Heated	33	401	12.2	23	22	671	55.2	58.5	28.47
1 to 50	358	5,980	16.7	128	125	348	20.8	42.1	11.25
51 to 99	296	5,948	20.1	274	267	900	44.8	34.1	14.25
100	1,732	28,814	16.6	1,648	1,601	924	55.6	43.5	6.08
Percent Cooled									
Not Cooled	451	4,467	9.9	293	285	630	63.7	88.5	14.42
1 to 50	667	13,220	19.8	616	599	899	45.3	64.6	10.91
51 to 99	363	9,160	25.2	424	412	1,134	45.0	33.0	9.31
100	939	14,296	15.2	740	719	766	50.3	31.3	9.55
Heating Equipment (Solely or in Combination)									
Furnaces	1,168	12,529	10.7	680	661	566	52.7	52.0	8.48
Boilers	505	16,302	32.3	1,043	1,014	2,007	62.2	48.6	7.90
Individual Space Heaters	835	16,297	19.5	787	765	917	47.0	48.7	10.49
Packaged Heating Units	564	11,970	21.2	593	576	1,022	48.1	39.9	9.75
Heat Pumps	168	4,909	29.3	248	241	1,437	49.1	33.8	16.39
Air Ducts	1,284	27,108	21.1	1,367	1,328	1,035	49.0	38.0	7.58
Heating or Reheating Coils	132	11,399	86.2	629	611	4,621	53.6	32.7	11.74
Fan-Coil Units	130	9,696	74.4	551	536	4,114	55.3	39.7	12.02
Steam or Hot Water Radiators or Baseboards	321	12,380	38.6	776	754	2,352	60.9	50.0	12.08
Other	44	1,106	25.3	Q	Q	Q	74.3	55.4	32.32
Cooling Equipment (Solely or in Combination)									
Central Chillers	139	11,068	79.6	574	558	4,012	50.4	31.0	13.25
Individual Air Conditioners	668	14,486	21.7	719	699	1,047	48.2	49.0	10.00
Packaged Cooling Units	1,366	26,434	19.3	1,257	1,222	894	46.2	36.6	7.36
Heat Pumps	145	4,551	31.3	239	233	1,601	51.1	35.6	16.58
Air Ducts	1,092	25,146	23.0	1,268	1,232	1,128	49.0	37.3	7.97
Fan-Coil Units	75	8,245	109.8	452	439	5,854	53.3	30.0	15.29
Other	64	1,022	Q	Q	Q	Q	69.2	59.0	26.74

See footnotes at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor:	0.789	0.893	0.876	1.204	1.204	1.081	0.998	1.123	
Year Main Central Chiller Installed									
1959 or Before	20	1,194	60.1	59	57	2,888	48.1	31.0	24.98
1960 to 1969	39	2,660	68.3	163	158	4,058	59.4	44.7	24.43
1970 to 1979	33	2,912	88.1	131	127	3,845	43.6	27.4	17.50
1980 to 1986	32	2,781	87.1	148	143	4,491	51.6	26.7	28.87
1987 to 1989	15	1,521	99.2	74	72	4,719	47.6	27.3	24.13
Year Packaged Cooling System Installed									
1959 or Before	56	1,367	24.4	67	65	1,158	47.5	37.3	24.24
1960 to 1969	197	3,756	19.0	233	226	1,148	60.3	47.7	18.89
1970 to 1979	410	8,239	20.1	389	378	922	45.9	37.9	18.54
1980 to 1986	432	7,907	18.3	301	292	677	37.0	29.2	10.44
1987 to 1989	271	5,167	19.1	267	260	960	50.3	37.7	13.33
Computer Area with Separate Air-Conditioning System									
Present in Building	165	12,085	73.5	671	652	3,965	54.0	32.2	11.17
Not Present	2,255	29,059	12.9	1,402	1,362	604	46.9	49.1	8.06
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	557	7,016	12.6	276	268	481	38.2	74.2	8.90
51 to 99	581	12,013	20.7	566	550	946	45.8	39.8	8.86
100	1,258	21,962	17.5	1,222	1,188	944	54.1	38.9	8.05
Percent Lit When Closed									
Not Lit	1,269	16,533	13.0	853	829	653	50.1	52.0	8.08
1 to 50	1,082	22,321	20.6	1,080	1,050	970	47.0	36.6	8.07
51 to 99	43	1,726	39.7	118	115	2,640	66.4	40.2	16.31
100	25	564	22.3	23	22	867	38.9	45.6	26.16
Lighting Equipment (Solely or in Combination)									
Incandescent Lamps	1,446	27,287	18.9	1,357	1,319	912	48.3	40.3	8.84
Fluorescent Lamps	2,291	40,313	17.6	2,018	1,961	856	48.7	41.3	8.96
High-Intensity Discharge Lamps	272	12,567	46.2	673	654	2,403	52.0	42.0	11.61
Other Lamps	20	418	20.8	16	16	783	37.7	21.3	27.31
High-Efficiency Ballasts	648	16,848	26.0	888	863	1,331	51.2	37.4	8.44
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	609	19,667	32.3	998	970	1,591	49.3	38.8	8.50
Freezers	481	17,278	35.9	928	902	1,874	52.2	39.2	8.49
Residential									
Refrigerators	1,515	31,353	20.7	1,554	1,511	997	48.2	39.1	8.87
Freezers	391	9,179	23.5	544	529	1,354	57.6	43.5	11.85
Ice-Making Machines	501	17,624	35.2	991	963	1,922	54.6	38.3	8.81
Refrigerated Vending Machines	950	27,789	29.3	1,509	1,467	1,545	52.8	40.5	7.36
Water Coolers	1,051	30,128	28.7	1,509	1,467	1,396	48.7	39.5	7.13
Other	29	1,027	35.1	109	106	3,613	103.1	56.2	32.84
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	1,465	19,094	13.0	895	869	593	45.5	40.4	7.82
With Thermostats	1,296	17,503	13.5	825	802	619	45.8	40.6	7.97
Any Control of Cooling	1,220	18,989	15.6	868	843	691	44.4	38.8	7.87
With Thermostats	1,077	17,244	16.0	784	762	707	44.2	37.9	8.13

See footnotes at end of table.

Table 38. Natural Gas Consumption (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion cubic feet)	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	
RSE Column Factor:	0.799	0.883	0.876	1.204	1.204	1.081	0.908	1.123	
Reduced Use During Off-Hours									
Heating Only	432	4,388	10.2	279	271	628	61.8	78.5	12.07
Cooling Only	117	2,397	20.5	150	145	1,245	60.7	60.1	10.09
Heating and Cooling	1,565	28,312	18.1	1,214	1,180	754	41.7	35.4	7.47
Computerized Energy Management and Control System									
Present in Building	182	10,633	58.6	495	482	2,652	45.3	29.6	12.14
Controls Heating and Cooling	175	10,160	57.9	481	467	2,664	46.0	29.5	12.42
Controls Lighting	39	3,145	80.3	143	139	3,549	44.2	27.1	26.97
Controls Other	23	1,938	84.8	120	117	5,114	60.3	41.7	30.88
Other Energy Management									
Regular HVAC Maintenance	1,267	29,847	23.6	1,631	1,585	1,251	53.1	39.9	6.59
Participated in Utility Conservation Program	201	7,242	36.0	404	392	1,947	54.2	35.9	12.02
NATURAL GAS DEMAND									
Annual Consumption (hundred cubic feet)									
1,000 or Less	663	4,170	6.3	34	33	50	7.9	7.5	8.08
1,001 to 5,000	1,046	9,967	9.5	262	254	243	25.5	27.7	8.37
5,001 to 10,000	348	6,485	18.6	248	241	692	37.1	28.9	6.59
10,001 to 25,000	238	7,326	30.8	354	344	1,443	46.9	44.7	6.21
25,001 to 50,000	71	5,017	70.9	248	241	3,401	48.0	34.9	11.62
50,001 to 100,000	28	2,808	100.8	191	185	6,652	66.0	54.9	6.42
Over 100,000	26	5,370	208.9	737	717	27,881	133.5	88.3	14.77

^a Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 39. Natural Gas Expenditures

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor:	1.014	1.144	1.018	1.417	1.243	1.145	0.420	
All Buildings	2,420	41,143	17	9,204	3.8	0.22	4.57	4.66
Building Floorspace (Square Feet)								
1,001 to 5,000	1,225	3,423	3	1,620	1.3	.47	5.51	4.42
5,001 to 10,000	532	3,955	7	1,304	2.5	.33	5.06	6.12
10,001 to 25,000	355	5,752	16	1,348	3.8	.23	4.99	4.59
25,001 to 50,000	153	5,451	36	1,318	8.6	.24	4.39	6.27
50,001 to 100,000	88	6,207	71	1,094	12.5	.18	4.53	6.64
100,001 to 200,000	45	6,018	135	1,016	22.7	.17	4.39	9.19
200,001 to 500,000	17	5,054	302	836	49.9	.17	3.77	14.57
Over 500,000	6	5,284	865	668	109.4	.13	3.38	17.22
Year Constructed								
1899 or Before	98	1,004	10	270	2.8	.27	5.29	18.28
1900 to 1919	152	3,068	20	527	3.5	.17	4.40	19.83
1920 to 1945	396	5,741	14	1,135	2.9	.20	4.79	10.50
1946 to 1959	512	7,238	14	1,809	3.5	.25	4.53	9.22
1960 to 1969	454	8,467	19	1,975	4.4	.23	4.44	7.21
1970 to 1979	420	8,103	19	1,939	4.6	.24	4.52	9.18
1980 to 1983	138	2,189	16	502	3.6	.23	4.40	11.49
1984 to 1986	148	3,460	23	665	4.5	.19	4.84	11.36
1987 to 1989	102	1,873	18	382	3.7	.20	4.62	15.25
BUILDING USE								
Principal Building Activity								
Assembly	345	4,304	12	809	2.3	.19	4.79	6.67
Education	199	6,640	33	1,309	6.6	.20	4.16	10.44
Food Sales	60	548	9	137	2.3	.25	5.17	15.88
Food Service	188	818	4	675	3.6	.83	5.43	8.46
Health Care	40	1,602	40	712	17.6	.44	3.93	15.59
Lodging	101	2,541	25	818	8.1	.32	4.49	12.02
Mercantile and Service	732	8,790	12	1,931	2.6	.22	4.77	6.92
Office	394	7,220	18	1,128	2.9	.16	4.88	7.43
Parking Garage	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	28	440	16	120	4.3	.27	5.04	24.43
Warehouse	207	5,135	25	853	4.1	.17	4.25	13.86
Other	26	932	35	420	15.9	.45	4.25	19.55
Vacant	84	1,891	23	237	2.8	.13	4.99	26.54
Weekly Operating Hours								
39 or Fewer	323	2,620	8	508	1.6	.19	5.25	7.84
40 to 48	650	9,163	14	1,771	2.7	.19	4.70	6.31
49 to 60	560	8,481	15	1,563	2.8	.18	4.93	7.48
61 to 84	377	7,952	21	1,587	4.2	.20	4.78	7.64
85 to 167	297	6,574	22	1,537	5.2	.23	4.39	12.01
168 (Open Continuously)	213	6,353	30	2,238	10.5	.35	4.14	8.93
Workers								
4 or Fewer	1,113	6,720	6	1,564	1.4	.23	5.37	6.89
5 to 9	556	5,180	9	1,087	2.0	.21	5.14	6.97
10 to 19	352	4,457	13	1,177	3.3	.26	4.88	6.91
20 to 49	242	6,618	27	1,538	6.4	.23	4.77	6.97
50 to 99	82	5,352	66	1,070	13.1	.20	4.35	9.85
100 to 249	53	5,043	96	1,417	26.9	.28	4.07	10.60
250 or More	23	7,773	334	1,350	58.0	.17	3.81	12.39

See footnote at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor:	1,014	1,144	1,019	1,417	1,243	1,146	0,420	
Ownership and Occupancy								
Nongovernment Owned	2,104	31,713	15	7,213	3.4	0.23	4.64	4.74
Owner Occupied	1,561	23,640	15	5,680	3.6	.24	4.52	5.37
Single Establishment	1,318	17,151	13	4,713	3.6	.27	4.48	6.18
Multiple Establishment	244	6,490	27	968	4.0	.15	4.74	10.09
Nonowner Occupied	543	8,072	15	1,533	2.8	.19	5.11	7.67
Single Establishment	363	4,279	12	850	2.3	.20	4.98	10.14
Multiple Establishment	146	3,515	24	535	3.7	.15	5.40	10.68
Vacant	33	278	8	Q	Q	Q	4.87	15.00
Government Owned	316	9,431	30	1,991	6.3	.21	4.34	9.48
Federal	13	Q	72	Q	Q	.24	3.19	23.51
State	78	2,317	30	504	6.5	.22	4.63	16.53
Local	225	6,202	28	1,271	5.6	.20	4.51	9.46
Multibuilding Facility								
Not on Multibuilding Facility	1,755	26,127	15	5,426	3.1	.21	4.78	4.90
Part of Multibuilding Facility	665	15,016	23	3,777	5.7	.25	4.29	7.44
On Facility with Central Plant	77	4,626	60	1,554	20.1	.34	3.78	16.46
Percent Vacant at Least Three Months								
0	2,009	27,476	14	7,010	3.5	.26	4.62	4.41
1 to 50	208	9,223	44	1,426	6.8	.15	4.53	10.84
51 to 99	63	2,854	45	379	6.0	.13	3.72	25.49
100	139	1,590	11	388	2.8	.24	4.87	14.52
Months in Use Out of Past 12 Months								
0 to 8	126	1,744	14	323	2.6	.18	4.61	13.75
9 to 11	152	2,640	17	627	4.1	.24	4.66	11.16
12	2,141	36,759	17	8,254	3.9	.22	4.56	4.88
LOCATION								
Census Region								
Northeast	355	8,517	24	1,807	5.1	.21	5.26	9.63
Midwest	734	12,815	17	3,381	4.6	.26	4.19	7.60
South	806	11,660	14	2,293	2.8	.20	4.74	8.92
West	525	8,151	16	1,724	3.3	.21	4.53	8.87
Census Division								
Northeast								
New England	53	1,236	23	226	4.3	.18	5.91	17.07
Middle Atlantic	302	7,281	24	1,580	5.2	.22	5.18	10.67
Midwest								
East North Central	499	8,797	18	2,386	4.8	.27	4.38	10.03
West North Central	236	4,018	17	995	4.2	.25	3.79	14.35
South								
South Atlantic	187	4,235	23	894	4.8	.21	4.65	14.18
East South Central	168	2,034	12	553	3.3	.27	4.52	20.10
West South Central	451	5,391	12	846	1.9	.16	5.00	10.06
West								
Mountain	204	3,121	15	683	3.3	.22	3.57	15.24
Pacific	320	5,030	16	1,040	3.2	.21	5.50	9.37
Metropolitan Status								
Metropolitan	1,738	34,274	20	7,185	4.1	.21	4.60	5.01
Nonmetropolitan	682	6,869	10	2,019	3.0	.29	4.46	9.59

See footnote at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor:	1,014	1,144	1,018	1,417	1,243	1,145	0.420	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	188	3,064	16	971	5.2	0.32	3.96	9.61
5,500-7,000 HDD	726	13,903	19	3,627	5.0	.26	4.39	8.35
4,000-5,499 HDD	444	9,668	22	1,830	4.1	.19	4.63	12.99
Under 4,000 HDD	555	8,436	15	1,677	3.0	.20	4.93	10.83
2,000 CDD or More and --								
Under 4,000 HDD	507	6,073	12	1,099	2.2	.18	5.30	10.95
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	313	5,123	16	1,595	5.1	.31	4.37	10.06
5,500-7,000 HDD	809	16,611	21	3,948	4.9	.24	4.26	8.86
4,000-5,499 HDD	282	5,961	21	1,028	3.6	.17	5.06	11.92
Under 4,000 HDD	559	7,906	14	1,624	2.9	.21	4.93	11.06
2,000 CDD or More and --								
Under 4,000 HDD	457	5,542	12	1,009	2.2	.18	5.28	11.35
STRUCTURE								
Floors								
1	1,397	13,819	10	3,474	2.5	.25	4.89	6.20
2	635	10,979	17	2,462	3.9	.22	4.52	6.78
3	272	5,721	21	1,171	4.3	.20	4.77	6.79
4 to 6	101	6,046	60	1,355	13.4	.22	4.21	12.96
7 or More	15	4,578	299	741	48.3	.16	3.87	15.64
Wall Materials								
Masonry	1,718	29,332	17	6,773	3.9	.23	4.62	5.00
Siding or Shingles	348	2,353	7	594	1.7	.25	5.09	11.10
Metal Panels	205	2,657	13	755	3.7	.28	4.20	15.20
Concrete Panels	109	4,894	45	721	6.6	.15	4.11	15.64
Window Glass	15	1,239	81	208	13.7	Q	4.42	26.77
Other	25	668	27	151	6.1	.23	5.17	23.69
Roof Materials								
Built-Up	992	21,965	22	4,595	4.6	.21	4.50	6.50
Shingles (Not Wood)	733	7,011	10	1,634	2.2	.23	5.04	7.70
Metal Surfacing	334	3,801	11	980	2.9	.26	4.45	12.29
Synthetic or Rubber	142	4,428	31	1,096	7.7	.25	4.36	9.39
Slate or Tile	125	1,857	15	389	3.1	.21	4.63	14.20
Concrete	19	1,036	53	111	5.7	Q	4.99	21.67
Wooden Materials	53	483	9	150	2.8	.31	5.37	16.30
Other	22	562	26	Q	Q	.44	3.94	22.01
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	1,732	29,746	17	6,924	4.0	.23	4.53	5.18
Wall Insulation	1,114	19,641	18	4,732	4.2	.24	4.44	6.28
Storm or Multiple Glazing	854	17,079	20	4,218	4.9	.25	4.52	6.63
Tinted, Reflective, or Shading Glass	552	15,468	28	3,236	5.9	.21	4.33	7.01
Exterior or Interior Shadings or Awnings	905	18,408	20	3,836	4.2	.21	4.50	6.20
Weather Stripping or Caulking	1,590	30,246	19	6,791	4.3	.22	4.50	5.01
None of the Above	260	3,880	15	669	2.6	.17	4.86	16.36

See footnote at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor	1,014	1,144	1,019	1,417	1,349	1,146	0,469	
ENERGY SOURCES AND END USES*								
Energy Sources								
(Solely or in Combination)								
Electricity	2,417	41,115	17	9,187	3.8	0.22	4.57	4.65
Natural Gas	2,420	41,143	17	9,204	3.8	.22	4.57	4.66
Fuel Oil	142	7,865	55	1,694	11.9	.22	4.08	11.88
District Heat	27	3,415	127	Q	21.4	.17	3.60	27.96
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	b
Propane	31	1,615	52	481	Q	.30	3.42	20.29
Other	36	775	22	126	3.5	.16	4.50	21.06
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	2,392	40,802	17	9,113	3.8	.22	4.57	4.66
Air-Conditioned Buildings	1,969	36,677	19	7,852	4.0	.21	4.54	5.04
Buildings with Water Heating	2,029	38,433	19	8,648	4.3	.23	4.54	4.74
Buildings with Cooking	582	18,868	32	4,164	7.2	.22	4.39	6.28
Buildings with Manufacturing	121	3,777	31	1,049	8.7	.28	3.77	16.43
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and Cooking	472	16,906	36	3,615	7.7	.21	4.40	7.16
With Water Heating, Without Cooking	1,225	17,389	14	3,833	3.1	.22	4.63	5.86
Without Water Heating or Cooking	247	1,976	8	332	1.3	.17	5.07	19.55
Without Air Conditioning								
With Water Heating and Cooking	83	1,575	19	488	5.9	.31	4.22	16.87
With Water Heating, Without Cooking	223	2,242	10	627	2.8	.28	5.16	8.02
Without Water Heating or Cooking	130	543	4	196	1.5	.36	4.93	12.67
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	Q	Q	Q	Q	Q	Q	Q	b
All Other Combinations	39	495	13	110	2.8	.22	4.59	22.41
Space-Heating Energy Source								
Natural Gas	2,158	33,017	15	8,281	3.8	.25	4.59	4.75
Main	2,079	31,110	15	7,947	3.8	.26	4.60	4.89
With Secondary	307	7,887	26	2,215	7.2	.28	4.07	9.62
Electricity Only	224	3,620	16	718	3.2	.20	4.74	11.27
Other Energy Sources or Combinations								
With No Secondary	80	4,134	51	1,352	16.8	.33	3.87	13.06
Secondary	1,772	23,222	13	5,732	3.2	.25	4.84	4.96
Other Excluding Natural Gas	79	1,907	24	334	4.2	.18	4.39	16.62
Building Not Heated	235	7,785	33	832	3.5	.11	4.39	13.39
Building Not Heated	28	341	12	91	3.3	.27	4.35	27.07
Main Space-Heating Energy Source								
Electricity	224	5,109	23	778	3.5	.15	4.72	12.18
Natural Gas	2,079	31,110	15	7,947	3.8	.26	4.60	4.89
Fuel Oil	74	1,985	27	150	2.0	.08	6.28	13.74
District Heat	23	2,933	127	371	16.1	.13	3.46	26.06
Propane	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor:	0.993	1.115	1.134	1.372	1.202	1.134	0.426	
Air-Conditioning Energy Source								
Natural Gas	97	1,976	20	549	5.7	0.28	4.43	12.11
Other Excluding Natural Gas	1,872	34,701	19	7,304	3.9	.21	4.55	5.30
Air-Conditioning Not Performed	451	4,467	10	1,352	3.0	.30	4.75	9.70
Water-Heating Energy Source								
Natural Gas	1,391	25,923	19	6,569	4.7	.25	4.66	4.85
Other Excluding Natural Gas	637	12,510	20	2,080	3.3	.17	4.21	9.28
Water Heating Not Performed	391	2,710	7	555	1.4	.20	5.05	10.46
Cooking Energy Source								
Natural Gas	462	14,766	32	3,244	7.0	.22	4.49	7.17
Other Excluding Natural Gas	120	4,103	34	920	7.7	.22	4.10	15.61
Cooking Not Performed	1,838	22,275	12	5,040	2.7	.23	4.72	5.43
Manufacturing Energy Source								
Natural Gas	23	838	36	395	17.0	.47	3.50	19.96
Other Excluding Natural Gas	98	2,939	30	653	6.7	.22	3.95	20.61
Manufacturing Not Performed	2,299	37,366	16	8,155	3.5	.22	4.70	4.39
HEATING AND COOLING								
Percent Heated								
Not Heated	33	401	12	99	3.0	.25	4.46	24.49
1 to 50	358	5,980	17	685	1.9	.11	5.50	9.36
51 to 99	296	5,948	20	1,263	4.3	.21	4.74	10.06
100	1,732	28,814	17	7,157	4.1	.25	4.47	4.60
Percent Cooled								
Not Cooled	451	4,467	10	1,352	3.0	.30	4.75	9.70
1 to 50	667	13,220	20	2,721	4.1	.21	4.54	6.74
51 to 99	363	9,160	25	1,862	5.1	.20	4.52	7.37
100	939	14,296	15	3,269	3.5	.23	4.55	7.25
Heating Equipment (Solely or in Combination)								
Furnaces	1,168	12,529	11	3,185	2.7	.25	4.82	6.15
Boilers	505	16,302	32	4,431	8.8	.27	4.37	6.24
Individual Space Heaters	835	16,297	20	3,271	3.9	.20	4.27	6.16
Packaged Heating Units	564	11,970	21	2,617	4.6	.22	4.54	7.50
Heat Pumps	168	4,909	29	1,075	6.4	.22	4.46	12.55
Air Ducts	1,284	27,108	21	5,956	4.6	.22	4.48	5.72
Heating or Reheating Coils	132	11,399	86	2,461	18.6	.22	4.03	6.80
Fan-Coil Units	130	9,696	74	2,120	16.3	.22	3.96	9.32
Steam or Hot Water Radiators or Baseboards	321	12,380	39	3,110	9.7	.25	4.12	9.19
Other	44	1,106	25	Q	Q	.32	4.30	22.01
Cooling Equipment (Solely or in Combination)								
Central Chillers	139	11,068	80	2,254	16.2	.20	4.04	9.84
Individual Air Conditioners	668	14,486	22	3,097	4.6	.21	4.43	6.25
Packaged Cooling Units	1,366	26,434	19	5,514	4.0	.21	4.51	5.84
Heat Pumps	145	4,551	31	1,010	6.9	.22	4.34	13.17
Air Ducts	1,092	25,146	23	5,474	5.0	.22	4.44	5.93
Fan-Coil Units	75	8,245	110	1,743	23.2	.21	3.97	10.98
Other	64	1,022	Q	Q	Q	.23	3.39	24.90

See footnotes at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor:	0.993	1.118	1.134	1.372	1.202	1.134	0.426	
Year Main Central Chiller Installed								
1959 or Before	20	1,194	60	247	12.4	0.21	4.30	21.14
1960 to 1969	39	2,660	68	591	15.2	.22	3.74	17.57
1970 to 1979	33	2,912	88	538	16.3	.18	4.24	13.30
1980 to 1986	32	2,781	87	592	18.5	.21	4.13	19.75
1987 to 1989	15	1,521	99	286	18.7	.19	3.95	18.56
Year Packaged Cooling System Installed								
1959 or Before	56	1,367	24	297	5.3	.22	4.57	17.01
1960 to 1969	197	3,756	19	922	4.7	.25	4.08	13.00
1970 to 1979	410	8,239	20	1,700	4.1	.21	4.50	8.28
1980 to 1986	432	7,907	18	1,416	3.3	.18	4.84	7.83
1987 to 1989	271	5,167	19	1,178	4.4	.23	4.53	9.88
Computer Area with Separate Air-Conditioning System								
Present in Building	165	12,085	73	2,593	15.8	.21	3.97	8.83
Not Present	2,255	29,059	13	6,611	2.9	.23	4.85	4.61
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	557	7,016	13	1,322	2.4	.19	4.93	6.08
51 to 99	581	12,013	21	2,513	4.3	.21	4.57	7.37
100	1,258	21,962	17	5,325	4.2	.24	4.48	6.19
Percent Lit When Closed								
Not Lit	1,269	16,533	13	3,838	3.0	.23	4.63	6.65
1 to 50	1,082	22,321	21	4,775	4.4	.21	4.55	6.11
51 to 99	43	1,726	40	481	11.1	.28	4.20	13.11
100	25	564	22	110	4.3	.19	5.01	21.81
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	1,446	27,287	19	5,987	4.1	.22	4.54	5.09
Fluorescent Lamps	2,291	40,313	18	8,925	3.9	.22	4.55	4.61
High-Intensity Discharge Lamps	272	12,567	46	2,660	9.8	.21	4.07	8.45
Other Lamps	20	418	21	68	3.4	.16	4.29	20.54
High-Efficiency Ballasts	648	16,848	26	3,800	5.9	.23	4.40	6.35
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	609	19,667	32	4,337	7.1	.22	4.47	6.90
Freezers	481	17,278	36	4,010	8.3	.23	4.45	6.79
Residential								
Refrigerators	1,515	31,353	21	6,700	4.4	.21	4.44	5.23
Freezers	391	9,179	23	2,322	5.9	.25	4.39	8.72
Ice-Making Machines	501	17,624	35	4,192	8.4	.24	4.35	6.85
Refrigerated Vending Machines	950	27,789	29	6,330	6.7	.23	4.32	5.62
Water Coolers	1,051	30,128	29	6,343	6.0	.21	4.32	5.52
Other	29	1,027	35	411	14.0	.40	3.89	22.40
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	1,465	19,094	13	4,115	2.8	.22	4.73	5.94
With Thermostats	1,296	17,503	14	3,796	2.9	.22	4.73	6.14
Any Control of Cooling	1,220	18,989	16	3,954	3.2	.21	4.69	6.08
With Thermostats	1,077	17,244	16	3,564	3.3	.21	4.68	6.32

See footnotes at end of table.

Table 39. Natural Gas Expenditures (Continued)

Building Characteristics	All Buildings Using Natural Gas			Natural Gas Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Cubic Feet (dollars)	
RSE Column Factor	0.993	1.113	1.134	1.372	1.203	1.134	0.429	
Reduced Use During Off-Hours								
Heating Only	432	4,388	10	1,300	3.0	0.30	4.79	5.09
Cooling Only	117	2,397	21	592	5.1	.25	4.07	15.54
Heating and Cooling	1,565	28,312	18	5,479	3.5	.19	4.64	5.76
Computerized Energy Management and Control System								
Present in Building	182	10,633	59	2,013	11.1	.19	4.18	5.06
Controls Heating and Cooling	175	10,160	58	1,945	11.1	.19	4.16	5.20
Controls Lighting	39	3,145	80	541	13.8	.17	3.89	19.45
Controls Other	23	1,938	85	483	21.1	.25	4.13	24.72
Other Energy Management								
Regular HVAC Maintenance	1,267	29,847	24	7,019	5.5	.24	4.43	5.01
Participated in Utility Conservation Program	201	7,242	36	1,647	8.2	.23	4.20	9.12
NATURAL GAS DEMAND								
Annual Consumption (hundred cubic feet)								
1,000 or Less	663	4,170	6	251	.4	.06	7.60	5.35
1,001 to 5,000	1,046	9,967	10	1,424	1.4	.14	5.60	5.34
5,001 to 10,000	348	6,485	19	1,229	3.5	.19	5.10	5.01
10,001 to 25,000	238	7,326	31	1,724	7.2	.24	5.01	5.63
25,001 to 50,000	71	5,017	71	1,146	16.2	.23	4.76	9.12
50,001 to 100,000	28	2,808	101	833	29.9	.30	4.50	5.20
Over 100,000	26	5,370	209	2,597	101.0	.48	3.62	11.50

^a Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^o Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 40. Natural Gas Consumption and Conditional Energy Intensity by Census Region

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.200	0.956	1.287	1.128	1.185	0.844	0.822	0.936	1.243	0.791	1.117	0.732	
All Buildings	344	808	485	381	8,517	12,815	11,660	8,151	40.3	63.0	41.6	46.7	11.50
Building Floorspace (Square Feet)													
1,001 to 5,000	45	111	72	67	438	1,077	1,145	763	101.7	103.2	63.2	88.0	12.44
5,001 to 10,000	38	71	99	50	620	1,119	1,298	918	61.9	63.6	76.0	54.5	16.10
10,001 to 25,000	41	119	60	50	1,008	1,700	1,816	1,227	41.0	70.1	32.9	40.7	13.63
25,001 to 50,000	51	136	60	53	861	1,664	1,836	1,090	59.2	81.7	32.8	49.0	18.79
50,001 to 100,000	24	104	55	58	827	1,920	2,127	1,333	29.6	54.4	25.8	43.4	20.19
100,001 to 200,000	38	103	Q	27	1,434	1,855	1,357	1,373	26.5	55.6	46.3	19.9	25.19
200,001 to 500,000	Q	75	Q	21	1,073	2,255	1,167	559	63.3	33.1	Q	37.5	34.36
Over 500,000	38	Q	18	Q	2,256	1,225	914	Q	16.8	71.9	Q	60.8	30.00
Year Constructed													
1899 or Before	Q	20	3	Q	334	368	194	Q	69.7	55.6	16.4	Q	30.20
1900 to 1919	28	41	Q	20	944	1,432	373	318	29.8	28.5	Q	63.9	20.79
1920 to 1945	47	124	33	33	1,616	2,055	1,429	641	29.0	60.6	22.8	52.0	23.49
1946 to 1959	52	124	114	109	1,479	1,792	2,245	1,722	34.9	69.3	51.0	63.5	21.96
1960 to 1969	106	188	78	74	1,850	2,783	2,360	1,475	57.3	67.4	33.0	49.9	17.66
1970 to 1979	47	180	124	78	1,014	2,490	2,493	2,106	Q	72.5	49.7	37.0	21.66
1980 to 1983	12	43	41	17	294	512	867	516	42.1	84.5	47.8	33.3	22.45
1984 to 1986	15	54	43	25	Q	1,002	1,000	824	Q	54.2	43.4	30.7	24.85
1987 to 1989	Q	32	17	19	352	380	700	440	39.7	85.0	24.4	44.0	28.30
BUILDING USE													
Principal Building Activity													
Assembly	23	66	36	43	806	1,154	1,401	942	Q	57.5	25.9	45.8	19.16
Education	42	120	61	Q	1,482	1,960	1,805	1,393	28.2	61.0	33.6	66.4	16.17
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Food Service	25	36	34	30	127	317	228	146	194.2	112.4	151.5	202.4	22.65
Health Care	24	116	25	16	327	744	304	226	74.0	156.4	82.0	69.1	27.72
Lodging	21	72	40	49	387	833	754	567	53.6	86.7	53.2	86.5	24.82
Mercantile and Service	108	164	84	49	1,722	2,647	2,860	1,561	62.9	62.1	29.4	31.1	17.88
Office	35	103	40	55	1,666	1,837	1,674	2,043	20.8	55.8	23.6	26.8	16.06
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	17	87	87	11	Q	1,847	1,575	637	15.8	47.1	55.0	16.7	28.29
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	11	Q	Q	Q	Q	360	Q	Q	11.1	Q	Q	36.75
Weekly Operating Hours													
39 or Fewer	Q	38	27	20	374	686	1,117	444	33.8	55.0	24.6	44.2	20.25
40 to 48	55	142	123	58	1,772	2,216	3,731	1,444	30.8	64.2	32.8	40.2	15.81
49 to 60	69	127	64	58	1,559	2,689	2,251	1,982	44.3	47.3	28.3	29.1	18.24
61 to 84	61	143	74	55	2,394	2,405	1,835	1,319	25.4	59.3	40.6	41.6	18.37
85 to 167	49	130	Q	98	1,362	2,622	1,231	1,359	35.9	49.7	59.4	72.1	25.53
168 (Open Continuously)	98	228	124	92	1,056	2,197	1,497	1,602	92.5	103.6	82.6	57.7	21.11
Workers													
4 or Fewer	44	121	67	61	775	2,496	2,143	1,305	56.5	48.4	31.1	47.1	16.86
5 to 9	33	78	54	48	852	1,552	1,852	925	Q	50.0	29.0	51.7	16.87
10 to 19	33	87	74	47	839	1,259	1,413	946	39.2	69.0	52.7	49.8	16.66
20 to 49	55	136	73	58	1,622	1,987	1,852	1,158	33.9	68.7	39.6	50.2	17.54
50 to 99	36	112	64	34	1,145	1,865	1,449	893	31.6	60.2	44.1	38.0	21.13
100 to 249	Q	121	101	47	1,097	1,660	1,073	1,213	71.7	72.7	94.4	38.8	24.16
250 or More	64	153	51	Q	2,188	1,996	1,878	1,711	29.4	76.8	27.4	49.8	23.32

See footnotes at end of table.

Table 40. Natural Gas Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.290	0.856	1.297	1.126	1.165	0.844	0.822	0.930	1.243	0.731	1.117	0.782	
Ownership and Occupancy													
Nongovernment Owned	286	650	378	244	6,257	10,269	9,067	6,119	45.6	63.3	41.7	39.9	12.12
Owner Occupied	247	545	270	195	5,013	8,174	6,366	4,088	49.4	66.7	42.4	47.7	13.26
Single Establishment	201	450	232	171	3,096	6,257	4,682	3,115	64.8	71.9	49.5	54.9	15.66
Multiple Establishment	47	95	38	24	1,916	1,917	1,684	973	24.3	49.7	22.7	24.7	21.68
Nonowner Occupied	38	105	108	49	1,245	2,096	2,702	2,031	30.7	50.3	39.9	24.3	18.04
Single Establishment	24	52	Q	28	610	992	1,789	889	39.3	52.0	37.8	31.4	20.84
Multiple Establishment	14	48	17	20	632	997	774	1,112	21.6	48.2	22.2	18.2	22.83
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	58	158	107	136	2,260	2,545	2,593	2,032	25.7	61.9	41.2	67.1	18.38
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
State	Q	28	43	24	632	579	716	390	Q	49.0	60.3	60.9	32.17
Local	42	124	59	58	1,574	1,914	1,710	1,004	26.5	64.8	34.3	57.6	18.45
Multibuilding Facility													
Not on Multibuilding Facility	186	489	285	176	5,951	8,692	7,390	4,094	31.3	56.3	38.5	43.0	10.76
Part of Multibuilding Facility	157	319	200	205	2,566	4,123	4,270	4,057	61.3	77.3	46.8	50.5	18.42
On Facility with Central Plant	Q	164	58	Q	849	1,427	1,014	Q	117.5	115.0	57.6	66.6	28.12
Percent Vacant at Least Three Months													
0	261	608	376	274	5,241	8,473	8,173	5,589	49.9	71.7	46.0	49.1	11.18
1 to 50	50	164	57	44	2,357	2,904	2,315	1,646	21.3	56.5	24.6	26.7	22.02
51 to 99	Q	20	9	Q	558	1,082	543	Q	43.9	Q	17.0	71.7	33.39
100	8	16	Q	14	361	355	629	245	Q	45.0	Q	58.3	30.74
Months in Use Out of Past 12 Months													
0 to 8	Q	24	18	21	Q	521	716	277	Q	45.5	24.5	75.2	33.14
9 to 11	24	37	Q	28	811	578	708	544	30.1	64.6	63.9	50.9	24.06
12	311	747	422	332	7,477	11,715	10,236	7,331	41.6	63.7	41.2	45.3	12.01
LOCATION													
Metropolitan Status													
Metropolitan	240	641	358	325	7,380	10,490	9,056	7,348	32.5	61.1	39.5	44.2	11.97
Nonmetropolitan	104	167	127	56	1,137	2,325	2,604	804	91.0	71.8	48.8	69.1	18.78
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	Q	201	NC	44	NC	2,605	NC	459	NC	77.2	NC	96.7	18.76
5,500-7,000 HDD	236	459	NC	132	4,076	7,791	NC	2,036	57.8	59.0	NC	64.8	18.76
4,000-5,499 HDD	108	148	108	33	4,442	2,419	2,146	661	24.3	61.0	50.2	49.8	23.62
Under 4,000 HDD													
2,000 CDD or More and --	NC	NC	192	149	NC	NC	4,178	4,258	NC	NC	45.9	34.9	18.21
Under 4,000 HDD	NC	NC	185	23	NC	NC	5,336	737	NC	NC	34.7	31.0	23.52
STRUCTURE													
Floors													
1	66	252	265	130	2,221	3,602	5,181	2,816	29.8	69.8	51.2	46.1	15.19
2	114	211	130	90	1,786	3,266	3,654	2,273	63.9	64.6	35.5	39.7	18.56
3	70	98	31	46	1,367	2,375	1,025	954	51.3	41.3	30.3	48.3	17.45
4 to 6	68	132	37	Q	1,509	2,140	1,070	1,327	45.3	61.8	34.6	63.7	28.36
7 or More	25	115	21	30	1,634	1,433	730	781	Q	80.4	29.4	38.6	29.13
Wall Materials													
Masonry	221	652	366	229	6,161	9,963	8,737	4,471	35.8	65.5	41.8	51.2	11.05
Siding or Shingles	23	40	20	34	613	639	491	610	Q	62.6	41.6	55.7	23.48
Metal Panels	Q	57	51	20	325	889	1,036	408	Q	63.9	49.5	48.0	27.71
Concrete Panels	21	29	42	Q	715	863	1,199	2,117	28.9	33.7	35.0	39.6	30.88
Window Glass	Q	Q	Q	6	Q	Q	Q	306	Q	Q	Q	20.7	31.25
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 40. Natural Gas Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.290	0.966	1.287	1.128	1.165	0.844	0.822	0.930	1.243	0.791	1.117	0.782	
Roof Materials													
Built-Up	126	386	295	216	3,566	6,959	6,840	4,579	35.2	55.4	43.1	47.2	15.06
Shingles (Not Wood)	67	120	51	86	1,766	1,754	1,629	1,862	38.1	68.5	31.3	46.3	18.63
Metal Surfacing	Q	66	69	21	862	1,004	1,371	565	Q	65.3	50.3	36.6	21.18
Synthetic or Rubber	50	144	41	16	1,179	1,920	888	441	42.4	75.1	46.5	36.4	20.12
Slate or Tile	17	25	Q	26	450	434	606	367	37.2	56.4	27.9	70.5	33.74
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	194	653	394	287	5,274	9,575	8,647	6,250	36.8	68.2	45.6	46.0	12.42
Wall Insulation	198	445	237	187	3,533	6,783	5,526	3,799	55.9	65.5	42.9	49.2	17.09
Storm or Multiple Glazing	178	517	126	111	3,774	7,356	3,918	2,031	47.1	70.3	32.3	54.8	11.55
Tinted, Reflective, or Shading Glass	118	303	158	168	2,701	4,032	4,853	3,881	43.9	75.3	32.6	43.2	17.39
Exterior or Interior Shadings or Awnings	144	342	185	182	4,020	5,533	5,280	3,576	35.9	61.9	35.1	50.8	13.69
Weather Stripping or Caulking	244	676	323	267	6,282	10,009	8,394	5,560	38.9	67.6	38.5	47.9	11.52
None of the Above	17	46	Q	37	834	Q	917	695	20.3	32.0	Q	53.9	29.72
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	344	804	484	381	8,515	12,801	11,648	8,151	40.3	62.8	41.5	46.7	11.92
Natural Gas	343	808	484	380	8,517	12,815	11,660	8,151	40.3	63.0	41.5	46.7	11.50
Fuel Oil	72	189	Q	Q	2,444	2,452	1,788	1,181	29.6	77.0	57.7	43.3	27.70
District Heat	Q	Q	Q	Q	Q	1,072	Q	Q	Q	69.9	Q	Q	39.92
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	33	Q	Q	Q	530	Q	Q	Q	61.5	Q	Q	40.98
Other	Q	18	Q	Q	Q	457	Q	Q	Q	40.3	Q	Q	35.22
Energy End Uses (Solely or in Combination)													
Heated Buildings	343	803	473	377	8,484	12,774	11,411	8,133	40.4	62.8	41.4	46.3	11.64
Air-Conditioned Buildings	248	718	462	303	7,198	11,509	11,000	6,969	34.5	62.4	42.0	43.5	11.80
Buildings with Water Heating	337	771	437	361	8,343	12,253	10,237	7,600	40.3	62.9	42.7	47.5	11.99
Buildings with Cooking	210	371	158	209	4,643	5,866	4,632	3,726	45.2	63.3	34.1	56.1	15.31
Buildings with Manufacturing	28	99	Q	Q	747	1,347	733	Q	37.7	73.2	115.3	70.7	29.96
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking													
.....	148	349	148	176	3,978	5,434	4,339	3,155	37.3	64.1	34.2	55.7	16.47
With Water Heating, Without Cooking													
.....	96	350	268	114	3,120	5,700	5,226	3,343	30.8	61.4	51.3	34.0	14.47
Without Water Heating or Cooking													
.....	Q	16	36	11	Q	363	1,128	400	Q	43.2	31.9	26.7	28.12
Without Air Conditioning													
With Water Heating and Cooking													
.....	Q	22	Q	32	639	430	Q	500	Q	51.5	Q	63.7	31.08
With Water Heating, Without Cooking													
.....	31	46	9	36	573	649	436	584	53.7	70.6	21.3	61.2	21.84
Without Water Heating or Cooking													
.....	Q	21	8	Q	Q	198	185	Q	Q	105.2	41.8	Q	28.66
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking													
.....	Q	Q	Q	Q	NC	NC	Q	NC	NC	NC	Q	NC	b
All Other Combinations													
.....	Q	Q	14	Q	Q	Q	322	Q	Q	Q	42.2	Q	33.14

See footnotes at end of table.

Table 40. Natural Gas Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RGE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RGE Column Factor	1.288	0.888	1.287	1.188	1.188	0.844	0.822	0.880	1.243	0.731	1.117	0.732	
Space-Heating Energy Source													
Natural Gas	317	768	431	287	5,970	11,709	9,098	6,241	53.1	65.6	47.4	46.1	11.40
Main	298	757	392	281	5,319	11,352	8,609	5,830	56.0	66.7	45.6	48.1	11.89
With Secondary	109	232	140	63	1,129	3,032	2,385	1,341	96.3	76.4	58.9	47.3	22.42
Electricity Only	30	44	Q	30	539	976	1,324	781	55.8	44.6	Q	37.9	22.76
Other Energy Sources or Combinations	39	186	90	34	557	2,007	1,019	552	70.3	92.9	88.7	60.9	29.52
With No Secondary	189	526	252	217	4,190	8,320	6,224	4,489	45.1	63.2	40.5	48.4	10.60
Secondary	19	11	39	Q	651	357	489	Q	29.6	30.8	79.7	Q	31.07
Other Excluding Natural Gas	26	35	41	Q	2,515	1,065	2,313	1,892	10.4	32.5	17.8	47.2	25.43
Building Not Heated	Q	Q	12	Q	Q	Q	249	Q	Q	Q	49.2	Q	37.24
Main Space-Heating Energy Source													
Electricity	14	34	74	44	568	741	2,240	1,560	24.7	45.6	32.9	28.2	25.89
Natural Gas	298	757	392	281	5,319	11,352	8,609	5,830	56.0	66.7	45.6	48.1	11.89
Fuel Oil	18	Q	Q	Q	1,417	Q	413	Q	12.4	Q	Q	Q	28.37
District Heat	Q	Q	Q	Q	1,206	699	Q	Q	Q	44.4	Q	Q	33.19
Propane	Q	Q	Q	Q	NC	Q	Q	NC	NC	Q	Q	NC	b
Other	Q	Q	Q	Q	Q	Q	NC	Q	Q	Q	NC	Q	b
Air-Conditioning Energy Source													
Natural Gas	36	53	19	Q	517	673	445	340	69.0	78.6	43.2	47.7	26.48
Other Excluding Natural Gas	212	665	442	287	6,681	10,836	10,555	6,629	31.8	61.4	41.9	43.3	12.67
Air-Conditioning Not Performed	Q	90	23	77	1,319	1,306	660	1,182	72.3	69.0	34.6	65.3	18.85
Water-Heating Energy Source													
Natural Gas	282	585	290	253	5,414	8,834	6,468	5,206	52.1	66.2	44.8	48.6	11.18
Other Excluding Natural Gas	54	186	147	108	2,928	3,419	3,769	2,394	18.5	54.4	38.9	45.0	23.00
Water Heating Not Performed	7	37	47	20	175	562	1,423	551	40.3	65.3	33.4	35.9	25.59
Cooking Energy Source													
Natural Gas	133	280	138	172	3,426	4,587	3,845	2,909	38.8	61.0	35.9	59.2	18.06
Other Excluding Natural Gas	Q	91	20	37	1,218	1,279	788	818	Q	71.3	25.3	44.9	29.73
Cooking Not Performed	134	437	327	172	3,874	6,949	7,028	4,425	34.6	62.9	46.5	38.8	13.07
Manufacturing Energy Source													
Natural Gas	Q	52	Q	Q	Q	308	Q	Q	Q	168.2	Q	Q	43.71
Other Excluding Natural Gas	17	47	Q	Q	Q	1,039	581	Q	33.8	45.0	Q	70.1	27.71
Manufacturing Not Performed	315	709	400	313	7,770	11,468	10,928	7,201	40.6	61.8	36.6	43.5	10.82
HEATING AND COOLING													
Percent Heated													
Not Heated	Q	Q	12	Q	Q	Q	272	Q	Q	Q	45.9	Q	34.80
1 to 50	19	41	38	27	1,243	1,900	1,788	1,049	15.7	21.5	21.0	25.8	23.82
51 to 99	28	92	90	56	641	1,601	2,013	1,693	44.0	57.7	44.8	33.2	21.88
100	295	669	345	293	6,582	9,254	7,587	5,391	44.8	72.3	45.4	54.4	12.47
Percent Cooled													
Not Cooled	Q	90	23	77	1,319	1,306	660	1,182	72.3	69.0	34.6	65.3	18.85
1 to 50	121	269	153	56	3,514	4,922	3,036	1,747	34.4	54.7	50.5	32.0	18.43
51 to 99	49	182	104	77	1,670	2,913	2,764	1,813	29.2	62.4	37.8	42.7	17.40
100	79	267	204	170	2,014	3,673	5,200	3,409	39.0	72.6	39.3	49.9	18.78

See footnotes at end of table.

Table 40. Natural Gas Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	North- east	Mid- west	South	West	North- east	Mid- west	South	West	North- east	Mid- west	South	West	
RSE Column Factor:	1.290	0.908	1.287	1.128	1.165	0.844	0.822	0.900	1.283	0.731	1.117	0.732	
LIGHTING													
Percent Lit When Open													
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	61	113	43	52	978	2,724	2,052	1,261	61.9	41.5	20.8	41.4	10.96
51 to 99	84	237	134	95	2,701	3,893	3,087	2,332	30.9	60.9	43.5	40.8	10.34
100	199	453	304	233	4,835	6,111	6,473	4,543	41.2	74.1	47.0	51.3	15.46

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 41. Natural Gas Expenditures by Census Region

Building Characteristics	Total Natural Gas Expenditures (million dollars)				Natural Gas Expenditures (dollars)								RSE Row Factor
					per Thousand Cubic Feet				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.754	1.442	1.864	1.508	0.483	0.288	0.488	0.448	1.798	1.135	1.525	0.974	
All Buildings	1,807	3,381	2,293	1,724	5.26	4.19	4.74	4.53	0.21	0.26	0.20	0.21	7.89
Building Floorspace (Square Feet)													
1,001 to 5,000	295	557	408	361	6.64	5.02	5.69	5.39	.67	.52	.36	.47	8.14
5,001 to 10,000	258	323	472	251	6.74	4.54	4.79	5.02	.42	.29	.36	.27	10.99
10,001 to 25,000	250	536	314	248	6.05	4.49	5.27	4.97	.25	.32	.17	.20	9.37
25,001 to 50,000	280	523	275	240	5.50	3.85	4.57	4.50	.33	.31	.15	.22	13.86
50,001 to 100,000	134	422	269	269	5.47	4.04	4.90	4.66	.16	.22	.13	.20	13.11
100,001 to 200,000	184	437	266	129	4.83	4.24	4.23	4.72	.13	.24	.20	.09	17.49
200,001 to 500,000	Q	281	Q	73	3.85	3.76	3.77	3.49	.24	.12	Q	.13	25.06
Over 500,000	145	Q	70	Q	3.82	3.43	3.93	2.81	.06	.25	Q	.17	15.66
Year Constructed													
1899 or Before	Q	88	20	Q	6.27	4.30	6.28	Q	.44	.24	.10	Q	14.13
1900 to 1919	153	187	Q	83	5.46	4.57	Q	4.06	.16	.13	Q	.26	16.43
1920 to 1945	273	542	171	148	5.86	4.36	5.26	4.45	.17	.26	.12	.23	14.00
1946 to 1959	278	556	562	412	5.40	4.47	4.92	3.77	.19	.31	.25	.24	13.12
1960 to 1969	485	758	382	351	4.57	4.04	4.91	4.77	.26	.27	.16	.24	12.20
1970 to 1979	236	736	562	404	5.08	4.08	4.54	5.19	Q	.30	.23	.19	12.37
1980 to 1983	72	150	197	83	5.81	3.48	4.76	4.84	.24	.29	.23	.16	15.80
1984 to 1986	85	246	207	127	5.76	4.54	4.79	5.01	Q	.25	.21	.15	16.22
1987 to 1989	Q	118	88	99	5.56	3.64	5.15	5.12	.22	.31	.13	.23	16.55
BUILDING USE													
Principal Building Activity													
Assembly	142	302	182	183	6.13	4.55	5.04	4.23	Q	.26	.13	.19	11.14
Education	195	477	312	325	4.67	3.99	5.15	3.51	.13	.24	.17	.23	11.59
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Food Service	154	175	181	165	6.22	4.91	5.27	5.58	1.21	.55	.80	1.13	12.93
Health Care	106	428	107	Q	4.38	3.67	4.30	4.55	.32	.57	.35	.31	18.21
Lodging	120	274	201	222	5.80	3.79	5.03	4.54	.31	.33	.27	.39	18.26
Mercantile and Service	556	693	436	246	5.14	4.22	5.20	5.07	.32	.26	.15	.16	11.80
Office	195	454	203	276	5.64	4.43	5.14	5.04	.12	.25	.12	.14	11.81
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	104	373	318	58	6.14	4.30	3.68	5.52	.10	.20	.20	.09	17.03
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	53	Q	Q	Q	4.82	4.98	Q	Q	.05	Q	Q	16.55
Weekly Operating Hours													
39 or Fewer	73	180	155	101	5.78	4.77	5.69	5.19	.19	.26	.14	.23	11.79
40 to 48	285	612	602	273	5.22	4.30	4.92	4.71	.16	.28	.16	.19	10.16
49 to 60	388	574	319	281	5.64	4.51	5.03	4.89	.25	.21	.14	.14	11.38
61 to 84	352	604	361	270	5.81	4.24	4.86	4.92	.15	.25	.20	.20	11.77
85 to 167	283	546	335	372	5.80	4.19	4.59	3.80	.21	.21	.27	.27	16.38
168 (Open Continuously)	425	865	522	426	4.35	3.80	4.22	4.61	.40	.39	.35	.27	14.97
Workers													
4 or Fewer	273	599	377	315	6.27	4.97	5.72	5.15	.35	.24	.18	.24	10.43
5 to 9	208	360	268	251	6.33	4.65	5.01	5.26	Q	.23	.14	.27	10.90
10 to 19	215	351	375	236	6.54	4.04	5.04	5.02	.26	.28	.27	.25	11.48
20 to 49	330	587	365	257	6.01	4.30	4.98	4.42	.20	.30	.20	.22	11.70
50 to 99	190	423	298	160	5.25	3.76	4.67	4.72	.17	.23	.21	.18	13.00
100 to 249	Q	495	387	209	4.13	4.10	3.82	4.45	.30	.30	.36	.17	18.23
250 or More	266	566	222	Q	4.14	3.69	4.33	3.46	.12	.28	.12	.17	18.25

See footnotes at end of table.

Table 41. Natural Gas Expenditures by Census Region (Continued)

Building Characteristics	Total Natural Gas Expenditures (million dollars)				Natural Gas Expenditures (dollars)								RSE Flow Factor
					per Thousand Cubic Feet				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Demand Factor	1,784	1,442	1,804	1,606	0.463	0.390	0.486	0.448	1.799	1.196	1.526	0.974	
Ownership and Occupancy													
Nongovernment Owned	1,522	2,744	1,760	1,187	5.34	4.22	4.67	4.87	0.24	0.27	0.19	0.19	8.32
Owner Occupied	1,276	2,246	1,255	904	5.17	4.12	4.66	4.64	.25	.27	.20	.22	9.06
Single Establishment	994	1,870	1,059	789	4.96	4.16	4.58	4.62	.32	.30	.23	.25	10.16
Multiple Establishment	282	376	196	115	6.05	3.94	5.12	4.78	.15	.20	.12	.12	14.21
Nonowner Occupied	246	498	505	284	6.46	4.73	4.70	5.77	.20	.24	.19	.14	10.61
Single Establishment	153	243	296	158	6.39	4.71	4.40	5.68	.25	.24	.17	.18	11.55
Multiple Establishment	88	230	98	120	6.46	4.78	5.70	5.91	.14	.23	.13	.11	16.81
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	284	637	533	536	4.91	4.04	5.00	3.93	.13	.25	.21	.26	12.34
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
State	Q	97	211	123	5.37	3.42	4.90	5.16	Q	.17	.30	.31	16.25
Local	200	518	296	257	4.79	4.18	5.06	4.45	.13	.27	.17	.26	13.27
Multibuilding Facility													
Not on Multibuilding Facility	1,077	2,150	1,369	831	5.79	4.40	4.82	4.73	.18	.25	.19	.20	7.92
Part of Multibuilding Facility	730	1,231	924	892	4.64	3.86	4.63	4.36	.28	.30	.22	.22	12.10
On Facility with Central Plant	402	599	267	Q	4.03	3.65	4.58	3.22	.47	.42	.26	.21	16.80
Percent Vacant at Least Three Months													
0	1,380	2,574	1,753	1,303	5.29	4.24	4.67	4.76	.26	.30	.21	.23	7.83
1 to 50	282	637	286	222	5.63	3.88	5.03	5.04	.12	.22	.12	.13	14.66
51 to 99	Q	96	50	Q	4.12	4.78	5.41	2.75	.18	Q	.09	.20	14.87
100	44	74	Q	67	5.85	4.66	4.84	4.69	Q	.21	Q	.27	17.26
Months in Use Out of Past 12 Months													
0 to 8	Q	96	89	97	Q	4.05	5.14	4.68	Q	.18	.12	.35	20.76
9 to 11	110	162	Q	129	4.53	4.34	4.99	4.68	.14	.28	.32	.24	13.71
12	1,656	3,123	1,978	1,497	5.33	4.18	4.70	4.51	.22	.27	.19	.20	8.20
LOCATION													
Metropolitan Status													
Metropolitan	1,347	2,630	1,694	1,514	5.62	4.11	4.74	4.66	.18	.25	.19	.21	6.00
Nonmetropolitan	460	750	599	209	4.44	4.50	4.73	3.78	.40	.32	.23	.26	9.65
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	NC	818	NC	153	NC	4.07	NC	3.46	NC	.31	NC	.33	10.76
5,500-7,000 HDD	1,191	1,992	NC	444	5.06	4.34	NC	3.36	.29	.26	NC	.22	9.73
4,000-5,499 HDD	615	571	489	155	5.71	3.87	4.55	4.70	.14	.24	.23	.23	15.83
Under 4,000 HDD	NC	NC	824	853	NC	NC	4.30	5.75	NC	NC	.20	.20	10.62
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	979	120	NC	NC	5.30	5.26	NC	NC	.18	.16	12.93
STRUCTURE													
Floors													
1	383	1,109	1,304	679	5.82	4.41	4.93	5.24	.17	.31	.25	.24	9.42
2	569	887	577	429	4.99	4.21	4.45	4.76	.32	.27	.16	.19	11.73
3	398	423	150	201	5.67	4.31	4.84	4.36	.29	.18	.15	.21	10.60
4 to 6	354	532	Q	Q	5.19	4.03	4.54	3.55	.23	.25	.16	.23	17.48
7 or More	102	430	94	115	4.12	3.73	4.37	3.82	.06	.30	.13	.15	17.13
Wall Materials													
Masonry	1,244	2,731	1,719	1,079	5.65	4.19	4.71	4.72	.20	.27	.20	.24	7.60
Siding or Shingles	135	161	123	175	5.96	4.04	6.06	5.18	Q	.25	.25	.29	13.75
Metal Panels	Q	231	229	91	3.88	4.07	4.48	4.69	Q	.26	.22	.22	17.74
Concrete Panels	98	117	197	309	4.74	4.01	4.71	3.69	.14	.14	.16	.15	16.19
Window Glass	Q	Q	Q	29	Q	Q	Q	4.60	Q	Q	Q	Q	16.86
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 41. Natural Gas Expenditures by Census Region (Continued)

Building Characteristics	Total Natural Gas Expenditures (million dollars)				Natural Gas Expenditures (dollars)								RSE Row Factor
					per Thousand Cubic Feet				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.784	1.442	1.284	1.604	0.483	0.386	0.495	0.448	1.796	1.135	1.528	0.974	
Roof Materials													
Built-Up	685	1,617	1,357	936	5.44	4.20	4.61	4.34	0.19	0.23	0.20	0.20	11.45
Shingles (Not Wood)	378	543	301	411	5.64	4.53	5.95	4.78	.21	.31	.18	.22	11.23
Metal Surfacing	Q	276	310	105	4.43	4.21	4.51	5.10	Q	.27	.23	.19	13.62
Synthetic or Rubber	279	563	193	61	5.58	3.91	4.68	3.77	.24	.29	.22	.14	13.85
Slate or Tile	85	108	78	118	5.07	4.39	4.64	4.58	.19	.25	.13	.32	21.72
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	1,066	2,708	1,865	1,285	5.50	4.15	4.74	4.47	.20	.28	.22	.21	8.12
Wall Insulation	988	1,824	1,122	798	5.01	4.10	4.74	4.28	.28	.27	.20	.21	10.57
Storm or Multiple Glazing	980	2,144	614	479	5.52	4.14	4.87	4.31	.26	.29	.16	.24	8.17
Tinted, Reflective, or Shading Glass	593	1,176	756	710	5.01	3.88	4.79	4.24	.22	.29	.16	.18	10.58
Exterior or Interior Shadings or Awnings	746	1,388	931	771	5.17	4.05	5.03	4.25	.19	.25	.18	.22	9.19
Weather Stripping or Caulking	1,312	2,779	1,573	1,127	5.37	4.11	4.88	4.23	.21	.28	.19	.20	7.48
None of the Above	111	214	146	197	6.60	4.68	Q	5.28	.13	.15	.16	.28	15.81
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	1,806	3,369	2,288	1,724	5.26	4.19	4.74	4.53	.21	.26	.20	.21	8.24
Natural Gas	1,807	3,381	2,293	1,724	5.26	4.19	4.74	4.53	.21	.26	.20	.21	7.89
Fuel Oil	345	706	Q	225	4.79	3.74	4.06	4.40	.14	.29	.23	.19	17.73
District Heat	85	Q	Q	Q	4.68	3.76	Q	Q	Q	.26	Q	Q	28.72
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	126	Q	Q	Q	3.88	Q	Q	Q	.24	Q	Q	41.19
Other	Q	79	Q	Q	Q	4.30	Q	Q	Q	.17	Q	Q	22.90
Energy End Uses (Solely or in Combination)													
Heated Buildings	1,804	3,373	2,231	1,705	5.26	4.20	4.73	4.53	.21	.26	.20	.21	7.91
Air-Conditioned Buildings	1,348	2,960	2,174	1,370	5.44	4.12	4.71	4.52	.19	.26	.20	.20	8.18
Buildings with Water Heating	1,764	3,214	2,053	1,618	5.24	4.17	4.70	4.49	.21	.26	.20	.21	8.12
Buildings with Cooking	1,001	1,508	796	859	4.78	4.06	5.04	4.11	.22	.26	.17	.23	10.18
Buildings with Manufacturing	156	372	Q	Q	5.56	3.77	3.56	3.27	.21	.28	.41	.23	19.18
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and Cooking													
751	1,404	744	716	5.06	4.03	5.03	4.07	.19	.26	.17	.23	11.68	
With Water Heating, Without Cooking													
575	1,479	1,199	579	6.00	4.23	4.47	5.10	.18	.26	.23	.17	9.07	
Without Water Heating or Cooking													
Q	73	182	57	Q	4.68	5.09	5.33	Q	.20	.16	.14	15.14	
Without Air Conditioning													
With Water Heating and Cooking													
Q	102	Q	135	4.07	4.60	Q	4.23	.39	.24	Q	.27	17.23	
With Water Heating, Without Cooking													
187	221	51	169	6.08	4.83	5.46	4.72	.33	.34	.12	.29	11.84	
Without Water Heating or Cooking													
Q	94	38	Q	Q	4.50	4.99	Q	Q	.47	.21	Q	18.11	
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking													
NC	NC	Q	NC	NC	NC	Q	NC	NC	NC	Q	NC	b	
All Other Combinations	Q	Q	72	Q	Q	Q	5.31	Q	Q	Q	.22	Q	19.08

See footnotes at end of table.

Table 41. Natural Gas Expenditures by Census Region (Continued)

Building Characteristics	Total Natural Gas Expenditures (million dollars)				Natural Gas Expenditures (dollars)								RBE Raw Factor
					per Thousand Cubic Feet				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RBE Census Region	1,784	1,447	1,384	1,408	0.489	0.269	0.455	0.448	1.795	1.197	1.228	2.074	
Space-Heating Energy Source													
Natural Gas	1,655	3,244	2,021	1,362	5.22	4.22	4.68	4.74	0.28	0.28	0.22	0.22	7.79
Main	1,550	3,202	1,866	1,330	5.20	4.23	4.75	4.74	.29	.28	.22	.23	7.98
With Secondary	447	911	571	285	4.12	3.94	4.07	4.50	.40	.30	.24	.21	14.85
Electricity Only	159	218	199	142	5.28	5.00	4.12	4.81	.29	.22	.15	.18	18.83
Other Energy Sources or Combinations	160	687	364	142	4.08	3.69	4.03	4.21	.29	.34	.36	.26	18.89
With No Secondary	1,102	2,291	1,294	1,045	5.83	4.36	5.14	4.81	.26	.28	.21	.23	7.85
Secondary	105	42	155	Q	5.46	3.78	3.98	Q	.16	.12	.32	Q	18.88
Other Excluding Natural Gas	149	129	211	343	5.80	3.74	5.22	3.85	.06	.12	.09	.18	18.58
Building Not Heated	Q	Q	62	Q	Q	Q	5.18	Q	Q	Q	.25	Q	21.17
Main Space-Heating Energy Source													
Electricity	74	136	334	234	5.26	4.04	4.56	5.33	.13	.18	.15	.15	19.68
Natural Gas	1,550	3,202	1,866	1,330	5.20	4.23	4.75	4.74	.29	.28	.22	.23	7.98
Fuel Oil	112	Q	Q	Q	6.47	Q	5.91	Q	.08	Q	Q	Q	25.83
District Heat	Q	Q	Q	Q	4.77	3.79	Q	2.77	Q	.17	Q	.19	25.79
Propane	NC	Q	Q	NC	NC	Q	Q	NC	NC	Q	Q	NC	b
Other	Q	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	Q	b
Air-Conditioning Energy Source													
Natural Gas	183	215	92	58	5.13	4.07	4.80	3.60	.35	.32	.21	.17	17.72
Other Excluding Natural Gas	1,165	2,745	2,082	1,312	5.49	4.13	4.71	4.57	.17	.25	.20	.20	8.87
Air-Conditioning Not Performed	Q	421	119	354	4.82	4.68	5.28	4.59	.35	.32	.18	.30	11.84
Water-Heating Energy Source													
Natural Gas	1,456	2,457	1,456	1,200	5.16	4.20	5.02	4.74	.27	.28	.23	.23	7.72
Other Excluding Natural Gas	307	757	597	418	5.68	4.07	4.07	3.89	.10	.22	.16	.17	14.89
Water Heating Not Performed	43	167	240	106	6.24	4.57	5.11	5.38	.25	.30	.17	.19	14.61
Cooking Energy Source													
Natural Gas	690	1,163	702	689	5.19	4.16	5.09	4.00	.20	.25	.18	.24	10.91
Other Excluding Natural Gas	311	Q	94	171	4.06	3.78	4.70	4.65	Q	.27	.12	.21	18.21
Cooking Not Performed	805	1,873	1,497	864	6.03	4.29	4.60	5.04	.21	.27	.21	.20	8.22
Manufacturing Energy Source													
Natural Gas	Q	175	Q	Q	Q	3.37	Q	Q	Q	.57	Q	Q	26.80
Other Excluding Natural Gas	100	197	Q	Q	5.89	4.22	3.97	3.15	.20	.19	.30	.22	21.38
Manufacturing Not Performed	1,650	3,009	1,992	1,504	5.24	4.24	4.99	4.80	.21	.26	.18	.21	7.23
HEATING AND COOLING													
Percent Heated													
Not Heated	Q	Q	63	Q	Q	Q	5.18	Q	Q	Q	.23	Q	20.10
1 to 50	134	197	202	153	6.90	4.84	5.39	5.64	.11	.10	.11	.15	13.11
51 to 99	168	380	415	300	5.99	4.12	4.61	5.34	.26	.24	.21	.18	12.88
100	1,497	2,794	1,614	1,252	5.08	4.17	4.69	4.27	.23	.30	.21	.23	8.49
Percent Cooled													
Not Cooled	Q	421	119	354	4.82	4.68	5.28	4.59	.35	.32	.18	.30	11.84
1 to 50	675	1,112	655	279	5.60	4.13	4.28	5.00	.19	.23	.22	.16	13.43
51 to 99	270	741	501	350	5.54	4.08	4.80	4.52	.16	.25	.18	.19	10.85
100	402	1,107	1,018	741	5.12	4.15	5.00	4.36	.20	.30	.20	.22	11.23

See footnotes at end of table.

Table 41. Natural Gas Expenditures by Census Region (Continued)

Building Characteristics	Total Natural Gas Expenditures (million dollars)				Natural Gas Expenditures (dollars)								RSE Row Factor
					per Thousand Cubic Feet				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor	1.784	1.442	1.864	1.606	0.483	0.399	0.495	0.448	1.796	1.135	1.528	0.974	
LIGHTING													
Percent Lit When Open													
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	341	497	227	257	5.64	4.40	5.34	4.93	0.35	0.18	0.11	0.20	11.97
51 to 99	471	991	608	442	5.64	4.18	4.53	4.66	.17	.25	.20	.19	10.92
100	994	1,869	1,440	1,022	4.99	4.13	4.74	4.39	.21	.31	.22	.22	10.33

^a Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 42. Natural Gas Consumption and Conditional Energy Intensity by Building Size

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Energy Intensity for Natural Gas (cubic feet/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	0.980	1.022	1.791	0.761	0.883	1.235	0.745	0.788	1.482	
All Buildings	553	812	651	7,378	17,410	16,356	75.0	46.7	39.8	8.46
Year Constructed										
1899 or Before	21	30	Q	320	684	Q	66.8	43.5	Q	33.27
1900 to 1919	30	48	Q	460	1,159	Q	66.2	41.7	Q	20.61
1920 to 1945	75	84	Q	1,290	2,230	2,222	57.9	37.5	35.6	18.93
1946 to 1959	126	170	103	1,555	3,174	2,509	81.0	53.7	41.2	18.82
1960 to 1969	96	186	162	1,312	3,959	3,197	73.4	47.1	50.8	14.69
1970 to 1979	108	160	161	1,326	3,094	3,683	81.7	51.7	43.6	15.82
1980 to 1983	33	38	44	416	893	880	78.6	42.0	50.0	20.29
1984 to 1986	42	53	43	429	1,348	1,683	97.5	39.1	25.7	22.62
1987 to 1989	22	44	17	270	869	734	80.9	50.4	23.4	28.21
BUILDING USE										
Principal Building Activity										
Assembly	67	86	Q	1,267	2,281	Q	53.2	37.8	Q	15.50
Education	29	163	122	447	3,201	2,991	64.7	51.0	40.9	16.60
Food Sales	12	Q	Q	156	Q	Q	79.1	Q	Q	30.94
Food Service	102	Q	NC	525	Q	NC	194.6	Q	NC	12.12
Health Care	10	11	161	116	216	1,270	82.7	50.0	126.6	27.92
Lodging	28	103	51	311	1,241	988	91.6	82.8	51.4	21.99
Mercantile and Service	148	172	Q	2,362	3,632	2,796	62.7	47.3	30.7	15.30
Office	62	118	52	1,101	2,651	3,468	56.0	44.4	15.1	14.66
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	9	Q	Q	111	Q	Q	82.4	Q	Q	33.84
Warehouse	27	70	104	551	2,524	2,060	49.0	27.7	50.5	22.30
Other	Q	41	Q	Q	498	Q	Q	82.4	Q	32.43
Vacant	Q	9	Q	289	419	Q	Q	21.7	Q	30.01
Weekly Operating Hours										
39 or Fewer	56	41	Q	1,146	1,283	Q	48.9	31.6	Q	17.37
40 to 48	138	183	56	2,063	4,633	2,467	66.8	39.5	22.9	13.62
49 to 60	92	156	69	1,703	4,040	2,738	54.3	38.7	25.1	13.69
61 to 84	104	149	79	1,054	2,919	3,979	98.9	51.0	20.0	14.63
85 to 167	91	120	139	830	2,217	3,528	109.7	54.3	39.4	18.00
168 (Open Continuously)	72	163	306	581	2,319	3,453	123.5	70.4	88.7	16.90
Workers										
4 or Fewer	224	67	Q	3,591	2,405	Q	62.5	27.9	Q	12.01
5 to 9	142	68	Q	2,003	2,518	Q	70.8	26.8	Q	11.60
10 to 19	126	109	7	1,246	2,714	498	100.8	40.1	14.3	17.23
20 to 49	58	243	21	495	4,985	1,138	118.0	48.8	18.5	19.77
50 to 99	Q	179	65	Q	2,707	2,621	Q	66.1	25.0	16.85
100 to 249	Q	131	216	Q	1,741	3,283	Q	75.0	65.7	16.22
250 or More	NC	17	338	NC	341	7,432	NC	48.4	45.4	22.73
Ownership and Occupancy										
Nongovernment Owned										
Owner Occupied	492	588	479	6,541	13,479	11,692	75.1	43.6	41.0	9.21
Single Establishment	373	477	407	4,957	9,642	9,041	75.3	49.5	45.0	10.16
Multiple Establishment	326	403	324	4,161	7,549	5,440	78.3	53.4	59.5	11.76
Nonowner Occupied	47	74	83	795	2,093	3,601	59.2	35.2	23.2	17.87
Single Establishment	118	111	Q	1,585	3,837	2,651	74.7	28.8	Q	12.80
Multiple Establishment	67	57	Q	1,062	2,121	1,096	62.8	27.0	Q	14.81
Vacant	25	50	Q	388	1,632	1,495	65.4	30.4	Q	17.08
Government Owned	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Federal	62	225	172	836	3,931	4,664	74.1	57.2	36.9	15.73
State	Q	Q	Q	Q	Q	Q	Q	Q	Q	13.26
Local	18	60	32	184	1,052	1,081	95.5	56.9	29.2	25.66
	42	153	88	622	2,733	2,847	67.2	55.9	30.8	15.95

See footnotes at end of table.

Table 42. Natural Gas Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Energy Intensity for Natural Gas (cubic feet/sq. ft.)			RSE Per Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor	0.260	1.022	1.761	0.781	0.663	1.235	0.745	0.745	1.462	
Multibuilding Facility										
Not on Multibuilding Facility	392	473	272	5,331	11,277	9,519	73.5	41.9	28.6	8.82
Part of Multibuilding Facility	162	340	379	2,046	6,132	6,837	79.1	55.4	55.4	13.15
On Facility with Central Plant	9	127	275	121	1,385	3,120	77.7	91.7	88.1	22.02
LOCATION										
Census Region										
Northeast	83	117	144	1,058	2,696	4,763	78.4	43.3	30.2	18.37
Midwest	182	360	266	2,195	5,284	5,335	83.0	68.1	49.8	12.00
South	171	175	139	2,443	5,780	3,438	70.0	30.3	40.4	17.34
West	117	161	Q	1,681	3,650	2,820	69.7	44.1	36.3	13.48
Census Division										
Northeast										
New England	12	11	15	152	411	673	82.2	26.2	22.5	29.84
Middle Atlantic	70	106	129	906	2,285	4,090	77.8	46.4	31.5	20.83
Midwest										
East North Central	119	255	171	1,457	3,609	3,731	81.9	70.7	45.8	15.17
West North Central	63	105	95	738	1,675	1,605	85.2	62.4	59.2	18.17
South										
South Atlantic	35	61	96	541	2,007	1,687	65.2	30.6	57.0	24.47
East South Central	77	33	12	524	1,161	348	147.5	28.8	33.6	25.25
West South Central	58	80	31	1,377	2,612	1,402	42.4	30.7	Q	21.28
West										
Mountain	55	70	Q	611	1,424	Q	90.5	49.1	60.8	17.17
Pacific	62	91	36	1,070	2,226	1,734	57.9	41.0	20.9	10.37
Metropolitan Status										
Metropolitan	404	630	530	5,084	14,097	15,093	79.5	44.7	35.1	8.23
Nonmetropolitan	150	182	Q	2,293	3,313	1,263	65.2	55.1	95.9	18.72
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	60	135	51	570	1,774	720	105.0	76.1	70.3	15.43
5,500-7,000 HDD	186	336	305	2,139	5,654	6,109	86.8	59.4	50.0	13.15
4,000-5,499 HDD	96	126	174	1,322	3,304	5,042	72.7	38.2	34.5	18.48
Under 4,000 HDD	120	138	83	1,787	3,519	3,130	67.0	39.2	26.5	18.34
2,000 CDD or More and --										
Under 4,000 HDD	92	78	38	1,560	3,159	1,354	59.0	24.6	28.3	23.40
ENERGY SOURCES AND END USES *										
Energy Sources (Solely or in Combination)										
Electricity	553	812	648	7,373	17,397	16,345	74.9	46.6	39.7	8.85
Natural Gas	552	812	651	7,378	17,410	16,356	74.8	46.6	39.8	8.49
Fuel Oil	16	107	293	276	2,060	5,529	56.6	52.0	53.0	21.34
District Heat	Q	Q	Q	Q	623	2,766	Q	Q	46.3	25.28
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Propane	Q	32	Q	Q	402	1,130	Q	78.8	89.2	34.20
Other	9	Q	Q	129	Q	Q	70.6	Q	Q	41.28
Energy End Uses (Solely or in Combination)										
Heated Buildings	544	804	648	7,317	17,227	16,258	74.3	46.7	39.8	8.49
Air-Conditioned Buildings	431	701	600	5,905	15,307	15,464	72.9	45.8	38.8	8.55
Buildings with Water Heating	491	769	646	6,110	16,188	16,135	80.3	47.5	40.1	8.55
Buildings with Cooking	156	313	479	1,514	6,221	11,134	103.3	50.3	43.0	10.42
Buildings with Manufacturing	18	101	159	297	1,664	1,816	61.6	60.9	87.5	20.02

See footnotes at end of table.

Table 42. Natural Gas Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Energy Intensity for Natural Gas (cubic feet/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factor:	0.980	1.022	1.791	0.761	0.663	1.233	0.745	0.768	1.463	
Space-Heating Energy Source										
Natural Gas	500	748	556	6,711	15,009	11,297	74.5	49.9	49.2	8.87
Main	473	725	530	6,488	14,108	10,514	72.9	51.4	50.4	9.08
With Secondary	59	161	324	871	3,243	3,774	68.0	49.6	85.8	13.88
Electricity Only	39	69	Q	682	2,134	804	57.9	32.2	Q	19.77
Other Energy Sources or Combinations	19	92	238	183	1,109	2,842	104.8	83.2	83.8	22.81
With No Secondary	414	564	206	5,617	10,865	6,740	73.6	51.9	30.6	9.42
Secondary	Q	23	26	224	900	783	119.9	25.7	33.2	30.91
Other Excluding Natural Gas	44	56	Q	605	2,219	4,961	72.8	25.0	18.5	18.89
Building Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source										
Electricity	64	61	41	628	1,991	2,490	101.6	30.5	16.4	22.26
Natural Gas	473	725	530	6,488	14,108	10,514	72.9	51.4	50.4	9.08
Fuel Oil	5	10	Q	156	767	1,062	30.4	12.8	Q	31.31
District Heat	Q	Q	Q	Q	504	2,403	Q	Q	36.1	29.46
Propane	Q	Q	Q	Q	Q	NC	Q	Q	NC	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Air-Conditioning Energy Source										
Natural Gas	29	31	64	277	958	740	103.7	32.8	86.1	19.22
Other Excluding Natural Gas	401	669	536	5,628	14,349	14,724	71.2	46.6	36.4	9.59
Air-Conditioning Not Performed	123	111	Q	1,472	2,102	892	83.5	53.0	Q	18.72
Water-Heating Energy Source										
Natural Gas	365	631	415	4,103	11,777	10,044	88.9	53.6	41.3	9.51
Other Excluding Natural Gas	125	138	232	2,008	4,411	6,091	62.4	31.2	38.0	15.42
Water Heating Not Performed	63	44	Q	1,267	1,222	Q	49.5	35.7	Q	24.84
Cooking Energy Source										
Natural Gas	141	248	334	1,254	4,593	8,919	112.7	54.0	37.4	11.19
Other Excluding Natural Gas	15	65	145	260	1,628	2,215	57.2	39.8	65.4	23.91
Cooking Not Performed	397	500	172	5,864	11,189	5,222	67.7	44.7	33.0	12.23
Manufacturing Energy Source										
Natural Gas	Q	59	Q	Q	394	382	Q	149.2	Q	36.03
Other Excluding Natural Gas	12	43	Q	235	1,270	1,434	52.7	33.5	77.0	25.24
Manufacturing Not Performed	535	711	492	7,081	15,746	14,540	75.6	45.2	33.8	7.88
HEATING AND COOLING										
Percent Heated										
Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	47	61	18	1,087	2,782	2,111	43.0	21.7	8.3	19.34
51 to 99	54	98	115	964	2,285	2,698	55.5	43.1	42.6	17.41
100	443	645	515	5,242	12,131	11,442	84.4	53.2	45.0	9.12
Percent Cooled										
Not Cooled	123	111	Q	1,472	2,102	892	83.5	53.0	Q	16.72
1 to 50	122	299	179	2,061	6,317	4,842	59.2	47.3	36.9	14.76
51 to 99	88	144	180	1,060	3,343	4,758	83.5	42.9	37.9	14.43
100	220	259	241	2,785	5,648	5,863	79.0	45.8	41.1	13.36
LIGHTING										
Percent Lit When Open										
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	115	117	Q	1,781	3,339	Q	64.8	34.9	Q	14.05
51 to 99	122	233	195	1,779	5,312	4,922	68.6	43.9	39.6	12.55
100	310	459	419	3,723	8,707	9,532	83.4	52.8	44.0	11.18

See footnotes at end of table.

Table 42. Natural Gas Consumption and Conditional Energy Intensity by Building Size (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Energy Intensity for Natural Gas (cubic feet/sq. ft.)			RSE Row Factor
	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	1,001 to 10,000 Square Feet	10,001 to 100,000 Square Feet	Over 100,000 Square Feet	
RSE Column Factors	0.000	1.022	1.781	0.791	0.885	1.238	0.745	0.798	1.482	
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	324	506	489	4,277	11,213	11,797	75.8	45.1	41.5	8.43
Fluorescent Lamps	521	792	650	6,932	17,062	16,319	75.2	46.4	39.8	3.48
High-Intensity Discharge Lamps	70	184	400	649	3,752	8,166	108.2	49.0	49.0	15.78
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
High-Efficiency Ballasts	149	387	328	1,721	7,163	7,964	86.5	54.0	41.2	12.23
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	327	331	212	4,624	8,096	6,374	70.7	40.9	33.3	12.37
With Thermostats	296	308	199	4,025	7,477	6,000	73.6	41.2	33.2	12.91
Any Control of Cooling	260	338	246	3,653	8,286	7,050	71.3	40.8	34.9	12.15
With Thermostats	234	290	239	3,230	7,282	6,733	72.4	39.8	35.5	12.60
Reduced Use During Off-Hours										
Heating Only	110	108	Q	1,372	2,046	971	80.2	52.9	Q	14.58
Cooling Only	30	46	70	361	1,000	1,036	83.3	45.6	Q	25.36
Heating and Cooling	298	484	399	4,755	11,534	12,024	62.7	42.0	33.2	9.75
Computerized Energy Management and Control System										
Present in Building	31	138	312	370	2,947	7,315	83.5	47.0	42.7	15.82
Controls Heating and Cooling	31	132	305	362	2,841	6,957	84.7	46.4	43.8	15.82
Controls Lighting	Q	22	110	Q	595	2,501	Q	37.6	44.0	22.05
Controls Other	Q	25	Q	Q	410	1,513	Q	60.7	60.6	25.45
Other Energy Management										
Regular HVAC Maintenance	304	663	619	3,656	12,700	13,491	83.2	52.2	45.9	9.52
Participated in Utility Conservation Program	40	191	161	530	2,764	3,947	76.0	69.1	40.8	15.85

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{NC} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 43. Natural Gas Consumption and Conditional Energy Intensity for Selected Principal Building Activities

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Natural Gas Energy Intensity (cubic feet/sq. ft.)			RSE Flow Factor
	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	
RSE Column Factor:	1.291	1.292	0.931	0.940	1.005	0.722	1.195	1.190	0.734	
All Buildings	406	232	1,380	8,790	7,220	25,133	46.1	32.1	54.9	8.86
Building Floorspace (Square Feet)										
1,001 to 5,000	74	41	180	1,104	593	1,726	67.0	69.1	104.4	8.79
5,001 to 10,000	74	21	164	1,258	507	2,189	58.9	40.6	74.7	15.26
10,001 to 25,000	63	42	166	1,752	738	3,262	35.8	57.0	50.8	14.02
25,001 to 50,000	89	50	162	880	940	3,631	100.8	53.4	44.5	16.62
50,001 to 100,000	20	25	196	1,000	973	4,234	20.4	26.0	46.3	19.33
100,001 to 200,000	23	17	192	1,254	991	3,773	18.6	16.7	50.8	24.94
200,001 to 500,000	Q	17	156	614	718	3,723	79.6	23.6	41.9	31.72
Over 500,000	14	19	165	928	1,760	2,595	Q	10.8	63.6	36.37
Year Constructed										
1899 or Before	Q	Q	22	Q	Q	532	Q	Q	41.0	21.66
1900 to 1919	15	20	85	394	477	2,197	38.8	41.5	38.6	30.11
1920 to 1945	36	33	168	989	835	3,918	36.7	40.0	42.8	22.85
1946 to 1959	68	43	290	1,242	1,064	4,931	54.4	40.0	58.7	21.38
1960 to 1969	123	38	284	1,822	998	5,648	67.5	38.6	50.2	15.62
1970 to 1979	91	39	299	2,245	1,414	4,445	40.5	27.9	67.2	17.55
1980 to 1983	21	13	81	608	482	1,099	34.7	26.2	73.3	21.10
1984 to 1986	20	17	101	666	1,266	1,527	30.7	Q	65.9	21.66
1987 to 1989	14	Q	52	499	538	836	27.1	Q	62.6	25.48
BUILDING USE										
Weekly Operating Hours										
39 or Fewer	4	Q	90	Q	Q	2,326	21.1	Q	38.9	16.21
40 to 48	55	95	228	1,259	2,152	5,752	43.4	44.3	39.6	13.74
49 to 60	104	55	159	2,397	2,216	3,868	43.3	24.8	41.1	12.89
61 to 84	133	39	161	3,033	1,584	3,335	43.8	24.8	48.1	16.65
85 to 167	56	9	285	1,353	503	4,718	41.3	18.2	60.5	21.63
168 (Open Continuously)	Q	30	457	557	662	5,133	Q	45.3	89.0	22.36
Workers										
4 or Fewer	73	12	208	1,451	276	4,993	50.0	44.3	41.6	12.66
5 to 9	58	19	135	1,410	423	3,348	41.3	44.8	40.3	14.12
10 to 19	58	42	142	1,168	799	2,490	49.8	51.9	56.9	14.57
20 to 49	66	38	219	1,457	811	4,350	45.2	46.3	50.4	16.18
50 to 99	70	23	153	1,089	761	3,503	64.6	30.5	43.6	21.95
100 to 249	Q	46	240	1,100	1,005	2,938	56.0	45.8	81.8	23.67
250 or More	19	52	283	1,116	3,146	3,511	16.8	16.6	80.7	22.20
Ownership and Occupancy										
Nongovernment Owned	396	200	963	8,565	5,832	17,316	46.2	34.3	55.6	6.55
Owner Occupied	313	154	790	5,863	3,963	13,814	53.4	38.8	57.2	11.54
Single Establishment	243	97	713	3,379	1,536	12,236	71.9	63.2	58.3	13.92
Multiple Establishment	70	57	77	2,485	2,427	1,578	28.3	23.5	48.8	18.16
Nonowner Occupied	82	46	173	2,702	1,869	3,502	30.5	24.5	49.3	15.68
Single Establishment	37	22	112	1,120	891	2,268	32.7	24.7	49.6	16.59
Multiple Establishment	46	24	30	1,582	977	955	28.9	24.3	31.0	23.03
Vacant	--	--	Q	--	--	278	--	--	Q	41.09
Government Owned	10	32	417	225	1,388	7,817	44.2	22.9	53.3	16.30
Federal	Q	Q	Q	Q	Q	Q	Q	Q	101.3	6.01
State	Q	4	104	Q	404	1,877	Q	Q	55.4	26.07
Local	Q	23	254	Q	752	5,355	Q	30.8	47.4	19.02
LOCATION										
Census Region										
Northeast	108	35	201	1,722	1,666	5,129	62.9	20.8	39.1	21.65
Midwest	164	103	541	2,647	1,837	8,331	62.1	55.8	64.9	14.12
South	84	40	361	2,860	1,674	7,126	29.4	23.6	50.7	16.54
West	49	55	277	1,561	2,043	4,547	31.1	26.8	61.0	14.34

See footnotes at end of table.

Table 43. Natural Gas Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Natural Gas Energy Intensity (cubic feet/sq. ft.)			RSE Flow Factor
	Mercantile	Office	All Other	Mercantile	Office	All Other	Mercantile	Office	All Other	
RSE Column Factor:	1.291	1.292	0.991	0.940	1.005	0.722	1.188	1.130	0.734	
Census Division										
Northeast										
New England	7	8	24	157	370	709	45.2	Q	33.5	32.43
Middle Atlantic	101	27	177	1,565	1,297	4,419	64.7	Q	40.0	22.85
Midwest										
East North Central	112	76	358	1,632	1,306	5,859	68.5	58.3	61.0	18.01
West North Central	53	26	183	1,015	530	2,472	52.0	49.8	74.1	18.44
South										
South Atlantic	33	18	142	770	774	2,692	42.4	23.7	52.7	26.26
East South Central	19	5	98	525	279	1,230	36.9	17.6	79.8	31.09
West South Central	32	16	121	1,565	622	3,204	20.6	26.3	37.8	18.70
West										
Mountain	23	21	148	714	385	2,022	32.3	53.4	73.0	23.40
Pacific	25	34	130	847	1,658	2,524	30.1	20.6	51.4	18.64
Metropolitan Status										
Metropolitan	273	200	1,091	6,633	6,584	21,056	41.1	30.4	51.8	9.53
Nonmetropolitan	133	32	289	2,157	636	4,076	61.6	49.8	70.8	18.77
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	59	25	161	897	459	1,708	65.9	55.6	94.2	20.28
5,500-7,000 HDD	186	105	535	2,821	2,088	8,994	66.0	50.4	59.5	15.29
4,000-5,499 HDD	68	42	286	1,599	1,877	6,192	42.4	22.6	46.2	18.41
Under 4,000 HDD	57	43	240	1,841	2,109	4,485	31.1	20.3	53.6	18.93
2,000 CDD or More and --										
Under 4,000 HDD	35	15	157	1,632	686	3,754	21.5	22.5	41.9	18.22
ENERGY SOURCES AND END USES *										
Energy Sources										
(Solely or in Combination)										
Electricity	405	229	1,379	8,788	7,214	25,112	46.1	31.7	54.9	9.23
Natural Gas	405	231	1,378	8,790	7,220	25,133	46.1	32.0	54.8	8.88
Fuel Oil	29	38	348	558	2,060	5,246	51.5	18.6	66.4	25.67
District Heat	Q	7	Q	Q	1,131	2,191	Q	Q	69.6	33.24
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	Q	124	Q	Q	1,413	Q	Q	87.8	42.47
Other	Q	Q	18	Q	Q	502	Q	Q	35.3	40.84
Energy End Uses										
(Solely or in Combination)										
Heated Buildings	400	232	1,363	8,757	7,220	24,826	45.7	32.1	54.9	8.92
Air-Conditioned Buildings	303	225	1,203	7,999	7,101	21,577	37.8	31.7	55.8	9.41
Buildings with Water Heating	357	224	1,326	7,646	6,902	23,885	46.7	32.4	55.5	9.25
Buildings with Cooking	122	51	774	3,331	2,763	12,775	36.7	18.5	60.6	15.19
Buildings with Manufacturing	66	20	193	625	451	2,700	104.8	43.3	71.6	29.18

See footnotes at end of table.

Table 43. Natural Gas Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Natural Gas Energy Intensity (cubic feet/sq. ft.)			RSE Row Factor
	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	
RSE Column Factor:	1.291	1.262	0.931	0.940	1.005	0.722	1.165	1.130	0.734	
Energy End-Use Combinations										
Heated Buildings										
With Air Conditioning										
With Water Heating and										
Cooking	82	49	690	3,234	2,676	10,996	25.3	18.3	62.8	15.44
With Water Heating,										
Without Cooking										
Without Water Heating or	186	169	473	3,859	4,115	9,415	48.1	41.1	50.2	12.98
Cooking	32	7	27	854	257	865	37.4	27.4	30.9	24.76
Without Air Conditioning										
With Water Heating and										
Cooking	Q	Q	74	Q	Q	1,499	Q	Q	49.3	22.19
With Water Heating,										
Without Cooking										
Without Water Heating or	44	Q	73	477	Q	1,688	93.1	Q	43.4	16.62
Cooking	16	Q	23	251	Q	284	64.7	Q	81.8	27.51
Buildings Without Heating, Air										
Conditioning, Water Heating,										
or Cooking										
All Other Combinations	Q	Q	18	Q	Q	370	Q	Q	48.0	41.42
Space-Heating Energy Source										
Natural Gas	384	212	1,208	7,427	4,990	20,600	51.7	42.5	58.6	9.39
Main										
With Secondary	367	208	1,153	6,961	4,814	19,334	52.7	43.2	59.7	9.72
Electricity Only	Q	42	421	1,204	1,355	5,328	67.7	30.9	78.9	18.89
Other Energy Sources or	25	15	112	925	470	2,225	26.7	31.2	50.5	19.32
Combinations	17	26	307	231	842	3,061	71.9	30.4	100.4	22.86
With No Secondary	285	166	733	5,757	3,459	14,006	49.6	47.9	52.3	10.49
Secondary	17	4	54	466	175	1,266	37.3	24.1	43.0	32.44
Other Excluding Natural Gas	16	20	156	1,330	2,230	4,226	12.0	8.8	36.8	28.39
Building Not Heated	Q	Q	16	Q	NC	307	Q	NC	53.4	44.94
Main Space-Heating Energy Source										
Electricity	30	19	117	1,544	1,172	2,393	19.2	16.4	48.8	24.21
Natural Gas	367	208	1,153	6,961	4,814	19,334	52.7	43.2	59.7	9.72
Fuel Oil	Q	Q	21	Q	Q	1,497	Q	Q	13.8	25.71
District Heat	Q	8	Q	Q	1,093	1,749	Q	Q	56.5	33.15
Propane	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Air-Conditioning Energy Source										
Natural Gas	16	23	85	339	283	1,354	46.2	82.5	62.8	23.77
Other Excluding Natural Gas	287	202	1,118	7,660	6,817	20,224	37.4	29.6	55.3	10.06
Air-Conditioning Not Performed	103	Q	176	792	Q	3,556	130.0	Q	49.6	19.24
Water-Heating Energy Source										
Natural Gas	275	170	966	4,553	4,110	17,260	60.3	41.3	56.0	10.19
Other Excluding Natural Gas	82	54	359	3,093	2,793	6,624	26.5	19.3	54.2	15.65
Water Heating Not Performed	49	8	54	1,144	317	1,248	42.7	24.8	43.5	22.06
Cooking Energy Source										
Natural Gas	75	44	605	2,954	2,384	9,428	25.2	18.3	64.2	16.78
Other Excluding Natural Gas	Q	8	169	377	379	3,347	Q	20.1	50.6	26.90
Cooking Not Performed	283	180	605	5,460	4,457	12,358	51.9	40.5	49.0	10.57
Manufacturing Energy Source										
Natural Gas	Q	Q	60	Q	Q	567	Q	Q	106.2	43.27
Other Excluding Natural Gas	18	14	133	444	362	2,134	41.2	38.4	62.4	28.87
Manufacturing Not Performed	340	212	1,186	8,165	6,769	22,433	41.6	31.3	52.9	8.77

See footnotes at end of table.

Table 43. Natural Gas Consumption and Conditional Energy Intensity for Selected Principal Building Activities (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)			Total Floorspace of Buildings Using Natural Gas (million square feet)			Natural Gas Energy Intensity (cubic feet/sq. ft.)			RSE Row Factor
	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	Mercan- tile	Office	All Other	
RSE Column Factor:	1.291	1.262	0.931	0.940	1.005	0.722	1.165	1.130	0.734	
HEATING AND COOLING										
Percent Heated										
Not Heated	Q	Q	17	Q	Q	362	Q	Q	46.6	38.64
1 to 50	37	15	73	1,184	377	4,419	31.5	38.6	16.5	21.52
51 to 99	43	40	184	1,452	1,674	2,822	29.6	24.0	65.1	17.04
100	320	176	1,106	6,120	5,165	17,530	52.3	34.1	63.1	9.88
Percent Cooled										
Not Cooled	103	Q	176	792	Q	3,556	130.0	Q	49.6	19.24
1 to 50	167	32	400	2,667	713	9,840	62.6	45.1	40.7	17.83
51 to 99	51	66	296	1,987	2,537	4,637	25.4	26.1	63.7	14.90
100	85	127	508	3,345	3,851	7,100	25.4	33.0	71.5	12.78
Computer Area with Separate Air-Conditioning System										
Present in Building	63	118	471	1,527	3,907	6,651	41.3	30.3	70.8	16.99
Not Present	342	113	909	7,264	3,313	18,482	47.2	34.2	49.2	10.01
LIGHTING AND REFRIGERATION										
Percent Lit When Open										
Not Lit	Q	Q	8	Q	NC	148	Q	NC	56.0	39.19
1 to 50	62	26	181	1,095	780	5,141	56.6	33.4	35.1	17.95
51 to 99	98	70	382	2,446	2,757	6,811	40.1	25.3	56.1	15.22
100	245	136	809	5,245	3,683	13,034	46.6	36.9	62.0	12.07
Lighting Equipment (Solely or in Combination)										
Incandescent Lamps	193	126	1,000	5,412	4,888	16,987	35.7	25.9	58.9	9.50
Fluorescent Lamps	396	230	1,337	8,717	7,172	24,424	45.4	32.1	54.8	8.79
High-Intensity Discharge Lamps	114	35	505	2,393	2,076	8,099	47.6	16.8	62.4	19.87
Other Lamps	Q	Q	12	Q	Q	167	Q	Q	73.1	31.21
High-Efficiency Ballasts	195	119	549	3,905	3,656	9,288	50.0	32.6	59.1	14.10
Refrigeration Equipment (Solely or in Combination)										
Commercial										
Refrigeration Units	110	56	803	4,164	2,906	12,598	26.5	19.4	63.8	14.05
Freezers	94	44	764	3,721	2,603	10,953	25.2	17.0	69.7	14.58
Residential										
Refrigerators	297	174	1,041	5,730	6,148	19,475	51.8	28.3	53.4	10.21
Freezers	39	37	454	1,242	1,123	6,814	31.6	32.6	66.6	16.23
Ice-Making Machines	127	69	767	3,586	3,243	10,795	35.4	21.3	71.1	15.13
Refrigerated Vending Machines	285	161	1,021	6,124	5,492	16,173	46.6	29.3	63.1	11.59
Water Coolers	260	186	1,021	5,886	5,939	18,304	44.2	31.4	55.8	10.98
Other	Q	Q	Q	Q	Q	687	Q	Q	134.7	41.43

^a Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

NC No cases in responding sample.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Flow Factor
	1959 or Before	1960- 1969	1970- 1979	1980- 1989	1959 or Before	1960- 1969	1970- 1979	1980- 1989	1959 or Before	1960- 1969	1970- 1979	1980- 1989	
RSE Column Factor	1.181	1.142	1.206	1.186	0.836	0.847	0.873	0.844	0.871	0.910	1.000	0.900	
All Buildings	808	445	429	335	17,051	8,467	8,103	7,522	47.4	52.6	52.9	44.5	2.31
Building Floorspace (Square Feet)													
1,001 to 5,000	141	45	58	50	1,782	565	554	522	79.2	80.3	105.1	96.7	4.11
5,001 to 10,000	111	51	50	46	1,843	747	772	593	60.4	68.3	64.9	77.4	4.75
10,001 to 25,000	110	63	46	51	2,441	1,286	871	1,153	45.1	48.9	52.7	44.6	4.59
25,001 to 50,000	123	61	71	46	2,310	1,155	1,112	873	53.2	53.0	63.4	52.5	5.79
50,001 to 100,000	99	62	44	37	2,496	1,517	1,110	1,083	39.7	41.0	39.2	33.9	5.57
100,001 to 200,000	49	54	92	36	1,749	1,600	1,565	1,104	28.1	33.7	59.0	32.6	5.34
200,001 to 500,000	Q	Q	36	47	2,109	1,174	751	1,020	Q	Q	47.4	45.9	5.39
Over 500,000	Q	31	33	22	2,321	423	1,366	1,173	48.5	73.4	Q	Q	5.35
BUILDING USE													
Principal Building Activity													
Assembly	92	37	23	17	2,329	955	595	425	39.5	38.5	38.4	41.0	5.22
Education	177	84	43	10	3,448	1,961	923	308	51.4	43.1	46.3	32.5	4.55
Food Sales	7	Q	Q	Q	143	Q	Q	Q	49.2	Q	Q	Q	13.94
Food Service	40	17	40	26	319	178	188	133	125.7	97.8	215.1	199.3	7.86
Health Care	Q	15	63	30	620	247	521	214	117.1	61.8	121.2	140.8	7.92
Lodging	49	54	30	49	857	744	390	550	57.2	72.7	78.1	88.3	7.72
Mercantile and Service	137	123	91	55	2,950	1,822	2,245	1,773	46.3	67.5	40.5	31.0	4.93
Office	108	38	39	46	2,523	998	1,414	2,286	42.6	38.6	27.9	20.2	3.66
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	57	37	75	32	1,921	933	1,299	983	29.7	40.0	Q	32.5	7.04
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	12.07
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Weekly Operating Hours													
39 or Fewer	58	16	18	6	1,446	563	399	212	39.9	27.9	44.6	29.3	5.90
40 to 48	194	75	56	53	4,578	1,847	1,313	1,426	42.3	40.6	42.3	37.3	5.54
49 to 60	136	69	54	59	3,300	1,456	1,869	1,856	41.1	47.1	29.0	31.9	5.50
61 to 84	134	67	82	50	3,003	1,627	1,822	1,499	44.6	41.0	44.9	33.5	3.71
85 to 167	119	89	105	38	2,708	1,660	1,335	872	44.1	53.5	78.3	43.3	5.83
168 (Open Continuously)	168	130	115	128	2,016	1,315	1,366	1,655	83.2	99.2	84.3	77.4	3.45
Workers													
4 or Fewer	153	49	49	41	3,971	1,008	846	895	38.6	48.9	58.4	45.5	3.06
5 to 9	92	43	44	33	2,498	944	1,052	686	36.8	45.7	41.4	48.4	4.75
10 to 19	86	46	53	57	1,949	1,143	705	661	44.2	39.8	74.6	86.4	6.89
20 to 49	136	77	55	55	2,787	1,632	1,055	1,144	48.8	47.3	52.1	47.8	4.25
50 to 99	88	79	61	19	1,869	1,520	1,241	723	46.8	52.3	48.8	25.8	5.12
100 to 249	108	100	81	59	1,518	1,239	1,147	1,139	71.1	80.3	70.9	51.8	5.11
250 or More	145	51	87	71	2,460	981	2,057	2,275	59.0	52.0	42.1	31.4	5.20
Ownership and Occupancy													
Nongovernment Owned													
Owner Occupied	474	292	264	227	9,698	4,635	4,751	4,556	48.9	63.1	55.6	49.8	3.30
Single Establishment	382	253	228	190	7,406	3,539	3,257	2,949	51.5	71.4	70.1	64.6	3.79
Multiple Establishment	93	40	36	36	2,291	1,097	1,495	1,607	40.5	36.3	23.8	22.5	4.98
Nonowner Occupied	96	40	92	73	2,563	1,436	1,698	2,375	37.3	28.0	54.1	30.8	5.18
Single Establishment	47	19	Q	40	1,456	792	846	1,184	32.2	24.4	76.8	33.6	6.81
Multiple Establishment	26	18	22	33	959	583	799	1,174	27.6	31.1	27.6	27.7	6.15
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned													
Federal	Q	Q	Q	Q	Q	Q	Q	Q	92.7	Q	Q	Q	14.48
State	45	27	22	Q	1,098	623	375	222	41.2	44.0	59.4	63.6	6.07
Local	138	82	47	15	3,101	1,668	1,104	329	44.5	49.2	42.3	47.1	4.83

See footnote at end of table.

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.131	1.140	1.208	1.148	0.836	0.847	0.979	0.944	0.871	0.919	1.089	0.985	
Multibuilding Facility													
Not on Multibuilding Facility	470	226	244	196	11,054	5,197	5,039	4,838	42.5	43.6	48.3	40.5	3.43
Part of Multibuilding Facility	338	219	185	139	5,998	3,271	3,064	2,684	56.3	66.9	60.5	51.7	2.55
On Facility with Central Plant	184	131	57	39	2,117	1,182	967	361	87.1	111.1	58.5	108.2	6.03
Percent Vacant at Least Three Months													
0	554	347	367	251	10,851	6,143	6,056	4,425	51.1	56.6	60.7	56.6	2.70
1 to 50	142	53	49	72	3,238	1,622	1,793	2,570	43.7	32.9	27.1	27.9	3.92
51 to 99	Q	30	Q	Q	2,248	352	Q	Q	29.6	84.4	Q	Q	8.75
100	46	15	Q	11	714	351	Q	392	63.9	41.8	Q	27.0	5.89
Months in Use Out of Past 12 Months													
0 to 8	21	Q	Q	29	812	Q	Q	609	25.5	Q	Q	47.0	5.23
9 to 11	75	42	12	5	1,255	852	355	179	59.9	48.9	34.8	30.6	5.91
12	712	394	406	301	14,985	7,386	7,654	6,734	47.5	53.3	53.0	44.7	2.34
LOCATION													
Census Region													
Northeast	150	106	47	41	4,373	1,850	1,014	1,280	34.3	57.3	Q	Q	7.84
Midwest	310	188	180	130	5,648	2,783	2,490	1,894	54.9	67.4	72.5	68.5	4.39
South	181	78	124	102	4,241	2,360	2,493	2,567	42.7	33.0	49.7	39.7	4.89
West	167	74	78	62	2,790	1,475	2,106	1,781	59.9	49.9	37.0	34.7	6.82
Census Division													
Northeast													
New England	13	6	Q	5	589	270	Q	190	Q	21.8	Q	27.2	8.14
Middle Atlantic	137	100	32	36	3,784	1,580	826	1,091	36.1	63.4	Q	Q	10.04
Midwest													
East North Central	204	143	119	79	4,214	1,922	1,506	1,154	48.3	74.7	79.1	68.5	6.69
West North Central	106	44	61	51	1,433	861	984	739	74.3	51.2	62.3	68.6	10.67
South													
South Atlantic	77	30	Q	30	1,616	772	731	1,116	47.8	38.9	76.6	26.5	8.43
East South Central	Q	15	34	36	677	396	465	495	56.2	37.6	72.2	72.4	14.39
West South Central	66	33	34	36	1,947	1,192	1,297	955	33.7	27.7	Q	38.1	10.02
West													
Mountain	120	23	27	21	1,422	492	608	599	84.2	47.4	45.0	34.7	13.82
Pacific	47	50	51	41	1,368	982	1,498	1,182	34.7	51.2	33.8	34.8	9.24
Metropolitan Status													
Metropolitan	617	332	318	297	13,643	7,282	6,805	6,544	45.2	45.6	46.8	45.4	2.83
Nonmetropolitan	192	113	111	38	3,409	1,185	1,299	977	56.2	95.2	85.4	38.8	7.07
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	93	Q	62	34	1,169	636	783	475	80.0	88.4	79.0	71.1	11.92
5,500-7,000 HDD	352	208	149	117	6,689	3,084	2,108	2,022	52.7	67.5	70.8	58.1	8.70
4,000-5,499 HDD	193	82	69	52	4,524	1,832	1,735	1,577	42.6	44.9	39.7	33.2	11.68
Under 4,000 HDD	91	65	107	77	2,394	1,583	2,364	2,095	38.2	41.0	45.5	36.6	10.37
2,000 CDD or More and --													
Under 4,000 HDD	78	34	41	54	2,274	1,332	1,113	1,353	34.5	25.3	37.2	40.2	9.42
STRUCTURE													
Floors													
1	198	149	223	143	4,088	3,549	3,549	2,634	48.5	41.9	62.8	54.2	4.07
2	209	168	91	77	3,826	2,587	2,249	2,317	54.5	65.0	40.6	33.1	3.73
3	148	45	27	26	3,961	746	566	448	37.4	59.9	47.6	57.1	5.32
4 to 6	160	57	44	60	3,215	1,031	733	1,067	49.9	55.6	60.2	56.5	4.97
7 or More	92	26	44	29	1,961	553	1,007	1,056	47.0	46.9	43.5	Q	6.36

See footnote at end of table.

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.131	1.142	1.209	1.146	0.830	0.847	0.870	0.944	0.871	0.919	1.099	0.985	
Wall Materials													
Masonry	663	320	302	183	14,252	6,511	4,522	4,047	46.5	49.1	66.8	45.1	2.73
Siding or Shingles	50	14	26	27	901	373	691	388	55.4	38.5	Q	70.2	7.39
Metal Panels	18	Q	53	54	303	458	1,093	804	60.3	Q	48.5	66.8	7.89
Concrete Panels	Q	28	38	44	1,278	888	1,269	1,460	51.9	31.5	29.7	29.9	7.77
Window Glass	Q	Q	7	Q	Q	Q	341	Q	Q	Q	20.8	Q	9.76
Other	Q	Q	Q	Q	Q	Q	Q	154	Q	Q	Q	55.4	10.18
Roof Materials													
Built-Up	446	214	224	139	9,249	4,702	4,645	3,369	48.2	45.5	48.2	41.2	2.68
Shingles (Not Wood)	144	83	67	31	3,947	1,456	805	804	36.4	57.3	82.8	38.5	5.52
Metal Surfacing	29	Q	50	67	571	766	1,253	1,211	50.0	97.2	40.0	55.7	8.25
Synthetic or Rubber	65	46	63	77	1,048	970	985	1,426	62.5	47.9	63.8	53.9	5.45
Slate or Tile	53	Q	Q	9	1,274	Q	Q	146	41.6	Q	Q	62.0	10.79
Concrete	11	Q	Q	Q	309	Q	Q	Q	36.2	Q	Q	Q	12.91
Wooden Materials	12	Q	Q	Q	272	Q	Q	Q	44.5	Q	Q	Q	9.42
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	581	297	345	306	10,047	6,183	6,920	6,596	57.8	48.0	49.8	46.3	2.64
Wall Insulation	309	216	252	289	5,025	3,878	4,805	5,934	61.5	55.7	52.3	48.8	3.26
Storm or Multiple Glazing	343	175	195	221	5,542	3,572	3,609	4,356	61.9	49.0	53.9	50.6	3.19
Tinted, Reflective, or Shading Glass	234	134	193	187	3,976	2,627	4,154	4,711	58.8	51.0	46.5	39.6	3.18
Exterior or Interior Shadings or Awnings	342	161	178	172	7,423	3,449	3,639	3,898	46.1	46.5	49.0	44.2	3.14
Weather Stripping or Caulking	593	305	316	297	10,924	6,341	6,356	6,624	54.3	48.1	49.7	44.8	2.52
None of the Above	78	27	28	Q	2,880	579	267	Q	27.1	47.0	105.1	Q	5.28
ENERGY SOURCES AND END USES*													
Energy Sources (Solely or in Combination)													
Electricity	807	442	429	335	17,039	8,460	8,097	7,519	47.4	52.2	53.0	44.5	2.65
Natural Gas	807	445	428	334	17,051	8,467	8,103	7,522	47.3	52.5	52.9	44.4	3.38
Fuel Oil	152	63	132	69	3,341	1,433	1,732	1,359	45.5	43.8	76.3	50.6	8.03
District Heat	Q	Q	Q	Q	1,850	594	Q	Q	61.3	Q	Q	Q	11.49
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	20.26
Propane	Q	Q	Q	Q	Q	Q	306	Q	Q	Q	163.0	Q	8.57
Other	7	Q	Q	Q	295	Q	Q	Q	23.5	Q	Q	Q	13.87
Energy End Uses (Solely or in Combination)													
Heated Buildings	802	443	422	328	16,935	8,380	8,029	7,458	47.4	52.9	52.6	44.0	2.53
Air-Conditioned Buildings	662	361	394	314	14,168	7,603	7,688	7,217	46.7	47.5	51.3	43.5	2.73
Buildings with Water Heating	751	427	407	322	15,718	8,069	7,482	7,164	47.8	52.9	54.3	44.9	2.44
Buildings with Cooking	366	230	205	146	7,704	3,925	3,825	3,415	47.5	58.7	53.7	42.7	3.45
Buildings with Manufacturing	131	47	83	18	1,960	539	723	555	66.7	87.9	114.4	31.6	5.92

See footnote at end of table.

NATURAL GAS

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.173	1.110	1.160	1.126	0.833	0.790	0.965	0.910	0.948	0.929	1.171	0.985	
Energy End-Use Combinations													
Heated Buildings													
With Air Conditioning													
With Water Heating and													
Cooking	309	179	196	137	6,602	3,489	3,584	3,232	46.9	51.3	54.7	42.3	15.24
Without Water Heating,													
Without Cooking													
310	172	183	164	6,418	3,760	3,550	3,662	48.3	45.6	51.5	44.7	13.63	
Without Water Heating or													
Cooking													
39	10	11	6	1,070	289	401	215	36.7	33.4	27.6	26.5	27.75	
Without Air Conditioning													
With Water Heating and													
Cooking	55	Q	Q	Q	1,024	378	Q	Q	53.8	Q	Q	Q	24.62
With Water Heating,													
Without Cooking													
72	23	16	10	1,571	355	184	132	46.1	66.0	86.2	75.0	22.59	
Without Water Heating or													
Cooking													
15	Q	Q	Q	222	Q	Q	Q	68.5	Q	Q	Q	23.42	
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking													
Q	Q	Q	Q	Q	Q	NC	NC	Q	Q	NC	NC	Q	b
All Other Combinations													
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Space-Heating Energy Source													
Natural Gas	717	414	371	302	13,789	7,092	6,563	5,573	52.0	58.4	56.6	54.2	10.33
Main													
702	407	350	269	13,256	6,819	5,910	5,125	52.9	59.6	59.3	52.5	10.40	
With Secondary													
208	136	131	70	3,193	1,934	1,574	1,187	65.0	70.4	83.1	58.6	22.65	
Electricity Only													
87	26	22	16	1,592	833	629	566	54.9	31.2	35.4	28.1	21.04	
Other Energy Sources or													
Combinations													
118	69	108	54	1,557	1,019	937	621	76.0	67.7	115.8	86.4	26.95	
With No Secondary													
494	271	220	200	10,064	4,885	4,336	3,938	49.1	55.4	50.6	50.7	10.58	
Secondary													
15	Q	21	Q	533	273	653	449	27.7	Q	32.1	72.8	34.13	
Other Excluding Natural Gas													
Q	29	51	26	3,146	1,288	1,466	1,885	27.2	22.3	34.6	13.8	29.16	
Building Not Heated													
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source													
Electricity													
26	23	52	65	837	846	1,540	1,886	31.6	27.1	33.5	34.2	26.97	
Natural Gas													
702	407	350	269	13,256	6,819	5,910	5,125	52.9	59.6	59.3	52.5	10.40	
Fuel Oil													
12	2	Q	Q	1,391	341	Q	Q	8.4	6.9	Q	Q	30.15	
District Heat													
Q	Q	Q	Q	1,507	517	378	Q	44.8	41.9	Q	Q	36.86	
Propane													
Q	Q	Q	Q	Q	NC	Q	NC	Q	NC	Q	NC	b	
Other													
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Air-Conditioning Energy Source													
Natural Gas													
29	38	21	35	545	663	348	420	53.6	57.6	61.5	83.8	25.93	
Other Excluding Natural Gas													
632	323	372	278	13,622	6,941	7,340	6,798	46.4	46.5	50.7	41.0	11.37	
Air-Conditioning Not Performed													
146	Q	35	21	2,884	864	415	304	50.7	97.0	84.2	68.1	20.75	
Water-Heating Energy Source													
Natural Gas													
544	341	286	240	11,463	5,798	4,488	4,174	47.4	58.9	63.6	57.5	10.74	
Other Excluding Natural Gas													
207	85	121	82	4,254	2,271	2,995	2,989	48.7	37.4	40.3	27.3	22.07	
Water Heating Not Performed													
57	19	22	13	1,334	398	621	358	42.7	46.8	36.0	36.5	25.39	
Cooking Energy Source													
Natural Gas													
284	149	159	131	5,864	2,923	2,973	3,006	48.4	51.0	53.5	43.6	15.19	
Other Excluding Natural Gas													
Q	Q	46	15	1,840	1,002	851	409	44.8	80.9	54.4	36.1	29.99	
Cooking Not Performed													
442	215	224	189	9,347	4,542	4,279	4,107	47.3	47.3	52.2	46.0	11.81	
Manufacturing Energy Source													
Natural Gas													
Q	31	Q	Q	261	255	Q	Q	Q	121.7	Q	Q	36.85	
Other Excluding Natural Gas													
Q	16	Q	11	1,699	284	566	391	47.3	57.5	101.4	29.0	29.05	
Manufacturing Not Performed													
677	398	346	317	15,091	7,929	7,380	6,967	44.9	50.2	46.9	45.5	9.76	

See footnotes at end of table.

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor	
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989		
RSE Column Factor:	1.173	1.110	1.159	1.188	0.883	0.799	0.885	0.910	0.946	0.928	1.171	0.886		
HEATING AND COOLING														
Percent Heated														
Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	60	22	25	18	3,141	986	1,078	776	19.2	22.4	23.0	22.9	22.19	
51 to 99	91	51	Q	55	2,278	1,063	1,076	1,530	39.8	48.0	65.2	35.9	21.58	
100	650	370	327	255	11,477	6,313	5,875	5,150	56.7	58.6	55.7	49.5	11.60	
Percent Cooled														
Not Cooled	146	Q	35	21	2,884	864	415	304	50.7	97.0	84.2	68.1	20.75	
1 to 50	265	140	130	64	6,737	2,640	2,170	1,674	39.4	53.2	59.8	38.3	17.13	
51 to 99	125	92	91	104	2,900	2,240	1,994	2,026	43.0	41.1	45.8	51.4	16.82	
100	272	129	173	146	4,531	2,723	3,525	3,517	60.0	47.3	49.1	41.4	16.08	
Computer Area with Separate Air-Conditioning System														
Present in Building	269	131	118	135	3,969	2,405	2,639	3,071	67.7	54.5	44.8	43.8	16.65	
Not Present	539	314	311	200	13,082	6,062	5,464	4,451	41.2	51.8	56.9	45.0	11.39	
LIGHTING AND REFRIGERATION														
Percent Lit When Open														
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	138	54	47	30	4,270	1,036	759	950	32.4	51.9	61.7	31.1	19.46	
51 to 99	204	122	138	86	4,512	2,344	2,531	2,627	45.2	52.2	54.6	32.7	16.49	
100	463	267	240	219	8,193	5,056	4,779	3,934	56.5	52.7	50.3	55.7	13.46	
Lighting Equipment (Solely or in Combination)														
Incandescent Lamps	563	289	286	182	11,887	5,684	5,399	4,317	47.3	50.8	53.0	42.2	12.50	
Fluorescent Lamps	783	440	412	329	16,604	8,388	7,958	7,364	47.1	52.4	51.7	44.6	10.35	
High-Intensity Discharge Lamps	251	160	126	118	4,073	2,562	2,925	3,008	61.6	62.4	43.0	39.1	20.13	
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b	
High-Efficiency Ballasts	290	205	181	188	5,852	3,521	3,748	3,727	49.5	58.3	48.4	50.3	15.38	
Refrigeration Equipment (Solely or in Combination)														
Commercial														
Refrigeration Units	368	208	222	172	7,416	4,244	4,180	3,827	49.6	48.9	53.1	45.0	14.06	
Freezers	338	198	208	158	5,700	4,119	3,939	3,520	59.2	48.1	52.8	44.9	14.41	
Residential														
Refrigerators	611	355	307	239	13,076	6,450	5,838	5,989	46.7	55.1	52.5	39.9	12.53	
Freezers	256	94	97	83	4,114	1,806	1,805	1,455	62.2	51.9	53.6	56.9	17.58	
Ice-Making Machines	356	191	234	181	5,964	3,733	4,158	3,769	59.8	51.2	56.3	48.1	14.93	
Refrigerated Vending Machines	532	346	329	260	9,694	6,114	6,167	5,815	54.9	56.6	53.4	44.7	12.42	
Water Coolers	544	367	305	252	11,141	6,942	6,321	5,724	48.8	52.8	48.2	44.1	12.18	
Other	Q	Q	Q	Q	Q	Q	Q	Q	91.7	Q	Q	Q	31.55	
ENERGY MANAGEMENT														
Occupant Control														
Any Control of Heating	384	161	161	164	8,707	3,236	3,791	3,360	44.1	49.9	42.6	48.7	13.22	
With Thermostats	357	141	151	155	7,995	2,763	3,570	3,175	44.6	50.9	42.2	48.8	13.88	
Any Control of Cooling	365	157	165	157	8,761	3,135	3,845	3,248	41.7	50.1	42.9	48.4	12.93	
With Thermostats	311	149	155	149	7,603	2,899	3,686	3,056	40.9	51.2	42.0	48.7	13.86	
Computerized Energy Management and Control System														
Present in Building	170	89	112	110	2,792	2,217	2,436	3,187	61.0	40.3	46.1	34.5	18.02	
Controls Heating and Cooling	170	87	105	105	2,635	2,102	2,317	3,105	64.5	41.5	45.5	33.7	16.26	
Controls Lighting	Q	18	30	35	Q	530	664	1,148	69.2	33.9	45.5	30.7	28.93	
Controls Other	Q	Q	31	9	Q	Q	525	368	Q	Q	59.0	24.8	34.18	

See footnotes at end of table.

Table 44. Natural Gas Consumption and Conditional Energy Intensity by Year Constructed (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/sq. ft.)				RSE Row Factor
	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	1959 or Before	1960-1969	1970-1979	1980-1989	
RSE Column Factor:	1.173	1.110	1.180	1.120	0.833	0.795	0.888	0.919	0.960	0.920	1.171	0.982	
Other Energy Management													
Regular HVAC Maintenance	607	364	348	267	10,525	6,497	6,608	6,217	57.7	56.0	52.6	43.0	11.80
Participated in Utility Conservation Program	132	103	109	49	2,532	1,808	1,825	1,077	52.0	56.9	59.7	45.4	12.43

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.173	1.192	0.879	0.908	0.939	0.954	
All Buildings	1,804	1,728	33,017	31,110	54.6	55.5	6.30
Building Floorspace (Square Feet)							
1,001 to 5,000	257	253	3,111	3,018	82.7	83.8	6.27
5,001 to 10,000	242	220	3,601	3,470	67.3	63.4	10.76
10,001 to 25,000	241	235	4,886	4,705	49.3	50.0	7.23
25,001 to 50,000	282	271	4,820	4,521	58.4	59.9	11.00
50,001 to 100,000	226	219	5,302	4,882	42.6	44.8	11.22
100,001 to 200,000	209	201	4,406	4,224	47.5	47.6	18.61
200,001 to 500,000	210	195	4,303	3,793	48.9	51.3	28.30
Over 500,000	136	134	2,588	2,496	52.6	53.8	31.98
Year Constructed							
1899 or Before	50	49	889	848	56.4	57.8	21.47
1900 to 1919	112	112	2,602	2,578	43.2	43.5	31.15
1920 to 1945	215	210	4,314	4,027	49.9	52.2	17.91
1946 to 1959	339	331	5,984	5,804	56.6	57.0	10.77
1960 to 1969	414	407	7,092	6,819	58.4	59.6	10.91
1970 to 1979	371	350	6,563	5,910	56.6	59.3	13.18
1980 to 1983	106	101	1,766	1,611	59.8	62.4	13.62
1984 to 1986	127	108	2,399	2,273	52.8	47.5	12.63
1987 to 1989	70	61	1,407	1,241	49.4	48.8	19.08
BUILDING USE							
Principal Building Activity							
Assembly	164	162	3,837	3,733	42.6	43.4	12.17
Education	256	251	5,082	4,779	50.3	52.6	9.18
Food Sales	21	18	438	332	48.5	53.9	24.56
Food Service	96	96	640	632	150.6	151.6	13.15
Health Care	164	158	1,337	1,211	123.0	130.3	17.69
Lodging	138	135	1,610	1,560	85.7	86.5	15.08
Mercantile and Service	384	367	7,427	6,961	51.7	52.7	10.80
Office	212	208	4,990	4,814	42.5	43.2	10.25
Parking Garage	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	24	18	383	314	61.6	57.0	35.00
Warehouse	197	189	4,540	4,277	43.3	44.3	21.34
Other	96	75	788	595	121.8	125.6	22.89
Vacant	44	43	Q	Q	Q	Q	41.41
Weekly Operating Hours							
39 or Fewer	94	94	2,335	2,279	40.3	41.1	11.04
40 to 48	360	350	7,848	7,538	45.8	46.4	8.21
49 to 60	300	295	7,124	6,664	42.2	44.2	10.24
61 to 84	306	284	6,037	5,643	50.6	50.4	10.79
85 to 167	277	272	5,012	4,754	55.3	57.2	17.53
168 (Open Continuously)	467	434	4,661	4,230	100.2	102.5	13.23
Workers							
4 or Fewer	268	263	6,085	5,940	44.0	44.4	10.26
5 to 9	190	184	4,494	4,344	42.2	42.5	10.10
10 to 19	207	189	3,844	3,629	53.8	52.0	8.97
20 to 49	297	290	5,437	5,110	54.6	56.8	10.03
50 to 99	235	224	4,576	4,304	51.3	52.0	15.80
100 to 249	326	316	3,936	3,674	82.7	86.1	16.68
250 or More	283	261	4,645	4,109	60.8	63.6	15.75

See footnote at end of table.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.173	1.192	0.879	0.906	0.836	0.854	
Ownership and Occupancy							
Nongovernment Owned	1,417	1,354	25,913	24,445	54.7	55.4	6.95
Owner Occupied	1,144	1,085	19,466	18,308	58.8	59.3	7.79
Single Establishment	955	907	15,006	14,198	63.6	63.9	9.74
Multiple Establishment	190	178	4,460	4,111	42.5	43.2	11.62
Nonowner Occupied	272	269	6,447	6,136	42.3	43.8	12.47
Single Establishment	154	153	3,430	3,308	45.0	46.2	16.29
Multiple Establishment	88	87	2,767	2,591	31.9	33.6	15.87
Vacant	Q	Q	250	237	Q	Q	34.58
Government Owned	387	374	7,104	6,665	54.5	56.2	9.98
Federal	20	17	387	332	51.6	52.6	26.21
State	97	91	1,514	1,388	64.0	65.4	18.51
Local	270	266	5,203	4,945	52.0	53.8	11.92
Multibuilding Facility							
Not on Multibuilding Facility	1,051	1,023	21,397	20,380	49.1	50.2	7.12
Part of Multibuilding Facility	753	706	11,620	10,730	64.8	65.8	9.98
On Facility with Central Plant	325	310	2,843	2,574	114.2	120.3	20.46
LOCATION							
Census Region							
Northeast	317	298	5,970	5,319	53.1	56.0	17.35
Midwest	768	757	11,709	11,352	65.6	66.7	9.22
South	431	392	9,098	8,609	47.4	45.6	13.84
West	287	281	6,241	5,830	46.1	48.1	6.35
Census Division							
Northeast							
New England	36	29	804	603	44.5	48.0	20.59
Middle Atlantic	281	269	5,166	4,716	54.5	57.0	19.57
Midwest							
East North Central	518	512	8,039	7,835	64.5	65.4	11.44
West North Central	250	245	3,670	3,517	68.1	69.6	16.12
South							
South Atlantic	174	167	2,982	2,787	58.4	59.9	23.03
East South Central	110	88	1,837	1,692	60.0	52.0	25.35
West South Central	147	138	4,279	4,130	34.4	33.3	15.17
West							
Mountain	127	124	2,218	2,031	57.3	60.8	8.37
Pacific	160	157	4,023	3,799	39.9	41.4	14.44
Metropolitan Status							
Metropolitan	1,370	1,300	26,890	25,233	51.0	51.5	6.67
Nonmetropolitan	434	428	6,127	5,877	70.8	72.9	13.71
Climate Zone: 45-Year Average							
Under 2,000 CDD and --							
Over 7,000 HDD	235	232	2,737	2,586	85.7	89.6	14.34
5,500-7,000 HDD	746	723	12,007	11,329	62.1	63.9	9.70
4,000-5,499 HDD	353	340	6,962	6,487	50.6	52.3	17.98
Under 4,000 HDD	304	276	6,511	6,080	46.7	45.4	16.03
2,000 CDD or More and --							
Under 4,000 HDD	167	157	4,799	4,628	34.9	34.0	17.52

See footnote at end of table.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.173	1.192	0.879	0.908	0.939	0.954	
1989 Degree-Days							
Under 2,000 CDD and --							
Over 7,000 HDD	350	339	4,559	4,215	76.8	80.3	13.06
5,500-7,000 HDD	834	812	13,983	13,270	59.6	61.2	11.47
4,000-5,499 HDD	169	164	3,661	3,384	46.3	48.5	15.99
Under 4,000 HDD	297	270	6,524	6,122	45.6	44.2	17.18
2,000 CDD or More and --							
Under 4,000 HDD	153	143	4,290	4,119	35.7	34.7	18.22
STRUCTURE							
Floors							
1	657	611	12,530	11,710	52.4	52.2	9.25
2	508	497	8,846	8,248	57.4	60.2	10.34
3	224	213	4,712	4,490	47.5	47.5	12.61
4 to 6	254	246	4,384	4,233	58.0	58.2	15.70
7 or More	162	160	2,545	2,429	63.5	66.0	21.43
Wall Materials							
Masonry	1,341	1,299	23,958	22,582	56.0	57.5	7.02
Siding or Shingles	93	92	2,082	2,032	44.8	45.5	15.04
Metal Panels	177	152	2,471	2,263	71.6	67.2	24.32
Concrete Panels	119	111	3,307	3,070	36.1	36.0	14.97
Window Glass	45	45	646	622	69.7	72.2	27.69
Other	29	29	555	542	51.7	52.9	34.28
Roof Materials							
Built-Up	898	878	17,687	16,646	50.7	52.7	8.30
Shingles (Not Wood)	295	289	5,776	5,548	51.2	52.1	12.82
Metal Surfacing	209	174	3,466	3,159	60.3	55.2	20.33
Synthetic or Rubber	230	220	3,509	3,273	65.5	67.1	11.77
Slate or Tile	72	72	1,230	1,204	58.8	59.5	18.87
Concrete	20	20	450	420	44.8	46.9	25.29
Wooden Materials	25	22	434	394	57.2	54.6	24.39
Other	Q	Q	Q	Q	118.0	118.0	15.36
Building Shell Conservation Features (Solely or in Combination)							
Roof or Ceiling Insulation	1,360	1,291	23,842	22,281	57.0	57.9	6.71
Wall Insulation	937	881	15,936	14,861	58.8	59.3	7.74
Storm or Multiple Glazing	852	818	13,674	12,728	62.3	64.2	7.16
Tinted, Reflective, or Shading Glass	646	610	11,558	10,561	55.9	57.7	9.05
Exterior or Interior Shadings or Awnings	732	708	14,280	13,419	51.2	52.8	6.76
Weather Stripping or Caulking	1,336	1,271	23,790	22,481	56.2	56.5	5.76
None of the Above	119	118	3,282	3,096	36.3	38.0	28.64
ENERGY SOURCES AND END USES*							
Energy Sources (Solely or in Combination)							
Electricity	1,801	1,725	33,004	31,102	54.6	55.5	6.31
Natural Gas	1,804	1,728	33,017	31,110	54.6	55.5	6.30
Fuel Oil	381	361	5,401	4,716	70.5	76.5	17.30
District Heat	Q	Q	Q	Q	90.2	Q	29.16
District Chilled Water	Q	Q	Q	Q	Q	Q	b
Propane	Q	Q	980	878	95.0	102.9	31.51
Other	21	20	454	Q	45.3	47.6	34.12

See footnote at end of table.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.173	1.192	0.879	0.908	0.930	0.954	
Energy End Uses (Solely or in Combination)							
Heated Buildings	1,804	1,728	33,017	31,110	54.6	55.5	6.30
Air-Conditioned Buildings	1,534	1,461	29,458	27,736	52.1	52.7	6.77
Buildings with Water Heating	1,697	1,622	30,438	28,662	55.7	56.6	6.42
Buildings with Cooking	805	775	13,341	12,485	60.3	62.0	6.63
Buildings with Manufacturing	221	215	2,813	2,634	78.5	81.5	22.50
Space-Heating Energy Source							
Natural Gas	1,804	1,728	33,017	31,110	54.6	55.5	6.30
Main	1,728	1,728	31,110	31,110	55.5	55.5	6.40
With Secondary	544	544	7,887	7,887	69.0	69.0	12.67
Electricity Only	152	152	3,620	3,620	41.9	41.9	15.83
Other Energy Sources or Combinations	349	349	4,134	4,134	84.5	84.5	16.60
With No Secondary	1,184	1,184	23,222	23,222	51.0	51.0	6.39
Secondary	76	--	1,907	--	39.9	--	22.64
Other Excluding Natural Gas	--	--	--	--	--	--	--
Building Not Heated	--	--	--	--	--	--	--
Main Space-Heating Energy Source							
Electricity	74	Q	1,543	Q	48.0	Q	25.66
Natural Gas	1,728	1,728	31,110	31,110	55.5	55.5	6.40
Fuel Oil	13	Q	523	Q	24.2	Q	26.43
District Heat	Q	Q	383	Q	61.6	Q	46.26
Propane	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	b
Ability to Switch Main Heating Fuel							
No Alternate	1,214	1,174	23,356	22,256	52.0	52.7	6.64
Alternate Main Heating Fuel							
Electricity	71	71	2,849	2,845	25.1	24.8	17.45
Natural Gas	36	Q	866	Q	41.8	Q	26.37
Fuel Oil	391	391	4,477	4,466	87.4	87.5	12.79
Propane	68	68	1,041	1,036	65.5	65.7	23.55
Other	Q	Q	Q	Q	Q	Q	b
Air-Conditioning Energy Source							
Natural Gas	117	117	1,854	1,825	63.3	64.0	15.76
Other Excluding Natural Gas	1,417	1,345	27,604	25,912	51.3	51.9	7.32
Air-Conditioning Not Performed	270	267	3,559	3,373	75.8	79.1	16.21

See footnote at end of table.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.147	1.100	0.822	0.893	1.019	1.026	
Water-Heating Energy Source							
Natural Gas	1,306	1,284	22,127	21,458	590.3	598.4	6.83
Other Excluding Natural Gas	390	338	8,311	7,204	469.7	469.7	12.90
Water Heating Not Performed	108	106	2,579	2,448	417.2	432.2	15.97
Cooking Energy Source							
Natural Gas	588	576	9,904	9,409	593.6	612.3	6.46
Other Excluding Natural Gas	217	198	3,437	3,076	630.7	645.0	23.95
Cooking Not Performed	999	954	19,677	18,625	508.0	512.0	8.01
Manufacturing Energy Source							
Natural Gas	105	100	634	550	1,651.2	1,825.1	29.76
Other Excluding Natural Gas	116	114	2,178	2,083	532.4	548.1	27.45
Manufacturing Not Performed	1,583	1,514	30,205	28,476	524.2	531.5	5.70
HEATING AND COOLING							
Percent Heated							
Not Heated	Q	Q	Q	Q	Q	Q	b
1 to 50	118	110	5,428	5,170	217.8	212.5	14.17
51 to 99	240	238	4,577	4,460	524.4	534.0	18.35
100	1,445	1,379	22,964	21,432	629.1	643.4	8.12
Percent Cooled							
Not Cooled	270	267	3,559	3,373	757.7	790.6	16.21
1 to 50	573	546	11,542	10,769	496.0	506.8	13.31
51 to 99	365	338	7,082	6,756	515.9	500.4	10.11
100	597	578	10,834	10,212	550.6	565.6	8.68
Year Main Central Chiller Installed							
1959 or Before	49	49	869	819	563.8	592.6	25.22
1960 to 1969	107	101	1,819	1,736	586.4	579.7	14.79
1970 to 1979	112	112	2,086	2,064	539.2	541.5	18.22
1980 to 1986	136	134	1,947	1,840	698.8	729.2	24.46
1987 to 1989	56	55	1,099	1,031	507.1	533.8	30.25
Year Packaged Cooling System Installed							
1959 or Before	63	57	1,109	1,074	564.0	528.2	28.10
1960 to 1969	170	164	2,855	2,707	594.0	607.7	12.31
1970 to 1979	343	328	6,796	6,435	505.4	509.3	11.34
1980 to 1986	276	254	6,382	5,992	431.9	424.7	11.48
1987 to 1989	239	229	4,335	4,072	551.4	561.7	14.58
Computer Area with Separate Air-Conditioning System							
Present in Building	569	525	9,006	8,274	631.3	634.0	11.13
Not Present	1,236	1,204	24,011	22,836	514.6	527.0	6.69
LIGHTING							
Percent Lit When Open							
Not Lit	Q	Q	Q	Q	Q	Q	b
1 to 50	247	240	5,858	5,730	420.9	418.4	10.20
51 to 99	504	481	9,720	9,027	519.0	532.6	10.81
100	1,046	1,001	17,305	16,218	604.6	617.0	8.06
ENERGY MANAGEMENT							
Occupant Control							
Any Control of Heating	785	743	15,632	14,747	502.1	503.7	8.41
With Thermostats	723	683	14,168	13,448	510.4	507.9	8.56
Any Control of Cooling	755	714	15,395	14,601	490.5	488.9	8.65
With Thermostats	680	640	13,824	13,092	492.1	489.0	8.87

See footnotes at end of table.

Table 45. Consumption and Conditional Energy Intensity for Buildings Heated with Natural Gas (Continued)

Building Characteristics	Total Natural Gas Consumption (billion cubic feet)		Total Floorspace of Buildings Using Natural Gas (million square feet)		Natural Gas Energy Intensity (cubic feet/sq. ft.)		RSE Row Factor
	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	All Buildings Heated with Natural Gas	Buildings with Natural Gas Main Heating	
RSE Column Factor:	1.147	1.166	0.832	0.863	1.016	1.026	
Reduced Use During Off-Hours							
Heating Only	260	257	3,562	3,380	728.7	760.9	14.95
Cooling Only	125	123	1,767	1,718	708.1	713.9	25.98
Heating and Cooling	1,044	1,011	22,644	21,452	461.1	471.4	7.47
Computerized Energy Management and Control System							
Present in Building	399	380	7,676	7,150	520.2	531.3	9.74
Controls Heating and Cooling	386	368	7,301	6,787	529.4	541.5	9.67
Controls Lighting	85	81	2,133	1,990	396.8	406.9	20.41
Controls Other	109	109	1,545	1,540	707.5	709.5	31.34
Other Energy Management							
Regular HVAC Maintenance	1,422	1,369	23,526	22,012	604.4	621.8	6.79
Participated in Utility Conservation Program	365	350	5,890	5,633	620.5	620.8	12.49

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labeled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

‡ No applicable RSE row factor.

MC No cases in responding sample.

○ Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 46. Natural Gas Conditional Energy Intensity and Distribution of Building-Level Intensities

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Natural Gas Consumed (billion cubic feet)	Total Consumed per Square Foot (cubic feet)	Distribution of Building-Level Intensities (cubic feet/sq. ft.)		
					25th Percentile	Median	75th Percentile
All Buildings	2,420	41,143	2,015	49.0	16.6	43.8	92.9
Building Floorspace (Square Feet)							
1,001 to 5,000	1,225	3,423	294	85.8	28.4	66.1	150.8
5,001 to 10,000	532	3,955	258	65.2	14.1	43.9	85.9
10,001 to 25,000	355	5,752	270	46.9	10.8	29.1	59.3
25,001 to 50,000	153	5,451	300	55.1	11.2	26.4	60.5
50,001 to 100,000	88	6,207	242	38.9	9.6	24.2	50.9
100,001 to 200,000	45	6,018	231	38.5	3.5	18.8	42.3
200,001 to 500,000	17	5,054	222	43.9	8.2	31.8	54.8
Over 500,000	6	5,284	198	37.4	2.2	5.8	31.1
Year Constructed							
1899 or Before	98	1,004	51	50.8	11.9	43.8	90.1
1900 to 1919	152	3,068	120	39.1	15.1	41.2	132.1
1920 to 1945	396	5,741	237	41.3	11.3	30.0	77.0
1946 to 1959	512	7,238	399	55.2	16.9	46.7	96.9
1960 to 1969	454	8,467	445	52.5	21.5	46.7	87.5
1970 to 1979	420	8,103	428	52.9	18.4	48.5	107.4
1980 to 1983	138	2,189	114	52.1	26.4	58.5	104.6
1984 to 1986	148	3,460	138	39.7	15.7	30.8	73.0
1987 to 1989	102	1,873	83	44.1	11.2	29.7	71.2
BUILDING USE							
Principal Building Activity							
Assembly	345	4,304	169	39.2	14.0	39.3	67.8
Education	199	6,640	314	47.3	20.6	49.5	88.5
Food Sales	60	548	27	48.4	31.9	62.3	86.5
Food Service	188	818	124	152.0	89.1	181.7	305.1
Health Care	40	1,602	181	113.1	10.6	32.8	123.1
Lodging	101	2,541	182	71.7	43.8	82.0	147.3
Mercantile and Service	732	8,790	405	46.1	13.9	33.6	74.9
Office	394	7,220	231	32.0	15.3	32.5	70.7
Parking Garage	16	282	10	36.5	37.0	53.0	67.6
Public Order and Safety	28	440	24	54.2	13.7	72.2	171.6
Warehouse	207	5,135	201	39.1	7.3	22.6	41.7
Other	26	932	99	106.1	52.9	105.5	135.6
Vacant	84	1,891	48	25.2	10.7	31.2	100.1
Weekly Operating Hours							
39 or Fewer	323	2,620	97	37.0	12.1	30.6	70.5
40 to 48	650	9,163	377	41.1	13.4	32.8	68.2
49 to 60	560	8,481	317	37.4	15.7	33.4	71.2
61 to 84	377	7,952	332	41.8	24.3	56.9	124.4
85 to 167	297	6,574	350	53.3	18.8	62.9	166.2
168 (Open Continuously)	213	6,353	541	85.2	32.6	72.2	154.5
Workers							
4 or Fewer	1,113	6,720	291	43.3	16.6	47.9	87.4
5 to 9	556	5,180	212	40.8	15.0	34.3	93.1
10 to 19	352	4,457	241	54.1	21.2	46.0	103.7
20 to 49	242	6,618	323	48.8	16.7	43.8	94.6
50 to 99	82	5,352	246	46.0	18.8	41.1	85.0
100 to 249	53	5,043	348	69.0	14.4	40.7	73.2
250 or More	23	7,773	354	45.6	6.0	16.6	73.0

See footnotes at end of table.

Table 46. Natural Gas Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Natural Gas Consumed (billion cubic feet)	Total Consumed per Square Foot (cubic feet)	Distribution of Building-Level Intensities (cubic feet/sq. ft.)		
					25th Percentile	Median	75th Percentile
Ownership and Occupancy							
Nongovernment Owned	2,104	31,713	1,556	49.1	16.6	42.9	94.2
Owner Occupied	1,561	23,640	1,256	53.1	16.8	46.4	98.9
Single Establishment	1,318	17,151	1,052	61.3	18.3	46.8	101.4
Multiple Establishment	244	6,490	204	31.4	11.4	34.0	84.7
Nonowner Occupied	543	8,072	300	37.2	14.3	32.6	72.2
Single Establishment	363	4,279	171	39.9	13.7	30.9	70.7
Multiple Establishment	146	3,515	99	28.2	15.0	35.9	72.0
Vacant	33	278	30	109.1	31.2	69.8	136.7
Government Owned	316	9,431	459	48.6	17.4	46.8	90.3
Federal	13	911	68	74.1	24.0	69.7	101.9
State	78	2,317	109	47.0	11.8	55.2	112.4
Local	225	6,202	282	45.5	19.1	43.9	75.8
Percent Vacant at Least Three Months							
0	2,009	27,476	1,518	55.2	17.7	45.5	96.9
1 to 50	208	9,223	315	34.2	9.3	33.2	68.2
51 to 99	63	2,854	102	35.7	10.2	21.0	76.1
100	139	1,590	80	50.1	18.7	41.6	79.8
Months in Use Out of Past 12 Months							
0 to 8	126	1,744	70	40.1	9.4	39.8	92.3
9 to 11	152	2,640	135	51.0	21.5	47.1	69.8
12	2,141	36,759	1,810	49.2	16.6	42.9	94.6
LOCATION							
Census Region							
Northeast	355	8,517	343	40.3	18.8	47.8	97.3
Midwest	734	12,815	808	63.0	31.9	67.6	114.7
South	806	11,660	484	41.5	11.5	30.6	67.8
West	525	8,151	380	46.7	15.7	34.0	76.2
Census Division							
Northeast							
New England	53	1,236	38	31.0	18.6	62.3	89.6
Middle Atlantic	302	7,281	305	41.9	18.9	46.9	104.5
Midwest							
East North Central	499	8,797	545	62.0	26.8	64.3	114.4
West North Central	236	4,018	262	65.3	41.2	73.5	114.7
South							
South Atlantic	187	4,235	192	45.4	10.2	31.0	58.9
East South Central	168	2,034	122	60.1	18.2	46.4	103.2
West South Central	451	5,391	169	31.4	11.1	25.1	60.4
West							
Mountain	204	3,121	191	61.2	21.9	54.8	80.7
Pacific	320	5,030	189	37.6	10.0	30.1	62.3
Metropolitan Status							
Metropolitan	1,738	34,274	1,562	45.6	16.7	43.0	92.9
Nonmetropolitan	682	6,869	452	65.8	15.0	43.9	90.9
Climate Zone: 45-Year Average							
Under 2,000 CDD and --							
Over 7,000 HDD	188	3,064	245	80.1	37.8	84.8	167.0
5,500-7,000 HDD	726	13,903	827	59.5	31.9	63.7	111.5
4,000-5,499 HDD	444	9,668	396	40.9	13.9	41.5	84.7
Under 4,000 HDD	555	8,436	340	40.3	14.4	33.6	70.8
2,000 CDD or More and --							
Under 4,000 HDD	507	6,073	207	34.1	9.8	22.6	52.4

See footnotes at end of table.

Table 46. Natural Gas Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Natural Gas Consumed (billion cubic feet)	Total Consumed per Square Foot (cubic feet)	Distribution of Building-Level Intensities (cubic feet/sq. ft.)		
					25th Percentile	Median	75th Percentile
ENERGY SOURCES AND END USES *							
Energy Sources (Solely or in Combination)							
Electricity	2,417	41,115	2,010	48.9	16.6	43.8	92.9
Natural Gas	2,420	41,143	2,015	49.0	16.6	43.8	92.9
Fuel Oil	142	7,865	415	52.8	5.7	22.7	68.1
District Heat	27	3,415	160	46.8	3.3	28.3	68.2
District Chilled Water	8	948	26	26.9	5.4	28.3	81.2
Propane	31	1,615	141	87.0	29.4	71.0	156.1
Other	36	775	28	36.1	11.9	29.4	114.7
Energy End Uses (Solely or in Combination)							
Heated Buildings	2,392	40,802	1,994	48.9	16.7	43.6	92.3
Air-Conditioned Buildings	1,969	36,677	1,730	47.2	16.6	41.7	89.1
Buildings with Water Heating	2,029	38,433	1,905	49.6	17.6	45.5	95.7
Buildings with Cooking	582	18,868	947	50.2	20.1	62.9	148.2
Buildings with Manufacturing	121	3,777	278	73.7	12.6	35.9	78.6
Energy End-Use Combinations							
Heated Buildings							
With Air Conditioning							
With Water Heating and Cooking	472	16,906	821	48.5	25.5	66.8	152.3
With Water Heating, Without Cooking	1,225	17,389	827	47.6	15.7	36.0	74.9
Without Water Heating or Cooking	247	1,976	65	33.1	10.9	22.0	48.3
Without Air Conditioning							
With Water Heating and Cooking	83	1,575	115	73.3	13.3	56.7	137.1
With Water Heating, Without Cooking	223	2,242	121	54.2	17.4	52.1	108.9
Without Water Heating or Cooking	130	543	40	73.1	19.2	58.5	115.4
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	1	17	1	57.0	.0	.0	.0
All Other Combinations	39	495	24	48.3	11.1	60.7	230.7
Space-Heating Energy Source							
Natural Gas	2,158	33,017	1,804	54.6	18.6	45.5	93.1
Main	2,079	31,110	1,728	55.5	19.6	46.7	94.4
With Secondary	307	7,887	544	69.0	21.3	44.2	89.6
Electricity Only	224	3,620	152	41.9	18.6	40.5	85.2
Other Energy Sources or Combinations							
With No Secondary	80	4,134	349	84.5	29.4	62.3	127.1
Secondary	1,772	23,222	1,184	51.0	19.0	47.1	95.1
Other Excluding Natural Gas	79	1,907	76	39.9	7.4	22.3	46.9
Building Not Heated	235	7,785	189	24.3	4.8	25.0	80.0
Building Not Heated	28	341	21	61.6	7.8	62.3	369.7
Main Space-Heating Energy Source							
Electricity	224	5,109	165	32.2	8.0	31.5	95.7
Natural Gas	2,079	31,110	1,728	55.5	19.6	46.7	94.4
Fuel Oil	74	1,985	24	12.0	2.1	10.1	26.2
District Heat	23	2,933	107	36.5	2.8	18.8	67.2
Propane	1	31	1	41.5	46.1	46.1	46.1
Other	11	238	4	17.6	11.9	11.9	114.7
Air-Conditioning Energy Source							
Natural Gas	97	1,976	124	62.8	24.2	58.6	130.3
Other Excluding Natural Gas	1,872	34,701	1,606	46.3	15.5	41.5	88.5
Air-Conditioning Not Performed	451	4,467	285	63.7	17.4	56.4	115.4

See footnotes at end of table.

Table 46. Natural Gas Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Natural Gas Consumed (billion cubic feet)	Total Consumed per Square Foot (cubic feet)	Distribution of Building-Level Intensities (cubic feet/sq. ft.)		
					25th Percentile	Median	75th Percentile
Water-Heating Energy Source							
Natural Gas	1,391	25,923	1,410	54.4	22.9	56.8	111.7
Other Excluding Natural Gas	637	12,510	494	39.5	10.7	28.7	66.8
Water Heating Not Performed	391	2,710	110	40.6	12.0	32.1	64.2
Cooking Energy Source							
Natural Gas	462	14,766	723	49.0	22.3	72.7	177.4
Other Excluding Natural Gas	120	4,103	225	54.7	16.1	33.9	66.8
Cooking Not Performed	1,838	22,275	1,067	47.9	15.1	37.6	77.2
Manufacturing Energy Source							
Natural Gas	23	838	113	135.0	35.1	62.7	256.5
Other Excluding Natural Gas	98	2,939	165	56.2	11.9	30.7	72.2
Manufacturing Not Performed	2,299	37,366	1,736	46.5	16.7	43.9	93.5
HEATING AND COOLING							
Percent Heated							
Not Heated	33	401	22	55.2	7.3	34.8	369.7
1 to 50	358	5,980	125	20.8	10.0	19.2	40.3
51 to 99	296	5,948	267	44.8	12.5	31.0	67.6
100	1,732	28,814	1,601	55.6	22.1	54.9	103.5
Percent Cooled							
Not Cooled	451	4,467	285	63.7	17.4	56.4	115.4
1 to 50	667	13,220	599	45.3	14.0	35.9	78.6
51 to 99	363	9,160	412	45.0	17.6	35.1	77.0
100	939	14,296	719	50.3	20.1	50.6	97.2
Computer Area with Separate Air-Conditioning System							
Present in Building	165	12,085	652	54.0	17.1	33.2	80.8
Not Present	2,255	29,059	1,362	46.9	16.6	44.2	95.0
LIGHTING AND REFRIGERATION							
Percent Lit When Open							
Not Lit	23	152	9	57.6	7.3	55.4	76.1
1 to 50	557	7,016	268	38.2	12.2	31.7	72.0
51 to 99	581	12,013	550	45.8	19.9	45.4	89.6
100	1,258	21,962	1,188	54.1	19.6	47.2	99.4
Refrigeration Equipment (Solely or in Combination)							
Commercial							
Refrigeration Units	609	19,667	970	49.3	20.6	60.9	135.9
Freezers	481	17,278	902	52.2	25.0	70.5	168.7
Residential							
Refrigerators	1,515	31,353	1,511	48.2	15.3	37.4	84.9
Freezers	391	9,179	529	57.6	21.3	51.7	103.7
Ice-Making Machines	501	17,624	963	54.6	28.1	66.4	149.2
Refrigerated Vending Machines	950	27,789	1,467	52.8	16.7	41.4	94.6
Water Coolers	1,051	30,128	1,467	48.7	13.6	32.5	72.2
Other	29	1,027	106	103.1	77.2	157.9	305.5
ENERGY MANAGEMENT							
Occupant Control							
Any Control of Heating	1,465	19,094	869	45.5	15.8	41.1	84.7
With Thermostats	1,296	17,503	802	45.8	16.4	41.2	84.8
Any Control of Cooling	1,220	18,989	843	44.4	15.2	39.3	80.6
With Thermostats	1,077	17,244	762	44.2	15.1	37.9	79.3

See footnotes at end of table.

Table 46. Natural Gas Conditional Energy Intensity and Distribution of Building-Level Intensities (Continued)

Building Characteristics	Number of Buildings (thousand)	Total Floorspace (million square feet)	Total Natural Gas Consumed (billion cubic feet)	Total Consumed per Square Foot (cubic feet)	Distribution of Building-Level Intensities (cubic feet/sq. ft.)		
					25th Percentile	Median	75th Percentile
Reduced Use During Off-Hours							
Heating Only	432	4,388	271	61.8	19.2	56.4	113.5
Cooling Only	117	2,397	145	60.7	11.2	47.0	121.7
Heating and Cooling	1,565	28,312	1,180	41.7	15.1	37.6	81.2
Computerized Energy Management and Control System							
Present in Building	182	10,633	482	45.3	18.5	41.8	90.3
Controls Heating and Cooling	175	10,160	467	46.0	18.0	41.8	90.3
Controls Lighting	39	3,145	139	44.2	15.3	42.9	94.6
Controls Other	23	1,938	117	60.3	7.5	43.6	95.7
NATURAL GAS DEMAND							
Annual Consumption (hundred cubic feet)							
1,000 or less	663	4,170	33	7.9	5.1	11.3	21.5
1,001 to 5,000	1,046	9,967	254	25.5	22.1	46.7	82.0
5,001 to 10,000	348	6,485	241	37.1	33.2	66.1	150.1
10,001 to 25,000	238	7,326	344	46.9	43.8	96.0	269.7
25,001 to 50,000	71	5,017	241	48.0	44.5	85.0	130.3
50,001 to 100,000	28	2,808	185	66.0	53.0	75.0	134.8
Over 100,000	26	5,370	717	133.5	88.9	157.9	407.5

Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

Note: • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 47. Fuel Oil Consumption

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
RSE Column Factor	1.068	0.797	0.844	1.108	1.102	1.066	0.971	1.166	
All Buildings	581	12,600	22	357	2,550	4,391	0.20	150	13.17
Building Floorspace (Square Feet)									
1,001 to 5,000	302	821	3	59	426	1,411	.52	285	15.21
5,001 to 10,000	97	698	7	41	298	3,055	.43	405	22.00
10,001 to 25,000	95	1,495	16	69	492	5,157	.33	387	13.51
25,001 to 50,000	36	1,319	37	47	336	9,295	.25	284	15.51
50,001 to 100,000	23	1,675	72	54	387	16,568	.23	214	25.97
100,001 to 200,000	17	2,228	135	46	324	19,584	.15	135	25.12
200,001 to 500,000	6	1,798	289	28	199	32,023	.11	52	29.16
Over 500,000	3	2,566	740	12	87	25,103	.03	21	26.50
Year Constructed									
1899 or Before	31	406	13	17	123	4,031	.30	389	23.45
1900 to 1919	35	809	23	26	185	5,338	.23	271	29.73
1920 to 1945	137	2,460	18	69	492	3,587	.20	161	18.07
1946 to 1959	141	2,068	15	77	554	3,919	.27	234	20.22
1960 to 1969	95	2,275	24	73	516	5,423	.23	200	32.15
1970 to 1979	90	2,399	27	61	434	4,819	.18	114	28.54
1980 to 1983	21	935	44	10	72	3,387	.08	59	30.20
1984 to 1986	12	576	50	Q	Q	3,176	Q	Q	43.67
1987 to 1989	19	671	Q	Q	Q	Q	Q	Q	47.20
BUILDING USE									
Principal Building Activity									
Assembly	98	1,069	11	31	226	2,294	.21	Q	22.52
Education	38	2,209	59	71	508	13,477	.23	315	21.66
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	b
Food Service	Q	Q	Q	Q	Q	Q	Q	Q	b
Health Care	13	1,397	109	17	121	Q	.09	43	33.52
Lodging	15	573	39	10	71	4,813	.12	Q	34.85
Mercantile and Service	219	1,616	7	75	544	2,479	.34	331	18.06
Office	67	2,909	44	43	310	4,639	.11	45	23.58
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	49	1,429	29	53	371	7,563	.26	388	31.70
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	b
Weekly Operating Hours									
39 or Fewer	91	758	8	26	183	2,024	.24	Q	23.24
40 to 48	129	2,649	20	65	468	3,612	.18	185	19.86
49 to 60	138	2,369	17	54	389	2,823	.16	131	17.70
61 to 84	86	1,789	21	68	488	5,687	.27	185	19.30
85 to 167	75	2,200	29	80	564	7,474	.26	242	27.55
168 (Open Continuously)	62	2,835	46	65	458	7,439	.16	80	24.94
Workers									
4 or Fewer	304	1,732	6	83	596	1,962	.34	831	15.33
5 to 9	115	1,083	9	35	248	2,165	.23	343	17.47
10 to 19	59	884	15	38	273	4,655	.31	362	22.69
20 to 49	54	1,499	28	72	516	9,565	.34	325	17.10
50 to 99	21	1,814	86	34	241	11,396	.13	186	24.63
100 to 249	17	1,700	99	57	401	23,278	.24	155	34.20
250 or More	11	3,888	340	39	276	24,128	.07	30	25.45

See footnote at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
RSE Column Factor	0.993	0.787	0.944	1.108	1.102	1.084	0.875	1.145	
Ownership and Occupancy									
Nongovernment Owned	498	8,758	18	242	1,726	3,465	0.20	141	14.28
Owner Occupied	400	6,942	17	200	1,431	3,580	.21	139	15.84
Single Establishment	355	5,553	16	176	1,256	3,534	.23	166	17.33
Multiple Establishment	44	1,389	31	24	175	3,955	.13	65	17.52
Nonowner Occupied	99	1,816	18	42	295	2,997	.16	153	25.84
Single Establishment	67	1,100	16	Q	134	Q	.12	137	37.09
Multiple Establishment	22	600	28	19	133	6,083	.22	149	26.72
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	83	3,842	47	115	824	9,973	.21	174	19.62
Federal	Q	Q	Q	Q	Q	Q	Q	Q	b
State	17	964	56	31	224	Q	.23	173	39.43
Local	59	2,487	42	79	562	9,611	.23	231	23.03
Multibuilding Facility									
Not on Multibuilding Facility	440	7,797	18	234	1,676	3,810	.21	170	13.72
Part of Multibuilding Facility	141	4,803	34	123	875	6,202	.18	124	21.98
On Facility with Central Plant	27	2,279	86	60	423	15,919	.19	100	35.37
Percent Vacant at Least Three Months									
0	499	8,968	18	284	2,028	4,064	.23	171	14.68
1 to 50	45	2,495	56	48	344	7,661	.14	76	18.54
51 to 99	14	719	51	14	101	7,260	.14	Q	37.09
100	23	419	Q	11	77	3,344	.18	477	34.71
Months in Use Out of Past 12 Months									
0 to 8	Q	Q	Q	Q	Q	Q	Q	Q	b
9 to 11	31	885	28	36	255	8,149	.29	491	33.88
12	530	11,166	21	309	2,203	4,157	.20	136	13.62
LOCATION									
Census Region									
Northeast	305	5,127	17	237	1,691	5,551	.33	280	18.22
Midwest	87	3,197	37	61	436	4,984	.14	108	21.21
South	156	2,844	18	50	357	Q	.13	103	31.02
West	33	1,432	44	Q	Q	Q	Q	Q	38.89
Census Division									
Northeast									
New England	104	1,892	18	92	659	6,352	.35	329	17.72
Middle Atlantic	201	3,235	16	145	1,032	5,138	.32	255	24.20
Midwest									
East North Central	56	1,948	35	38	272	4,887	.14	114	25.41
West North Central	32	1,249	39	23	164	Q	.13	Q	32.39
South									
South Atlantic	123	2,037	Q	42	301	Q	.15	126	32.08
East South Central	Q	Q	Q	Q	Q	Q	Q	Q	b
West South Central	Q	Q	Q	Q	Q	Q	Q	Q	b
West									
Mountain	Q	Q	Q	Q	Q	Q	Q	Q	b
Pacific	23	1,123	48	Q	Q	Q	Q	Q	28.80
Metropolitan Status									
Metropolitan	377	10,142	27	274	1,959	5,192	.19	134	13.69
Nonmetropolitan	203	2,458	12	83	591	2,903	.24	253	35.60

See footnote at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
RSE Column Factor	0.969	0.797	0.844	3.108	1.102	1.098	0.871	1.165	
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	89	1,870	21	65	469	5,258	0.25	203	20.26
5,500-7,000 HDD	186	3,922	21	137	978	5,256	.25	226	26.28
4,000-5,499 HDD	234	4,272	18	127	909	3,894	.21	157	17.03
Under 4,000 HDD	44	1,840	42	Q	Q	Q	Q	Q	28.46
2,000 CDD or More and --									
Under 4,000 HDD	Q	696	Q	Q	Q	Q	.08	Q	51.22
1989 Degree-Days									
Under 2,000 CDD and --									
Over 7,000 HDD	124	2,563	21	100	714	5,773	.28	235	28.41
5,500-7,000 HDD	214	5,122	24	148	1,058	4,952	.21	179	18.05
4,000-5,499 HDD	181	2,605	14	84	601	3,319	.23	159	22.10
Under 4,000 HDD	35	1,647	47	Q	Q	3,551	Q	Q	30.56
2,000 CDD or More and --									
Under 4,000 HDD	Q	663	Q	Q	Q	Q	Q	Q	50.39
STRUCTURE									
Floors									
1	265	2,277	9	101	724	2,735	.32	323	18.19
2	172	3,056	18	108	769	4,469	.25	241	24.44
3	98	2,044	21	75	540	5,504	.26	320	10.88
4 to 6	39	2,699	68	52	371	9,419	.14	89	24.05
7 or More	7	2,523	383	21	146	22,178	.06	26	25.64
Wall Materials									
Masonry	392	9,382	24	285	2,038	5,205	.22	172	14.33
Siding or Shingles	112	707	6	31	222	1,987	.31	Q	26.15
Metal Panels	50	665	13	17	125	2,484	.19	164	26.45
Concrete Panels	19	1,246	65	Q	Q	Q	.09	58	42.45
Window Glass	Q	452	Q	Q	Q	Q	.10	Q	38.50
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Roof Materials									
Built-Up	200	6,554	33	175	1,249	6,258	.19	123	15.57
Shingles (Not Wood)	206	2,145	10	72	519	2,521	.24	235	21.35
Metal Surfacing	100	822	8	34	241	2,415	.29	288	22.80
Synthetic or Rubber	40	1,777	45	59	420	10,622	.24	176	26.47
Slate or Tile	Q	Q	Q	Q	Q	3,349	Q	229	24.82
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation									
Features (Solely or in Combination)									
Roof or Ceiling Insulation	420	9,597	23	254	1,818	4,332	.19	129	13.98
Wall Insulation	275	6,374	23	148	1,056	3,836	.17	109	16.51
Storm or Multiple Glazing	269	6,723	25	160	1,151	4,284	.17	129	14.79
Tinted, Reflective, or Shading Glass	86	4,801	56	75	535	6,217	.11	67	18.00
Exterior or Interior Shadings or Awnings	178	5,764	32	130	931	5,242	.16	104	15.84
Weather Stripping or Caulking	378	9,440	25	244	1,751	4,637	.19	132	12.06
None of the Above	65	1,155	18	Q	308	Q	Q	Q	36.42

See footnote at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					Fuel Oil Price
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
RSE Column Factor:	0.888	0.707	0.844	1.108	1.102	1.099	0.000	0.000	
ENERGY SOURCES AND END USES*									
Energy Sources (Solely or in Combination)									
Electricity	580	12,579	22	355	2,538	4,372	0.20	150	15.88
Natural Gas	142	7,865	55	149	1,060	7,438	.13	93	15.89
Fuel Oil	581	12,600	22	357	2,550	4,391	.20	150	15.17
District Heat	9	1,413	150	Q	Q	10,476	Q	Q	15.88
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	64	1,475	Q	66	472	Q	.32	288	21.58
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Energy End Uses (Solely or in Combination)									
Heated Buildings	578	12,512	22	356	2,541	4,394	.20	151	15.19
Air-Conditioned Buildings	374	10,459	28	260	1,858	4,968	.18	122	15.00
Buildings with Water Heating	453	11,819	26	321	2,291	5,054	.19	143	15.58
Buildings with Cooking	141	6,236	44	150	1,070	7,601	.17	111	15.28
Buildings with Manufacturing	34	1,099	33	Q	Q	Q	Q	Q	24.88
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking									
	99	5,456	55	108	770	7,808	.14	89	23.94
With Water Heating, Without Cooking									
	231	4,603	20	139	993	4,305	.22	162	17.23
Without Water Heating or Cooking									
	Q	Q	Q	Q	Q	Q	Q	Q	b
Without Air Conditioning									
With Water Heating and Cooking									
	35	676	19	39	275	7,837	.41	483	21.08
With Water Heating, Without Cooking									
	87	1,020	12	35	246	2,833	.24	420	21.14
Without Water Heating or Cooking									
	79	417	5	21	149	1,900	.36	502	28.07
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking									
	--	--	--	--	--	--	--	--	--
All Other Combinations	Q	Q	Q	Q	Q	Q	Q	Q	b
Space-Heating Energy Source									
Fuel Oil	555	10,526	19	344	2,459	4,427	.23	197	15.34
Main									
	473	5,599	12	287	2,056	4,347	.37	360	15.97
With Secondary									
	74	1,146	16	59	423	5,743	.37	326	18.77
Electricity Only									
	41	465	11	27	192	4,652	.41	431	25.92
Other Energy Sources or Combinations									
	32	682	21	32	231	7,132	.34	271	27.08
With No Secondary									
	399	4,453	11	228	1,633	4,090	.37	370	15.88
Secondary									
	83	4,927	60	57	403	4,884	.08	60	25.41
Other Excluding Fuel Oil									
	23	1,986	87	Q	Q	Q	Q	Q	25.95
Building Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source									
Electricity	29	1,174	40	4	32	1,079	.03	18	40.43
Natural Gas	63	4,716	75	44	312	4,977	.07	45	25.83
Fuel Oil	473	5,599	12	287	2,056	4,347	.37	360	15.97
District Heat	6	933	159	Q	Q	Q	Q	Q	29.28
Propane	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					BSE Fuel Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
Air-Conditioning Energy Source									
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	370	10,287	28	257	1,837	4,959	0.18	123	15.20
Air-Conditioning Not Performed	207	2,141	10	97	692	3,346	.32	398	15.27
Water-Heating Energy Source									
Fuel Oil	126	2,284	18	124	885	7,005	.39	330	17.99
Other Excluding Fuel Oil	327	9,488	29	197	1,406	4,307	.15	106	16.41
Water Heating Not Performed	128	781	6	36	259	2,030	.33	Q	16.59
Cooking Energy Source									
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	139	6,090	44	137	974	7,007	.16	104	20.33
Cooking Not Performed	440	6,364	14	207	1,480	3,363	.23	201	13.73
Manufacturing Energy Source									
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	28	919	33	Q	Q	Q	Q	Q	36.99
Manufacturing Not Performed	547	11,501	21	309	2,216	4,048	.19	142	11.80
HEATING AND COOLING									
Percent Heated									
Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	75	995	13	27	196	2,592	.20	232	22.91
51 to 99	90	2,421	27	62	438	4,855	.18	119	39.92
100	410	9,081	22	264	1,891	4,613	.21	153	12.27
Percent Cooled									
Not Cooled	207	2,141	10	97	692	3,346	.32	398	16.27
1 to 50	175	3,702	21	146	1,038	5,927	.28	348	29.90
51 to 99	81	3,423	42	65	463	5,696	.14	81	24.83
100	118	3,333	28	50	358	3,038	.11	55	21.89
Heating Equipment (Solely or in Combination)									
Furnaces	284	2,785	10	99	706	2,484	.25	236	21.00
Boilers	242	8,267	34	282	2,013	8,320	.24	181	13.76
Individual Space Heaters	189	4,739	25	113	809	4,276	.17	122	21.04
Packaged Heating Units	30	1,889	64	28	197	6,648	.10	72	33.86
Heat Pumps	21	1,516	74	16	116	5,647	.08	34	26.15
Air Ducts	228	8,112	36	181	1,288	5,652	.16	97	19.98
Heating or Reheating Coils	45	5,186	116	89	632	14,157	.12	66	24.04
Fan-Coil Units	55	4,402	80	78	557	10,106	.13	71	19.02
Steam or Hot Water Radiators or Baseboards	191	6,453	34	216	1,540	8,049	.24	194	15.38
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooling Equipment (Solely or in Combination)									
Central Chillers	40	5,209	131	52	367	9,221	.07	38	22.89
Individual Air Conditioners	220	5,031	23	181	1,292	5,875	.26	197	16.13
Packaged Cooling Units	173	6,305	37	153	1,086	6,292	.17	110	18.66
Heat Pumps	29	1,514	52	17	123	4,210	.08	49	32.42
Air Ducts	149	7,317	49	131	932	6,236	.13	78	21.32
Fan-Coil Units	27	4,271	156	50	352	12,816	.08	39	27.98
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
RSE Column Factor	0.992	0.768	0.819	1.093	1.082	1.041	0.998	1.285	
Year Main Central Chiller Installed									
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	9	863	94	Q	Q	Q	Q	Q	22.68
1970 to 1979	10	1,121	114	Q	Q	Q	Q	Q	38.07
1980 to 1986	9	1,670	182	12	86	9,404	0.05	25	27.62
1987 to 1989	8	1,095	133	Q	Q	Q	Q	Q	29.64
Year Packaged Cooling System Installed									
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	28	905	32	Q	Q	Q	Q	Q	26.21
1970 to 1979	42	1,618	39	37	266	6,379	.16	113	26.02
1980 to 1986	56	1,974	35	48	347	6,141	.18	98	22.72
1987 to 1989	35	1,484	42	33	236	6,699	.16	103	34.29
Computer Area with Separate Air-Conditioning System									
Present in Building	57	5,487	96	92	657	11,480	.12	63	18.33
Not Present	524	7,113	14	265	1,893	3,616	.27	289	15.13
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	160	1,717	11	48	348	2,176	.20	340	16.67
51 to 99	137	3,766	27	102	725	5,280	.19	145	21.98
100	282	7,008	25	203	1,452	5,147	.21	133	17.13
Percent Lit When Closed									
Not Lit	307	4,317	14	154	1,100	3,585	.25	228	17.69
1 to 50	256	7,002	27	167	1,198	4,670	.17	123	17.81
51 to 99	15	1,041	71	29	208	14,112	.20	96	40.44
100	Q	Q	Q	Q	Q	Q	Q	Q	b
Lighting Equipment (Solely or in Combination)									
Incandescent Lamps	358	8,978	25	239	1,708	4,765	.19	132	18.58
Fluorescent Lamps	545	12,319	23	347	2,479	4,550	.20	147	13.01
High-Intensity Discharge Lamps	68	4,558	68	104	740	10,962	.16	123	21.98
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	164	6,321	39	147	1,045	6,382	.17	112	18.50
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	133	6,867	52	159	1,138	8,543	.17	109	18.79
Freezers	96	6,445	67	142	1,012	10,521	.16	102	21.46
Residential									
Refrigerators	375	10,351	28	290	2,073	5,527	.20	136	14.45
Freezers	91	3,306	36	81	574	6,281	.17	98	26.88
Ice-Making Machines	93	5,835	62	105	751	8,031	.13	71	24.40
Refrigerated Vending Machines	241	9,590	40	225	1,606	6,651	.17	113	15.54
Water Coolers	255	10,265	40	249	1,774	6,968	.17	119	13.78
Other	Q	605	Q	Q	Q	Q	.08	Q	46.19

See footnotes at end of table.

Table 47. Fuel Oil Consumption (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (million gallons)	Gallons			
						per Building	per Square Foot	per Worker	
All Buildings	6,908	0,709	0,919	1,093	1,082	1,041	0,989	1,265	
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	324	4,750	15	157	1,125	3,470	0.24	189	13.11
With Thermostats	284	4,287	15	143	1,025	3,608	.24	193	14.88
Any Control of Cooling	218	4,334	20	134	965	4,426	.22	156	16.08
With Thermostats	190	3,962	21	104	749	3,942	.19	132	16.79
Reduced Use During Off-Hours									
Heating Only	193	2,068	11	83	596	3,096	.29	332	14.88
Cooling Only	35	784	22	24	174	4,896	.22	171	26.75
Heating and Cooling	286	7,725	27	172	1,230	4,303	.16	115	16.18
Computerized Energy Management and Control System									
Present in Building	30	4,189	138	51	361	11,859	.09	48	22.75
Controls Heating and Cooling	30	3,987	133	50	360	12,035	.09	49	22.64
Controls Lighting	4	1,171	281	Q	Q	Q	Q	Q	26.40
Controls Other	3	917	305	Q	Q	Q	Q	Q	42.80
Other Energy Management									
Regular HVAC Maintenance	360	10,398	29	283	2,021	5,610	.19	137	14.43
Participated in Utility Conservation Program	65	3,478	53	64	457	7,003	.13	76	23.04
FUEL OIL DEMAND									
Annual Consumption (gallons)									
1,000 or less	231	4,181	18	12	84	364	.02	14	17.57
1,001 to 5,000	239	2,848	12	73	524	2,194	.18	143	16.75
5,001 to 10,000	62	1,355	22	61	439	7,097	.32	258	14.82
10,001 to 25,000	30	2,017	68	66	474	15,896	.23	214	14.99
Over 25,000	19	2,199	115	145	1,029	53,656	.47	324	22.76

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 48. Fuel Oil Expenditures

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				RSE Column Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
RSE Column Factor:	1.263	1.036	1.100	1.263	1.263	1.036	1.100	
All Buildings	581	12,600	22	1,822	3.1	0.14	0.71	19.34
Building Floorspace (Square Feet)								
1,001 to 5,000	302	821	3	351	1.2	.43	.82	8.80
5,001 to 10,000	97	698	7	232	2.4	.33	.78	17.34
10,001 to 25,000	95	1,495	16	378	4.0	.25	.77	19.40
25,001 to 50,000	36	1,319	37	233	6.5	.18	.69	13.22
50,001 to 100,000	23	1,675	72	251	10.7	.15	.65	18.11
100,001 to 200,000	17	2,228	135	198	12.0	.09	.61	16.97
200,001 to 500,000	6	1,798	289	126	20.2	.07	.63	18.88
Over 500,000	3	2,566	740	54	15.5	.02	.62	22.16
Year Constructed								
1899 or Before	31	406	13	96	3.1	.24	.78	21.24
1900 to 1919	35	809	23	138	4.0	.17	.75	24.26
1920 to 1945	137	2,460	18	377	2.7	.15	.76	14.20
1946 to 1959	141	2,068	15	404	2.9	.20	.73	18.44
1960 to 1969	95	2,275	24	349	3.7	.15	.68	20.20
1970 to 1979	90	2,399	27	288	3.2	.12	.66	18.29
1980 to 1983	21	935	44	50	2.4	.05	.70	23.20
1984 to 1986	12	576	50	26	2.3	Q	.71	25.24
1987 to 1989	19	671	Q	Q	Q	Q	.69	23.21
BUILDING USE								
Principal Building Activity								
Assembly	98	1,069	11	180	1.8	.17	.80	18.15
Education	38	2,209	59	331	8.8	.15	.65	18.31
Food Sales	Q	Q	Q	Q	Q	Q	Q	b
Food Service	Q	Q	Q	Q	Q	Q	Q	b
Health Care	13	1,397	109	72	Q	.05	.60	22.27
Lodging	15	573	39	52	3.5	.09	.73	23.18
Mercantile and Service	219	1,616	7	430	2.0	.27	.79	19.68
Office	67	2,909	44	232	3.5	.08	.75	17.08
Parking Garage	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	49	1,429	29	234	4.8	.16	.63	24.24
Other	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	b
Weekly Operating Hours								
39 or Fewer	91	758	8	144	1.6	.19	.78	17.17
40 to 48	129	2,649	20	331	2.6	.12	.71	18.22
49 to 60	138	2,369	17	296	2.1	.12	.76	18.18
61 to 84	86	1,789	21	364	4.2	.20	.75	18.18
85 to 167	75	2,200	29	391	5.2	.18	.69	21.18
168 (Open Continuously)	62	2,835	46	296	4.8	.10	.65	18.26
Workers								
4 or Fewer	304	1,732	6	475	1.6	.27	.80	18.24
5 to 9	115	1,083	9	201	1.7	.19	.81	19.20
10 to 19	59	884	15	203	3.5	.23	.75	18.45
20 to 49	54	1,499	28	365	6.8	.24	.71	18.20
50 to 99	21	1,814	86	164	7.7	.09	.68	18.26
100 to 249	17	1,700	99	241	14.0	.14	.60	25.22
250 or More	11	3,888	340	173	15.1	.04	.63	17.37

See footnote at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				BEE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
BEE Column Factor:	1,293	1,995	1,100	1,293	1,241	1,744	0,009	
Ownership and Occupancy								
Nongovernment Owned	498	8,758	18	1,282	2.6	0.15	0.74	10.02
Owner Occupied	400	6,942	17	1,069	2.7	.15	.75	11.71
Single Establishment	355	5,553	16	932	2.6	.17	.74	12.00
Multiple Establishment	44	1,389	31	137	3.1	.10	.78	14.07
Nonowner Occupied	99	1,816	18	213	2.2	.12	.72	10.74
Single Establishment	67	1,100	16	91	1.4	.08	.68	20.30
Multiple Establishment	22	600	28	103	4.7	.17	.78	21.10
Vacant	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	83	3,842	47	540	6.5	.14	.66	10.00
Federal	Q	Q	Q	Q	Q	Q	Q	b
State	17	964	56	145	Q	.15	.65	20.30
Local	59	2,487	42	370	6.3	.15	.66	17.62
Multibuilding Facility								
Not on Multibuilding Facility	440	7,797	18	1,231	2.8	.16	.73	10.07
Part of Multibuilding Facility	141	4,803	34	591	4.2	.12	.68	10.50
On Facility with Central Plant	27	2,279	86	262	9.9	.12	.62	27.00
Percent Vacant at Least Three Months								
0	499	8,968	18	1,447	2.9	.16	.71	11.20
1 to 50	45	2,495	56	244	5.4	.10	.71	10.00
51 to 99	14	719	51	76	5.4	.11	.75	20.70
100	23	419	Q	55	2.4	.13	.71	20.00
Months in Use Out of Past 12 Months								
0 to 8	Q	Q	Q	Q	Q	Q	Q	b
9 to 11	31	885	28	172	5.5	.19	.67	20.00
12	530	11,166	21	1,579	3.0	.14	.72	10.00
LOCATION								
Census Region								
Northeast	305	5,127	17	1,225	4.0	.24	.72	12.40
Midwest	87	3,197	37	310	3.5	.10	.71	10.00
South	156	2,844	18	241	Q	.08	.68	20.00
West	33	1,432	44	Q	1.4	Q	.70	20.00
Census Division								
Northeast								
New England	104	1,892	18	473	4.6	.25	.72	14.20
Middle Atlantic	201	3,235	16	752	3.7	.23	.73	10.00
Midwest								
East North Central	56	1,948	35	194	3.5	.10	.71	21.10
West North Central	32	1,249	39	116	3.6	.09	.71	24.00
South								
South Atlantic	123	2,037	Q	203	Q	.10	.67	20.00
East South Central	Q	Q	Q	Q	Q	Q	Q	b
West South Central	Q	Q	Q	Q	Q	Q	Q	b
West								
Mountain	Q	Q	Q	Q	Q	Q	Q	b
Pacific	23	1,123	48	Q	1.5	Q	.70	22.00
Metropolitan Status								
Metropolitan	377	10,142	27	1,414	3.7	.14	.72	10.10
Nonmetropolitan	203	2,458	12	408	2.0	.17	.69	20.00

See footnote at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	89	1,870	21	339	3.8	0.18	0.72	16.22
5,500-7,000 HDD	186	3,922	21	687	3.7	.18	.70	20.33
4,000-5,499 HDD	234	4,272	18	676	2.9	.16	.74	13.48
Under 4,000 HDD	44	1,840	42	Q	1.8	Q	.58	25.61
2,000 CDD or More and --								
Under 4,000 HDD	Q	696	Q	Q	Q	.05	.72	48.10
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	124	2,563	21	495	4.0	.19	.69	20.72
5,500-7,000 HDD	214	5,122	24	774	3.6	.15	.73	14.73
4,000-5,499 HDD	181	2,605	14	444	2.4	.17	.74	17.63
Under 4,000 HDD	35	1,647	47	Q	2.0	Q	.57	23.94
2,000 CDD or More and --								
Under 4,000 HDD	Q	663	Q	Q	Q	.06	.72	48.13
STRUCTURE								
Floors								
1	265	2,277	9	520	2.0	.23	.72	13.48
2	172	3,056	18	551	3.2	.18	.72	18.28
3	98	2,044	21	403	4.1	.20	.75	15.52
4 to 6	39	2,699	68	256	6.5	.09	.69	18.41
7 or More	7	2,523	383	92	14.0	.04	.63	18.49
Wall Materials								
Masonry	392	9,382	24	1,445	3.7	.15	.71	11.19
Siding or Shingles	112	707	6	173	1.6	.25	.78	19.13
Metal Panels	50	665	13	91	1.8	.14	.73	20.86
Concrete Panels	19	1,246	65	79	4.1	.06	.68	33.88
Window Glass	Q	452	Q	Q	Q	.07	.66	30.73
Other	Q	Q	Q	Q	Q	Q	Q	b
Roof Materials								
Built-Up	200	6,554	33	866	4.3	.13	.69	11.47
Shingles (Not Wood)	206	2,145	10	408	2.0	.19	.79	14.44
Metal Surfacing	100	822	8	180	1.8	.22	.75	17.72
Synthetic or Rubber	40	1,777	45	277	7.0	.16	.66	19.71
Slate or Tile	Q	Q	Q	Q	2.6	Q	.79	19.48
Concrete	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	420	9,597	23	1,307	3.1	.14	.72	11.01
Wall Insulation	275	6,374	23	760	2.8	.12	.72	12.43
Storm or Multiple Glazing	269	6,723	25	839	3.1	.12	.73	11.37
Tinted, Reflective, or Shading Glass	86	4,801	56	368	4.3	.08	.69	13.71
Exterior or Interior Shadings or Awnings	178	5,764	32	662	3.7	.11	.71	12.48
Weather Stripping or Caulking	378	9,440	25	1,268	3.4	.13	.72	8.48
None of the Above	65	1,155	18	204	3.1	.18	.66	35.23

See footnote at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
RSE Column Factor	1.283	1.036	1.100	1.363	1.241	1.144	0.353	
ENERGY SOURCES AND END USES*								
Energy Sources								
(Solely or in Combination)								
Electricity	580	12,579	22	1,814	3.1	0.14	0.71	10.30
Natural Gas	142	7,865	55	717	5.0	.09	.68	11.56
Fuel Oil	581	12,600	22	1,822	3.1	.14	.71	10.14
District Heat	9	1,413	150	Q	7.0	Q	.67	33.58
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	b
Propane	64	1,475	Q	323	5.1	.22	.68	25.13
Other	Q	Q	Q	Q	Q	Q	Q	b
Energy End Uses								
(Solely or in Combination)								
Heated Buildings	578	12,512	22	1,815	3.1	.15	.71	10.14
Air-Conditioned Buildings	374	10,459	28	1,321	3.5	.13	.71	12.48
Buildings with Water Heating	453	11,819	26	1,624	3.6	.14	.71	10.34
Buildings with Cooking	141	6,236	44	720	5.1	.12	.67	14.82
Buildings with Manufacturing	34	1,099	33	206	6.1	Q	.62	31.93
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and								
Cooking	99	5,456	55	513	5.2	.09	.67	18.30
With Water Heating,								
Without Cooking								
231	4,603	20	733	3.2	.16	.74	12.97	
Without Water Heating or								
Cooking								
Q	Q	Q	Q	Q	Q	Q	Q	b
Without Air Conditioning								
With Water Heating and								
Cooking								
35	676	19	187	5.3	.28	.68	18.70	
With Water Heating,								
Without Cooking								
87	1,020	12	184	2.1	.18	.75	16.95	
Without Water Heating or								
Cooking								
79	417	5	113	1.4	.27	.76	18.93	
Buildings Without Heating, Air								
Conditioning, Water Heating,								
or Cooking								
--	--	--	--	--	--	--	--	--
All Other Combinations								
Q	Q	Q	Q	Q	Q	Q	Q	b
Space-Heating Energy Source								
Fuel Oil	555	10,526	19	1,758	3.2	.17	.71	10.29
Main	473	5,599	12	1,483	3.1	.26	.72	10.67
With Secondary								
74	1,146	16	289	3.9	.25	.68	14.98	
Electricity Only								
41	465	11	137	3.3	.30	.72	19.74	
Other Energy Sources or								
Combinations								
32	682	21	151	4.7	.22	.65	20.53	
With No Secondary								
399	4,453	11	1,194	3.0	.27	.73	11.97	
Secondary								
83	4,927	60	275	3.3	.06	.68	18.75	
Other Excluding Fuel Oil								
23	1,986	87	Q	Q	Q	Q	.70	22.01
Building Not Heated								
Q	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source								
Electricity	29	1,174	40	25	Q	.02	.81	29.83
Natural Gas	63	4,716	75	207	3.3	.04	.66	17.69
Fuel Oil	473	5,599	12	1,483	3.1	.26	.72	10.67
District Heat	6	933	159	Q	Q	Q	.65	39.00
Propane	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
RSE Column Factor:	1.328	0.943	1.224	1.351	1.185	1.186	0.350	
Air-Conditioning Energy Source								
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	370	10,287	28	1,305	3.5	0.13	0.71	12.60
Air-Conditioning Not Performed	207	2,141	10	501	2.4	.23	.72	10.96
Water-Heating Energy Source								
Fuel Oil	126	2,284	18	631	5.0	.28	.71	13.78
Other Excluding Fuel Oil	327	9,488	29	993	3.0	.10	.71	12.44
Water Heating Not Performed	128	781	6	198	1.6	.25	.77	15.09
Cooking Energy Source								
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	139	6,090	44	664	4.8	.11	.68	15.22
Cooking Not Performed	440	6,364	14	1,102	2.5	.17	.74	10.48
Manufacturing Energy Source								
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	28	919	33	Q	6.0	Q	.64	43.03
Manufacturing Not Performed	547	11,501	21	1,616	3.0	.14	.73	9.24
HEATING AND COOLING								
Percent Heated								
Not Heated	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	75	995	13	151	2.0	.15	.77	16.49
51 to 99	90	2,421	27	291	3.2	.12	.66	23.06
100	410	9,081	22	1,362	3.3	.15	.72	9.27
Percent Cooled								
Not Cooled	207	2,141	10	501	2.4	.23	.72	10.96
1 to 50	175	3,702	21	726	4.1	.20	.70	15.89
51 to 99	81	3,423	42	326	4.0	.10	.70	18.97
100	118	3,333	28	269	2.3	.08	.75	14.45
Heating Equipment (Solely or in Combination)								
Furnaces	284	2,785	10	528	1.9	.19	.75	16.50
Boilers	242	8,267	34	1,388	5.7	.17	.69	10.22
Individual Space Heaters	189	4,739	25	564	3.0	.12	.70	15.47
Packaged Heating Units	30	1,889	64	124	4.2	.07	.63	24.58
Heat Pumps	21	1,516	74	81	3.9	.05	.70	18.07
Air Ducts	228	8,112	36	864	3.8	.11	.67	14.91
Heating or Reheating Coils	45	5,186	116	399	9.0	.08	.63	17.47
Fan-Coil Units	55	4,402	80	378	6.9	.09	.68	14.51
Steam or Hot Water Radiators or Baseboards	191	6,453	34	1,052	5.5	.16	.68	12.48
Other	Q	Q	Q	Q	Q	Q	Q	b
Cooling Equipment (Solely or in Combination)								
Central Chillers	40	5,209	131	244	6.1	.05	.66	17.04
Individual Air Conditioners	220	5,031	23	906	4.1	.18	.70	14.79
Packaged Cooling Units	173	6,305	37	745	4.3	.12	.69	14.12
Heat Pumps	29	1,514	52	88	3.0	.06	.71	23.74
Air Ducts	149	7,317	49	628	4.2	.09	.67	16.03
Fan-Coil Units	27	4,271	156	220	8.0	.05	.63	20.50
Other	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				Fuel Price Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
FSE Column Factor	1,328	0,943	1,224	1,331	1,188	1,188	0.284	
Year Main Central Chiller Installed								
1959 or Before	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	9	863	94	Q	Q	Q	0.63	14.25
1970 to 1979	10	1,121	114	Q	5.3	Q	.64	20.48
1980 to 1986	9	1,670	182	60	6.5	0.04	.69	22.32
1987 to 1989	8	1,095	133	Q	Q	Q	.75	12.97
Year Packaged Cooling System Installed								
1959 or Before	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	28	905	32	Q	Q	Q	.63	21.00
1970 to 1979	42	1,618	39	186	4.5	.12	.70	18.28
1980 to 1986	56	1,974	35	246	4.4	.12	.71	17.25
1987 to 1989	35	1,484	42	158	4.5	.11	.67	20.28
Computer Area with Separate Air-Conditioning System								
Present in Building	57	5,487	96	442	7.7	.08	.67	19.38
Not Present	524	7,113	14	1,380	2.6	.19	.73	17.40
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	160	1,717	11	280	1.8	.16	.81	11.95
51 to 99	137	3,766	27	498	3.6	.13	.69	17.34
100	282	7,008	25	1,027	3.6	.15	.71	12.84
Percent Lit When Closed								
Not Lit	307	4,317	14	787	2.6	.18	.72	12.85
1 to 50	256	7,002	27	873	3.4	.12	.73	13.45
51 to 99	15	1,041	71	132	9.0	.13	.64	20.18
100	Q	Q	Q	Q	Q	Q	Q	b
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	358	8,978	25	1,204	3.4	.13	.70	12.85
Fluorescent Lamps	545	12,319	23	1,767	3.2	.14	.71	9.58
High-Intensity Discharge Lamps	68	4,558	68	493	7.3	.11	.67	18.88
Other Lamps	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	164	6,321	39	732	4.5	.12	.70	13.79
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	133	6,867	52	765	5.7	.11	.67	14.25
Freezers	96	6,445	67	670	7.0	.10	.66	18.58
Residential								
Refrigerators	375	10,351	28	1,452	3.9	.14	.70	18.91
Freezers	91	3,306	36	379	4.1	.11	.66	21.28
Ice-Making Machines	93	5,835	62	502	5.4	.09	.67	18.25
Refrigerated Vending Machines	241	9,590	40	1,098	4.5	.11	.68	11.75
Water Coolers	255	10,265	40	1,217	4.8	.12	.69	16.40
Other	Q	605	Q	Q	Q	.05	.64	23.48

See footnotes at end of table.

Table 48. Fuel Oil Expenditures (Continued)

Building Characteristics	All Buildings Using Fuel Oil			Fuel Oil Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Gallon (dollars)	
RSE Column Factor	1.389	0.943	1.224	1.351	1.195	1.195	0.360	
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	324	4,750	15	837	2.6	0.18	0.74	10.20
With Thermostats	284	4,287	15	764	2.7	.18	.75	11.49
Any Control of Cooling	218	4,334	20	712	3.3	.16	.74	12.07
With Thermostats	190	3,962	21	562	3.0	.14	.75	10.35
Reduced Use During Off-Hours								
Heating Only	193	2,068	11	435	2.3	.21	.73	10.04
Cooling Only	35	784	22	132	3.7	.17	.76	20.00
Heating and Cooling	286	7,725	27	888	3.1	.11	.72	12.70
Computerized Energy Management and Control System								
Present in Building	30	4,189	138	229	7.5	.05	.63	16.37
Controls Heating and Cooling	30	3,987	133	228	7.6	.06	.63	16.30
Controls Lighting	4	1,171	281	Q	Q	Q	.63	18.10
Controls Other	3	917	305	Q	Q	Q	.68	51.88
Other Energy Management								
Regular HVAC Maintenance	360	10,398	29	1,415	3.9	.14	.70	11.00
Participated in Utility Conservation Program	65	3,478	53	321	4.9	.09	.70	17.20
FUEL OIL DEMAND								
Annual Consumption (gallons)								
1,000 or Less	231	4,181	18	73	.3	.02	.87	11.55
1,001 to 5,000	239	2,848	12	437	1.8	.15	.83	11.24
5,001 to 10,000	62	1,355	22	335	5.4	.25	.76	11.71
10,001 to 25,000	30	2,017	68	339	11.4	.17	.72	12.00
Over 25,000	19	2,199	115	638	33.3	.29	.62	16.85

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 49. Fuel Oil Consumption and Conditional Energy Intensity by Census Region

Building Characteristics	Total Fuel Oil Consumption (million gallons)				Total Floorspace of Buildings Using Fuel Oil (million square feet)				Fuel Oil Energy Intensity (gallons/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
Total Fuel Oil Consumption	1,696	446	376	Q	5,127	3,197	2,844	1,432	0.33	0.14	0.13	Q	
All Buildings	1,696	446	376	Q	5,127	3,197	2,844	1,432	0.33	0.14	0.13	Q	21.83
Building Floorspace (Square Feet)													
1,001 to 10,000	534	93	113	Q	879	180	Q	Q	.61	.52	.29	Q	30.80
10,001 to 100,000	775	243	164	Q	2,166	927	986	409	.36	.26	.17	0.11	28.44
Over 100,000	387	110	Q	Q	2,081	2,091	1,464	956	.19	.05	Q	Q	32.63
Year Constructed													
1945 or Before	633	112	Q	Q	2,291	841	Q	Q	.28	Q	Q	Q	31.12
1946 to 1959	349	106	98	Q	786	499	663	Q	.44	.21	.15	Q	33.71
1960 to 1969	358	61	Q	Q	1,018	553	539	Q	.35	.11	Q	Q	38.82
1970 to 1979	245	67	Q	Q	639	705	523	Q	.38	Q	.22	Q	40.04
1980 to 1989	112	Q	Q	Q	392	600	684	Q	.29	.17	Q	Q	47.25
BUILDING USE													
Principal Building Activity													
Assembly	151	Q	Q	Q	540	Q	297	Q	.28	Q	.14	Q	32.69
Education	296	97	Q	Q	974	735	Q	Q	.30	.13	Q	Q	40.55
Mercantile and Service	419	Q	Q	Q	943	Q	Q	Q	.44	Q	Q	Q	32.03
Office	202	Q	21	Q	971	573	633	733	.21	Q	Q	Q	37.97
Warehouse	195	Q	Q	Q	465	Q	Q	Q	.42	Q	Q	Q	55.90
Other	433	77	Q	Q	1,234	985	699	Q	.35	.08	.10	Q	32.49
Weekly Operating Hours													
48 or Fewer	378	120	149	Q	1,246	715	1,162	Q	.30	Q	.13	Q	31.14
49 to 84	646	144	90	Q	2,066	956	802	Q	.31	.15	.11	Q	26.74
85 to 168	672	182	Q	Q	1,815	1,527	880	812	.37	.12	.15	Q	29.38
Workers													
9 or Fewer	627	98	126	Q	1,546	301	836	Q	.41	.33	.15	Q	26.10
10 to 99	676	188	149	Q	1,962	1,195	779	Q	.34	Q	.19	Q	27.88
100 or More	393	161	Q	Q	1,619	1,702	1,229	1,039	.24	.09	Q	Q	35.48
Ownership and Occupancy													
Nongovernment Owned													
Nongovernment Owned	1,240	231	244	Q	3,565	2,127	2,072	995	.35	.11	.12	Q	23.95
Owner Occupied	1,051	202	168	Q	2,905	1,861	1,328	848	.36	.11	.13	Q	25.05
Single Establishment	892	193	160	Q	2,301	1,556	1,109	587	.39	.12	.14	Q	28.95
Multiple Establishment	159	10	Q	Q	604	305	Q	Q	.26	.03	Q	Q	31.05
Nonowner Occupied	189	Q	Q	Q	660	Q	Q	Q	.29	Q	Q	Q	31.39
Single Establishment	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Multiple Establishment	125	Q	Q	Q	386	Q	Q	Q	.32	Q	Q	Q	33.97
Vacant	Q	Q	Q	Q	Q	Q	Q	NC	Q	Q	Q	NC	b
Government Owned													
Government Owned	456	215	131	Q	1,562	1,071	772	Q	.29	.20	.17	Q	36.70
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
State	Q	Q	Q	Q	Q	Q	Q	Q	.25	Q	Q	Q	79.86
Local	327	121	Q	Q	1,021	772	438	Q	.32	.16	.23	Q	39.94
Multibuilding Facility													
Not on Multibuilding Facility	1,184	230	246	Q	3,715	1,551	1,865	665	.32	.15	.13	Q	23.96
Part of Multibuilding Facility	512	216	130	Q	1,411	1,646	979	767	.36	.13	.13	Q	34.80
On Facility with Central Plant	Q	Q	Q	Q	590	842	375	Q	Q	Q	Q	Q	48.64
Percent Vacant at Least Three Months													
0	1,312	372	307	Q	3,542	2,418	1,951	1,057	.37	.15	.16	Q	24.27
1 to 50	241	Q	Q	Q	898	653	574	Q	.27	.10	.07	Q	37.98
51 to 99	Q	Q	Q	Q	Q	Q	Q	NC	Q	Q	Q	NC	b
100	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 49. Fuel Oil Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)				Total Floorspace of Buildings Using Fuel Oil (million square feet)				Fuel Oil Energy Intensity (gallons/sq. ft.)				RSE Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	0.816	1.093	1.335	0.999	0.677	0.762	0.968	1.321	0.884	1.082	1.328	1.022	
Months in Use Out of Past 12 Months													
0 to 8	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
9 to 11	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
12	1,476	412	292	Q	4,339	3,093	2,417	1,317	0.34	0.13	0.12	Q	52.74
LOCATION													
Metropolitan Status													
Metropolitan	1,390	317	221	Q	4,405	2,613	1,847	1,277	.32	.12	.12	Q	34.09
Nonmetropolitan	Q	130	154	Q	Q	585	997	Q	.42	.22	Q	Q	41.48
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	220	249	NC	Q	763	1,028	NC	Q	.29	.24	NC	Q	17.27
5,500-7,000 HDD	856	118	NC	Q	2,199	1,476	NC	Q	.39	.08	NC	Q	37.59
4,000-5,499 HDD	620	Q	191	Q	2,165	Q	1,268	Q	.29	Q	.15	Q	24.08
Under 4,000 HDD	NC	NC	Q	Q	NC	NC	989	851	NC	NC	Q	Q	26.37
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	Q	Q	NC	NC	587	Q	NC	NC	Q	Q	40.28
STRUCTURE													
Floors													
1	397	155	Q	Q	952	530	674	Q	.42	.29	Q	Q	37.88
2	546	136	Q	Q	1,307	638	711	Q	.42	.21	.11	Q	35.18
3	364	95	70	Q	1,113	421	386	Q	.33	.23	.18	Q	38.09
4 to 6	285	Q	Q	Q	991	812	Q	Q	.29	Q	Q	Q	38.87
7 or More	103	14	Q	Q	764	796	470	493	Q	.02	Q	Q	34.15
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	1,163	378	254	Q	3,650	2,585	2,157	1,205	.32	.15	.12	Q	34.88
Wall Insulation	669	213	Q	Q	2,175	1,872	1,505	822	.31	.11	.11	Q	30.41
Storm or Multiple Glazing	762	291	96	Q	2,613	2,285	1,211	Q	.29	.13	.08	Q	33.54
Tinted, Reflective, or Shading Glass	368	75	79	Q	1,234	1,422	1,323	821	.30	.05	.06	Q	29.37
Exterior or Interior Shadings or Awnings	636	141	135	Q	2,183	1,597	1,171	813	.29	.09	.12	Q	28.85
Weather Stripping or Caulking	1,151	354	224	Q	3,602	2,771	2,131	936	.32	.13	.11	Q	32.88
None of the Above	Q	Q	Q	Q	464	Q	Q	Q	Q	Q	Q	Q	38.88
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	1,683	446	374	Q	5,105	3,197	2,844	1,432	.33	.14	.13	Q	52.38
Natural Gas	634	222	Q	Q	2,444	2,452	1,788	1,181	.26	.09	.10	Q	37.89
Fuel Oil	1,691	436	357	Q	5,127	3,197	2,844	1,432	.33	.14	.13	Q	29.83
District Heat	68	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	28.57
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Propane	279	Q	Q	Q	711	Q	Q	Q	.39	Q	Q	Q	34.78
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Energy End Uses (Solely or in Combination)													
Heated Buildings	1,695	445	372	Q	5,127	3,197	2,817	1,370	.33	.14	.13	Q	31.89
Air-Conditioned Buildings	1,150	340	349	Q	3,824	2,896	2,426	1,313	.30	.12	.14	0.04	24.22
Buildings with Water Heating	1,529	413	310	Q	4,795	3,108	2,534	1,382	.32	.13	.12	Q	22.78
Buildings with Cooking	758	157	123	Q	2,395	1,737	1,219	885	.32	.09	.10	Q	28.88
Buildings with Manufacturing	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5

See footnotes at end of table.

Table 49. Fuel Oil Consumption and Conditional Energy Intensity by Census Region (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)				Total Floorspace of Buildings Using Fuel Oil (million square feet)				Fuel Oil Energy Intensity (gallons/sq. ft.)				RSE Row Factor
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	0.818	1.093	1.335	2.999	0.677	0.792	0.996	1.321	0.584	1.502	1.120	1.633	
Space-Heating Energy Source													
Fuel Oil	1,633	434	349	Q	4,772	2,746	2,314	694	0.34	0.16	0.15	Q	22.78
Main	1,556	230	244	Q	3,860	518	1,117	Q	.40	.44	.22	Q	25.78
With Secondary	326	Q	Q	Q	732	Q	Q	Q	.45	Q	Q	Q	37.93
Electricity Only	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Energy Sources or Combinations	190	Q	Q	Q	498	Q	Q	Q	.38	Q	Q	Q	43.31
With No Secondary	1,230	190	190	Q	3,129	396	852	Q	.39	.48	.22	Q	26.72
Secondary	77	204	Q	Q	912	2,227	1,198	Q	.08	.09	.09	Q	38.02
Other Excluding Fuel Oil	Q	Q	Q	Q	355	452	503	676	Q	.02	Q	Q	38.04
Building Not Heated	Q	Q	Q	Q	NC	NC	Q	Q	NC	NC	Q	Q	b
Main Space-Heating Energy Source													
Electricity	Q	Q	13	Q	Q	Q	Q	Q	Q	Q	.02	Q	32.26
Natural Gas	73	133	Q	Q	671	2,119	994	932	.11	.06	Q	Q	37.98
Fuel Oil	1,556	230	244	Q	3,860	518	1,117	Q	.40	.44	.22	Q	25.78
District Heat	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	Q	Q	Q	Q	Q	NC	NC	Q	Q	NC	NC	b
Other	Q	Q	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	b
Water-Heating Energy Source													
Fuel Oil	732	Q	Q	Q	1,747	Q	Q	Q	.42	Q	Q	Q	26.09
Other Excluding Fuel Oil	793	347	216	Q	3,048	2,923	2,261	1,256	.26	.12	.10	Q	26.34
Water Heating Not Performed	167	Q	Q	Q	331	Q	Q	Q	.50	Q	Q	Q	33.27
HEATING AND COOLING													
Percent Heated													
Not Heated	Q	Q	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	b
1 to 50	93	Q	Q	Q	436	Q	Q	Q	.21	Q	Q	Q	42.11
51 to 99	289	Q	Q	Q	696	Q	704	Q	Q	Q	Q	Q	46.82
100	1,298	326	241	Q	3,983	2,409	1,912	777	.33	.14	.13	Q	22.28
Percent Cooled													
Not Cooled	546	Q	Q	Q	1,302	Q	Q	Q	.42	Q	Q	Q	22.18
1 to 50	726	175	Q	Q	2,090	995	456	Q	.35	.18	.30	Q	32.41
51 to 99	228	119	Q	Q	859	1,049	958	557	.26	.11	.11	Q	35.27
100	196	46	105	Q	875	852	1,012	Q	.22	Q	.10	Q	37.25
LIGHTING													
Percent Lit When Open													
Not Lit	Q	Q	Q	Q	Q	Q	NC	NC	Q	Q	NC	NC	b
1 to 50	250	Q	Q	Q	730	Q	Q	Q	.34	Q	Q	Q	32.87
51 to 99	436	145	Q	Q	1,368	940	871	588	.32	.15	Q	Q	34.26
100	987	252	205	Q	2,942	1,877	1,424	765	.34	Q	.14	Q	27.69

Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 50. Fuel Oil Expenditures by Census Region

Building Characteristics	Total Fuel Oil Expenditures (million dollars)				Fuel Oil Expenditures (dollars)								RSE Flow Factor
					per Gallon				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Header	1989	1988	1987	1986	1989	1988	1987	1986	1989	1988	1987	1986	
All Buildings	1,225	310	241	Q	0.72	0.71	0.68	0.70	0.24	0.10	0.08	Q	15.35
Building Floorspace (Square Feet)													
1,001 to 10,000	430	65	79	Q	.81	.77	.80	Q	.49	.36	.20	Q	14.37
10,001 to 100,000	552	167	114	Q	.71	.70	.71	.69	.25	.18	.12	0.07	15.00
Over 100,000	243	77	Q	Q	.63	.70	.49	.65	.12	.04	.03	Q	13.75
Year Constructed													
1945 or Before	483	76	Q	Q	.77	.70	Q	Q	.21	Q	Q	Q	19.01
1946 to 1959	259	71	69	Q	.74	.68	.73	Q	.33	.14	.10	Q	15.82
1960 to 1969	236	44	Q	Q	.66	.75	.68	Q	.23	.08	Q	Q	20.22
1970 to 1979	171	49	Q	Q	.70	.75	.54	Q	.27	Q	.11	Q	20.92
1980 to 1989	75	Q	Q	Q	.68	.71	.68	Q	.19	Q	.02	Q	20.58
BUILDING USE													
Principal Building Activity													
Assembly	121	Q	Q	Q	.80	Q	.80	Q	.22	Q	.11	Q	14.15
Education	196	61	Q	Q	.66	.63	Q	Q	.20	.08	Q	Q	22.56
Mercantile and Service	326	Q	Q	Q	.78	Q	Q	Q	.35	Q	Q	Q	18.04
Office	154	Q	14	Q	.77	.71	.76	.70	.16	Q	Q	Q	14.09
Warehouse	122	Q	Q	Q	.63	Q	Q	Q	.26	Q	Q	Q	20.34
Other	305	54	42	Q	.71	.72	.64	Q	.25	.05	.06	Q	20.47
Weekly Operating Hours													
48 or Fewer	281	79	Q	Q	.75	.69	.72	Q	.23	Q	.09	Q	18.04
49 to 84	487	102	Q	Q	.76	.73	.77	Q	.24	.11	.08	Q	14.96
85 to 168	456	129	Q	Q	.68	.71	.57	.67	.25	.08	.09	Q	24.72
Workers													
9 or Fewer	497	70	94	Q	.80	.78	.84	Q	.32	.23	.11	Q	18.01
10 to 99	491	128	98	Q	.73	.69	.68	Q	.25	.11	.13	Q	19.80
100 or More	237	112	Q	Q	.60	.70	.49	.67	.15	.07	.04	Q	22.46
Ownership and Occupancy													
Nongovernment Owned													
Owner Occupied	928	165	158	Q	.75	.74	.69	.75	.26	.08	.08	.03	19.25
Single Establishment	783	144	118	Q	.75	.74	.75	.76	.27	.08	.09	Q	18.06
Multiple Establishment	659	137	113	Q	.74	.73	.75	.76	.29	.09	.10	Q	18.02
Nonowner Occupied	124	Q	Q	Q	.78	.76	Q	Q	.20	.02	Q	Q	18.48
Single Establishment	145	Q	Q	Q	.77	Q	Q	Q	.22	Q	Q	Q	18.06
Multiple Establishment	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
Vacant	96	Q	Q	Q	.77	Q	Q	Q	.25	Q	Q	Q	22.21
Government Owned	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	5
Government Owned	297	145	84	Q	.65	.68	.65	Q	.19	.14	.11	Q	22.49
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5
State	Q	Q	Q	Q	.61	Q	Q	Q	.16	Q	Q	Q	20.01
Local	216	81	Q	Q	.66	.67	.64	Q	.21	.10	.14	Q	21.99
Multibuilding Facility													
Not on Multibuilding Facility	889	158	158	Q	.75	.71	.67	.69	.24	.10	.08	Q	18.14
Part of Multibuilding Facility	335	152	84	Q	.66	.71	.68	.71	.24	.09	.09	Q	22.56
On Facility with Central Plant	Q	Q	Q	Q	.56	.69	.62	Q	Q	Q	Q	Q	19.46
Percent Vacant at Least Three Months													
0	952	258	194	Q	.73	.71	.66	.70	.27	.11	.10	Q	18.04
1 to 50	174	Q	23	Q	.72	.71	.61	Q	.19	.07	.04	Q	17.96
51 to 99	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	5
100	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	5

See footnotes at end of table.

Table 50. Fuel Oil Expenditures by Census Region (Continued)

Building Characteristics	Total Fuel Oil Expenditures (million dollars)				Fuel Oil Expenditures (dollars)								RSE Row Factor
					per Gallon				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
Base Census Region	1,259	1,582	1,970	2,741	0.277	0.492	0.466	0.298	0.891	1.506	1.563	2.597	
Months in Use Out of Past 12 Months													
0 to 8	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
9 to 11	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
12	1,073	286	183	Q	0.73	0.71	0.66	0.73	0.25	0.09	0.08	Q	15.44
LOCATION													
Metropolitan Status													
Metropolitan	1,013	222	142	Q	.73	.72	.68	.67	.23	.08	.08	Q	15.55
Nonmetropolitan	Q	88	99	Q	.69	.70	.67	Q	.29	.15	.10	Q	28.67
Climate Zone: 45-Year Average													
Under 2,000 CDD and --													
Over 7,000 HDD	164	172	NC	Q	.75	.70	NC	Q	.22	.17	NC	Q	16.81
5,500-7,000 HDD	598	80	NC	Q	.70	.72	NC	Q	.27	.05	NC	Q	25.64
4,000-5,499 HDD	462	Q	139	Q	.75	Q	.74	Q	.21	Q	.11	Q	14.46
Under 4,000 HDD	NC	NC	Q	Q	NC	NC	.57	.67	NC	NC	.07	Q	34.44
2,000 CDD or More and --													
Under 4,000 HDD	NC	NC	Q	Q	NC	NC	.70	Q	NC	NC	Q	Q	47.45
STRUCTURE													
Floors													
1	297	109	Q	Q	.75	.73	.63	Q	.31	.21	.15	Q	18.08
2	391	94	Q	Q	.72	.70	.73	Q	.30	.15	.08	Q	22.07
3	274	65	54	Q	.75	.69	.79	Q	.25	.15	.14	Q	21.56
4 to 6	196	Q	Q	Q	.69	.71	Q	Q	.20	Q	Q	Q	24.50
7 or More	67	10	Q	Q	.65	.72	.52	.63	Q	.01	Q	Q	20.04
Building Shell Conservation Features (Solely or in Combination)													
Roof or Ceiling Insulation	853	263	159	Q	.74	.71	.66	.68	.23	.10	.07	Q	16.81
Wall Insulation	490	151	106	Q	.74	.73	.65	.67	.23	.08	.07	Q	19.88
Storm or Multiple Glazing	562	203	65	Q	.74	.71	.71	Q	.22	.09	.05	Q	17.30
Tinted, Reflective, or Shading Glass	255	53	48	Q	.69	.72	.65	.61	.21	.04	.04	Q	20.06
Exterior or Interior Shadings or Awnings	460	96	85	Q	.73	.70	.66	.69	.21	.06	.07	Q	16.44
Weather Stripping or Caulking	840	246	152	Q	.73	.71	.71	.70	.23	.09	.07	Q	15.88
None of the Above	160	Q	Q	Q	.65	Q	Q	Q	.34	Q	Q	Q	55.77
ENERGY SOURCES AND END USES *													
Energy Sources (Solely or in Combination)													
Electricity	1,216	310	241	Q	.72	.71	.68	.70	.24	.10	.08	Q	15.88
Natural Gas	438	150	102	Q	.69	.70	.59	.65	.18	.06	.06	Q	20.63
Fuel Oil	1,225	310	241	Q	.72	.71	.68	.70	.24	.10	.08	Q	16.38
District Heat	46	Q	Q	Q	.68	Q	Q	Q	Q	Q	Q	Q	26.25
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	201	Q	Q	Q	.72	Q	Q	Q	.28	Q	Q	Q	25.16
Other	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	b
Energy End Uses (Solely or in Combination)													
Heated Buildings	1,225	310	241	Q	.72	.71	.68	.68	.24	.10	.09	Q	14.62
Air-Conditioned Buildings	829	237	223	32	.72	.71	.67	.71	.22	.08	.09	0.02	18.06
Buildings with Water Heating	1,098	285	197	Q	.72	.70	.66	.69	.23	.09	.08	Q	16.38
Buildings with Cooking	516	102	77	Q	.68	.66	.64	.68	.22	.06	.06	Q	21.11
Buildings with Manufacturing	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 50. Fuel Oil Expenditures by Census Region (Continued)

Building Characteristics	Total Fuel Oil Expenditures (million dollars)				Fuel Oil Expenditures (dollars)								RSE Row Factor
					per Gallon				per Square Foot				
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West	
RSE Column Factor:	1.235	1.582	1.970	2.741	0.277	0.462	0.459	0.295	0.891	1.509	1.589	2.597	
Space-Heating Energy Source													
Fuel Oil	1,184	309	236	Q	0.73	0.71	0.67	0.68	0.25	0.11	0.10	Q	15.00
Main	1,129	163	173	Q	.73	.71	.71	Q	.29	.31	.15	Q	15.99
With Secondary	226	Q	Q	Q	.69	Q	Q	Q	.31	Q	Q	Q	21.29
Electricity Only	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Energy Sources or Combinations	128	Q	Q	Q	.67	Q	Q	Q	.26	Q	Q	Q	23.14
With No Secondary	903	137	138	Q	.73	.72	.72	Q	.29	.35	.16	Q	15.71
Secondary	56	146	Q	Q	.72	.71	.59	Q	.06	.07	.05	Q	20.89
Other Excluding Fuel Oil	Q	Q	Q	Q	.70	.76	.76	.68	Q	c	Q	Q	22.81
Building Not Heated	NC	NC	Q	Q	NC	NC	Q	Q	NC	NC	Q	Q	b
Main Space-Heating Energy Source													
Electricity	Q	Q	Q	Q	Q	Q	.77	Q	Q	Q	.01	Q	16.88
Natural Gas	51	91	Q	Q	.73	.72	.52	.68	.08	.04	.05	Q	29.74
Fuel Oil	1,129	163	173	Q	.73	.71	.71	Q	.29	.31	.15	Q	15.33
District Heat	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	Q	Q	NC	NC	Q	Q	NC	NC	Q	Q	NC	NC	b
Other	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	b
Water-Heating Energy Source													
Fuel Oil	533	Q	Q	Q	.73	Q	Q	Q	.31	Q	Q	Q	13.67
Other Excluding Fuel Oil	565	248	146	Q	.71	.72	.68	.67	.19	.08	.06	Q	18.52
Water Heating Not Performed	127	Q	Q	Q	.77	Q	Q	Q	.38	Q	Q	Q	22.04
HEATING AND COOLING													
Percent Heated													
Not Heated	Q	NC	Q	Q	Q	NC	Q	Q	Q	NC	Q	Q	b
1 to 50	74	Q	Q	Q	.80	Q	Q	Q	.17	Q	Q	Q	23.56
51 to 99	199	Q	Q	Q	.69	Q	.60	Q	.29	Q	.10	Q	42.89
100	941	226	163	Q	.73	.71	.71	.68	.24	.09	.09	Q	13.82
Percent Cooled													
Not Cooled	395	Q	Q	Q	.73	Q	Q	Q	.30	Q	Q	Q	12.23
1 to 50	516	121	82	Q	.71	.70	.63	Q	.25	.12	.18	Q	23.09
51 to 99	165	83	69	Q	.73	.71	.64	.78	.19	.08	.07	Q	24.16
100	148	33	72	Q	.76	.77	.75	Q	.17	Q	.07	Q	16.20
LIGHTING													
Percent Lit When Open													
Not Lit	Q	Q	NC	NC	Q	Q	NC	NC	Q	Q	NC	NC	b
1 to 50	200	Q	Q	Q	.80	Q	Q	Q	.27	Q	Q	Q	15.14
51 to 99	311	100	68	Q	.71	.70	.58	.66	.23	.11	.08	Q	21.27
100	700	175	133	Q	.71	.71	.68	.71	.24	.09	.09	Q	18.94

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Value rounds to zero in the units displayed.

NC No cases in responding sample.

Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)			RSE Row Factor
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor	0.999	0.992	1.719	0.795	0.889	1.018	0.829	0.794	1.008	
All Buildings	2,459.3	2,056.3	403.0	10,526	5,599	4,927	0.23	0.37	0.08	15.42
Building Floorspace (Square Feet)										
1,001 to 5,000	419.0	400.4	Q	802	743	Q	.52	.54	Q	19.71
5,001 to 10,000	296.2	272.7	Q	682	563	Q	.43	.48	Q	36.36
10,001 to 25,000	479.1	441.3	Q	1,380	1,125	Q	.35	.39	Q	19.36
25,001 to 50,000	325.6	316.1	9.5	1,216	887	329	.27	.36	.03	24.45
50,001 to 100,000	383.1	266.9	116.2	1,450	744	706	.26	.36	Q	36.23
100,001 to 200,000	314.8	Q	Q	1,816	Q	921	.17	Q	Q	38.44
200,001 to 500,000	157.7	Q	76.7	1,290	Q	1,051	.12	Q	.07	29.78
Over 500,000	83.8	Q	24.3	1,891	Q	1,489	.04	Q	Q	35.72
Year Constructed										
1899 or Before	123.2	121.8	Q	406	291	Q	.30	.42	Q	36.01
1900 to 1919	177.2	154.5	Q	794	567	Q	.22	.27	Q	39.24
1920 to 1945	491.9	455.9	Q	2,398	1,544	853	.21	.30	Q	22.10
1946 to 1959	548.3	482.4	Q	1,868	1,172	697	.29	.41	Q	24.94
1960 to 1969	498.4	421.8	76.5	2,051	1,002	1,050	.24	.42	.07	28.53
1970 to 1979	417.4	330.5	Q	1,640	733	907	.25	.45	Q	29.82
1980 to 1983	67.2	Q	Q	668	Q	Q	.10	Q	Q	36.80
1984 to 1986	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
BUILDING USE										
Principal Building Activity										
Assembly	225.7	203.6	Q	1,022	791	Q	.22	.26	Q	23.27
Education	506.4	434.1	72.3	2,152	1,205	947	.24	.36	.08	27.14
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Food Service	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Health Care	112.4	Q	45.6	1,198	Q	1,065	.09	Q	.04	30.84
Lodging	60.0	Q	Q	404	Q	Q	.15	Q	Q	46.44
Mercantile and Service	535.5	503.8	Q	1,444	1,099	Q	.37	.46	Q	22.27
Office	294.8	259.2	35.5	1,819	723	1,095	.16	.36	.03	28.82
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	362.9	222.7	Q	1,342	819	Q	.27	.27	Q	42.23
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Weekly Operating Hours										
39 or Fewer	183.5	181.3	Q	749	635	Q	.25	.29	Q	23.23
40 to 48	466.9	395.2	Q	2,484	1,267	1,218	.19	.31	Q	24.10
49 to 60	385.5	362.1	Q	1,868	1,316	552	.21	.28	.04	22.06
61 to 84	472.8	416.4	Q	1,478	908	570	.32	.46	.10	24.82
85 to 167	558.3	378.9	Q	1,928	1,004	924	.29	.38	.19	30.17
168 (Open Continuously)	392.3	322.4	69.9	2,019	469	1,550	.19	.69	.05	28.15
Workers										
4 or Fewer	587.2	563.6	Q	1,702	1,467	Q	.34	.38	Q	20.52
5 to 9	244.4	225.4	Q	1,023	833	Q	.24	.27	Q	23.30
10 to 19	272.2	233.9	Q	866	579	Q	.31	.40	Q	29.31
20 to 49	500.6	464.5	Q	1,365	962	403	.37	.48	Q	22.01
50 to 99	236.1	179.5	Q	1,493	783	Q	.16	.23	Q	37.17
100 to 249	389.5	Q	Q	1,414	517	897	.28	.43	Q	39.67
250 or More	229.3	Q	64.8	2,664	Q	2,206	.09	Q	.03	29.69

See footnote at end of table.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)			RSE Row Factor
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.909	0.892	1.719	0.759	0.889	1.019	0.809	0.794	1.006	
Ownership and Occupancy										
Nongovernment Owned	1,683.1	1,424.5	258.6	7,223	4,021	3,203	0.23	0.35	0.08	17.15
Owner Occupied	1,397.5	1,193.3	204.3	5,686	3,057	2,629	.25	.39	.08	17.76
Single Establishment	1,226.9	1,036.6	190.4	4,817	2,645	2,172	.25	.39	.09	26.27
Multiple Establishment	170.6	156.7	13.9	869	413	456	.20	.38	.03	20.23
Nonowner Occupied	285.6	231.2	Q	1,537	963	Q	.19	.24	Q	26.63
Single Establishment	Q	77.0	Q	933	539	Q	.14	.14	Q	40.89
Multiple Establishment	130.0	Q	Q	489	Q	Q	.27	Q	Q	26.62
Vacant	Q	Q	NC	Q	Q	Q	Q	Q	NC	b
Government Owned	776.2	631.8	144.4	3,303	1,578	1,725	.23	.40	.08	25.09
Federal	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
State	184.2	Q	Q	794	Q	Q	Q	Q	Q	48.34
Local	560.3	479.0	81.3	2,245	1,179	1,065	.25	.41	.08	27.76
Multibuilding Facility										
Not on Multibuilding Facility	1,644.0	1,448.4	Q	6,659	4,236	2,423	.25	.34	.08	14.89
Part of Multibuilding Facility	815.3	607.9	207.4	3,867	1,362	2,505	.21	.45	.08	25.54
On Facility with Central Plant	Q	Q	148.6	1,845	Q	1,518	Q	Q	.10	31.29
LOCATION										
Census Region										
Northeast	1,632.7	1,555.6	77.1	4,772	3,860	912	.34	.40	.08	20.16
Midwest	434.2	230.0	204.2	2,746	518	2,227	.16	.44	.09	23.97
South	349.4	243.7	Q	2,314	1,117	1,198	.15	.22	.09	34.83
West	Q	Q	Q	694	Q	Q	Q	Q	Q	55.32
Census Division										
Northeast										
New England	649.7	611.7	Q	1,838	1,611	Q	.35	.38	Q	17.52
Middle Atlantic	983.0	943.9	39.1	2,934	2,250	684	.34	.42	.06	27.30
Midwest										
East North Central	271.0	115.1	155.9	1,626	320	1,305	.17	.36	.12	28.89
West North Central	163.2	Q	Q	1,120	Q	922	Q	Q	Q	33.28
South										
South Atlantic	296.1	212.5	Q	1,754	1,012	742	.17	.21	Q	38.25
East South Central	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
West South Central	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
West										
Mountain	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Pacific	Q	Q	Q	476	Q	Q	Q	Q	Q	65.94
Metropolitan Status										
Metropolitan	1,879.9	1,596.0	283.9	8,296	4,140	4,156	.23	.39	.07	14.37
Nonmetropolitan	579.4	460.3	Q	2,230	1,459	771	.26	.32	.15	38.74
Climate Zone: 45-Year Average										
Under 2,000 CDD and --										
Over 7,000 HDD	459.5	361.3	Q	1,753	1,006	746	.26	.36	Q	18.83
5,500-7,000 HDD	939.1	811.6	127.5	3,343	1,775	1,569	.28	.46	.08	25.05
4,000-5,499 HDD	892.2	793.9	Q	3,889	2,345	1,544	.23	.34	.06	19.47
Under 4,000 HDD	Q	Q	Q	1,165	Q	771	Q	Q	Q	38.58
2,000 CDD or More and --										
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)			RSE Row Factor
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Percent	0.900	0.892	1.710	0.700	0.695	1.010	0.820	0.734	1.960	
1989 Degree-Days										
Under 2,000 CDD and --										
Over 7,000 HDD	670.1	556.5	Q	2,308	1,306	1,002	0.29	0.43	Q	33.15
5,500-7,000 HDD	1,047.0	872.2	174.8	4,544	2,273	2,272	.23	.38	0.08	18.07
4,000-5,499 HDD	589.4	553.8	Q	2,312	1,596	717	.25	.35	Q	25.09
Under 4,000 HDD	Q	Q	Q	986	Q	640	Q	Q	Q	33.97
2,000 CDD or More and --										
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
STRUCTURE										
Floors										
1	714.0	593.5	Q	2,030	1,386	643	.35	.43	Q	19.28
2	756.8	617.7	139.0	2,726	1,740	986	.28	.35	.14	28.08
3	493.7	442.7	Q	1,835	1,265	570	.27	.35	Q	21.98
4 to 6	353.7	286.9	66.8	2,205	818	1,387	.16	.35	.05	27.10
7 or More	141.1	Q	25.6	1,730	Q	1,341	.08	Q	.02	27.93
Wall Materials										
Masonry	1,974.2	1,643.0	331.2	8,190	4,423	3,767	.24	.37	.09	16.82
Siding or Shingles	213.7	210.0	Q	670	605	Q	.32	.35	Q	31.01
Metal Panels	123.7	92.6	Q	593	299	Q	.21	.31	Q	30.84
Concrete Panels	Q	Q	Q	876	Q	687	.12	Q	Q	47.87
Window Glass	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Roof Materials										
Built-Up	1,220.9	1,001.3	219.6	5,237	2,257	2,980	.23	.44	.07	18.35
Shingles (Not Wood)	510.8	497.5	Q	1,979	1,592	Q	.26	.31	Q	24.00
Metal Surfacing	205.4	192.1	Q	707	579	Q	.29	.33	Q	27.98
Synthetic or Rubber	413.5	270.8	Q	1,471	530	941	.28	.51	Q	33.88
Slate or Tile	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)										
Roof or Ceiling Insulation	1,740.0	1,405.5	334.5	7,694	3,825	3,869	.23	.37	.09	16.88
Wall Insulation	1,002.0	748.8	253.2	5,162	2,261	2,901	.19	.33	.09	19.83
Storm or Multiple Glazing	1,103.1	906.0	197.1	5,563	2,558	3,005	.20	.35	.07	17.78
Tinted, Reflective, or Shading Glass	483.4	391.7	91.7	3,537	1,061	2,476	.14	.37	.04	19.90
Exterior or Interior Shadings or Awnings	881.1	767.0	114.0	4,516	2,049	2,467	.20	.37	.05	16.45
Weather Stripping or Caulking	1,684.8	1,384.3	300.5	7,815	3,602	4,213	.22	.38	.07	18.88
None of the Above	303.8	Q	Q	1,095	717	Q	Q	.38	Q	46.33
ENERGY SOURCES AND END USES*										
Energy Sources (Solely or in Combination)										
Electricity	2,447.0	2,044.0	403.0	10,505	5,577	4,927	.23	.37	.08	15.82
Natural Gas	997.2	703.0	294.2	6,386	1,985	4,400	.16	.35	.07	18.83
Fuel Oil	2,459.3	2,056.3	403.0	10,526	5,599	4,927	.23	.37	.08	15.42
District Heat	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
District Chilled Water	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Propane	453.9	331.8	Q	1,344	877	Q	.34	.38	Q	30.10
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)		
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil	
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating
Commercial Buildings	2,459.3	2,056.3	403.0	10,526	5,599	4,927	0.23	0.37	0.08
Energy End Uses (Solely or in Combination)									
Heated Buildings	2,459.3	2,056.3	403.0	10,526	5,599	4,927	0.23	0.37	0.08
Air-Conditioned Buildings	1,784.0	1,409.3	374.7	8,415	3,754	4,661	.21	.38	.08
Buildings with Water Heating	2,204.3	1,811.0	393.3	9,828	4,986	4,842	.22	.36	.08
Buildings with Cooking	1,019.0	887.0	132.0	5,109	2,179	2,930	.20	.41	.05
Buildings with Manufacturing	Q	Q	Q	960	Q	Q	Q	Q	Q
Space-Heating Energy Source									
Fuel Oil	2,459.3	2,056.3	403.0	10,526	5,599	4,927	.23	.37	.08
Main	2,056.3	2,056.3	--	5,599	5,599	--	.37	.37	--
With Secondary	423.3	423.3	--	1,146	1,146	--	.37	.37	--
Electricity Only	192.1	192.1	--	465	465	--	.41	.41	--
Other Energy Sources or Combinations	231.2	231.2	--	682	682	--	.34	.34	--
With No Secondary	1,633.0	1,633.0	--	4,453	4,453	--	.37	.37	--
Secondary	403.0	--	403.0	4,927	--	4,927	.08	--	.08
Other Excluding Fuel Oil	--	--	--	--	--	--	--	--	--
Building Not Heated	--	--	--	--	--	--	--	--	--
Main Space-Heating Energy Source									
Electricity	Q	Q	Q	Q	Q	Q	Q	Q	Q
Natural Gas	292.7	Q	278.3	3,898	Q	3,827	.08	Q	.07
Fuel Oil	2,056.3	2,056.3	--	5,599	5,599	--	.37	.37	--
District Heat	41.2	Q	Q	Q	Q	Q	Q	Q	Q
Propane	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other	--	--	--	--	--	--	--	--	--
Ability to Switch Main Heating Fuel									
No Alternate	1,723.9	1,590.0	Q	5,300	4,097	1,203	.33	.39	Q
Alternate Main Heating Fuel									
Electricity	Q	Q	Q	Q	Q	Q	Q	Q	Q
Natural Gas	314.2	309.5	Q	949	890	Q	.33	.35	Q
Fuel Oil	279.1	Q	261.9	3,681	Q	3,579	.08	Q	.07
Propane	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other	Q	Q	NC	Q	Q	NC	Q	Q	NC
Air-Conditioning Energy Source									
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other Excluding Fuel Oil	1,762.9	1,389.6	373.4	8,305	3,687	4,618	.21	.38	.08
Air-Conditioning Not Performed	675.2	646.9	Q	2,112	1,845	Q	.32	.35	Q

See footnote at end of table.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)			RSE Row Factor
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
1980 Census Report	0.820	0.892	1.289	0.686	0.675	0.883	0.614	0.714	1.075	
Water-Heating Energy Source										
Fuel Oil	831.8	827.1	Q	2,089	1,967	Q	0.40	0.42	Q	21.07
Other Excluding Fuel Oil	1,372.5	983.9	388.6	7,739	3,019	4,720	.18	.33	0.08	19.92
Water Heating Not Performed	254.9	245.2	Q	699	613	Q	.36	.40	Q	24.18
Cooking Energy Source										
Fuel Oil	Q	Q	NC	Q	Q	Q	Q	Q	NC	b
Other Excluding Fuel Oil	922.4	790.4	132.0	4,962	2,038	2,924	.19	.39	.05	22.39
Cooking Not Performed	1,440.3	1,169.3	271.0	5,418	3,420	1,997	.27	.34	.14	17.49
Manufacturing Energy Source										
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding Fuel Oil	Q	Q	Q	833	Q	Q	Q	Q	Q	58.95
Manufacturing Not Performed	2,130.7	1,871.9	258.8	9,567	5,310	4,257	.22	.35	.06	12.97
HEATING AND COOLING										
Percent Heated										
Not Heated	--	--	--	--	--	--	--	--	--	--
1 to 50	187.1	113.6	Q	843	592	Q	.22	.19	Q	30.62
51 to 99	422.2	322.0	Q	1,993	658	1,335	.21	.49	Q	37.99
100	1,834.0	1,604.8	229.3	7,675	4,334	3,341	.24	.37	.07	12.10
Percent Cooled										
Not Cooled	675.2	646.9	Q	2,112	1,845	Q	.32	.35	Q	15.89
1 to 50	994.3	831.0	Q	3,407	2,095	1,313	.29	.40	.12	28.12
51 to 99	455.4	287.2	168.2	2,652	757	1,895	.17	.38	.09	27.18
100	334.2	291.1	43.1	2,355	902	1,453	.14	.32	.03	24.48
Year Main Central Chiller Installed										
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	Q	Q	Q	783	Q	570	Q	Q	Q	31.57
1970 to 1979	Q	Q	Q	745	Q	628	Q	Q	Q	28.04
1980 to 1986	82.0	Q	47.2	1,057	Q	882	.08	Q	.05	30.86
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Year Packaged Cooling System Installed										
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	Q	Q	Q	816	Q	512	Q	Q	Q	39.28
1970 to 1979	263.5	218.7	44.8	1,249	512	737	.21	.43	.06	28.09
1980 to 1986	332.2	237.3	Q	1,478	802	676	.22	.30	.14	24.91
1987 to 1989	198.7	101.0	Q	1,130	247	Q	.18	.41	Q	38.51
Computer Area with Separate Air-Conditioning System										
Present in Building	597.2	463.2	133.9	3,993	1,205	2,788	.15	.38	.05	21.37
Not Present	1,862.1	1,593.1	Q	6,533	4,394	2,139	.29	.36	.13	18.92
LIGHTING										
Percent Lit When Open										
Not Lit	Q	Q	NC	Q	Q	Q	Q	Q	NC	b
1 to 50	341.8	307.5	Q	1,598	1,206	Q	.21	.25	Q	20.19
51 to 99	699.4	580.4	Q	3,140	1,353	1,787	.22	.43	Q	25.17
100	1,393.0	1,143.4	249.6	5,678	2,976	2,703	.25	.38	.09	20.99

See footnotes at end of table.

Table 51. Consumption and Conditional Energy Intensity for Buildings Heated with Fuel Oil (Continued)

Building Characteristics	Total Fuel Oil Consumption (million gallons)			Total Floorspace of Buildings Using Fuel Oil (million square feet)			Fuel Oil Energy Intensity (gallons/sq. ft.)			RSE Row Factor
	All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		All Buildings Heated with Fuel Oil	Buildings with Fuel Oil		
		Main Heating	Secondary Heating		Main Heating	Secondary Heating		Main Heating	Secondary Heating	
RSE Column Factor:	0.920	0.992	1.060	0.686	0.875	0.993	0.914	0.714	1.076	
ENERGY MANAGEMENT										
Occupant Control										
Any Control of Heating	1,110.3	989.6	120.7	4,318	2,746	1,572	0.26	0.36	0.08	16.30
With Thermostats	1,010.1	897.1	113.0	3,878	2,470	1,408	.26	.36	.08	18.19
Any Control of Cooling	949.7	806.5	143.2	3,789	1,942	1,846	.25	.42	.08	20.05
With Thermostats	734.5	611.4	123.1	3,449	1,730	1,719	.21	.35	.07	20.65
Reduced Use During Off-Hours										
Heating Only	584.5	550.0	Q	2,020	1,663	Q	.29	.33	Q	15.01
Cooling Only	164.4	142.9	Q	591	301	Q	.28	.47	Q	35.52
Heating and Cooling	1,178.0	968.1	209.9	6,319	3,006	3,313	.19	.32	.06	19.48
Computerized Energy Management and Control System										
Present in Building	313.5	219.3	94.2	3,031	628	2,402	.10	.35	.04	24.87
Controls Heating and Cooling	312.6	218.6	94.0	2,858	622	2,236	.11	.35	.04	24.56
Controls Lighting	Q	Q	Q	652	Q	Q	Q	Q	Q	64.31
Controls Other	Q	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Energy Management										
Regular HVAC Maintenance	1,937.3	1,571.3	366.0	8,439	4,142	4,297	.23	.38	.09	16.38
Participated in Utility Conservation Program	438.3	375.1	63.2	2,717	1,096	1,621	.16	.34	.04	25.36

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

-- Data not applicable.

Notes: * To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 52. District Heat Consumption

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					Heat Rate Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
1982 Census Period	1,029	1,024	0,844	1,148	1,348	1,078	877.1	1,088	
All Buildings	98	6,578	67	585	585	5,964	88.96	56.5	88.96
Building Floorspace (Square Feet)									
1,001 to 5,000	Q	Q	Q	Q	Q	Q	Q	Q	Q
5,001 to 10,000	Q	Q	Q	Q	Q	Q	Q	Q	Q
10,001 to 25,000	30	540	18	63	63	2,100	117.32	79.4	117.32
25,001 to 50,000	13	498	37	Q	Q	Q	Q	Q	Q
50,001 to 100,000	11	838	75	119	119	10,658	141.95	108.7	141.95
100,001 to 200,000	8	1,179	146	106	106	13,063	89.64	71.4	89.64
200,001 to 500,000	5	1,264	274	76	76	16,404	59.86	40.7	59.86
Over 500,000	2	2,111	1,058	133	133	66,859	63.17	31.3	63.17
Year Constructed									
1899 or Before	Q	Q	Q	Q	Q	Q	Q	Q	Q
1900 to 1919	Q	264	33	15	15	1,924	57.84	55.6	57.84
1920 to 1945	21	1,276	61	Q	Q	Q	88.09	51.0	88.09
1946 to 1959	18	Q	87	Q	Q	6,712	76.81	44.1	76.81
1960 to 1969	22	1,214	54	156	156	6,982	128.34	82.1	128.34
1970 to 1979	11	1,227	107	110	110	9,579	89.39	76.6	89.39
1980 to 1983	Q	Q	Q	Q	Q	Q	Q	Q	Q
1984 to 1986	Q	Q	Q	Q	Q	Q	Q	Q	Q
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	Q	Q
BUILDING USE									
Principal Building Activity									
Assembly	15	828	54	49	49	3,206	59.47	Q	59.47
Education	16	Q	Q	Q	Q	Q	82.29	78.6	82.29
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	Q
Food Service	Q	Q	Q	Q	Q	Q	Q	Q	Q
Health Care	4	680	181	92	92	24,513	135.12	76.5	135.12
Lodging	13	693	54	Q	Q	Q	Q	Q	Q
Mercantile and Service	Q	Q	Q	Q	Q	Q	Q	Q	Q
Office	23	2,316	101	167	167	7,285	72.07	29.0	72.07
Parking Garage	Q	Q	Q	Q	Q	Q	Q	Q	Q
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q
Warehouse	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q
Weekly Operating Hours									
39 or Fewer	Q	Q	Q	Q	Q	Q	Q	Q	Q
40 to 48	19	929	48	105	105	5,469	113.26	80.4	113.26
49 to 60	14	1,184	85	66	66	Q	55.98	27.0	55.98
61 to 84	Q	971	80	60	60	4,890	Q	Q	Q
85 to 167	10	Q	Q	Q	Q	Q	62.30	55.1	62.30
168 (Open Continuously)	35	2,153	61	272	272	7,749	126.58	83.9	126.58
Workers									
4 or Fewer	24	Q	17	Q	Q	835	50.42	486.8	50.42
5 to 9	Q	Q	Q	Q	Q	Q	Q	Q	Q
10 to 19	8	188	25	16	16	2,123	86.35	163.3	86.35
20 to 49	23	905	39	Q	Q	Q	Q	Q	Q
50 to 99	12	638	51	Q	Q	Q	Q	Q	Q
100 to 249	9	897	100	99	99	10,986	109.99	69.9	109.99
250 or More	8	3,248	406	225	225	28,108	69.25	31.2	69.25

See footnote at end of table.

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
RSE Column Factor:	1,033	1,824	0,844	1,749	1,140	1,315	0,771	1,803	
Ownership and Occupancy									
Nongovernment Owned	55	3,365	61	284	284	5,121	84.32	47.0	27.99
Owner Occupied	51	3,086	60	263	263	5,155	85.21	48.6	29.61
Single Establishment	45	2,019	44	228	228	5,006	112.82	85.6	28.91
Multiple Establishment	6	1,067	Q	35	35	Q	32.99	12.8	31.00
Nonowner Occupied	Q	Q	Q	Q	Q	Q	Q	Q	b
Single Establishment	Q	Q	Q	Q	Q	Q	Q	Q	b
Multiple Establishment	Q	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	43	3,213	75	301	301	7,059	93.83	69.8	26.65
Federal	7	Q	153	Q	Q	8,938	58.43	41.9	21.09
State	23	1,657	71	201	201	8,621	121.27	89.5	31.70
Local	Q	Q	Q	Q	Q	Q	Q	Q	b
Multibuilding Facility									
Not on Multibuilding Facility	7	1,292	Q	58	58	Q	44.93	17.5	33.74
Part of Multibuilding Facility	91	5,286	58	527	527	5,767	99.73	74.9	21.35
On Facility with Central Plant	82	4,436	54	476	476	5,792	107.26	83.9	22.39
Percent Vacant at Least Three Months									
0	77	4,006	52	412	412	5,318	102.77	71.1	20.51
1 to 50	10	1,829	187	131	131	13,383	71.41	34.0	34.34
51 to 99	Q	Q	Q	Q	Q	Q	Q	Q	b
100	Q	Q	Q	Q	Q	Q	Q	Q	b
Months in Use Out of Past 12 Months									
0 to 8	Q	Q	Q	Q	Q	Q	Q	Q	b
9 to 11	Q	Q	Q	Q	Q	Q	Q	Q	b
12	78	6,021	77	555	555	7,133	92.21	55.7	20.92
LOCATION									
Census Region									
Northeast	29	2,236	78	179	179	6,267	80.14	Q	35.35
Midwest	16	1,509	97	159	159	10,206	105.28	68.1	23.94
South	Q	1,583	51	126	126	Q	Q	69.4	38.84
West	23	Q	54	121	121	5,241	97.14	63.9	24.75
Census Division									
Northeast									
New England	Q	Q	50	Q	Q	Q	Q	Q	45.63
Middle Atlantic	21	1,866	Q	127	127	Q	68.27	33.0	32.92
Midwest									
East North Central	9	845	94	88	88	9,752	104.05	73.9	28.18
West North Central	7	Q	101	Q	Q	10,832	106.85	62.1	25.72
South									
South Atlantic	Q	Q	Q	Q	Q	Q	Q	Q	b
East South Central	Q	Q	Q	Q	Q	Q	Q	Q	b
West South Central	Q	Q	Q	Q	Q	Q	Q	Q	b
West									
Mountain	Q	Q	Q	Q	Q	Q	Q	Q	b
Pacific	12	517	44	Q	Q	4,144	94.38	48.9	31.07
Metropolitan Status									
Metropolitan	85	6,283	74	532	532	6,267	84.72	52.7	21.48
Nonmetropolitan	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

DISTRICT HEAT

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
	1,000	1,000	1,000	1,149	1,149	1,026	1,271	1,093	
Climate Zone: 45-Year Average									
Under 2,000 CDD and --									
Over 7,000 HDD	6	425	76	Q	Q	15,635	206.31	Q	35.05
5,500-7,000 HDD	34	2,202	65	199	199	5,921	90.45	66.4	29.55
4,000-5,499 HDD	25	2,118	86	152	152	6,199	71.84	35.0	35.89
Under 4,000 HDD	Q	1,171	62	83	83	Q	70.65	48.9	37.41
2,000 CDD or More and --									
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	Q	b
1989 Degree-Days									
Under 2,000 CDD and --									
Over 7,000 HDD	9	808	90	Q	Q	12,795	Q	Q	33.05
5,500-7,000 HDD	43	2,741	64	254	254	5,947	92.51	69.5	29.41
4,000-5,499 HDD	14	1,337	98	84	84	6,193	62.98	25.4	35.27
Under 4,000 HDD	Q	1,037	59	Q	Q	Q	67.19	47.6	37.13
2,000 CDD or More and --									
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	Q	b
STRUCTURE									
Floors									
1	Q	Q	Q	Q	Q	Q	Q	Q	b
2	32	851	27	70	70	2,218	82.83	83.8	30.10
3	18	1,145	65	Q	Q	Q	Q	Q	28.48
4 to 6	16	1,662	102	168	168	10,297	101.22	84.8	30.03
7 or More	9	2,612	288	177	177	19,548	67.89	31.7	29.51
Wall Materials									
Masonry	65	3,911	60	385	385	5,917	98.41	65.8	22.12
Siding or Shingles	Q	Q	Q	Q	Q	Q	Q	Q	b
Metal Panels	Q	Q	Q	Q	Q	Q	Q	Q	b
Concrete Panels	Q	1,292	80	113	113	6,963	87.11	65.2	35.05
Window Glass	Q	Q	Q	23	23	Q	Q	Q	33.03
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Roof Materials									
Built-Up	48	3,351	69	309	309	6,375	92.15	53.2	29.55
Shingles (Not Wood)	Q	Q	Q	Q	Q	Q	Q	Q	b
Metal Surfacing	Q	Q	Q	Q	Q	Q	Q	Q	b
Synthetic or Rubber	15	1,375	92	Q	Q	Q	Q	Q	30.75
Slate or Tile	10	339	35	40	40	4,176	118.15	101.0	33.74
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)									
Roof or Ceiling Insulation	79	5,208	66	459	459	5,851	88.19	58.8	21.53
Wall Insulation	45	2,931	65	265	265	5,862	90.45	62.8	24.55
Storm or Multiple Glazing	26	2,348	89	212	212	8,009	90.20	58.9	24.37
Tinted, Reflective, or Shading									
Glass	20	3,195	158	246	246	12,148	77.12	44.3	29.27
Exterior or Interior Shadings									
or Awnings	47	4,364	92	331	331	6,966	75.76	46.0	31.51
Weather Stripping or Caulking	75	5,665	75	495	495	6,592	87.32	53.9	23.05
None of the Above	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
RSE Column Factor:	1,053	1,024	964	1,146	1,140	1,076	8,771	1,009	
ENERGY SOURCES AND END USES*									
Energy Sources (Solely or in Combination)									
Electricity	98	6,578	67	585	585	5,964	88.96	56.5	22.16
Natural Gas	27	3,415	127	290	290	10,811	84.98	47.0	29.04
Fuel Oil	9	1,413	150	143	143	15,193	101.21	49.6	36.36
District Heat	98	6,578	67	585	585	5,964	88.96	56.5	20.75
District Chilled Water	17	1,604	97	147	147	8,828	91.33	65.1	32.48
Propane	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Energy End Uses (Solely or in Combination)									
Heated Buildings	98	6,562	67	584	584	5,953	88.99	56.4	20.75
Air-Conditioned Buildings	74	5,957	80	506	506	6,821	84.92	50.9	21.19
Buildings with Water Heating	88	6,458	73	580	580	6,574	89.81	56.7	20.92
Buildings with Cooking	25	3,902	157	298	298	11,984	76.44	42.7	27.83
Buildings with Manufacturing	14	Q	Q	Q	Q	Q	64.50	48.5	24.85
Energy End-Use Combinations									
Heated Buildings									
With Air Conditioning									
With Water Heating and Cooking	22	3,805	173	283	283	12,851	74.31	40.8	27.80
With Water Heating, Without Cooking	50	2,111	42	221	221	4,436	104.48	74.3	21.30
Without Water Heating or Cooking	Q	Q	Q	Q	Q	Q	Q	Q	b
Without Air Conditioning									
With Water Heating and Cooking	Q	Q	Q	Q	Q	Q	Q	Q	b
With Water Heating, Without Cooking	14	430	32	Q	Q	Q	Q	Q	40.03
Without Water Heating or Cooking	Q	Q	Q	Q	Q	Q	Q	Q	b
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	Q	Q	Q	Q	Q	Q	Q	Q	b
All Other Combinations	Q	Q	Q	Q	Q	Q	Q	Q	b
Space-Heating Energy Source									
District Heat	94	6,065	64	520	520	5,524	85.69	54.4	20.98
Main	93	5,961	64	511	511	5,484	85.67	54.7	21.23
With Secondary	20	1,152	57	134	134	6,629	116.00	Q	33.39
Electricity Only	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Energy Sources or Combinations	6	677	120	60	60	10,627	88.66	42.2	37.88
With No Secondary	73	4,809	66	377	377	5,168	78.40	50.5	22.62
Secondary	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding District Heat	Q	Q	Q	Q	Q	Q	Q	Q	b
Building Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source									
Electricity	Q	Q	Q	Q	Q	Q	Q	Q	b
Natural Gas	Q	Q	Q	Q	Q	Q	Q	Q	b
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	Q	b
District Heat	93	5,961	64	511	511	5,484	85.67	54.7	21.23
Propane	Q	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
RSE Column Factor:	1.042	0.967	0.934	1.106	1.105	1.118	0.774	0.985	
Air-Conditioning Energy Source									
District Heat	2	Q	368	Q	Q	25,024	68.06	36.7	25.13
Other Excluding District Heat	72	5,066	71	445	445	6,206	87.89	53.8	22.84
Air-Conditioning Not Performed	24	620	26	Q	Q	Q	Q	Q	26.46
Water-Heating Energy Source									
District Heat	48	4,686	97	447	447	9,252	95.32	63.1	23.19
Other Excluding District Heat	40	1,772	44	133	133	3,337	75.23	42.3	31.71
Water Heating Not Performed	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooking Energy Source									
District Heat	5	991	218	104	104	22,833	104.64	52.7	33.99
Other Excluding District Heat	20	2,910	143	195	195	9,561	66.84	38.8	33.40
Cooking Not Performed	73	2,676	37	287	287	3,918	107.23	85.3	22.03
Manufacturing Energy Source									
District Heat	Q	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding District Heat	12	Q	Q	Q	Q	Q	56.99	41.1	21.21
Manufacturing Not Performed	84	5,288	63	502	502	5,996	94.93	58.1	21.17
HEATING AND COOLING									
Percent Heated									
Not Heated	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	Q	Q	Q	Q	Q	Q	Q	Q	b
51 to 99	15	1,169	77	59	59	3,858	50.22	27.0	35.10
100	80	5,256	66	519	519	6,478	98.76	63.8	21.30
Percent Cooled									
Not Cooled	24	620	26	Q	Q	Q	Q	Q	26.46
1 to 50	24	1,089	46	113	113	4,809	104.11	Q	30.72
51 to 99	15	1,765	114	137	137	8,850	77.60	42.7	22.91
100	35	3,103	88	256	256	7,278	82.36	47.4	31.21
Heating Equipment (Solely or in Combination)									
Furnaces	Q	Q	Q	Q	Q	Q	Q	Q	b
Boilers	11	622	58	50	50	4,629	Q	47.3	36.62
Individual Space Heaters	24	2,220	92	189	189	7,797	84.92	61.3	32.94
Packaged Heating Units	7	605	84	Q	Q	6,959	82.89	Q	31.23
Heat Pumps	7	531	78	Q	Q	5,783	73.93	37.0	35.67
Air Ducts	60	5,603	93	430	430	7,111	76.76	46.8	23.88
Heating or Reheating Coils	40	4,657	115	339	339	8,372	72.80	42.8	25.97
Fan-Coil Units	31	3,109	100	267	267	8,594	85.90	54.7	23.86
Steam or Hot Water Radiators or Baseboards	58	3,898	67	378	378	6,505	96.86	54.2	23.28
Other	Q	Q	Q	Q	Q	Q	Q	Q	b
Cooling Equipment (Solely or in Combination)									
Central Chillers	17	3,467	202	228	228	13,239	65.65	35.2	28.89
Individual Air Conditioners	34	1,844	54	185	185	5,478	100.53	55.1	23.89
Packaged Cooling Units	35	3,214	91	254	254	7,169	79.12	41.5	28.69
Heat Pumps	6	642	103	Q	Q	7,867	76.17	36.2	30.52
Air Ducts	52	5,009	96	392	392	7,500	78.23	45.7	25.38
Fan-Coil Units	23	3,745	166	272	272	12,048	72.60	40.5	26.68
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Stu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
RSE Column Factor:	1.042	0.987	0.894	1.000	1.000	1.110	0.779	0.868	
Year Main Central Chiller Installed									
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	6	Q	251	Q	Q	16,242	64.78	39.4	26.05
1970 to 1979	Q	491	171	39	39	13,766	80.39	Q	26.45
1980 to 1986	3	Q	365	Q	Q	21,984	Q	Q	34.83
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	Q	b
Year Packaged Cooling System Installed									
1959 or Before	Q	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	Q	Q	Q	Q	Q	Q	97.61	49.0	26.05
1970 to 1979	11	529	47	68	68	6,026	129.59	62.1	27.95
1980 to 1986	Q	Q	Q	54	54	Q	46.08	Q	46.82
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	Q	b
Computer Area with Separate Air-Conditioning System									
Present in Building	23	3,508	153	316	316	13,764	90.11	50.7	22.73
Not Present	75	3,070	41	269	269	3,581	87.65	Q	25.75
LIGHTING AND REFRIGERATION									
Percent Lit When Open									
Not Lit	Q	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	Q	Q	Q	Q	Q	Q	Q	Q	b
51 to 99	24	2,211	92	145	145	6,005	65.49	Q	31.48
100	64	4,114	64	423	423	6,620	102.74	64.8	20.69
Percent Lit When Closed									
Not Lit	45	1,762	39	193	193	4,293	109.30	84.3	20.01
1 to 50	51	4,376	86	334	334	6,557	76.43	46.8	27.77
51 to 99	Q	416	Q	Q	Q	26,188	Q	Q	41.87
100	Q	Q	Q	Q	Q	Q	Q	Q	b
Lighting Equipment (Solely or in Combination)									
Incandescent Lamps	58	5,024	86	443	443	7,583	88.14	50.5	21.72
Fluorescent Lamps	94	6,549	70	583	583	6,224	89.07	56.4	20.75
High-Intensity Discharge Lamps	22	3,649	165	222	222	10,024	60.74	39.7	34.86
Other Lamps	Q	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	41	3,176	78	280	280	6,885	88.05	57.1	22.87
Refrigeration Equipment (Solely or in Combination)									
Commercial									
Refrigeration Units	24	4,055	172	322	322	13,615	79.38	43.5	25.11
Freezers	19	3,825	206	307	307	16,582	80.34	43.1	26.51
Residential									
Refrigerators	63	5,450	86	511	511	8,102	93.84	56.3	20.19
Freezers	16	2,189	133	202	202	12,320	92.41	65.4	26.52
Ice-Making Machines	28	4,442	156	352	352	12,374	79.18	44.5	24.05
Refrigerated Vending Machines	56	5,524	98	491	491	8,713	88.82	53.9	21.42
Water Coolers	81	5,803	72	549	549	6,805	94.61	59.8	19.57
Other	Q	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 52. District Heat Consumption (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Consumption					RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	Total (billion pounds)	per Building (thousand pounds)	per Square Foot (pounds)	per Worker (thousand pounds)	
RSE Column Factor:	1.042	0.987	0.994	1.165	1.165	1.116	0.178	0.982	
ENERGY MANAGEMENT									
Occupant Control									
Any Control of Heating	37	1,927	53	206	206	5,629	106.89	72.9	39.55
With Thermostats	34	1,884	55	203	203	5,955	107.82	73.6	39.14
Any Control of Cooling	41	2,244	55	223	223	5,451	99.55	64.5	27.19
With Thermostats	37	2,160	58	216	216	5,824	100.07	64.7	27.65
Reduced Use During Off-Hours									
Heating Only	15	542	36	Q	Q	Q	Q	Q	44.48
Cooling Only	7	408	55	Q	Q	7,144	130.10	Q	28.45
Heating and Cooling	38	4,160	111	289	289	7,693	69.55	40.9	29.32
Computerized Energy Management and Control System									
Present in Building	24	3,752	159	272	272	11,499	72.54	48.3	25.43
Controls Heating and Cooling	23	3,724	159	271	271	11,559	72.70	48.5	25.58
Controls Lighting	2	Q	Q	Q	Q	25,250	72.43	45.8	26.39
Controls Other	2	Q	266	Q	Q	23,602	88.88	54.0	25.17
Other Energy Management									
Regular HVAC Maintenance	86	6,045	71	530	530	6,188	87.69	54.7	21.39
Participated in Utility Conservation Program	20	1,672	84	154	154	7,771	92.32	64.2	33.69

• Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^{nc} No cases in responding sample.

^Q Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table 53. District Heat Expenditures

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
RSE Column Factor	1.208	1.188	0.888	1.358	1.291	0.819	0.818	
All Buildings	98	6,578	67	3,857	39.3	0.59	6.59	18.03
Building Floorspace (Square Feet)								
1,001 to 5,000	Q	Q	Q	Q	Q	Q	Q	b
5,001 to 10,000	Q	Q	Q	Q	Q	Q	Q	b
10,001 to 25,000	30	540	18	334	11.1	.62	5.27	24.00
25,001 to 50,000	13	498	37	479	Q	Q	Q	18.55
50,001 to 100,000	11	838	75	738	66.1	.88	6.20	22.91
100,001 to 200,000	8	1,179	146	641	79.3	.54	6.07	24.42
200,001 to 500,000	5	1,264	274	565	122.6	.45	7.47	16.07
Over 500,000	2	2,111	1,058	958	480.6	.45	7.19	20.67
Year Constructed								
1899 or Before	Q	Q	Q	Q	Q	Q	Q	b
1900 to 1919	Q	264	33	107	13.5	.40	7.00	28.03
1920 to 1945	21	1,276	61	Q	Q	.59	6.66	33.87
1946 to 1959	18	Q	87	788	43.6	.50	6.50	34.94
1960 to 1969	22	1,214	54	903	40.5	.74	5.80	25.31
1970 to 1979	11	1,227	107	766	66.8	.62	6.98	23.94
1980 to 1983	Q	Q	Q	Q	Q	Q	Q	b
1984 to 1986	Q	Q	Q	Q	Q	Q	Q	b
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	b
BUILDING USE								
Principal Building Activity								
Assembly	15	828	54	349	Q	.42	7.09	36.44
Education	16	Q	Q	Q	Q	.49	6.01	18.46
Food Sales	Q	Q	Q	Q	Q	Q	Q	b
Food Service	Q	Q	Q	Q	Q	Q	Q	b
Health Care	4	680	181	Q	159.5	.88	6.51	32.19
Lodging	13	693	54	Q	Q	Q	6.12	22.28
Mercantile and Service	Q	Q	Q	Q	Q	Q	Q	b
Office	23	2,316	101	1,207	52.7	.52	7.23	28.49
Parking Garage	Q	Q	Q	Q	Q	Q	Q	b
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	b
Warehouse	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	b
Weekly Operating Hours								
39 or Fewer	Q	Q	Q	Q	Q	Q	Q	b
40 to 48	19	929	48	646	33.6	.70	6.14	31.22
49 to 60	14	1,184	85	557	Q	.47	8.40	21.43
61 to 84	Q	971	80	383	31.3	.39	6.41	38.58
85 to 167	10	Q	Q	Q	Q	.36	5.77	20.07
168 (Open Continuously)	35	2,153	61	1,786	50.8	.83	6.55	24.49
Workers								
4 or Fewer	24	Q	17	Q	Q	.35	6.87	28.88
5 to 9	Q	Q	Q	Q	Q	Q	Q	b
10 to 19	8	188	25	109	14.3	.58	6.74	28.58
20 to 49	23	905	39	Q	Q	.94	6.30	28.57
50 to 99	12	638	51	Q	32.1	.63	Q	27.38
100 to 249	9	897	100	587	65.4	.65	5.95	19.78
250 or More	8	3,248	406	1,622	202.7	.50	7.21	21.94

See footnote at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
RSE Column Factor	1.228	1.228	1.228	1.228	1.231	0.515	0.515	
Ownership and Occupancy								
Nongovernment Owned	55	3,365	61	1,876	33.9	0.56	6.61	24.08
Owner Occupied	51	3,086	60	1,755	34.4	.57	6.67	25.14
Single Establishment	45	2,019	44	1,423	31.3	.70	6.25	23.28
Multiple Establishment	6	1,067	Q	332	Q	.31	9.42	18.78
Nonowner Occupied	Q	Q	Q	Q	Q	Q	Q	b
Single Establishment	Q	Q	Q	Q	Q	Q	Q	b
Multiple Establishment	Q	Q	Q	Q	Q	Q	Q	b
Vacant	Q	Q	Q	Q	Q	Q	Q	b
Government Owned	43	3,213	75	1,981	46.4	.62	6.57	21.80
Federal	7	Q	153	Q	59.8	.39	6.69	19.57
State	23	1,657	71	1,294	55.5	.78	6.44	27.10
Local	Q	Q	Q	Q	Q	Q	Q	b
Multibuilding Facility								
Not on Multibuilding Facility	7	1,292	Q	515	76.8	.40	8.88	25.73
Part of Multibuilding Facility	91	5,286	58	3,342	36.6	.63	6.34	20.88
On Facility with Central Plant	82	4,436	54	2,910	35.4	.66	6.12	22.97
Percent Vacant at Least Three Months								
0	77	4,006	52	2,651	34.2	.66	6.44	19.37
1 to 50	10	1,829	187	955	97.9	.52	7.32	25.22
51 to 99	Q	Q	Q	Q	Q	Q	Q	b
100	Q	Q	Q	Q	Q	Q	Q	b
Months in Use Out of Past 12 Months								
0 to 8	Q	Q	Q	Q	Q	Q	Q	b
9 to 11	Q	Q	Q	Q	Q	Q	Q	b
12	78	6,021	77	3,630	46.6	.60	6.54	18.24
LOCATION								
Census Region								
Northeast	29	2,236	78	1,286	45.0	.58	7.18	28.79
Midwest	16	1,509	97	1,081	69.5	.72	6.81	21.87
South	Q	1,583	51	816	Q	.52	6.49	41.90
West	23	Q	54	Q	Q	.54	5.55	28.16
Census Division								
Northeast								
New England	Q	Q	50	Q	Q	Q	5.66	49.31
Middle Atlantic	21	1,866	Q	993	Q	.53	7.79	26.69
Midwest								
East North Central	9	845	94	546	60.5	.65	6.20	23.44
West North Central	7	Q	101	Q	81.8	.81	7.55	19.35
South								
South Atlantic	Q	Q	Q	Q	Q	Q	Q	b
East South Central	Q	Q	Q	Q	Q	Q	Q	b
West South Central	Q	Q	Q	Q	Q	Q	Q	b
West								
Mountain	Q	Q	Q	Q	Q	Q	Q	b
Pacific	12	517	44	275	23.4	.53	5.64	30.82
Metropolitan Status								
Metropolitan	85	6,283	74	3,511	41.3	.56	6.59	18.77
Nonmetropolitan	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
RSE Column Factor:	1.206	1.168	0.956	1.359	1.291	0.818	0.616	
Climate Zone: 45-Year Average								
Under 2,000 CDD and --								
Over 7,000 HDD	6	425	76	Q	92.4	1.22	5.91	33.86
5,500-7,000 HDD	34	2,202	65	1,229	36.5	.56	6.17	24.06
4,000-5,499 HDD	25	2,118	86	1,176	47.9	.56	7.73	27.80
Under 4,000 HDD	Q	1,171	62	540	28.6	.46	6.53	31.43
2,000 CDD or More and --								
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	b
1989 Degree-Days								
Under 2,000 CDD and --								
Over 7,000 HDD	9	808	90	709	79.1	.88	6.19	33.25
5,500-7,000 HDD	43	2,741	64	1,637	38.4	.60	6.45	24.01
4,000-5,499 HDD	14	1,337	98	674	49.6	.50	8.00	29.38
Under 4,000 HDD	Q	1,037	59	446	25.5	.43	6.40	31.60
2,000 CDD or More and --								
Under 4,000 HDD	Q	Q	Q	Q	Q	Q	Q	b
STRUCTURE								
Floors								
1	Q	Q	Q	Q	Q	Q	Q	b
2	32	851	27	397	12.5	.47	5.63	32.78
3	18	1,145	65	Q	Q	Q	6.45	27.37
4 to 6	16	1,662	102	1,011	61.9	.61	6.01	24.08
7 or More	9	2,612	288	1,435	158.2	.55	8.09	20.17
Wall Materials								
Masonry	65	3,911	60	2,589	39.8	.66	6.73	18.51
Siding or Shingles	Q	Q	Q	Q	Q	Q	Q	b
Metal Panels	Q	Q	Q	Q	Q	Q	Q	b
Concrete Panels	Q	1,292	80	638	39.5	.49	5.67	31.53
Window Glass	Q	Q	Q	192	Q	Q	8.30	26.64
Other	Q	Q	Q	Q	Q	Q	Q	b
Roof Materials								
Built-Up	48	3,351	69	1,917	39.6	.57	6.21	20.31
Shingles (Not Wood)	Q	Q	Q	Q	Q	Q	Q	b
Metal Surfacing	Q	Q	Q	Q	Q	Q	Q	b
Synthetic or Rubber	15	1,375	92	746	Q	.54	6.41	33.09
Slate or Tile	10	339	35	281	29.3	.83	7.03	26.42
Concrete	Q	Q	Q	Q	Q	Q	Q	b
Wooden Materials	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b
Building Shell Conservation Features (Solely or in Combination)								
Roof or Ceiling Insulation	79	5,208	66	2,997	38.2	.58	6.52	20.84
Wall Insulation	45	2,931	65	1,730	38.2	.59	6.52	23.27
Storm or Multiple Glazing	26	2,348	89	1,464	55.4	.62	6.91	21.43
Tinted, Reflective, or Shading Glass	20	3,195	158	1,669	82.3	.52	6.77	24.17
Exterior or Interior Shadings or Awnings	47	4,364	92	2,377	50.1	.54	7.19	21.14
Weather Stripping or Caulking	75	5,665	75	3,249	43.3	.57	6.57	20.14
None of the Above	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
RSE Column Factor	1.200	1.200	0.900	1.200	1.201	0.910	0.510	
ENERGY SOURCES AND END USES^a								
Energy Sources (Solely or in Combination)								
Electricity	98	6,578	67	3,857	39.3	0.59	6.59	18.97
Natural Gas	27	3,415	127	1,928	71.8	.56	6.64	23.94
Fuel Oil	9	1,413	150	860	91.3	.61	6.01	32.58
District Heat	98	6,578	67	3,857	39.3	.59	6.59	18.03
District Chilled Water	17	1,604	97	972	58.5	.61	6.63	27.03
Propane	Q	Q	Q	Q	Q	Q	Q	b
Other	Q	Q	Q	Q	Q	Q	Q	b
Energy End Uses (Solely or in Combination)								
Heated Buildings	98	6,562	67	3,847	39.2	.59	6.59	18.03
Air-Conditioned Buildings	74	5,957	80	3,359	45.3	.56	6.64	19.08
Buildings with Water Heating	88	6,458	73	3,824	43.3	.59	6.59	18.20
Buildings with Cooking	25	3,902	157	2,111	84.8	.54	7.08	23.48
Buildings with Manufacturing	14	Q	Q	Q	Q	.39	6.00	19.07
Energy End-Use Combinations								
Heated Buildings								
With Air Conditioning								
With Water Heating and Cooking	22	3,805	173	1,989	90.4	.52	7.03	23.45
With Water Heating, Without Cooking	50	2,111	42	1,350	27.1	.64	6.12	17.80
Without Water Heating or Cooking	Q	Q	Q	Q	Q	Q	Q	b
Without Air Conditioning								
With Water Heating and Cooking	Q	Q	Q	Q	Q	Q	Q	b
With Water Heating, Without Cooking	14	430	32	Q	Q	Q	5.90	36.05
Without Water Heating or Cooking	Q	Q	Q	Q	Q	Q	Q	b
Buildings Without Heating, Air Conditioning, Water Heating, or Cooking	--	--	--	--	--	--	--	--
All Other Combinations	Q	Q	Q	Q	Q	Q	Q	b
Space-Heating Energy Source								
District Heat	94	6,065	64	3,432	36.5	.57	6.60	17.70
Main	93	5,961	64	3,408	36.6	.57	6.67	17.83
With Secondary	20	1,152	57	702	34.8	.61	5.25	31.90
Electricity Only	Q	Q	Q	Q	Q	Q	Q	b
Other Energy Sources or Combinations	6	677	120	297	52.6	.44	4.95	36.48
With No Secondary	73	4,809	66	2,707	37.1	.56	7.18	17.95
Secondary	Q	Q	Q	Q	Q	Q	Q	b
Other Excluding District Heat	Q	Q	Q	Q	Q	Q	Q	b
Building Not Heated	Q	Q	Q	Q	Q	Q	Q	b
Main Space-Heating Energy Source								
Electricity	Q	Q	Q	Q	Q	Q	Q	b
Natural Gas	Q	Q	Q	Q	Q	Q	Q	b
Fuel Oil	Q	Q	Q	Q	Q	Q	Q	b
District Heat	93	5,961	64	3,408	36.6	.57	6.67	17.83
Propane	--	--	--	--	--	--	--	--
Other	Q	Q	Q	Q	Q	Q	Q	b

See footnote at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures			
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)
Air-Conditioning Energy Source							
District Heat	2	Q	368	414	170.7	0.46	6.82
Other Excluding District Heat	72	5,066	71	2,945	41.0	.58	6.61
Air-Conditioning Not Performed	24	620	26	Q	Q	Q	6.29
Water-Heating Energy Source							
District Heat	48	4,686	97	3,047	63.1	.65	6.82
Other Excluding District Heat	40	1,772	44	776	19.4	.44	5.82
Water Heating Not Performed	Q	Q	Q	Q	Q	Q	Q
Cooking Energy Source							
District Heat	5	991	218	Q	163.6	.75	7.16
Other Excluding District Heat	20	2,910	143	1,368	67.2	.47	7.03
Cooking Not Performed	73	2,676	37	1,747	23.9	.65	6.09
Manufacturing Energy Source							
District Heat	Q	Q	Q	Q	Q	Q	Q
Other Excluding District Heat	12	Q	Q	Q	Q	.35	6.17
Manufacturing Not Performed	84	5,288	63	3,358	40.1	.64	6.69
HEATING AND COOLING							
Percent Heated							
Not Heated	Q	Q	Q	Q	Q	Q	Q
1 to 50	Q	Q	Q	Q	Q	Q	Q
51 to 99	15	1,169	77	467	30.7	.40	7.96
100	80	5,256	66	3,341	41.7	.64	6.44
Percent Cooled							
Not Cooled	24	620	26	Q	Q	Q	6.29
1 to 50	24	1,089	46	722	30.6	.66	6.37
51 to 99	15	1,765	114	1,020	65.9	.58	7.45
100	35	3,103	88	1,617	46.0	.52	6.33
Heating Equipment (Solely or in Combination)							
Furnaces	Q	Q	Q	Q	Q	Q	Q
Boilers	11	622	58	281	26.0	.45	Q
Individual Space Heaters	24	2,220	92	1,205	Q	.54	6.39
Packaged Heating Units	7	605	84	297	41.2	.49	5.91
Heat Pumps	7	531	78	216	31.8	.41	5.49
Air Ducts	60	5,603	93	2,969	49.1	.53	6.90
Heating or Reheating Coils	40	4,657	115	2,392	59.1	.51	7.06
Fan-Coil Units	31	3,109	100	1,869	60.1	.60	7.00
Steam or Hot Water Radiators or Baseboards	58	3,898	67	2,519	43.4	.65	6.67
Other	Q	Q	Q	Q	Q	Q	Q
Cooling Equipment (Solely or in Combination)							
Central Chillers	17	3,467	202	1,645	95.7	.47	7.23
Individual Air Conditioners	34	1,844	54	1,253	37.0	.68	6.76
Packaged Cooling Units	35	3,214	91	1,641	46.3	.51	6.45
Heat Pumps	6	642	103	309	49.8	.48	6.33
Air Ducts	52	5,009	96	2,631	50.4	.53	6.71
Fan-Coil Units	23	3,745	166	1,939	85.9	.52	7.13
Other	Q	Q	Q	Q	Q	Q	Q

See footnotes at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE Row Factor
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
RSE Column Factor	1.199	1.113	1.347	1.333	1.316	0.825	0.508	
Year Main Central Chiller Installed								
1959 or Before	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	6	Q	251	680	115.1	0.46	7.09	26.85
1970 to 1979	Q	491	171	306	106.8	.62	7.76	31.84
1980 to 1986	3	Q	365	Q	159.8	.44	7.27	36.69
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	b
Year Packaged Cooling System Installed								
1959 or Before	Q	Q	Q	Q	Q	Q	Q	b
1960 to 1969	Q	Q	Q	Q	Q	.52	5.34	40.84
1970 to 1979	11	529	47	435	38.3	.82	6.36	31.39
1980 to 1986	Q	Q	Q	Q	Q	.38	8.22	30.20
1987 to 1989	Q	Q	Q	Q	Q	Q	Q	b
Computer Area with Separate Air-Conditioning System								
Present in Building	23	3,508	153	2,121	92.3	.60	6.71	21.97
Not Present	75	3,070	41	1,736	23.1	.57	6.45	21.61
LIGHTING AND REFRIGERATION								
Percent Lit When Open								
Not Lit	Q	Q	Q	Q	Q	Q	Q	b
1 to 50	Q	Q	Q	Q	Q	Q	Q	b
51 to 99	24	2,211	92	1,073	44.5	.49	7.41	26.81
100	64	4,114	64	2,650	41.5	.64	6.27	19.62
Percent Lit When Closed								
Not Lit	45	1,762	39	1,318	29.4	.75	6.85	20.75
1 to 50	51	4,376	86	2,195	43.0	.50	6.56	24.06
51 to 99	Q	416	Q	Q	153.6	Q	5.87	40.67
100	Q	Q	Q	Q	Q	Q	Q	b
Lighting Equipment (Solely or in Combination)								
Incandescent Lamps	58	5,024	86	2,922	50.0	.58	6.60	18.39
Fluorescent Lamps	94	6,549	70	3,842	41.0	.59	6.59	18.03
High-Intensity Discharge Lamps	22	3,649	165	1,589	71.9	.44	7.17	26.04
Other Lamps	Q	Q	Q	Q	Q	Q	Q	b
High-Efficiency Ballasts	41	3,176	78	1,883	46.4	.59	6.73	21.95
Refrigeration Equipment (Solely or in Combination)								
Commercial								
Refrigeration Units	24	4,055	172	2,176	92.0	.54	6.76	22.25
Freezers	19	3,825	206	2,079	112.2	.54	6.76	23.65
Residential								
Refrigerators	63	5,450	86	3,334	52.8	.61	6.52	17.43
Freezers	16	2,189	133	1,401	85.3	.64	6.93	26.77
Ice-Making Machines	28	4,442	156	2,465	86.7	.55	7.01	21.39
Refrigerated Vending Machines	56	5,524	98	3,271	58.1	.59	6.67	18.05
Water Coolers	81	5,803	72	3,559	44.1	.61	6.48	18.17
Other	Q	Q	Q	Q	Q	Q	Q	b

See footnotes at end of table.

Table 53. District Heat Expenditures (Continued)

Building Characteristics	All Buildings Using District Heat			District Heat Expenditures				RSE %
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (million dollars)	per Building (thousand dollars)	per Square Foot (dollars)	per Thousand Pound (dollars)	
	1,388	1,118	1,047	1,323	1,210	1.09	6.52	
ENERGY MANAGEMENT								
Occupant Control								
Any Control of Heating	37	1,927	53	1,385	37.9	0.72	6.72	25.25
With Thermostats	34	1,884	55	1,363	39.9	.72	6.71	25.25
Any Control of Cooling	41	2,244	55	1,502	36.6	.67	6.72	25.25
With Thermostats	37	2,160	58	1,451	39.1	.67	6.71	25.25
Reduced Use During Off-Hours								
Heating Only	15	542	36	Q	Q	Q	5.80	25.25
Cooling Only	7	408	55	332	44.7	.81	6.26	25.25
Heating and Cooling	38	4,160	111	1,999	53.1	.48	6.91	25.25
Computerized Energy Management and Control System								
Present in Building	24	3,752	159	1,788	75.6	.48	6.57	25.25
Controls Heating and Cooling	23	3,724	159	1,780	76.0	.48	6.57	25.25
Controls Lighting	2	Q	Q	Q	Q	.35	4.86	25.25
Controls Other	2	Q	266	Q	164.1	.62	6.95	25.25
Other Energy Management								
Regular HVAC Maintenance	86	6,045	71	3,457	40.4	.57	6.52	25.25
Participated in Utility Conservation Program	20	1,672	84	977	49.2	.58	6.33	25.25

* Statistics presented under the "Energy Sources and End Uses" headings represent overall consumption for all end uses combined, not consumption of a particular fuel for a particular end use. For example, the row labelled "Electricity" under "Main Space-Heating Energy Source" gives overall consumption statistics for all buildings that use electricity for main space heating, not statistics on electricity consumed for main space heating. Such end-use data are not available from this survey. See "Energy Sources Used - Building and Supplier Survey Estimates" in Appendix B, "Nonsampling and Sampling Errors."

^b No applicable RSE row factor.

^c Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

— Data not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the corresponding RSE column and RSE row factors. • See Glossary for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

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How the Survey Was Conducted

A structure under construction with walls and/or roof still incomplete at the time of interview is out of scope for the CBECS.

OFFICE BUILDING

STATE OF NEW JERSEY
DEPARTMENT OF TREASURY

Appendix A

How the Survey Was Conducted

Introduction

The Commercial Buildings Energy Consumption Survey (CBECS) is conducted by the Energy Information Administration (EIA) to provide basic statistical information on the consumption of, and expenditures for, energy in U.S. commercial buildings, along with data on energy-related characteristics of these buildings. To obtain this information, a survey was conducted based upon a sample of commercial buildings selected according to the sample design requirements described in the "Sample Design" section below. A "building," as opposed to an "establishment," was chosen as the basic unit for the CBECS because a building is the consuming unit.

This is the fourth in a series of surveys for this sector. Previous surveys were conducted in 1979, 1983, and 1986 under the name Nonresidential Buildings Energy Consumption Survey or NBECS. Although the survey name was changed, the design remains essentially the same. For consistency, all the surveys will be referred to as CBECS in this report.

The CBECS was conducted in two major stages. In the first stage, information about the selected buildings was collected in the Building Characteristics Survey through voluntary personal interviews with the buildings' owners, managers, or tenants. These data were collected on Forms EIA-871A, Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire (consists of the Building Questionnaire together with the Authorization Form); EIA-871H, the asbestos questions collected for the Environmental Protection Agency (EPA); and EIA-871G, Construction Improvements and Maintenance and Repairs Supplement, for the Census Bureau (Forms EIA-871H and EIA-871G incorporated as Sections R and S of Form EIA-871A, respectively). The Authorization Form was used to secure the release of the buildings' energy consumption records to the data collection contractor during the Energy Suppliers Survey, which is the second stage.

In the second stage, the Energy Suppliers Survey, data concerning the actual consumption of energy were obtained from records maintained by energy suppliers to the building. This information was obtained by means of a mail survey conducted under EIA's mandatory data collection authority using Forms EIA-871C through F. An adjunct to the Energy Suppliers Survey, the Facility Survey, was collected using Form EIA-871B. Under EIA's direction, a survey research firm conducted both the personal interviews for the Building Characteristics Survey and the mail survey of energy suppliers.

This is the second report from the 1989 CBECS and includes data from both the Building Characteristics Survey and the Energy Suppliers Survey. The first report, *Characteristics of Commercial Buildings 1989*, was based solely on the Building Characteristics Survey data and was published in June 1991.

This appendix has the following main sections: Sample Design, Building Characteristics Survey, and Energy Suppliers Survey. The latter two sections focus on the procedures for collecting and processing the survey data. In addition, there are sections on Public Use Data Preparation, Confidentiality, and a section for each

of the special data collections for the Bureau of the Census and the Environmental Protection Agency. Copies of all the data collection questionnaires used in both stages of the 1989 CBECS (Forms EIA-871A through H) are shown in Appendix F of this report.

Sample Design

In the CBECS, the individual building is the basic sample unit. (See the "Glossary" for the definition of a "commercial building" as used in this survey.) For the 1989 CBECS, 8,791 buildings were selected for inclusion in the sample using an area probability sample supplemented by lists of large buildings. A total of 6,659 sample buildings were selected by use of multistage area probability methods as explained below. A supplementary sample of 2,132 buildings was obtained by sampling from lists of large and specialized buildings within the same Primary Sampling Units (PSU) as were selected for the multistage area sample. Because "large" buildings had a higher probability of being selected into the sample than "small" buildings, certain very large buildings that had been included in previous CBECS were also included in the 1989 CBECS. Except for these few buildings, the 1989 sample did not overlap with the earlier survey samples. However, the 1989 sample was selected from the same penultimate sampling units as the 1986 sample. That is, buildings were selected within the PSU's originally selected for the 1986 sample. For the area sample, buildings were selected within the same segments as were used for the 1986 sample.

The sample design for the 1989 CBECS was based on the 1986 CBECS sample with the following changes:

- The number of PSU's was reduced by 10 to cut costs in the 1989 CBECS. The dropped PSU's were selected by subsampling PSU's from entirely non-Metropolitan Statistical Area (MSA) strata in each of the four Census regions.
- The reduction in number of PSU's was accompanied by a reduction in the number of buildings in the sample; that is, there was no attempt to "replace" in other PSU's the buildings that would have been selected from the deleted PSU's. An additional weighting factor was introduced in the 1989 sample design to compensate for the reduced sampling rate in entirely non-MSA strata.
- A subset of the 1989 area segments was randomly selected to be updated for new construction since 1986. Segments estimated in advance (from the 1986 data) to have larger numbers of new buildings had higher probability of being selected as "update" segments. In the "nonupdate" segments, the sample of buildings for 1989 was selected only from the 1986 listings.

In the update segments, the 1986 listings were updated to include newly constructed buildings and buildings newly converted to commercial use. The within-segment sampling rates for old buildings were the same as the sampling rates for nonupdated segments. Higher within-segment sampling rates for new (or newly listed) buildings were established to reflect the fact that such buildings could be selected only from updated segments.

- Dodge Reports on new construction projects¹³ were added to the list frame to help identify buildings constructed during the period between the 1986 and 1989 surveys.

The following two subsections concerning the area sample and the list sample components provide more details about the sample design and selection.

¹³Dodge Reports are collected, maintained, and distributed by the F.W. Dodge Division of the McGraw-Hill Information Systems Company, New York.

Multistage Area Probability Sample

The area component of the 1989 CBECS sample used a four-stage cluster sampling design: Selecting Primary Sampling Units (PSU), Selecting Secondary Sampling Units (SSU), Selecting Segments, and Selecting Buildings (Figure A1).

Selecting Primary Sampling Units (PSU)

To prepare for the first-stage sample approximately 3,100 counties and independent cities of the United States were grouped into 1,799 PSU's. A PSU typically consists of one or more contiguous counties, such as a metropolitan area with surrounding suburban counties or a set of one or more rural counties. Essentially, the same PSU's were selected for both the 1989 CBECS and the 1987 Residential Energy Consumption Survey (RECS).[3] The two survey designs diverged at the second and subsequent stages.

PSU's with similar characteristics were grouped to form 129 strata. Characteristics used to define the strata were Census divisions, MSA or non-MSA status, the predominant residential heating fuel in 1980, and climate zone.[3] The design of efficient area samples requires that the area segments be as nearly equal in size as possible. An example of a measure of size is the number of households reported in the 1980 Census. For CBECS, population is correlated with the survey's characteristic of interest--commercial buildings. Within each stratum, one PSU was selected with probability proportional to its 1980 Census population.

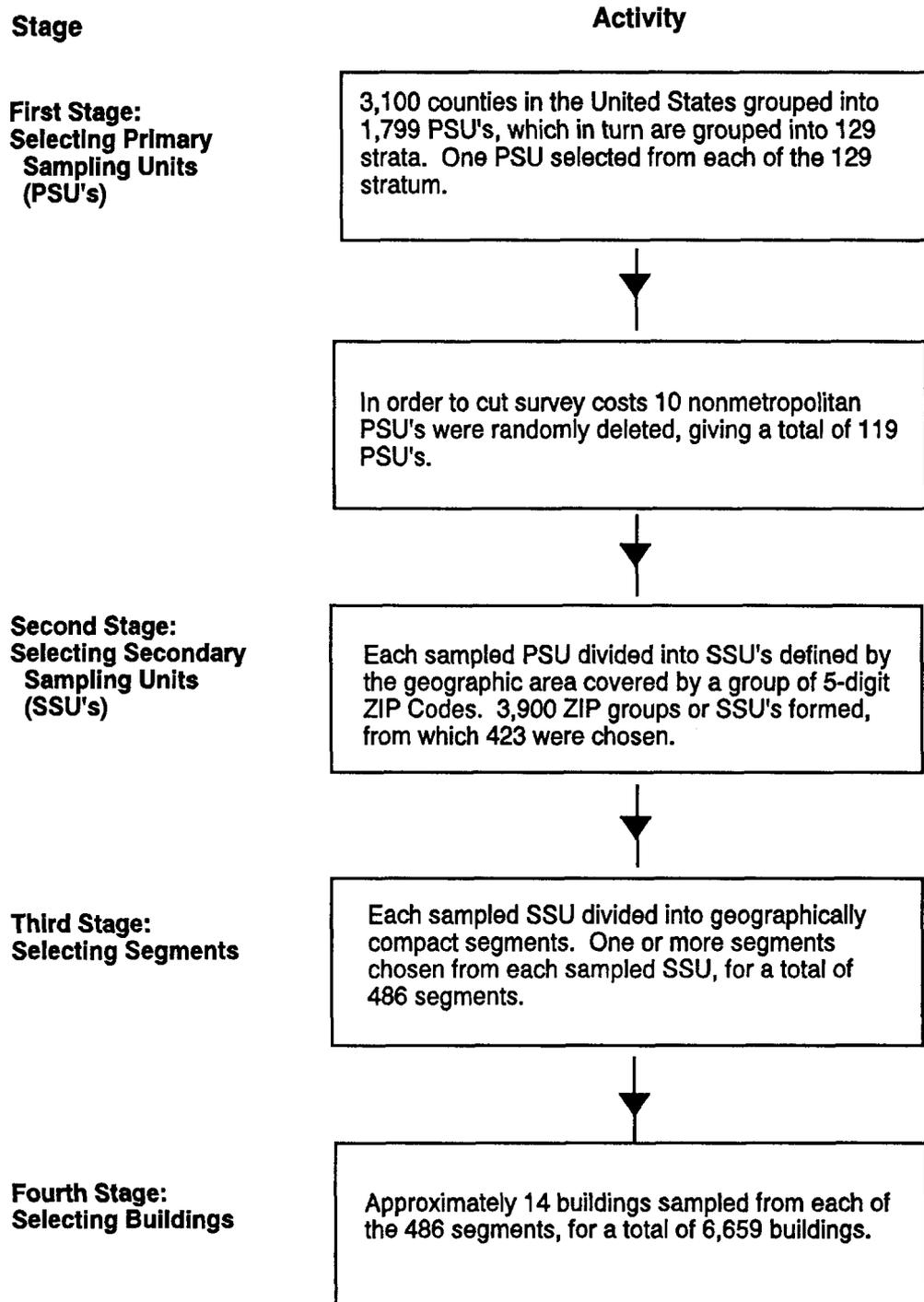
Probability-proportional-to-size (PPS) sampling is commonly used to take advantage of existing knowledge about the sample units, in order to improve the reliability of survey estimates. For quantities roughly proportional to these measures of size, estimates based on PPS sampling have lower variances than estimates based on equal-probability sampling. Despite being a measure of people rather than of buildings, the 1980 population of a PSU was a useful measure of size because of its relationship with commercial activity and energy consumption.

Thirty-two PSU's had populations large enough for each of these PSU's to form a stratum by itself, so that each was selected with certainty. For the noncertainty PSU's, the Keyfitz method was used to assign selection probabilities.[5] This method enhanced the probability of inclusion of specific PSU's that had been selected for the previous RECS, while, at the same time, ensuring that the current RECS selection probabilities were still proportional to 1980 population levels. Controlled selection was used to improve the geographic coverage of the sample by maximizing the number of different States represented by the sampled PSU's.[4] Finally, 10 non-MSA PSU's were randomly deleted from the initial sample of PSU's to reduce survey costs for the 1989 CBECS.

Selecting Secondary Sampling Units (SSU)

To form second-stage sampling units for CBECS, each sampled PSU was divided into areas corresponding to 5-digit ZIP Codes.[2] ZIP Codes covering small areas or representing individual buildings or post office boxes were grouped together with larger area ZIP Codes. All second-stage sample units are, thus, referred to as ZIP groups. A total of about 3,900 ZIP groups were formed within the sampled PSU's. Of these, 423 were selected using probabilities proportional to a second-stage measure of size. Having been designed to reflect the level of commercial activity, this measure of size was the estimated number of buildings in the ZIP group. This measure of size was computed for each ZIP group using employment data from the U.S. Department of

Figure A1. Multistage Area Probability Sample Stages and Activities



Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Commerce, Bureau of the Census' 1983 County Business Patterns (CBP) reports, and employee occupancy rates in different building types obtained from the 1979 CBECS.

The ZIP code group measure of size was used to select ZIP codes for inclusion in the sample, using a procedure that was closely integrated with the selection of the third-stage units. The 129 sampled PSU's were sorted into cells defined by Census region and MSA/non-MSA status. The size for each cell was defined as the sum of the PSU-weighted measures of size of all ZIP groups in the PSU's of that cell. The desired number of third-stage sample units (prior to deletion of the 10 non-MSA PSU's) were allocated to the cells proportional to the cell sizes. The third-stage units were then suballocated to the PSU's within the cells, again using the ZIP code group measure of size.

Within each PSU, a controlled selection procedure was used to allocate third-stage units to the ZIP groups within that PSU, such that ZIP groups of various measures of size were represented in the sample. A ZIP group was considered to be selected into the sample if one or more third-stage units were allocated to it. Of the ZIP groups sampled, most were selected once. However, some ZIP groups with large measures of size were selected two or more times. A total of 509 selections occurred within the original sample of 129 PSU's, representing 444 unique ZIP code groups. The number of times that a ZIP group was selected corresponded to the number of third-stage sample units to be drawn into the sample from that ZIP group.

Selecting Segments

The third-stage sample unit was a segment, that consisted of a geographically compact area containing roughly 100 nonresidential buildings. Sampled ZIP code groups were divided into segments based on field mapping and rough counting of nonresidential buildings. Within the original sample of 129 PSU's, a total of 509 segments were selected from within sampled ZIP groups using equal probability sampling. If the field mapping and counting procedures were performed in all PSU's and ZIP code groups nationwide, approximately 43,260 potential segments would result. Thus, the 509 segments actually selected represented a sampling rate of roughly 1 in 85 segments nationwide. Within PSU's and ZIP groups, the segments were selected such that 509 of the 43,260 potential segments nationwide were sampled with equal overall probabilities. However, due to the subsampling of PSU's mentioned earlier, segments in the non-MSA PSU's in the 119 PSU's designated for the 1989 CBECS had overall probabilities of selection equal to approximately three-fourths of the probabilities of selection of segments in the MSA PSU's. A total of 486 segments were chosen for the 1989 CBECS.

Once segments were selected, preparations were made for the fourth stage of sampling, which was the selection of commercial buildings from within segments. With a few exceptions, a building, for purposes of the CBECS, is defined as a structure totally enclosed by walls extending from the foundation to the roof. A commercial building was one that housed some type of commercial activity. (See the "Glossary" for a complete definition of a commercial building.) Field workers canvassed each sampled segment on foot, identifying and listing the addresses of all commercial buildings. These workers also estimated the square footage and apparent principal usage of listed buildings. This information was subsequently used to assign buildings to strata for sampling.

Since the sample for the 1989 CBECS was based on the 1986 CBECS sample, a complete relisting (updating) of 200 of the originally sampled 509 segments was done for the 1989 CBECS to take into account any buildings newly constructed or converted to commercial use after the earlier survey, as well as those demolished or converted from commercial use. The selection of the 200 update segments was made randomly within strata defined on the basis of advance estimates of the number of newly constructed buildings in the segment. Since the update segments represented a stratified subsample of the original sample of segments,

new buildings in these segments could be appropriately weighted to provide national estimates of newly constructed buildings. The remaining segments were not updated and thus were weighted to reflect only those buildings in existence at the time of the 1986 CBECS.

To avoid double counting, buildings in nonupdate segments that were constructed after the 1986 listings were not eligible for the sample, since such new construction was already represented by the weighted update sample. For this reason, if a sample building in a nonupdate segment was found during the interview to have a construction year later than 1987, the building was deleted from the survey on the assumption that it was a new building on the site of an old listing. Nonupdate segment buildings reported as constructed in 1987 were retained if they otherwise matched the 1986 listing description.

Selecting Buildings

Buildings were sampled within size/usage strata with equal probability. However, sampling fractions varied between strata so that strata containing large buildings were sampled more intensively than strata containing small buildings. For example, while the stratum of office buildings with less than 10,000 square feet was sampled at an overall rate of only 1 in 1,530, the stratum of office buildings with 50,000 square feet or more was sampled at a rate of 1 in 230. This stratified sampling is similar to PPS sampling in that each uses measures of size (but in a different way) to increase the reliability of estimates of square footage and energy consumption.

Approximately 14 buildings were sampled from each of the 486 segments. The number of buildings included in the CBECS varied from the number sampled, depending on what the interviewer actually found at the building. If during the interview a sample selection turned out to be a facility (for example, a campus or complex) of two or three buildings rather than a single building, all buildings in the facility were taken into the sample. Facilities of four or more buildings were subsampled.

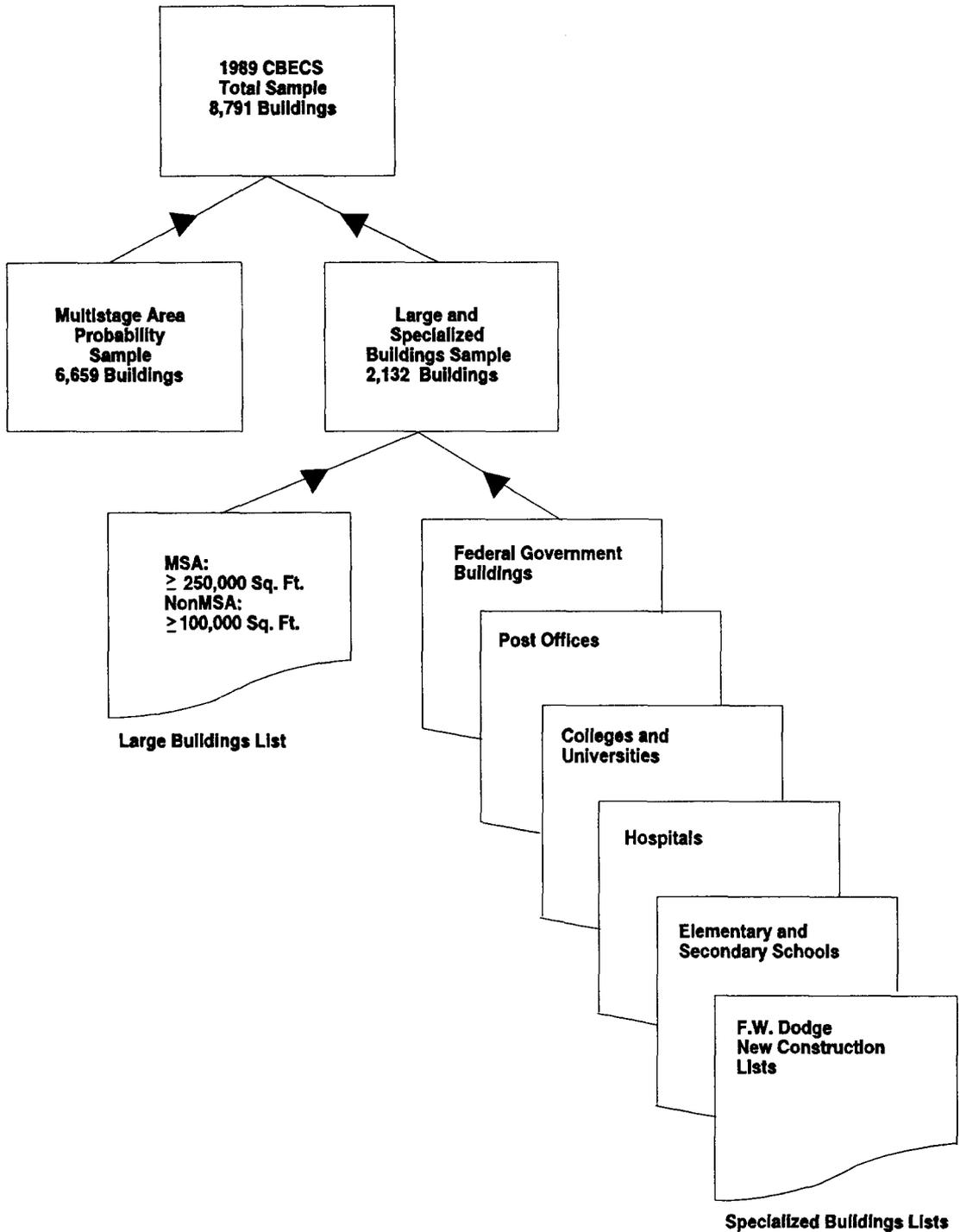
A final total of 6,659 buildings was selected into the multistage area probability sample.

Supplementary Sample from Lists of Large and Specialized Buildings

To ensure adequate coverage of buildings that were significant energy users, the multistage area probability sample was supplemented within each selected PSU by a sample from a list of "large" buildings or facilities. Also, a supplementary sample was drawn from seven lists of specialized buildings to improve the precision of energy consumption estimates for certain types of buildings (Figure A2).

In PSU's that were MSA's, the list of large buildings contained buildings with 250,000 or more square feet of enclosed floorspace. In the non-MSA PSU's, this list contained buildings of 100,000 square feet or more. The list was compiled through inquiries with Chambers of Commerce, other local sources, and special directories. The seven lists of specialized buildings were limited to certain types of buildings or facilities with 50,000 square feet or more. These lists were (1) hospitals, (2) colleges and universities, (3) elementary and secondary schools, (4) post offices, (5) Federal Government buildings, (6) Dodge reports for "small" new construction projects (50,000 to 250,000 square feet) and (7) Dodge reports for "large" new construction projects (over 250,000 square feet). These lists of specialized buildings were used for three reasons. First, they contained many large buildings and thus helped ensure accurate coverage of significant energy users. (The Dodge reports ensured better representation in the sample of newly constructed large buildings.) Second, the special lists ensured good coverage for certain building types that are distinguished separately in CBECS reports, such as those used for health care and education. Third, the lists compensated for inadequacies in the measures of size developed for ZIP groups using the 1983 CBP reports. These reports do not cover employees exempt

Figure A2. 1989 CBECS Sample Design



Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption

from the Social Security System, such as the majority of the Federal workforce. The weighting procedure used for the final sample does not require that the supplemental lists be comprehensive to produce unbiased estimates. However, the more complete these lists are, the more efficient the sample design is.

The lists within each sampled PSU were stratified by building size and general usage, and buildings were sampled with equal probability within strata. (In many cases, building size in square feet was estimated from available data such as the number of beds for hospitals, or the number of students for education buildings.)

As in the area sample, strata containing large buildings were sampled more intensively than strata of small buildings. Also, as with the area probability sample, if a selected unit turned out to be a facility with three or fewer buildings, all were taken into the sample. Otherwise, buildings on the facility were subsampled.

The eight lists (that is, the large buildings list and seven specialized building lists) were sampled independently. The problem of overlap was handled by unduplicating the large buildings list to the extent possible and by using a "priorities" approach whereby, a building present on a higher priority list was disregarded if it was selected only from a lower priority list. The priorities of the lists, in descending order, were as follows: (1) hospitals, (2) colleges and universities, (3) elementary and secondary schools, (4) post offices, (5) large buildings lists, (6) Federal Government buildings (7) Dodge reports over 250,000 square feet and (8) Dodge reports 50,000 to 250,000 square feet. For example, if a given building was present on the hospitals list, its selection from another list was disregarded.[2])

For the Dodge reports on large construction projects (over 250,000 feet), a complete list of projects in each sampled PSU was obtained, and a sample was drawn from that list. Thus, it was possible to determine if a building sampled from some other source was also included in this Dodge list. For small Dodge projects (between 50,000 and 250,000 square feet) only a sample was obtained. Therefore, there was no way to verify whether a building that by definition should have been covered by this list was in fact included in the list from which that sample was drawn. For this reason, this "conceptual list" was given lowest priority.

There was also a problem of overlap between the list sample and the multistage area probability sample. Computation of joint probabilities of selection would be somewhat intractable in the complex design. Instead, a less efficient, but unbiased, procedure was adopted where buildings were made self-representing if they were sampled from an area segment and also appeared on one of the list frames.[1] A new building sampled from an update segment of the area sample and between 50,000 and 250,000 square feet in size was assumed to appear on the (unverifiable) Dodge list for that size range. Smaller new buildings were assumed not to appear on Dodge lists, and larger ones were checked against the complete lists that were obtained for this size range.

A total of 1,660 list entries were sampled. Because some entries were multibuilding facilities, the final list sample comprised 2,132 individual buildings.

Building Characteristics Survey

Description of the Target Population

The target population for the 1989 CBECS consisted of all commercial buildings in the United States larger than 1,000 square feet. Thus, to be eligible for the survey, a building had to satisfy three criteria: (1) it had to meet the survey's definition of a building, (2) it had to be used primarily for some commercial purpose, and (3) it had to measure 1,001 square feet or more. The eligibility of a building for inclusion in this survey was evaluated at three different times: during the initial listing of the sample, at the time the interviewer observed the building, and during the interviewing of the building owner or manager. At the stages of listing and interviewer observation, eligibility was determined using somewhat looser criteria. These broader standards ensured that marginal cases were screened ultimately by interviewing a knowledgeable respondent, rather than on the basis of lister or interviewer judgment.

The first eligibility criterion, the building definition, has been used consistently in all the CBECS. The second criterion, commercial activity, has been more strictly interpreted in each of the successive surveys, to concentrate attention on a well-defined population that does not overlap those covered by other EIA surveys.

The third criterion, size, was added in the 1986 CBECS process to eliminate the very small buildings, which form a large, inherently ill-defined group of marginal structures. These buildings contribute minimally to total commercial floorspace and energy consumption of the overall sample, yet different, reasonable decisions on how to identify them could lead to substantial variations in building counts.

The definition of a building was the same one used in previous CBECS's, that is, a structure totally enclosed by walls that extend from the foundation to the roof and intended for human access. Thus, structures such as water, radio, and television towers were excluded from the survey. Also excluded were: (1) partially open structures, such as lumber yards; (2) enclosed structures that people usually do not enter, such as pumping stations and cooling towers at electric power plants; (3) enclosed structures that are not buildings, such as oil tanks, statues, and monuments; and (4) dilapidated or uncompleted buildings missing a roof or a wall. Structures that were included in the survey by specific exception despite not being "totally enclosed by walls," were parking garages and structures on pillars.

The second criterion was that a building had to be primarily used for some commercial purpose; that is, more than 50 percent of the building's floorspace must be devoted to activities that are neither residential, industrial, or agricultural. Buildings that were 100 percent residential and farm buildings, such as barns, were out of scope for the 1989 survey (as in previous surveys) and should not have been included during the listing stage. The primary use of the sampled building is the governing consideration for this criterion. That is, if an administrative office building within an industrial complex was the sampled building, it was considered in scope since its principal building activity is commercial. However, if the sampled building was an industrial processing plant within the same complex, it would be out of scope because its principal activity is industrial. Buildings used for industrial purposes and for processing of agricultural products were included in the listing stage. During the interviewing stage, interviewers were instructed not to begin interviews at buildings where they observed 75 percent or more of the floorspace was used for residential, industrial, or agricultural purposes. Once the interview began, screening questions instructed the interviewer to terminate the interview if the respondent indicated half or more than half of the square footage was used for residential, industrial, or agricultural purposes. In previous surveys, buildings used primarily for residential purposes, but having *any* commercial activity, were included in the survey and report tables. Beginning in 1986, if more than 50 percent of the floorspace of these buildings were used for residential purposes they were excluded from CBECS. Interviewers retired 121 cases prior to beginning the interview and terminated 936 interviews because the building's use was not predominantly commercial.

The third criterion was that a commercial building had to measure more than 1,000 square feet (about twice the size of a two-car garage) to be considered in scope for the 1989 CBECS. Buildings measuring less than 1,000 square feet were excluded at two stages. First, buildings of less than 500 square feet were included in listings from nonupdate segments, but were excluded from the update segment listings. Interviewers did not begin interviews when they observed a building to be 500 square feet or less; 154 cases were retired for this reason. Second, screening questions asked during the interview instructed the interviewer to terminate when the square footage was 1,000 square feet or less. Interviewers terminated 521 interviews because the building did not meet the size criterion.

Response Rates

As mentioned in the Sample Design section, the total sample of the 1989 CBECS consisted of 8,791 buildings, 6,659 from the area sample and 2,132 from the list sample (Table A1). Of these, 6,352 buildings were eligible for interviewing, 4,770 from the area sample and 1,582 from the list sample. Of the total number of buildings eligible for interview, interviews were completed at 92.5 percent, or 5,877 buildings.

Authorization forms, used to secure the release of the buildings' energy consumption records, were obtained for 91.1 percent of interviews completed (5,167 of 5,670 buildings) where energy was used in the buildings.

Table A1. Number and Distribution of 1989 CBECS Sample Buildings by Building Disposition

Building Disposition	Number of Buildings	Percent of All Buildings	Percent of Eligible Buildings
<u>Total Sample</u>			
Total	8,791	100.0	NA
Eligible for Interview	6,352	72.2	100.0
Interviewed	5,877	66.8	92.5
Not Interviewed	475	5.4	7.5
Not Eligible for Interview	2,439	27.8	NA
<u>Area Sample</u>			
Total	6,659	100.0	NA
Eligible for Interview	4,770	71.6	100.0
Interviewed	4,389	65.9	92.0
Not Interviewed	381	5.7	8.0
Not Eligible for Interview	1,889	28.4	NA
<u>List Sample</u>			
Total	2,132	100.0	NA
Eligible for Interview	1,582	74.2	100.0
Interviewed	1,488	69.8	94.1
Not Interviewed	94	4.4	5.9
Not Eligible for Interview	550	25.8	NA

NA Not applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Data Collection

Data Collection Procedures

Initial contacts with the building representatives were made through an introductory letter sent to them at each building in the survey sample. The letter, signed by the Director of the Office of Energy Markets and End Use of the EIA, was addressed to the building owner or manager. The letter explained that the building had been selected for the survey, introduced the survey contractor, assured the building manager that the data would remain confidential, and discussed the uses and needs for the CBECS data in setting national energy policies. To protect confidentiality, the letter was addressed by the survey contractor after it was signed at EIA.

The data were collected by personal interviews conducted from August 7, 1989 through November 30, 1989. Interviewers visited all sampled buildings in person to ascertain if the structure met the eligibility requirements of the survey. They also used this opportunity to identify an individual associated with the building who met the survey criteria for a building representative and who could serve as that building's respondent. The respondent could be the owner of the building, a tenant, a hired building manager or engineer, or a spokesperson for a management company. Table A2 shows the number of in-person contacts by the interviewer, which were required to obtain a completed 1989 CBECS Building Questionnaire.

Table A2. Number of In-Person Contacts to Obtain a Completed Building Questionnaire

Number of In-Person Contacts	Completed Interviews	Percent
1	1,775	30.2
2	1,919	32.7
3	1,123	19.1
4	532	9.1
5+	452	7.7
Not Reported/ Telephone Interview	76	1.3
Total	5,877	100.0

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

A limited number of interviews were conducted by telephone. This occurred either as part of a nonresponse conversion effort, or if a knowledgeable building respondent was not located in the same PSU as the sampled building. However, in all cases, an interviewer had first visited and observed the sampled building.

Building Questionnaire Changes

The CBECS Building Questionnaire (Form EIA-871A) was basically the same as that used in the previous three surveys. However, experience with the prior surveys resulted in changes being made to resolve ambiguities and permit better description of the characteristics of the building. These wording and structural changes were made to improve data quality. The Building Questionnaire is shown in Appendix F.

For the 1989 CBECS, entire sections of the questionnaire were redesigned to make them easier for the respondent to understand. The heating and cooling equipment sections were reconfigured and simplified to include just one list for each use, combining both distribution and production equipment. The "Energy Conservation Features" section was shortened and simplified, and the reference to energy audits was eliminated.

Due to budget constraints, 10 nonmetropolitan PSU's were dropped from the sample frame (see the Sample Design section of this appendix for more details), and billing data were no longer collected from propane suppliers to the building in the "Energy Supplier" portion of the 1989 CBECS. However, the Building Characteristics Survey respondents were still asked if propane was used in the building; this information is included in the tables of the 1989 CBECS, *Commercial Buildings Characteristics 1989* report, (DOE/EIA-0246(89)).

To reflect growing concerns over the use of chlorofluorocarbons (CFC's), several questions were added concerning the presence of different types of refrigeration equipment and the installation date of the main chiller or packaged air-conditioning equipment. These data could be used to estimate the amount and type of CFC's currently present in the commercial buildings sector.

Interest in cogeneration is increasing, thus questions were added to the 1989 CBECS Building Questionnaire on the amount of energy cogenerated, nameplate capacity, whether the building was interconnected to a utility and whether the building was designated as a Qualifying Facility under the Public Utilities Regulatory Policies Act of 1978 (PURPA).

In addition, the 1989 CBECS asked for the first time, whether the sampled building was part of a multibuilding facility and, if so, whether the multibuilding facility had a central physical plant that produced district heating, district cooling, or electricity. The purpose of this question was to provide information needed for a follow-up survey on the facility's generation of district heating, district cooling, and electricity--including cogeneration, even if that generation took place in a building that might be out of scope for the CBECS.

Changes in specific data items that resulted from experience with the previous surveys included:

- "Concrete" was added as a response category for type of roofing material.
- "Masonry" became a single exterior wall material category; the distinction between masonry over wood or steel or solid masonry was eliminated.
- "Indoor enclosed parking garage" was added as a separate building activity.
- The distinction between "energy-efficient" and "standard" light-bulbs was eliminated.
- Secondary water heating fuel was dropped.

Other additional new questions concerned the presence of an environmentally-controlled space for computers and respondent participation in a utility-sponsored conservation program.

Data were also gathered at the request, and with the financial support, of Federal agencies other than DOE. Section R, EIA-871H, Asbestos in Buildings, was added for and funded by the Environmental Protection Agency (EPA). The content of Section S, EIA-871G, Construction Improvements and Maintenance and Repairs Supplement, collected by the EIA as an agent for the Bureau of the Census, was modified as a result of experience gained during the 1986 CBECS. Since all respondents were asked the Census-sponsored questions in the 1989 CBECS, (versus only half in 1986), these questions were included as part of the Building Questionnaire as opposed to a separate questionnaire. (For additional discussions pertaining to the EPA and Census-funded questions, see the sections on each at the end of this appendix.)

The Interview

Each interview began with a series of screening questions designed to verify the building's address, location within the segment boundaries, and eligibility for the survey. Respondents were asked about the building as a whole rather than individual establishments located within the building.

The completed building interview lasted an average of 36 minutes. This included the time for the interviewer to ascertain and record whether the listing was correct, to ask all questions on the Building Characteristics Questionnaire, and to obtain a signed authorization form from the respondent. On average, the EPA section took an additional four minutes and the Census section added six minutes to the interview. The EPA and Census sections of the Building Questionnaire were each submitted for clearance and approval to the U.S. Office of Management and Budget separately by the sponsoring agency.

The average time for each completed case (including interviewer preparation, travel, callbacks, interviewing, and editing time) was 5 hours and 36 minutes. Each interviewer conducted an average of 42 interviews. However, there was great variability by interviewers, from the normal process, with 12 interviewers each completing 10 or fewer interviews, while 4 interviewers each completed between 90 and 100.

Interviewer Training and Supervision

The data were collected by the contractor's field staff, which consisted of 140 interviewers under the supervision of 6 regional supervisors and their assistants, as well as a central office staff consisting of a project manager, a field director, and a subsampling assistant. The six regional supervisors and their assistants were trained at a 4-day supervisor training session. They were trained in data collection, field office procedures, and quality control. The supervisors were also trained to serve as small-group leaders at the interviewer training sessions.

Three and one-half days of interviewer training sessions were held at two locations during August 1989. All interviewers working on CBECS were trained at one of these sessions or at a replacement interviewer-training course held in September. Twenty-seven of the interviewing staff had worked on the 1986 CBECS. Of the 140 interviewers, 123 had some prior interviewing experience, and 17 had no prior interviewing experience.

Each training session was conducted by the contractor's central office staff with the assistance of the regional supervisors. EIA personnel observed both sessions, and Census Bureau and EPA personnel attended at least one session each. The sessions covered the background of the CBECS, the definition of a building, finding the sampled building, a question-by-question review of the questionnaire, and administrative information. New interviewers were trained in general interviewing techniques. A variety of training techniques were used including lectures, slide presentations, and small-group practice sessions on interviewing and administering the questionnaire. All interviewers had completed four scripted-practice interviews by the conclusion of the training session. Each trainee's performance was monitored and evaluated by the regional supervisors and only those judged qualified were given field assignments. Every interviewer was provided with a CBECS "Interviewer's Manual," which included step-by-step instructions for planning, conducting, and recording interviews and question-by-question specifications describing the intent of each question, definitions of terms used in the survey, and instructions detailing how each question was to be asked.

Several steps were taken to ensure that the interviews were conducted as intended. Completed questionnaires were field edited twice, once by the interviewer and once by the supervisor before being mailed to the central office for data processing. For more information about how the data were edited, see the section on "Data Editing."

In addition, the regional supervisor conducted a validation of a random sample of 10 percent of each interviewer's work. Interviewers were informed that a sample of their work would be validated, but they were not informed which cases would be checked. The regional supervisors telephoned the respondents identified on the interview to confirm that the interview had been conducted and to verify several key data items.

Corrective actions were taken when problems with an interviewers' performance were identified. These actions included monitoring the interviewer's work more closely, retraining the interviewer on the sections of the questionnaire causing the problems, and, as a last resort, dismissal of the interviewer. Overall, 17 percent of cases were validated.

Minimizing Nonresponse

Several approaches were employed in the effort to minimize nonresponse. As previously noted, before the initial contact with the building representative was made, a letter was sent from the Director of the Office of Energy Markets and End Use to the owner or manager of each building. Then, during the field period, the interviewer assigned to the building was authorized to make up to four callbacks at different times of the day throughout the week to minimize the number of building representatives not contacted. After four failed callbacks, the interviewer and supervisor discussed the case and additional callbacks could be authorized. Field supervisors also notified the home office of potential refusals and the field director sent personalized letters addressing individual concerns and urging participation. Approximately 230 such letters were mailed, with completed interviews obtained for one-quarter of these buildings.

There were three categories of nonresponse for CBECS: refusals, cases where the knowledgeable respondent was located outside of the sample PSU, and cases where the respondent was unavailable during the field data collection period. In November 1989, 483 refusals and other cases of nonresponse were reviewed; 78 refusals and 15 other nonresponse cases were selected as viable candidates for nonresponse conversion. Individualized letters explaining the importance of the survey were mailed to the cases selected for nonresponse conversion. The cases were assigned to telephone interviewers with special training and experience in refusal conversion strategies. The nonresponse conversion effort resulted in 5 ineligible cases and 28 of the remaining 88 cases (or 32 percent) being turned into completed interviews.

An additional type of nonresponse conversion dealt with respondents who declined to sign the authorization forms that would allow consumption records to be released by their energy suppliers. Personalized written requests for signed authorization forms were mailed for all buildings for which energy usage had been reported and a signed form had not been obtained by an interviewer. Such requests were mailed to 522 buildings interviewed by field staff and to the 28 buildings for which interviews were conducted by telephone. A total of 155 signed authorizations were received by mail as a result of these efforts.

Data Editing

Data editing for the Building Characteristics Survey occurred at several points during data collection and processing. As mentioned in the previous section, questionnaires were edited twice in the field before being sent to the central office. The first field edit was performed by the interviewer after completing the interview and before submitting it to the field supervisor. During this edit, the interviewer checked the form for legibility and completeness. Once received by the field supervisor, the form underwent a second field edit using the "Field-Edit Form" to check a set of 17 specified data items. The purpose of this field edit was to provide the supervisor, the data collection contractor, and the interviewer with continuous feedback on the quality of the data being collected. The supervisor mailed a copy of the form to the interviewer and discussed the results of these edits in weekly telephone conferences with each interviewer and mailed a copy of the field-edit form with each questionnaire to the contractor's central office.

After the contractor received the questionnaire, it was manually edited and prepared for data entry. The scan edit checked for completeness and logical consistency and identified cases with missing data. Certain data were designated as key data items. These key data items required telephone data retrieval if they were missing from the questionnaire.

Cases proceeded to coding and data entry after telephone data retrieval was completed. Preparation for data entry involved checking the accuracy of the questionnaire skip patterns and checking that only allowable values or codes were entered. All data entry was performed with 100 percent verification of all keystrokes.

The contractor took several steps to resolve inconsistencies or ambiguities in the data. First, answers to other parts of the questionnaire were reviewed to see if they might help explain the problem. The interviewers had been asked to write comments after the interview or to explain any special cases in the margin of the questionnaire. These notes were relied upon extensively in this part of the review and were very helpful in explaining some of the inconsistencies. EIA personnel reviewed some of the hard-to-resolve cases and provided technical guidance on how to reconcile some questionnaire responses. When these efforts failed to resolve a problem, especially if it concerned the energy sources or heating and cooling equipment, the contractor contacted the respondent by telephone.

Telephone contacts to clarify both questionable or missing information were made to the respondents for 1,108 buildings, 19 percent of all completed cases. All changes made to any questionnaire response as a result of these reviews were carefully documented and explained on an error resolution sheet attached to the questionnaire.

Next, the data were machine edited to ensure further completeness and logical consistency, and to verify that the values fell within allowable codes or within acceptable ranges. Items failing these edits were reviewed by trained editors to assess the nature of the problem and determine how to correct it. These edit failures were most often due to problems in coding or data entry. Items failing edits that could not be resolved were referred to the contractors' supervisory-level personnel for review and resolution. EIA personnel also provided technical guidance for the error-resolution process.

As the last step, prior to delivery of the data tape to the EIA, the contractor produced data frequencies and crosstabulations. These were reviewed to search for outlying values and inconsistencies that the edits may not have identified.

Data Preparation for Report

Draft data tapes from the Building Characteristics Survey portion of the 1989 CBECS were received by EIA from the survey contractor in July and September 1990. EIA data analysts reviewed and processed the data to prepare them for the final data tape. Crosstabulations were run to check for internal consistency of the data, and 1989 CBECS data were compared with data from previous CBECS. Questions concerning data accuracy or values were referred to the survey contractor for verification. Respondents were recontacted to verify responses when possible. The final authority on some of the data items was based on an EIA staff judgment.

If retrieval of missing data for one or more items failed, or if retrieval was not performed because the item was not a key data item, data values were supplied by imputation. For a description of the imputation process, see Appendix B, "Nonsampling and Sampling Errors."

Energy Suppliers Survey

During the Building Characteristics Survey, each respondent was asked to provide the name, address, and account numbers of all suppliers of energy to the building. In addition, respondents were asked to sign the Authorization Form at the end of the Building Questionnaire. Copies of this form were sent to the suppliers to secure the release of the buildings' billing records to EIA's survey contractor. Attempts were made to

contact all suppliers of electricity, natural gas, fuel oil, district steam, hot water, and chilled water that were identified during the Building Characteristics Survey.

This section deals specifically with the Energy Suppliers Survey, describing the forms, response rates, data collection and processing procedures, and data preparation for the statistical reports.

Energy Suppliers Forms

Each supplier of electricity, natural gas, fuel oil, district steam, hot water, and chilled water to a sampled building, was asked to provide consumption and expenditures data on a mailed survey form. Response to the form was mandatory for the supplier. The format of the form varied by the type of energy supplied and whether or not a signed authorization form had been obtained. To meet these varying needs, six data-collection instruments were developed, four were in booklet or folder form and two were single sheets printed on two-part chemical transfer paper. The forms were color-coded by the energy supplied and numbered according to the format. Following is a list of the survey forms; see Appendix F of this report for copies of these forms.

Form EIA-871C-1:	Building Natural Gas Usage Form (pink)
Form EIA-871C-2:	Worksheet for Natural Gas Usage (2-part paper)
Form EIA-871D:	District Heating and Cooling Usage Form (blue)
Form EIA-871E-1:	Building Electricity Usage Form (yellow)
Form EIA-871E-2:	Worksheet for Electricity Usage (2-part paper)
Form EIA-871F:	Building Fuel Oil Usage (green)

Note: Form EIA-871B, Facility Form (on gold paper) was fielded as an adjunct to the Energy Suppliers Survey. However, it is different from the other six supplier forms listed above. See the sections on "Changes from Previous Surveys" and "Facility Survey" that follow for more information on this form, which was used for the first time in the 1989 CBECS.

The reporting form for each energy source had one of two types of formats:

1. The basic form (Type-1) was used when an authorization form had been obtained. In a departure from previous surveys, the same form was used whether there was only one customer in the building or many customers. In the latter case, the supplier was asked to provide data for the building summed over all the customers in the building.
2. The worksheet (Type-2) was a special one-page form on two-part paper used when an authorization form had not been obtained. The supplier was requested to aggregate cost and consumption data for a group of sampled buildings and to report the yearly totals. The special two-part paper was designed so that only the total for all the buildings appeared on the sheet returned to EIA. This form was used only for suppliers of electricity and natural gas.

Both form types asked for data summed over several customers. The basic form was for summation across customers or accounts within a *single* building in the sample, while the worksheet was for summation across all accounts in a *group* of buildings.

Suppliers were not required to transcribe data onto the survey forms. Responses were accepted in any format (including computer printouts), as long as the necessary information was provided. Respondents to the basic form were not required to compute the sums across customers, but could report data for each account in the building, leaving the actual aggregation to be performed by EIA.

Since there were differences in data items by energy source, there were corresponding variations in the reporting forms as well. The electricity forms requested kilowatt (kW) demand; the natural gas forms included

transportation gas, as well as provision for reporting variable units of measures (such as therms, cubic feet or 1,000 cubic feet); the fuel oil forms requested fuel-tank data; and the district heating and cooling forms asked for information concerning the entire district or system.

Despite the above-mentioned differences, the forms for the different fuels were similar in terms of the data requested. In each case, the supplier was asked to report the following data: (1) quantity consumed or delivered; (2) cost; (3) unit of measure; (4) dates of deliveries or consumption; and (5) number of customers included in both the consumption and cost data reported on the form.

The data were requested for a 14-month period between December 1, 1988 and January 31, 1990. The 14-month period was required to ensure that data would cover a full calendar year no matter what the actual billing period had been. For example, if the billing period began on the 10th of each month, the first bill would be from December 10 through January 9. The bills were then prorated (annualized) to obtain data for the calendar year. (See Appendix B, "Nonsampling and Sampling Errors," for details on the annualization procedures.)

Changes from Previous Surveys

There were two major changes in the Energy Suppliers Survey portion of the 1989 CBECS. The first was the addition of the Facility Form in order to capture more information about multibuilding facilities or complexes that had their own central plant that supplied energy. (See the section above for more details on this new data collection form). The second major change from previous surveys was that billing information was no longer collected from suppliers of bottled gas or propane to the CBECS buildings. The elimination of this part of the Energy Suppliers Survey was undertaken due to budgetary constraints for the 1989 CBECS. Since propane only accounted for approximately 1 percent of all energy consumption in commercial buildings in the 1986 survey, it was thought that this action would not impair quality of the 1989 CBECS data.

Another change was the consolidation of form types within the different energy sources. In previous surveys, separate survey forms were used when a building had one or more customer accounts. For the 1989 CBECS, there was no differentiation in forms by number of customer accounts in the building--the same basic form was used whether or not aggregation within the building was required.

Also, a question asking the suppliers of electricity, natural gas, and fuel oil, "whether they classified the building in their records as residential, commercial, industrial, commercial/industrial or other" was added to the 1989 survey. This question was added in order to help EIA in its comparison of figures from EIA supply and consumption data surveys. (See Appendix C, "CBECS Coverage Related to EIA Supply Surveys.") EIA collects data from two distinct sources. The "supply" surveys measure the quantity of fuel (including electricity) produced and/or supplied to the market, along with other information related to the fuel's production and supply. The second group of surveys, "consumption" surveys, such as CBECS, collect data from samples of end-use customers. These surveys gather information on the types of fuels used by the consumer, the purposes for which each fuel is used, and the characteristics of the users.

In the supply surveys, annual data are collected on sales or deliveries to end-use consumers. In many cases, suppliers classify their end-use sales by rate classification, which may not be consistent with other definitions of the sectors. Electric and natural gas utility companies have different rate structures, typically based on the customer's consumption level for different categories of customers. For example, low consumption is classified as "residential," intermediate consumption is classified as "commercial," and high levels of consumption are classified as "industrial." The utility then specifies how much fuel it supplied to the different sectors by totaling the quantity supplied under these rate classes. To the extent there is not a one-to-one correspondence between the economic activity of the customers and the rate schedule at which they are billed, there will be a misclassification of end-use sector supply data. Therefore, in order to assess the impact of any misclassification, the utilities were asked to report how they classified the account for the building sampled in CBECS. (See Appendix B, "Nonsampling and Sampling Errors," for a discussion of rate classes.)

In addition to the above changes, each supplier form had some additional modifications. For the Electricity Form (EIA-871E-1.), the following changes in 1989 were:

- Schedule B, "Usage Disaggregated by End Use" was dropped. This optional schedule was introduced in the 1986 CBECS to allow electricity suppliers to report information by metered end use, if it was more convenient for the supplier. However, this form was not used by the suppliers in the 1986 CBECS and was, therefore, dropped in the 1989 survey.
- Billed kilowatt demand column was dropped. It had been added in the 1986 CBECS, but the quality of the data reported in this column was not good and it was dropped after consultations with the energy suppliers.
- A question asking for the number of accounts opened and closed, by time period, was added to aid in the identification of valid partial records.
- The rate features question, added in 1986, was dropped after suppliers indicated that the building respondents were more likely to have this information. Consequently, this question was added to the Building Questionnaire for the 1989 CBECS.

A column was added to the Fuel Oil Form (EIA-871F), asking if the delivery indicated on the form was the first delivery to this customer. It was added to ascertain if all the deliveries were reported. For instance, previously, if the first reported delivery was in March 1989, there was no way of knowing whether this was the first delivery by this fuel oil supplier to the customer or whether the supplier just did not have records covering earlier deliveries. This column could also indicate whether further contact with the building respondent was necessary to identify other fuel oil suppliers. Since fuel oil is the one fuel type that can be readily provided by different suppliers, it is often necessary to locate more than one supplier.

As a result of consultations with natural gas suppliers, the Natural Gas Form (EIA-871C-1) was changed by: (1) dropping the question about interruptible service and the backup fuel for the building (the building respondent should be the source for these data, especially the backup fuel); and (2) the addition of a request for transportation gas volumes and the expenditures associated with these volumes. Transportation gas or "direct purchase" gas is gas that the customer buys directly from the natural gas producer or broker, which is then transported via the utility pipelines to the building or complex. These customers can often negotiate a lower price than when buying directly from the local natural gas utility, since transportation gas customers are usually large campuses or complexes using large amounts of natural gas.

The District Heating and Cooling Usage Form (EIA-871D) had a question added asking whether the quantity reported included that supplied to other buildings. If yes, the respondent was asked to provide either the estimated percentage of the reported quantity used by the CBECS sampled building or the square footage of both the specific building and the combined district loop (the service area for the central physical plant).

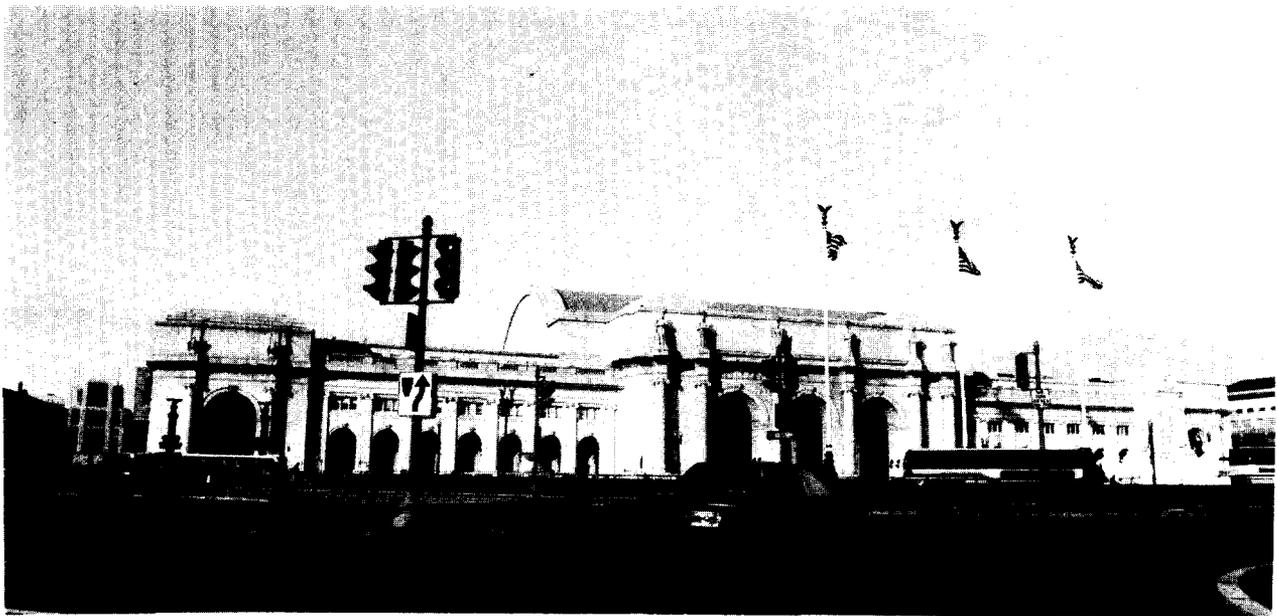
Facility Survey

The "Facility Form," Form EIA-871B, was added for the first time in the 1989 CBECS. This new form was designed: (1) to improve the estimates of district heating consumption and (2) to provide initial estimates of the primary fuels consumed to produce district steam and hot water in central plants on campuses and complexes. During the interview at the building, the respondent was asked if the building was part of a multibuilding facility or complex. A multibuilding facility or complex was defined as a group of two or more buildings on the same site owned or operated by a single organization, business, or individual. If the building was part of such a facility, the respondent was then asked if the facility had a central physical plant that produced district heating, district cooling, or electricity.

The form asked for: the principal activity of the facility; the number of buildings on the facility and their total square footage; information that would indicate whether the central plant was a "qualifying facility" under the Public Utilities Regulatory Act of 1978 (PURPA); verification that there was a central plant and whether the plant had a cogeneration system, the nameplate capacity of that system, whether the system was interconnected with an electric utility, and all system input information (fuels, consumption, expenditures) as well as all information on system output from the plant to the district system (output fuels, period, yearly plant output, number of buildings served, and total square footage served).

Facility forms were mailed when respondents to the Building Questionnaire had indicated that the building was both part of a facility and had a central plant. Forms were mailed at the same time as the rest of the Suppliers Survey forms (in January 1990). Half of the returns were received within 2 months of the original request. Mailed second requests and reminder letters resulted in a limited number of responses. The telephone prompting, begun in late August, was much more effective at examining nonresponses. During these calls, survey staff members were able to answer questions and to encourage respondents to return their survey questionnaires even if they were unable to provide all of the requested data. The survey close-out date was November 10, 1990.

A total of 394 survey forms were mailed to managers of central plants, as indicated on the Building Questionnaire. However, 24 of these responded that there was no central plant and it was ascertained from an additional 9 of the responses that they did not meet the criteria of a facility. The overall response rate for the facility form was 68 percent (Table A3). This is based on all responses, including those containing data (usable or not) and those that indicated they did not have a central plant. Nonrespondents include those who refused to answer the questionnaire (6 cases), those who indicated they would not respond because they do not maintain the necessary records to provide the requested information (3 cases), those that had not provided any information by survey closeout date (113 cases), and two "problem" cases which could not be classified. A total of 136 of the 385 eligible facilities (35 percent) responded with complete data that passed the critical item edit. Another 125 facilities provided some information, but what they provided was missing critical data needed for a response to be complete.



This train station is classified as an assembly building in the 1989 CBECS and includes various activities such as: entertainment, food sales, food service, etc.

Table A3. Facility Form Responses by Disposition and Census Region

Form Disposition	Northeast	Midwest	South	West	Total	Percent
A. Complete, Usable Data	21	32	42	17	112	28
B. Complete, No Central Plant	4	7	5	8	24	6
C. Partially Complete	24	31	44	26	125	32
D. Nonresponse	31	24	41	28	124	32
E. Not a Facility	3	3	0	3	9	2
F. Total Cases (sum of A through E)	83	97	132	82	394	100
G. Some Facility Data Present (A+B+C)	49	70	91	51	261	N/A
H. Response Rate (percent) (G/F-E)	61	74	69	65	68	N/A

NA Not Applicable

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Table A4 lists responding facilities by their principal activity and square footage of the facility. About half of the smallest facilities were elementary and secondary schools. Hospitals tended to be in the largest categories. Colleges and universities were also among the largest facilities.

Analyses of the results and usefulness of the data from the Facility Form is in progress. An upcoming report in the consumption survey analysis series will contain the results of the analysis of these data.

Suppliers Survey Response Rates

The overall response rate for the 1989 energy suppliers survey was 86.7 percent (Table A5). Note that the following discussion excludes the response rate for the Facility Form (EIA-871B). See the separate section in this appendix above on the Facility Form for response statistics concerning that form. The response rate is defined as:

$$\frac{\text{Usable Records}}{\text{All Records Minus Out-of-Scope Records}}$$

Each record corresponds to a single energy supplier for a particular energy source to a particular building. For example, a building with one electricity supplier, two fuel oil suppliers, and no other energy suppliers would have a total of three energy supplier records, one for electricity and two for fuel oil. Records were initially created on the basis of the Building Characteristics Survey respondents' reports of the names and addresses of their energy suppliers. A record was declared out-of-scope if it turned out to correspond to a supplier that did not actually serve the building during calendar year 1989.

Table A4. Reporting Facilities by Principal Activity and Square Footage of the Facility

Principal Activity	Square Footage Category							Total	Percent
	5,000-25,000	25,001-100,000	100,001-200,000	200,001-500,000	500,000-1 Million	Over 1 Million	Undetermined		
College/University	0	1	2	5	5	36	3	52	20
Secondary School	1	0	7	5	3	0	4	20	7
Elementary School	0	8	0	0	0	0	2	10	4
Office	0	0	3	6	5	16	3	33	13
Shopping Center/Mall	0	0	0	0	0	2	1	3	1
Hospital	0	1	0	7	20	22	10	60	23
Industrial/Manufacturing	0	4	8	18	7	16	6	59	23
Hotel/Motel	0	0	1	1	2	0	1	5	2
Correctional Facility	0	0	0	3	0	2	2	7	3
Entertainment/Sports Complex and Other	0	2	0	4	1	3	2	12	5
Total	1	16	21	49	43	97	34	261	100

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Table A5. Response Rates by Energy Source

	Electricity	Natural Gas	Fuel Oil	Steam	Hot Water	Chilled Water	Total
A. Total Mailed Out	5,627	3,497	824	447	114	183	10,692
B. Out of Scope	3	35	17	10	17	14	96
C. Nonresponse	349	212	252	152	70	85	1,120
D. Complete: Usable Records	5,101	3,177	529	266	26	84	9,183
E. Complete: Unusable Records	174	73	26	19	1	0	293
F. Response Rate (Percent) (D/(A-B))	90.7	91.8	65.6	60.9	26.8	49.7	86.7

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Response rates for electricity and natural gas were 90.7 and 91.8 percent respectively, which is similar to results obtained in previous CBECS; these suppliers accounted for 85 percent of all supplier records. The 1989 CBECS response rate for all suppliers (87 percent) was lower because of the difficulty in obtaining responses from suppliers of fuel oil (65.6 percent) and district sources (including steam, hot water, and chilled water).

A total of 424 forms could not be mailed. These 424 forms were subtracted to calculate line A of Table A5. In the case of fuel oil, which accounted for 69 percent of the cases in this category, mailing was often impossible because the supplier's name was not known. For electricity and natural gas, forms could not be mailed if the buildings had no authorization forms and could not be grouped on a worksheet. Grouping was impossible in cases where data from a second or third building without an authorization form was not available to allow the respondent to aggregate information.

Of the forms mailed, 1,120 were classified as nonresponse. This included refusals, inability to respond within the data collection period, and inability to locate the correct account for the building.

Data Collection Procedures

Advance Mailings

A copy of the 1986 CBECS report, *Commercial Buildings Consumption and Expenditures 1986*, was mailed in May 1989 to electricity and natural gas suppliers who had participated in the 1986 CBECS. The letter accompanying the report described plans and schedules for the 1989 CBECS since it was likely that these suppliers would also be included in the 1989 survey. The letter also requested the companies to provide to the survey contractor any updates or changes to the contact information for the 1989 CBECS.

Survey Mailings

As the Building Questionnaires and authorization forms with the lists of energy suppliers were received, buildings were grouped by energy supplier. The grouping together of data requests enabled one major mailing to each supplier asking for information for all the sampled buildings in their service area at one time. Some data requests were sent out after the initial mailing as energy-supplier information became available from later-responding buildings.

For the 5,877 buildings for which responses had been obtained in the Building Characteristics Survey, a total of 10,692 Energy Suppliers forms were mailed to 1,253 suppliers of energy. Of these, 425 (34 percent) were electricity and natural gas suppliers, 572 (46 percent) were fuel oil suppliers, and the remaining 256 (20 percent) were district heating and cooling suppliers.

The initial mailing to the energy suppliers was January 22, 1990. The Facility Forms were also mailed around the same time. See the Facility Survey section of this appendix for more information on the adjunct survey. Reminder letters to suppliers were sent in March 1990, with a second written request to nonrespondents in April. Telephone prompts for electricity and natural gas suppliers were carried out between May and October 1990. Survey close-out was October 5, 1990.

Letters were sent to electricity and natural gas suppliers in late June 1991, thanking them for their cooperation on the 1989 CBECS and asking for their comments on the survey data collection forms and some procedural changes for the 1992 CBECS. The suppliers' comments will be used in the redesign of the survey questionnaires and procedures for the 1992 CBECS.

Nonresponse Conversion

Extensive efforts were used to obtain usable energy supplier data. Letters and telephone prompts were made to the energy suppliers throughout the data collection period to remind the suppliers to deliver the data within the required time period. In addition, a toll-free telephone number was provided to all suppliers, both in the cover letter accompanying the survey forms and printed on the face of each survey form. Suppliers were encouraged to call this number if they had any questions. This "hotline" was staffed by trained CBECS contractor staff familiar with the CBECS Energy Suppliers Survey. Hotline staff were knowledgeable regarding the most frequent technical problems encountered by suppliers and the instructions to be given to suppliers calling with these questions. At the end of each call, the supplier was asked for a filing date for the forms.

The nonresponse effort for the suppliers of electricity, natural gas, and district sources began with a letter 5 weeks (March 8, 1990) after the initial mailing (January 29, 1990). A second followup letter was sent on April 19, 1990. Nonrespondents were then telephoned and asked for an expected forms completion date. They were called again when that date arrived and they still had not responded. The nonresponse procedure was followed both for complete nonresponse by an energy supplier and for incomplete or missing buildings within a supplier's response.

On March 20, 1990, a letter was sent to each supplier of fuel oil that had not yet returned all the survey forms. A computer-generated listing of the building addresses for which survey forms had not been returned was attached to the letter. On April 19, 1990, an additional letter was sent to fuel oil nonrespondents with new survey forms attached. In May through August 1990, a final effort was made to obtain responses from fuel oil suppliers; trained data retrieval staff telephoned nonresponding companies and attempted to obtain the information by telephone.

Nonresponse conversion efforts for the Facility Form and for nonpurchased district sources began in March 1990 with a remailing of forms to all nonrespondents. A second letter was mailed in May 1990 to Facility Form nonrespondents. A final nonresponse conversion effort was undertaken in July through October 1990 via telephone retrieval. Trained data retrieval staff attempted to obtain information for the Facility Form and District Usage forms directly by telephone.

Data Editing

As the suppliers forms were received, they were screened for accuracy and completeness. Forms were then keyed and extensive computer edits were performed. The EIA specified ranges and values to be used for the technical edits. These values were based on previous CBECS responses and on knowledge of utility rates and practices. The first edits were range and basic logic checks, followed by consistency checks among data items. Edit failures at these levels were most often due to coding or data entry error. If the causes of the error were not apparent to the technical reviewer, it was referred to supervisory staff for resolution.

Eight subject-matter specific or technical edit checks were specified by EIA and were performed on the supplier data. These technical edits resulted in 12,040 edit failures, which were reviewed by data analysts and sometimes referred to EIA personnel for resolution (Table A6). Of the 12,040 edit failures, 3,234 were resolved through a record update. The remaining 8,806 (73 percent) were overridden for various reasons.

The technical edits were similar to those used in the 1986 CBECS. However, three edits were dropped:

- "Consumption ratio indicated extreme variability"--this edit, which identified outliers within sets of bills, was not useful. Too many cases were flagged, which were found to be valid
- "Quantity of fuel oil delivered exceeded the tank size as reported by the building respondent"--this was dropped because many failures in 1986 were the result of suppliers aggregating monthly deliveries rather than reporting each delivery separately

- "Billed demand was out of range"--this information was not asked for in the 1989 CBECS.

Error correction was routine for the first two levels of editing. The technical edits had more complicated decision rules and required more supervisory involvement. The data reviewers basically had three choices when confronted with a technical edit failure:

- Update the data to eliminate the error conditions due to errors made by the coder, data entry operator, or supplier for future rounds of the edit cycle;
- Override the edit failure by assigning an override code and eliminate the failure for future rounds of the edit cycle; or
- Flag the case with a Problem Card and send it for review by a supervisor.

During the update process, data analysts assigned a reason for each update. Of the 60,875 updates to correct any type of edit failure, the majority (81 percent) were due to a clerical error by the supplier, data keyer, data coder, or data editor. Following the technical edits, there were 2,789 updates (5 percent) as a result of data retrieval telephone contacts with suppliers, and 632 updates (1 percent) were made due to the data analysts' decision.

Table A6. Frequency of Technical Edit Failures by Failure Type

Edit #	Edit Description	Total Failures
1	Billing period appeared too long or too short	917
2.1	Annual consumption does not match the building characteristics	829
3.1	No expenditures, but consumption is reported	385
3.1A	No consumption, but expenditures are reported	28
3.1B	Expenditures reported were out of range for low consumption	3,996
3.2	The price per period was out of range, based on known market prices	4,048
4	The metered demand was out of range	1,504
7	The building indicated metered demand, but it is not reported by the supplier	333
	Total Edit Failures	12,040

Source: Energy Information Administration, Office of Energy Markets and End Use, 1989 Commercial Buildings Energy Consumption Survey.

Data Adjustments

Adjustments for unit nonresponse were performed in conjunction with weighting of the sample, as described in the "Unit Nonresponse Adjustments" section of Appendix B, "Nonsampling and Sampling Errors." Cases missing all or part of calendar year 1989 consumption or expenditures were considered as particular kinds of item nonresponse. Adjustments for these cases were made as described under "Annual Consumption and Expenditures" in Appendix B. For cases where the Energy Suppliers Survey data covered more than the one sampled building or covered less than the entire building, the survey contractor implemented three special adjustment procedures to enable EIA to compute building-specific annualized consumption and expenditures. These special procedures were disaggregation, aggregation, and worksheet processing.

Disaggregation

Disaggregation was generally necessary when either the supplier or the building respondent reported that the energy bill for a source included more than the sampled building. In a limited number of cases, the preliminary data reviewer designated a case for disaggregation, even if the supplier or building respondent had not. A disaggregation "factor" was calculated based on the square footage of the buildings involved. A total of 2,572 energy source records were selected for disaggregation.

Aggregation

Aggregation is the opposite of disaggregation and was used when a supplier could report consumption information for only a portion of the building, usually for a subset of customers. A total of 95 cases required aggregation. An aggregation factor was calculated based on the proportion of customers reported.

Worksheet Processing

Worksheets were used to request electricity and natural gas suppliers to report consumption when an authorization form had not been obtained. The worksheet allowed the supplier to report consumption and expenditures aggregated across two or more buildings. This aggregation preserved the confidentiality of the data for individual buildings. The identical aggregated consumption and expenditures data were keyed for each of the buildings involved and each was coded as a linked record with the others on the same worksheet.

Data Quality Verification

At the conclusion of the batch editing process, several additional data quality verifications were performed. These included the following steps:

- A manual review of the completeness of the discrete fuel sources was performed. Energy-source records that looked sporadic were reviewed.
- Energy-source record counts were compared with the number of energy sources indicated for the building by the building respondent.
- A listing of prices of standardized quantities was run for all bill records, in price order. This list was reviewed to detect price errors that had been mistakenly overridden.
- A program was created to identify overridden flags that had been written to the file in error. These cases were reviewed and the flag was removed.

Any errors identified were corrected by the survey contractor prior to the delivery to EIA of the final data file.

Weather Data

A file of heating and cooling degree-days for each of the billing periods reported by each building supplier was created in the following manner:

- A National Oceanic and Atmospheric Administration (NOAA) division code was assigned to each building in the CBECS sample. Working with NOAA division maps and building address information, one of 356 division codes was assigned to each building.

- A file of NOAA data covering the 30-month period from January 1988 to June 1990 (the most recent information available at the time) was used to compute the average daily temperature for each day in the 30-month period for each weather division.
- Daily heating and cooling degree-day averages were computed for each of ten base temperatures (degrees Fahrenheit): 50, 55, 57, 60, 65, 68, 70, 73, 75, 80. Only base temperature 65 degrees Fahrenheit is covered in this report.
- Degree-day totals were constructed for each billing period, or gap between billing periods, for each energy supplier for each building. In addition, degree-day totals were constructed for each of the 12 calendar months of 1989 for each sampled building, whether or not the building had any energy supplied in 1989.
- As part of the annualization and imputation procedures described in Appendix B, "Nonsampling and Sampling Errors," billing period dates were imputed. The cleaned dates were used for the final degree-day computations.

Data Preparation for Report

Data tapes from the Energy Suppliers Survey portion of the 1989 CBECS were received from the survey contractor in May and July 1991. EIA data analysts reviewed and processed the data to prepare them for the final data tape. Crosstabulations were run to check for internal consistency of the data, and the 1989 CBECS data were compared with data from previous CBECS. Commercial buildings' consumption and expenditure data are complex and interrelated. The EIA review was extensive and paid special attention to the issues of peak electricity demand, transportation gas, and incomplete data for buildings. Questions concerning data accuracy or outlier values were referred to the survey contractor for verification. Respondents were recontacted to verify responses when possible. EIA staff reviewed the data questionnaires at the survey contractor's site, and EIA staff judgment was the final authority on some of the data items.

The sections above on data adjustments and weather data provide details on the work undertaken to prepare the data for this report. In addition, if retrieval of missing data for one or more items failed, or if retrieval was not performed because the item was not a key item, data values were supplied by imputation. For a description of the imputation process, see Appendix B, "Nonsampling and Sampling Errors."

In some cases, investigation of anomalies revealed errors in the building characteristics data base. These errors included: one building was deleted from the database; the principal building activity was reclassified from education to assembly for one building; the main and secondary heating fuel for one building was swapped between natural gas and fuel oil; and natural gas was changed from a primary to secondary heating fuel for one building. These findings were documented by EIA, but no changes were made to the building characteristics dataset. This dataset was considered finalized as of the publication of the Building Characteristics Report.

One frequent discrepancy was between the building respondent's report of which fuels were used in the building and the determination ultimately made through followup contacts with energy suppliers. Rather than the building characteristics records being revised, the building response was retained and the Suppliers Survey determination was coded separately. The Suppliers Survey response was the basis for statistics published in this report. Appendix B, "Nonsampling and Sampling Errors," discusses in more detail the discrepancy between building respondent and energy supplier reports of fuels used.

Annualization was the estimation of calendar year 1989 consumption or expenditures from data that span a longer, shorter, or offset period. Proration of the reported data was the basis for the annualization procedures. For cases where consumption or expenditures data were completely missing, the annual amounts were imputed by regression. See Appendix B for details on the annualization and imputation process.

Once the annualized consumption and expenditures were computed or imputed for each building, statistical tables of aggregated data were produced and analyzed. The report text was based on these tables, which are presented both in the text and in the Detailed Tables section of this report.

Confidentiality of Information

The EIA does not receive or take possession of the names or addresses of individual respondents or any other individually identifiable energy data that could be specifically linked with a building respondent. All names and addresses are maintained by the survey contractor for survey verification purposes only. In addition, geographic identifiers and NOAA Weather Division identifiers were not included on any data files delivered to the EIA. Building characteristics which could uniquely identify a particular responding building, such as number of floors, building square footage, and number of workers in the building, were masked on any data provided to the EIA. All building-level records that are placed on public use data files are masked for further confidentiality protection.

Public Use Data Preparation

Following the publication of the statistical reports for both the Building Characteristics Survey and the Energy Suppliers Survey of the CBECS, further work is performed on the basic survey data at the microlevel to prepare the final data tape for release to the public. Measures such as the stripping of all geographic identifiers, except Census region and Census division, are taken to mask the data to ensure that the identity of individual respondents is kept confidential. All of these procedures culminate in the release of a final data tape to the public through the National Technical Information Service (NTIS). (See Appendix G for information on how to order these tapes.) This tape contains both the building characteristics and energy suppliers data. The final data are available both on magnetic computer tapes for use with a main frame computer and on floppy diskettes to use with personal computers.

Special Data Collection for the Bureau of Census

For both the 1986 and 1989 CBECS, the EIA collected supplemental information for the Bureau of the Census, U.S. Department of Commerce on expenditures for construction improvements and for maintenance and repairs. In the 1989 CBECS, this information was in Section S (Census Supplement) of the Building Questionnaire and all respondents were asked these questions. Any respondent who did not have access to the construction improvement and maintenance and repair data was asked the name, address, and telephone number of the person who would have it. These individuals were later contacted if the building was selected for the subsequent followup study. Before the followup study was conducted, item response on the key item concerning construction improvements was 92.2 percent, or 5,421 of the 5,877 buildings had completed data for this item.

In the fall of 1989, a three-part followup study for the Census Supplement was conducted with 307 owner and tenant representatives. This followup was done to reduce both total and partial nonresponse to the supplement, as well as to verify independently the data that were obtained during the original interview. The building owners and tenant representatives were first sent a letter explaining the purpose of the survey, along with worksheets and definitions. The respondents were told to use the worksheets to calculate and record the amount of expenditures and to retain the worksheets pending a telephone call from the data collection contractor. Then, several weeks later, specially trained telephone interviewers called to obtain the data. The overall response rate for the followup study was 82.4 percent.

In the first phase of the follow up study, 60 cases were selected for Group 1, "Nonresponse Conversion." Forty of those buildings were 100,000 square feet or larger. These cases were selected from buildings for which no data had been obtained on the Census Supplement at the time of the building characteristics interview. The principal reason for having no supplement data for these 60 buildings was because of refusals. A total of 40 responses were obtained from this followup effort.

In the second phase of the follow up study, data retrieval for item nonresponse was conducted. A subsample of 90 buildings selected from those for which the respondents provided a "don't know" response to one or both of the Census-sponsored questions, and, instead, provided the name, address, and telephone number of the person or persons who would have the information. Referrals such as these were often to management companies not located in the same city as the sampled buildings. Followup for the 90 buildings provided additional information, covering 76 (84.4 percent) of the 90 sampled buildings.

In the third and final phase of the followup study, a sample of 157 buildings was selected to verify independently the data obtained in the original interview. Packages of materials explaining the verification study and requesting the respondent to provide data about the two types of expenditures were mailed to the original respondents to the Census-sponsored questions. The respondents were then telephoned to obtain the data. Of the 157 original respondents, 137 (87.3 percent) resubmitted the data.

The results of the followup study are being evaluated by the Bureau of the Census and will be used in the design of future surveys. The data from the construction improvements and maintenance and repairs questions will be published by the Bureau of the Census in a supplement to the Current Construction Reports, C-30 Series, Value of New Construction Put in Place.¹⁴

Special Data Collection for the Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) sponsored Section R, "Asbestos in Buildings," on the 1989 CBECs Building Questionnaire. The five questions in this section were designed to collect information on the presence and possible abatement of asbestos in commercial buildings.

The questions contained in Section R were treated as an extension of those in the rest of the questionnaire. Thus, if a case was found to be ineligible for interview for purposes of CBECs, it was ineligible for the entire questionnaire, including the EPA questions. Similarly, if a case was found to represent more than one building for purposes of CBECs, more than one building characteristics interview was conducted including the EPA questions. Interviewers were trained for Section R using the same techniques used for other parts of the questionnaire (see prior section on "Interviewer Training and Supervision"). Question-by-question specifications for Section R were included as a separate section in the CBECs Interviewer's Manual.

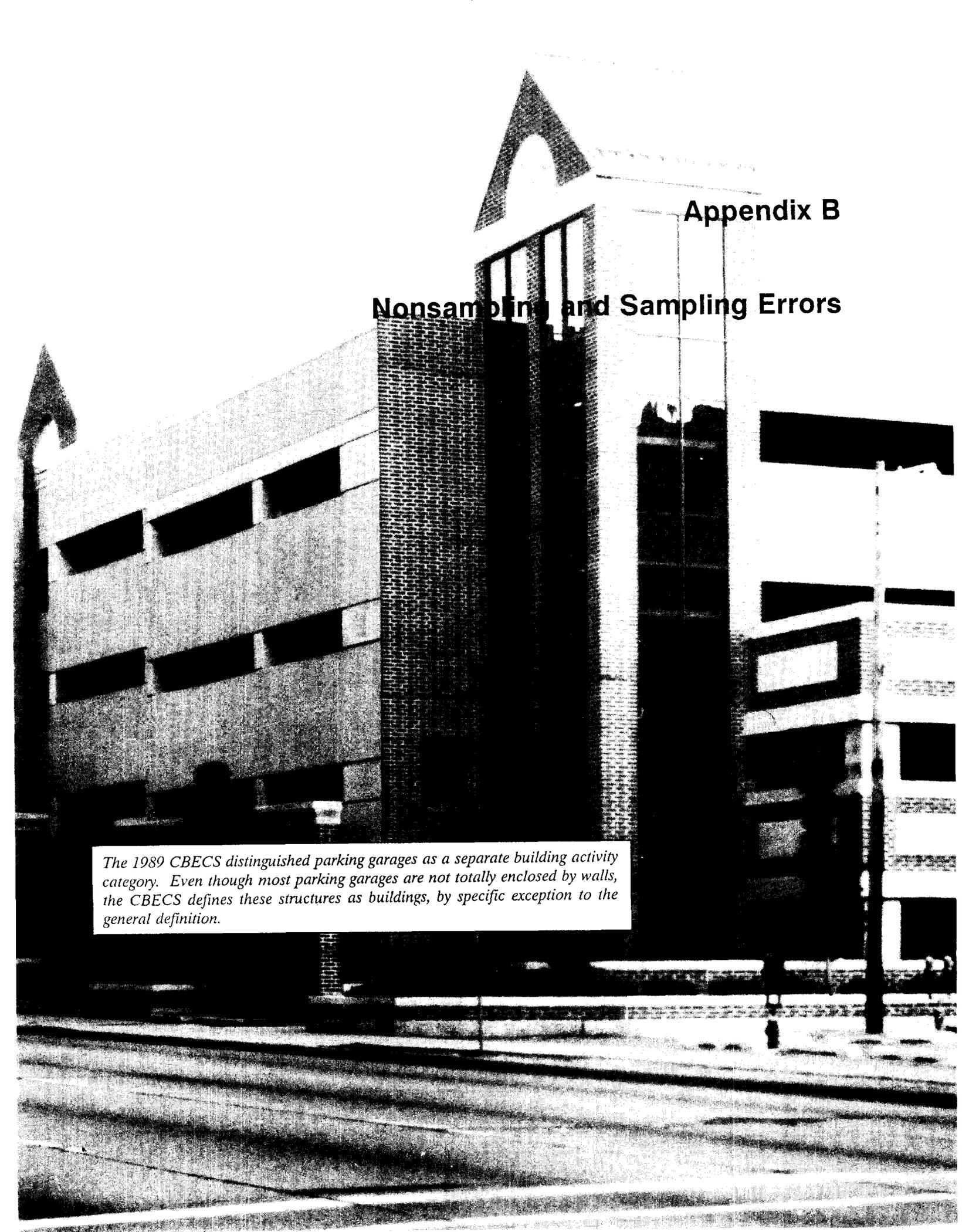
Field edits performed by supervisors included checks pertaining specifically to Section R. Once received at the Central Office, other edits developed by EPA were performed. These included range and consistency checks. However, because of budget limitations, data retrieval was performed only when the entire section had been omitted or when a "key" item in the other sections of the questionnaire was required. Even without individual item data retrieval, the overall item response rate was high: 91.5 percent.

The final response rate for the entire asbestos section, based on the 5,877 completed CBECs questionnaires, was 99 percent. The results from Section R are presented in *Commercial Buildings Characteristics, 1989* (DOE/EIA-0246(89)) in Tables 111 through 117 in the "Detailed Tables" section.

¹⁴1986 results were published in *Expenditures for Nonresidential Improvements and Upkeep: 1986, Current Construction Reports Special Studies*, Bureau of the Census, March 1989.

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Appendix B

Nonsampling and Sampling Errors

The 1989 CBECS distinguished parking garages as a separate building activity category. Even though most parking garages are not totally enclosed by walls, the CBECS defines these structures as buildings, by specific exception to the general definition.

Appendix B

Nonsampling and Sampling Errors

Introduction

All the statistics published in this report are estimates of population values, such as the total floorspace in U. S. commercial buildings. These estimates are based on reports from representatives of a randomly chosen subset of the entire population of commercial buildings. As a result, the estimates always differ from the true population values.

The differences between the estimated values and the actual population values are of two types, nonsampling errors and sampling errors. Differences that are expected to occur in all possible samples, or in the average of all estimates from all possible samples, are known as systematic errors or biases. Sampling errors, on the other hand, are random differences between the survey estimate and the population value that occur because of the particular sample that was selected by chance. The average sampling error, averaged over all possible samples, would be zero. Although the sampling error is nonzero and unknown for the particular sample chosen, the sample design permits sampling errors to be estimated. The section, "Estimation of Sampling Errors," describes how the sampling error is estimated and presented for statistics given in this report.

The four sections that follow this introduction describe some of the sources of nonsampling error and how the survey is designed and conducted to minimize such errors. Unlike the sampling error, the nonsampling error's magnitude cannot be estimated from the sample data. For this reason, avoiding biases at the outset is a primary objective of all stages of survey design and field procedures.

One possible source of bias is nonresponse, either for an entire sampled building (unit nonresponse) or for a particular question from a responding building (item nonresponse). Most unit nonresponse cases were caused by a representative who refused to cooperate or was unavailable. Item nonresponse for building characteristics resulted when the building representative did not know, or, less frequently, refused to give the answer to a particular question. The section "Nonresponse" presents in detail the procedures used to handle these two types of nonresponse.

The consumption and expenditures featured in this report were based on monthly billing records submitted by the buildings' energy suppliers. The section, "Annual Consumption and Expenditures" describes the procedures used to obtain annual estimates from these bills, as well as the procedures used to handle partial or completely missing data. The peak electricity demand estimates in this report were also based on the monthly billing data, as described in the section, "Annual Peak Electricity Demand."

The fourth section dealing with nonsampling error is titled, "Additional Data Notes," and discusses special problems encountered in reconciling building and supplier reports on energy sources used, demand-side management, transportation gas, fuel switching, and district heating and cooling.

Nonresponse

Unit Nonresponse

The response rate for the 1989 Building Survey portion of CBECS, as reported in Appendix A, was 92.5 percent. That is, of the 6,352 buildings eligible for interview, 7.5 percent did not respond at all to the Building Characteristics Survey. This rate was similar to that for the 1986 CBECS and represents a low unit nonresponse rate for a survey of this length and complexity.

Weight adjustment was the method used to reduce unit nonresponse bias in the survey statistics. The CBECS sample was designed so that survey responses could be used to estimate characteristics of the entire stock of nonresidential buildings in the United States. The method of estimation was to calculate basic sampling weights (base weights) that related the sampled buildings to the entire stock of nonresidential buildings. In statistical terms, a base weight is the reciprocal of the probability of selecting a building into the sample. A base weight can be understood as the number of actual buildings represented by a sampled building: a sampled building that has a base weight of 1,000 represents itself and 999 similar (but unsampled) buildings in the total stock of buildings.

To reduce the bias from unit nonresponse in the survey statistics, the base weights of respondent buildings were adjusted upward, so that the respondent buildings would represent not only unsampled buildings but also nonrespondent buildings. The base weights of respondent buildings were multiplied by the adjustment factor "A," defined as the sum of the base weights over all buildings selected for the sample divided by the corresponding sum over all respondent buildings. Respondent weights remained nonzero after weight adjustment. Nonrespondent weights were set to zero, because they were accounted for by the upward adjustment of respondent weights.

Unit nonrespondents tended to fall into certain categories. For example, nonresponse tended to be higher in the Northeast than in the Midwest. To reduce nonresponse bias as much as possible, adjustment factors were computed independently within 119 subgroups according to characteristics known from the sampling stage for both responding and nonresponding buildings. These characteristics included the general building activity, the rough size of the building, Census region, and metropolitan versus nonmetropolitan area.

Item Nonresponse--Building Characteristics

Item nonresponse is the type of nonresponse that occurs when an item (or several items) is missing in an otherwise completed questionnaire. Nonresponse in the Building Survey was imputed to allow publication of *Commercial Buildings Characteristics 1989*, the companion volume to this report.[6] The Energy Suppliers Survey consisted of four distinct data collections (electricity, natural gas, fuel oil, and district heating/cooling surveys) to obtain 1989 consumption information for buildings in the Building Survey. Partial and complete nonresponse in the Suppliers Survey are discussed in this section under "Annual Consumption and Expenditures."

The companion volume contains item nonresponse rates for many of the building characteristics used to present estimates in this report. Nonresponses to items in the Building Questionnaire were treated by a technique known as "hot-deck" imputation. In hot-decking, when a certain response is missing for a given building, another building, called a "donor," is randomly chosen to furnish its reported value for that missing item. That value is then assigned to the building with item nonresponse (the nonrespondent or "receiver").

To serve as a donor, a building had to be similar to the nonrespondent in characteristics correlated with the missing item. This procedure was used to reduce the bias caused by different nonresponse rates for a particular item among different types of buildings. What characteristics were used to define "similar" depended on the nature of the item to be imputed. The most frequently used characteristics were: principal building

activity, floorspace category, year constructed category, and Census region. Other characteristics (such as type of heating fuel and presence of furnace or boilers) were used for specific items. To hot-deck values for a particular item, all buildings were first grouped according to the values of the matching characteristics specified for that item. Within each group defined by the matching variables, donor buildings were assigned randomly to receiver buildings.

As in the 1986 survey, the 1989 CBECS used a vector hot-deck procedure. With this procedure, the building that donated a particular item to a receiver also donated certain related items if any of these were missing. Thus, a vector of values, rather than a single value, is copied from the donor to the receiver. This procedure helps to keep the hot-decked values internally consistent, avoiding the generation of implausible combinations of building characteristics.

Annual Consumption and Expenditures

This report presents estimates of energy consumption and expenditures in commercial buildings during calendar year 1989. These estimates were computed from the annual consumption and expenditures determined for each building in the CBECS sample. However, these annual values were not obtained directly for the sampled buildings. Rather, energy suppliers provided billing data, which were used to calculate calendar year consumption and expenditures for each building, according to the procedures described in this section. Also described in this section are the imputation procedures used in cases where the energy supplier survey data were unavailable or inadequate.

To assure that calendar year 1989 consumption would be completely accounted for, the data requested from suppliers were bills covering the period from December 1988 through January 1990. These bills formed the basis for the annual energy consumption and expenditures estimates published in this report.

Billing Data: Ideal and Reality

The basic consumption and expenditures data were reported for each building by billing period. Ideally, the data for each continuous-delivery energy source (electricity, natural gas, and district heating and cooling) used in each sampled building should have been in the form of complete records for consecutive billing periods either totally or partially contained in calendar year 1989, covering exactly the energy consumed within the sampled building. The data for the discrete-delivery energy source (fuel oil) should have been in the form of complete data records for all deliveries during 1989. For both continuous- and discrete-delivery energy sources, the delivered energy source should have been used entirely within the sampled building.

In practice, though, the billing data often covered more or less than the sampled building, or did not match the target time frame, calendar year 1989. There were several common types of discrepancy between the bill coverage and the ideal of a single building and fixed time frame.

- Bill coverage included days in 1988 and 1990 as well as calendar year 1989. This was the typical situation for a complete billing record. Very rarely would one billing period begin on January 1 and another end on December 31, 1989.
- Bill coverage spanned at least a 1-year period, but did not include all of 1989. In most such cases, the time frame covered by the bills extended from the middle of 1989 into the middle of 1990. Many energy suppliers maintain accessible billing records only for the most recent 13 months. Thus, at the time of reporting, the data available did not cover the beginning of 1989.
- Bill coverage spanned less than a 1-year period.

- Bill coverage was for several sampled buildings combined. This occurred when no authorization form was obtained to authorize the supplier to provide data for individual buildings. In such cases, the supplier reported only annual totals for a group of sampled buildings summed together, using the electricity or natural gas worksheet.
- Bill coverage included nonsampled buildings or equipment outside the sampled buildings, as well as the one sampled building.
- Bill coverage excluded some of the building's occupants or tenants. This undercoverage occurred when the energy supplier had several customers in a sampled building and was unable to identify all of them on the basis of the information provided by the Building Survey respondent. In a few cases, energy suppliers were unwilling to release information on all customers in a building, even in aggregate form, without having a separate authorization from each.
- The problem of determining bill coverage was compounded by incomplete dates. In the most common case, the billing period date included a month and year, but not the day of the month.

To deal with the discrepancies between the ideal billing data and what could actually be obtained, the following seven processing steps were taken:

1. Classify each set of bills, from a particular energy supplier for a particular building, as to coverage in terms of both building and time frame;
2. Complete the billing dates for all bills;
3. Annualize bills with full-year time frame coverage;
4. Annualize bills with part-year time frame coverage;
5. Adjust annualized bills, other than worksheet cases, for building over and undercoverage;
6. Impute annual consumption and expenditures for buildings with completely missing data;
7. Allocate worksheet totals among the buildings included on worksheets.

Each of these processing steps is explained below.

Step 1. Classifying Coverage of Building and Time Frame

This classification was performed by the CBECS contractor as part of the data collection recordkeeping. To track responses to the mailed Energy Suppliers Survey, determination had to be made whether a response received represented complete data for a building. In many cases, followup letters converted initial responses from partial to complete, or more nearly complete. In other cases, the incomplete response was all that could be obtained.

Determining Time Frame

An important aspect of the time-frame classification was determining why data were missing for part of calendar year 1989. The main question was whether consumption had actually taken place during the entire year or was actually zero during the unreported time.

If consumption occurred through the entire year, data might be missing for several reasons. One is that the supplier's active records might not go back far enough. Another is that data may simply have been lost from the supplier's record, even though in general these records did go back to the beginning of 1989.

A more complicated situation occurred when a new customer occupied a building in the middle of the target year. The data provided for this customer, for which the authorization form was signed, would be complete, but the data for the previous occupant, who consumed energy in the first part of the year, would be missing. In any case where part of the year's consumption data were missing, annual consumption would be understated if the reported 1989 data were treated as complete, rather than being inflated to account for the missing period.

The opposite situation could occur if a customer first occupied the building in the middle of the year, with no previous customer occupying the building. In this case, with no consumption during the first part of the year, annual consumption would be overstated if the reported data were annualized as if consumption occurred year round.

A special set of questions on the Energy Suppliers Survey forms was designed to determine if any change in customers had occurred during the target year, and if so how these customers were covered in the reported data. However, most suppliers did not answer these questions. As a general rule, data were treated as complete if they covered a full year, whether calendar 1989 or not. Part-year data were treated as incomplete, unless the supplier specifically indicated otherwise.

Particularly complicated were some electricity and natural gas cases where individual records were provided for each customer in a building with several customers. In most such cases, bills for all the customers covered the same time frame. Sometimes, though, different customers' records covered different time frames. In these cases, it was assumed that the data were complete for each customer, but the customers began or ended service at different times during the year. Aggregate consumption and expenditures were therefore computed for each time period by summing whichever customers had consumption during that period. If consumption was present for a particular customer in a particular period but expenditures were missing (or vice versa) aggregate expenditures (or consumption) were left as missing.

Determining Building Coverage

Building coverage was determined from information obtained from both the Building Survey respondent and the energy suppliers. If the Building Survey respondent indicated that a particular supplier's bill covered several buildings, the total square footage of buildings on that bill was requested. A disaggregation factor was then computed as the ratio of the sampled building's square footage to this total square footage. In some cases, the supplier indicated that a bill covered additional, nonsampled buildings, though the Building Survey respondent indicated otherwise. In these cases, the disaggregation ratio was computed using floorspace taken from listing information, or from the supplier's estimate. Disaggregation factors were always computed using the same source of information for both the total and the sampled building's floorspace: either the Building Survey respondent, the listing information, or the supplier. Some suppliers, particularly for district heating and cooling, did not provide floorspace figures, but did give an estimate of what percentage of the reported consumption took place in the sampled building; these percentages were used directly as disaggregation factors.

When the information required to compute a disaggregation factor was unavailable from any source, a flag indicating that disaggregation was needed, but not possible, was placed on the building records. In these cases, annual consumption and expenditures were imputed as if the data for the building were completely missing.

When the billing data omitted some customers in a building, an aggregation factor was computed. This factor was usually the ratio of the number of customers in the building to the number reported. Where more detailed information was available, the aggregation factor was the ratio of the total building floorspace to the floorspace occupied by the reported customers.

Step 2. Complete Billing Dates

Virtually all missing billing dates were one of two types. The first type of dates that were incomplete had the month and year entered, but the day was missing for the beginning and ending dates of all billing periods on a record. These cases were imputed by assigning "16" to each beginning date and "15" to each ending date.

The second type of incomplete dates were missing the day of the month for some, but not all, billing periods. For each case of this second type, the billing periods affected were either bounded (surrounded by billing periods with known beginning and ending dates), or unbounded (either at the beginning or end of the set of billing periods). Any set of consecutive bounded billing periods with missing dates was assigned billing dates that would make all billing periods in the set have as close to the same number of days as possible. Unbounded billing periods were assigned beginning and/or ending dates as needed so that the number of days in each unbounded period was the same as the median number of days in billing periods of known length.

Step 3. Annualizing Full-Year Data

One of the main reasons that the CBECS requested energy supplier data from December 1988 through January 1990 was to assure that 1989 consumption would be completely accounted for in the case of a complete response. However, unless a billing period happened to end on December 31, 1988, or December 31, 1989, consumption as reported by the energy suppliers ran over from the target period of calendar 1989, forward into 1990 and backward into 1988. In general, then, procedures were required to trim away these excess data. For this trimming, different procedures were used for continuous- and discrete-delivery energy sources.

For continuous-delivery energy sources (electricity, natural gas, and district sources), consumption and expenditures for a billing period extending into 1990 were adjusted by splitting the overlapping period into two subperiods, one running from the beginning date through December 31, the other from January 1 through the billing or meter reading date. Consumption and expenditures were prorated according to the number of days in each subperiod, and the consumption and expenditures for the subperiod that fell in 1989 were included in the total expenditures and consumption for 1989. An analogous procedure was used for a billing period extending into 1988. The assumption that the use of continuous-delivery energy sources took place at a constant rate throughout the billing period may be incorrect for any particular building. However, the procedure should yield approximately unbiased overall estimates.

Billing periods extending outside 1989 did not affect the discrete-delivery energy source (fuel oil) because, for this energy source, all deliveries during 1989 were accumulated. For fuel oil, the ending dates on the bills were used to determine which bills were for deliveries during 1989. No attempt was made to prorate bills, since there was no necessary connection between billing dates and consumption, as was the case for continuous-delivery energy sources.

For cases where the billing time frame covered a full year but was shifted so that either the beginning or the end of 1989 was not included, a similar procedure was used. In these cases, the data were annualized to a 1-year period within the reported time frame, overlapping as much as possible with 1989. The amount of shifting required to obtain 1-year periods is shown in Table B1 for electricity, natural gas, and district heat. A limited amount of shifting (involving 11 sampled buildings) was also performed for fuel oil.

Step 4. Annualizing Part-Year Data

The annualization procedures for cases that had partial billing data, but less than a full year, were also different for continuous- and discrete-delivery energy sources. For continuous-delivery energy sources, the number of reported days of consumption was at least as large as the number of reported days of expenditures for almost all sets of bills. Thus, the major problem was to find methods of annualizing the incomplete

consumption data. Expenditures were then annualized using the partial expenditures data and the annualized consumption data. The distributions of sampled buildings by days of reported consumption and expenditures data for continuous-delivery energy sources are given in Tables B2, B3, and B4.

Table B1. Days of Data from Outside Calendar Year 1989 Used to Obtain Annual Estimates

Shift of Reporting Period from Calendar Year 1989	Number of Buildings					
	Sample			Population (thousand)		
	Electricity	Natural Gas	District Heat	Electricity	Natural Gas	District Heat
All Buildings with Reported Data	5,050	3,115	280	3,900	2,230	50
Over 30 Days into 1988	48	33	19	35	33	4
30 or Fewer Days into 1988	155	88	6	113	54	1
No Days Shifted	4,111	2,818	251	3,191	2,001	45
30 or Fewer Days into 1990	408	94	1	353	83	0
31 to 90 Days into 1990	212	63	0	173	43	0
91 to 180 Days into 1990	38	11	0	19	11	0
Over 180 Days into 1990	78	8	3	17	5	0

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table B2. Days of Reported Consumption and Expenditures Data for Electricity

Days of Reported Electricity Data	Consumption			Expenditures		
	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Consumption (trillion Btu)	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Expenditures (million dollars)
All Buildings	5,657	4,294	2,773	5,657	4,294	55,943
Days of Electricity Data						
30 or Fewer Days	613	394	366	618	405	7,472
31 to 330 Days	142	121	73	182	136	1,861
331 to 364 Days	111	100	45	114	104	1,205
365 Days	4,485	3,473	2,106	4,437	3,443	41,590
Worksheets	306	306	182	306	206	3,814

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table B3. Days of Reported Consumption and Expenditures Data for Natural Gas

Days of Reported Natural Gas Data	Consumption			Expenditures		
	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Consumption (trillion Btu)	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Expenditures (million dollars)
All Buildings	3,456	2,420	2,073	3,456	2,420	9,204
Days of Natural Gas Data						
30 or Fewer Days	352	192	219	358	194	1,093
31 to 330 Days	86	53	38	101	69	207
331 to 364 Days	55	45	27	66	53	168
365 Days	2,813	2,032	1,689	2,781	2,004	7,275
			100			
Worksheets	150	99		150	99	461

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table B4. Days of Reported Consumption and Expenditures Data for District Heat

Days of Reported District Heat Data	Consumption			Expenditures		
	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Consumption (trillion Btu)	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Expenditures (million dollars)
All Buildings	506	98	585	506	98	3,857
Days of District Heat Data						
30 or Fewer Days	259	60	284	247	56	2,058
31 to 330 Days	9	1	40	8	1	145
331 to 364 Days	5	1	1	5	1	7
365 Days	233	36	260	246	41	1,647

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

The part-year annualization method for the consumption of continuous-delivery energy sources depended on the number of days of reported consumption. If at least 331 days were reported, then consumption for the missing portion of the year was imputed by computing the average consumption per day for the adjacent billing period(s), then multiplying by the number of days of missing data. In certain cases, at least 331 days of consumption were reported, but 365 days of expenditures were reported. In these cases, the missing consumption was computed using the average price for billing periods in which both consumption and expenditures were reported. Summing all reported and imputed consumption then yielded the total annual consumption.

If the number of days of reported consumption was between 31 and 330, the missing consumption was imputed using a hot-decked proration factor, where all cases with 331 days or more of reported consumption served as a pool of potential "donors." For each case with 31 to 330 reported days of consumption, a donor was randomly selected from the subset of buildings in the same Census region, with the same principal building activity, and in the same end use category for space heating, air conditioning, and water heating as the building needing imputation (called the "receiver"). Then, the donor's consumption was calculated first for the same

part-year period for which the receiver had data, D_r , and second for the entire year D_t . Then, a proration factor was computed as the donor's ratio of annualized consumption to the computed part-year consumption. Multiplying the receiver's reporting period total by this proration factor gave the annualized consumption for the receiver building. That is:

$$\hat{R}_t = \frac{D_t}{D_r} \times R_r, \quad (1)$$

where

- \hat{R}_t = the estimated total annual consumption for the receiver building,
- R_r = the (part-year) reported consumption total for the receiver building,
- D_t = the total annualized consumption for the donor building, and
- D_r = the consumption of the donor building during the part-year period for which the receiver building had reported data.

Expenditure imputations were performed after completion of all imputations for partially missing consumption since (1) consumption data were usually more complete than expenditures data; and (2) given a value for consumption, the expenditures could be estimated without a great deal of difficulty.

As was true for consumption, the imputation procedure for missing continuous-delivery expenditures was determined by the number of days of reported data. If 30 or fewer days of expenditures were reported, then the expenditures were treated as completely missing. Otherwise, expenditures were imputed based on average prices within the set of bills for a given building. Using bills where both consumption and expenditures were reported, the consumption and the expenditures were summed. The average price was then calculated as the sum of the expenditures divided by the sum of the consumption. This average price was multiplied by the reported (or imputed) consumption to obtain the estimated expenditures.

For fuel oil, a discrete-delivery energy source, the billing dates are not linked to the time of consumption. Thus, the annualized data represent the total deliveries of fuel oil during the year. Furthermore, unlike continuous-delivery bills, discrete-delivery bills tend to be irregularly spaced. Gaps between bills could represent either missing data or periods during which no deliveries were required. The completeness of a set of bills was determined by relying on reports of suppliers. A set of bills was treated as complete if the supplier stated that the bills were complete for the year, and treated as missing otherwise, even if a partial set of bills was available. Table B5 shows the numbers of sampled buildings by the completeness of reported fuel oil data.

Table B5. Completeness of Reported Consumption and Expenditures Data for Fuel Oil

Completeness of Data	Consumption			Expenditures		
	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Consumption (trillion Btu)	Sample Number of Cases	Population Number of Buildings (thousand)	Estimated Expenditures (million dollars)
All Buildings	1009	581	357	1009	581	1822
Complete	607	343	160	606	341	822
Partial	1	2	0	1	2	2
Missing	401	236	196	402	238	998

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Buildings rarely had more than one supplier for a continuous-delivery energy source, such as electricity, but multiple suppliers for fuel oil occurred frequently. If data for one or more of several suppliers were missing, even though responding suppliers had reported all their 1989 deliveries, these buildings were also treated as if no data were available.

Imputations for both deliveries and expenditures made use of the observed price(s). An average price P_x was computed using the data from billing periods in which both consumption and expenditures were reported. If expenditures were missing, the expenditures were imputed as P_x times the quantity delivered on date x . For missing deliveries, the reported expenditures were divided by P_x to impute the amount delivered.

Step 5. Adjusting for Building Over and Undercoverage (Other Than Worksheets)

The annualization procedures for full- and part-year data adjusted for inconsistent time-frame coverage. After the nonmissing consumption and expenditures data were annualized, the annual values were adjusted for building coverage. Where data were requested from the supplier for a single sampled building, but were provided only for a group of buildings including the sampled one, or were provided only for a portion of the building, the coverage adjustment was a simple multiplication of the annualized consumption and expenditures by the disaggregation or aggregation factor. As described above under Step 1, this factor was computed by the survey contractor directly on the basis of information received on the Building or Suppliers Survey.

Step 6. Imputing for Completely Missing Consumption and Expenditures

In a significant fraction of cases, the energy supplier did not provide the consumption or expenditures data for some or all billing periods or deliveries in 1989. Reasons for missing data included energy supplier refusal; archived, lost, or destroyed billing records; and authorization form refusal on the part of the building respondent. In other cases, the energy supplier provided data, but either the building data were combined with those of nonsampled buildings and could not be disaggregated, or the consumption and/or expenditures were incomplete enough to be treated as missing. Finally, if a building had partial billing data, but no donor building was found during the hot-deck procedure, the building's consumption was treated as missing. This occurred in 21 buildings using electricity, 23 buildings using natural gas, 3 buildings using district steam, 1 building using district hot water, and 6 buildings using district chilled water.

The general approach taken to the problem of imputing annual consumption or expenditures was to annualize the complete or partial sets of bills first, then to use these annualized bills in regression equations to develop imputed values for the data that were totally missing. The regression imputation approach was chosen because data from the Building Survey were already available for all of the buildings lacking energy supplier data. The first step was the estimation of missing consumption based on characteristics of buildings. After the consumption had been imputed, missing expenditures were estimated based on the reported or imputed consumption.

Completely Missing Consumption

Each of the energy sources presented in this report was imputed separately, although the overall methodology was similar for all. The consumption imputation method is, therefore, described in general terms, referring to individual energy sources only where necessary. The regression equations were developed primarily to serve as adequate predictors of building consumption based on structural characteristics. Simplicity and ease of estimation were also important considerations.

The data used to specify regression equations and estimate the regression parameters used for consumption imputation had to meet several criteria. Only cases with essentially complete consumption data were used. For continuous-delivery energy sources, "essentially complete data" included buildings with 331 to 365 days

of reported consumption; for discrete-delivery energy sources, only buildings with completely reported deliveries were included. Any cases that were reported on forms with data from nonsampled buildings (or that lacked data for some customers within the sampled building) were eliminated if the disaggregation (or aggregation) factor (from Step 1) indicated that the sampled building accounted for less than half (or more than double) the total floorspace of all the buildings reported on the form. District heating cases were kept if the sampled building accounted for more than double or less than a tenth of the floorspace. Finally, any buildings with imputed values for building characteristics that were used as predictors in the regression equations were also eliminated.

The development of regression equations began by examining the distributions of the dependent variable, consumption. The distributions were found to be highly skewed. For example, annual electricity consumption ranged from several kWh to several hundred million kWh. The skewness of these distributions suggested that a transformation of the dependent variable would be useful. The logarithmic (log) transformation, square root transformation, and several other power transformations for electricity and natural gas consumption were evaluated using Box-Cox transformations in conjunction with some preliminary consumption regression equations.[5] The results indicated that the log transformation of consumption was most appropriate.

Just as the consumption variable was highly skewed, so too were some of the potential regressor variables. Square footage, for instance, varied from less than one hundred to more than one million square feet. Transformations of independent variables were evaluated by simple regressions of the log of consumption on various transformations of each potential quantitative variable. Plots of residuals versus predicted values from these simple regressions were also examined. As a result of these analyses, several key potential regressor variables, including the number of employees, square footage, and heated square footage, were also transformed to the log scale.

The principal activity within the building is an important determinant of consumption patterns. Therefore, for electricity, separate equations were developed for each of 13 principal building activities. For natural gas, which had a smaller sample size, 10 equations were developed. For fuel oil, district heat, and district chilled water, sample sizes were not large enough to permit regression equations to be fit by principal building activity.

The equations developed for the log of consumption were fit using ordinary least squares. Examination of residuals helped to isolate some reporting errors, but otherwise showed approximately normally distributed, homoscedastic residuals. However, the goal was to impute consumption, not the log of consumption. As an estimate of consumption, the back-transformed log prediction is a biased estimate.

Accordingly, the consumption values were calculated using parameter values estimated in two stages: the initial regression of log consumption on structural characteristics, and a bias correction.[2] The bias correction coefficient was estimated by (1) summing the total actual consumption of cases used to estimate the regression parameters, (2) summing the total of the back-transformed predicted values (from the log regression) for these same cases, and (3) dividing the sum of the actual values (1) by the sum of the back-transformed values (2).

Completely Missing Expenditures

As for consumption, imputation for expenditures for each of the energy sources presented in this report was performed separately, although with a similar overall methodology. Again, the imputations are described in general terms, referring to individual energy sources only where necessary.

Energy supplier rate schedules are usually structured so that the price per unit of energy is lower as consumption increases. The rate schedule is usually a step function with the definition of steps and rates varying by energy supplier and by rate class. For the CBECS, rate schedules were not collected for the sampled buildings. Even the identity of the supplier was not disclosed to the Energy Information Administration. Therefore, a statistical procedure was needed to relate the expenditures to the consumption for imputation purposes.

As with the consumption imputations, the data used to specify the form and estimate the parameters of the expenditure imputation equations had to meet two criteria. First, only cases with essentially complete consumption and expenditures were used. For continuous-delivery energy sources, "essentially complete data" included buildings with 331 to 365 days of reported data for both consumption and expenditures; for discrete-delivery energy sources, only buildings with completely reported deliveries and expenditures were included. Any cases with data that were reported on forms with nonsampled buildings were eliminated if the disaggregation (or aggregation) factor (from Step 1) indicated that the sampled building accounted for less than half (or more than double) of the total floorspace of all the buildings reported on the form. Finally, any buildings with imputed values for building characteristics, such as square footage or number of employees, that were used as predictors in the regression equations were also eliminated.

As a start, expenditures were plotted against consumption. Since both distributions were highly skewed, the log of expenditures was also plotted against the log of consumption. The latter set of plots disclosed a basically linear relationship between the log of expenditures and the log of consumption. The only noticeable departure from linearity was found at the low values of electricity and natural gas consumption, where the log of expenditures seemed to be unrelated to the log of the consumption. This cutoff apparently was due to base charges for these two energy sources, which dominated the total expenditures for low values of consumption. The breakpoint occurred at approximately 1,000 kWh for electricity and at approximately 10,000 cubic feet for natural gas. Therefore, buildings with annual consumption below these values were eliminated from the data used to fit the regression equations.

The approximately linear relationship observed between the log of expenditures and the log of consumption suggested an equation of the form:

$$\log(\text{expenditures}) = a + b \times \log(\text{consumption}). \quad (2)$$

This is for consumption above the cutoff. Transformed back from the log scale, this equation becomes:

$$\text{expenditures} = a \times \text{consumption}^b. \quad (3)$$

This equation expresses a plausible general relationship. If b equals one, then the parameter, a , can be interpreted as the price per unit consumed. If b is less than one, then the equation describes a situation in which the price per unit consumed declines with increasing consumption.

The above equation was estimated separately for metropolitan and nonmetropolitan areas within each Census division for electricity and natural gas. However, the CBECS sample size was insufficient to support this level of estimation for fuel oil, district heat, and district chilled water. For these three energy sources, the two parameters were estimated at the national level.

As was the case for consumption, the equations for the log of expenditures were fit using ordinary least squares. Transformation bias correction coefficients were also computed using the same procedure as for consumption.

If the reported or imputed value of electricity consumption for a building with missing expenditures was less than 1,000 kWh, then the expenditures were imputed as though the consumption were 1,000 kWh (the breakpoint identified in the plots of the log of expenditures versus the log of consumption). The same procedure was followed for natural gas, using a cutoff of 10,000 cubic feet for consumption. No cutoff was used for fuel oil, district heat, or district chilled water consumption.

Step 7. Allocating Worksheet Totals

Worksheets combined consumption and expenditures for several sampled buildings and were used only for electricity and natural gas data. For each of these energy sources, the number of buildings with supplier data reported on worksheets represented about 5 percent of all sampled buildings supplied with the energy source.

The worksheet problem was not simply a matter of allocating an annual number among a set of buildings. In general, different reporting periods were given for each building on the worksheet, and the period lengths were rarely exactly 365 days long. In addition, the bills for a sampled building on a worksheet could include consumption in other, nonsampled, buildings just as was the case for sampled buildings not reported on worksheets.

A preliminary estimate of annual consumption and expenditures was made for each building on the worksheet using the regressions developed to impute completely missing data. A total for the set of cases on the worksheet was then estimated as:

$$\hat{W} = \sum_{i=1}^n \frac{\text{days}_i}{365} \times \frac{\hat{x}_i}{\text{adj}_i}, \quad (4)$$

where

- \hat{W} = the regression-estimated worksheet total,
- n = the number of buildings included on the worksheet,
- days_i = the number of days of data reported for the i^{th} building,
- \hat{x}_i = the annual value estimated via regression for the i^{th} building,
- adj_i = the aggregation/disaggregation adjustment for the i^{th} building (as discussed in Step 1).

The ratio \hat{x}_i/adj_i estimated the annual total that would have been reported for a building requiring aggregation or disaggregation by the factor adj_i . The ratio $\text{days}_i/365$ estimated the fraction (usually greater than one) of this annual total that would have appeared on the worksheet if days_i of data were included for the building. The sum \hat{W} was thus the regression-based estimate of what the worksheet total would have been.

The quantity (consumption or expenditures) for the i^{th} building, x_i , was then calculated as:

$$x_i = \frac{W}{\hat{W}} \times \hat{x}_i, \quad (5)$$

where W was the supplier-reported worksheet total for the worksheet that included the i^{th} building. The ratio W/\hat{W} scaled the regression-imputed annual values, \hat{x}_i , to be consistent with the reported worksheet totals.

Annual Peak Electricity Demand

Peak electricity demand data were requested for the same billing periods for which electricity consumption and expenditures were reported. (See Appendix F for copies of the electricity supplier forms.) Ideally, the metered demand represented the maximum consumption rate (in kW) during the billing period. However, two special data problems affect the availability of peak electricity demand data.

First, although virtually all electricity consumption is metered, peak electricity demand is metered where it is economical to do so. In general, peak demand meters are only installed for larger consumers of electricity. Second, in multicustomer buildings, each customer with a demand meter has its own peak demand. Since these peaks would rarely be coincident, the building peak cannot be taken as the sum of individual peaks. However, the overall building peak must be greater than or equal to the maximum customer peak.

Following Step 2 of "Annual Consumption and Expenditures," the peak electricity demand data was processed in three additional steps:

1. Using the billing data, each building was classified as either demand-metered or not demand-metered;
2. The annual peak demand, the season of the peak, and the annual load factor were determined for each building;
3. Peak demand and season of peak were imputed for demand-metered buildings missing these data.

These steps are described below.

Step 1. Classification of Buildings

For the 1989 Building Survey, a building was considered to be demand-metered if any electricity account in the building had metered peak demand. Extending this definition to the Energy Suppliers Survey, a building was classified as demand-metered if the billing data for any account within the building showed metered peak demand. This extension of the Building Survey definition allowed multicustomer buildings to be classified on the basis of reported billing data, rather than imputed on the basis of consumption as in the 1986 CBECS.

As shown in the text table below, there was a considerable discrepancy between what the building respondent reported and the actual billing situation. Problems obtaining information on billing features from building respondents are not unique to the CBECS. In a small-scale study, it was also found that a large proportion of store managers were unaware of billing features.[8] In particular, among store managers whose electricity bills were typically 40 percent demand charges, none knew what a demand charge was, or even that they were billed for peak demand. The results in this text table give national credence to the findings of Komor et al:

Building Survey Response	Percent of Buildings with Demand-Metering ^a
Demand Metered in Building	71.0
Demand Not Metered in Building	47.5
Did Not Know If Metered	56.4

^aPer energy supplier's response.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Step 2. Determination of Peak Demand and Related Items

For single-account buildings that were determined to be demand-metered in Step 1, the annual peak demand was taken as the maximum of the billing period peaks. For the few buildings that had part-year electricity billing data, the annual peak was taken as the maximum of the peaks in the reported billing periods. This approach results in a slight understatement of the annual peak, because the actual peak may have occurred during one of the unreported periods. However, since the number of buildings involved was relatively small, the difference between the part-year and full-year maxima would be small in most cases.

In multicustomer buildings, the overall building peak demand was not available. However, the overall peak had to be at least as high as the highest peak reported for any single customer. In buildings where one customer's peak was substantially larger than that of any other customer, that customer's peak would have been close to the overall peak. Therefore, in processing bills from multicustomer buildings, the peak demand for any single customer was designated as a "partial peak" (associated with part of the building electricity consumption), although the overall building peak was still treated as missing.

Before assigning the peak to a season, the month of the peak was found. Since the exact time of the billing period peak was unknown, the peak was taken to have occurred in whichever month contained the most days in the billing period during which the peak occurred. Peaks occurring November through April were then classified as winter peaks, while those occurring May through October were classified as summer peaks.

The annual load factor was then calculated, using previously calculated annual electricity consumption, as follows:

$$\text{annual load factor} = \frac{\text{annual consumption}}{365 \times 24 \times \text{peak annual demand}} \quad (6)$$

As an edit, the annual load factor was calculated using the partial peak, and the partial peak was set to missing if the load factor was less than .10 or greater than 1.

Step 3. Imputation for Missing Peak Demand

Although any electricity consumer has a peak demand, three types of buildings were missing peak demand:

1. buildings determined to be not demand-metered;
2. buildings with completely missing supplier data;
3. multicustomer buildings, and other buildings with partial peaks.

No attempt was made to impute for the first type of missing demand, mainly because buildings without demand-metering tended to be smaller than the demand-metered buildings, so that imputation would involve extrapolation beyond the range of the reported data. Accordingly, tables dealing with peak electricity demand have been limited to buildings with (reported or imputed) demand-metering.

Once the decision was made to exclude buildings that had not been demand-metered, imputation became a two-step process. First, it was necessary to impute whether the building with missing data was demand-metered. If the building was imputed to be a demand-metered building, then the peak and season of the peak were imputed. Table B6 shows the amount of each type of imputation that was necessary.

Table B6. Item Response for Peak Electricity Demand Data

Response Category	Demand Metering		Peak Demand		Season of Peak	
	Sample Number of Cases	Population Number of Buildings (thousand)	Sample Number of Cases	Population Number of Buildings (thousand)	Sample Number of Cases	Population Number of Buildings (thousand)
Eligible Buildings	5,657	4,294	3,657	2,217	3,657	2,217
Reported	4,748	3,698	2,368	1,622	2,524	1,679
Imputed	909	596	1,289	594	1,133	537

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Imputation of the demand-metering attribute made use of the relationship observed within suppliers between the presence of demand-metering and annual electricity consumption. Using buildings with reported data, the probability of being a demand-metered building was estimated as a logistic function of the annual consumption. The parameters estimated from the reported data regression were used to estimate probabilities for each unclassified building, and a uniform random number was generated. If the random number was less than or equal to the estimated probability, then the building was imputed to be demand-metered. For buildings imputed to be demand-metered, the season of peak demand was imputed by hot-decking, the same method used to impute missing items from the Building Survey.

Finally, annual load factors were imputed for each building imputed to be demand-metered. Values were imputed using parameters estimated from a linear regression of the logistic transformation of the annual load factor on various building characteristics (such as weekly operating hours, end uses of electricity, and percent of floorspace heated). Separate imputation equations were estimated for each of nine principal building activities. The imputed annual peak demand was then calculated by solving the load factor equation for the annual peak.

Load factors were imputed, and peak demand values calculated, for multiple-account buildings which had partial peaks (from Step 2). If the partial peak was less than the imputed peak, then the imputed peak was treated as the buildings' annual peak demand; otherwise, the partial peak was used.

Load factors and peak intensities were computed for each building reported or imputed to have metered demand. Also of interest are the analogous ratios over a utility service region, or other large area. The ratio of a region's consumption to the annual peak for the region as a whole would represent the average utilization of the region's generating capacity. The ratio of the region's annual peak to the total floorspace in the region would represent the average capacity requirement per square foot. However, the regional peak cannot be determined from the individual annual (or even monthly) peaks alone, since these peaks are not coincident. That is, the individual peaks occur at different peak times, so that the sum of the individual peaks can be considerably greater than the overall regional peak.

Additional Data Notes

Energy Sources Used--Building and Supplier Survey Estimates

As explained in Appendix A, "How the Survey Was Conducted," the CBECS was conducted in two stages. During the first stage, the building representative was asked which energy sources were used in the building during 1989. In the second stage, the energy suppliers, identified by the building representative during the first stage, were asked to provide consumption and expenditures data. In some cases, contacts with the energy suppliers revealed inaccuracies in the Building Survey report as to which energy sources had been used in the building. All statistics in this report on energy sources used are based on the final determination made during the Energy Suppliers Survey.

When a supplier reported that a particular building was not a customer during 1989, calls were made to the building respondent to determine the reason for the discrepancy. In some cases, a different supplier was identified for the same energy source. In others, it turned out that the energy source had not actually been used; in some of these cases, a different energy source was identified instead. For example, natural gas may have been reported originally, but the callback determined that natural gas was consumed only in a central plant outside the sampled building, while the building itself used district steam, which had not been reported originally. In this case, natural gas would be coded as "not used in the building," and district steam would be added as "used in the building." The net discrepancies between the Building Survey and Suppliers Survey estimates for the use of each energy source were small for both the building counts and the floorspace totals (Tables B7 and B8).

The Energy Suppliers Survey was able to correct the energy sources used, only in cases where a supplier had been misreported as supplying a particular building with an energy source. If the Building Survey respondent happened to omit an energy supplier, but reported all the other supplier data correctly, the omitted supplier would not have been discovered. The number of such cases was probably quite small.

In some cases, a supplier reported that a particular building had been a customer for a given energy source, but not during calendar year 1989. For continuous-delivery energy sources (electricity, natural gas, and district heating and cooling), the building was classified as not using the energy source. For the discrete-delivery energy source (fuel oil), though, the building was classed as using the energy source, but with zero consumption and expenditures for 1989. Thus, for example, those buildings whose respondents reported that fuel oil was used during 1989, but which received no fuel oil deliveries in that year, were included in the count of buildings and floorspace using fuel oil, though they did not contribute to the fuel oil delivery total.

The revised information on what energy sources were used had an effect on the energy end-use data also. The Building Survey data on what energy sources were used for what end uses were collected in concert with the data on what energy sources were used. (See Appendix F for copies of the survey forms.) Edit checks on the Building Survey data assured consistency between energy sources reported for end uses and energy sources reported at all. However, when the information on energy sources used "at all" was revised during the Energy Suppliers Survey, no new information was obtained on energy sources used for particular end uses. As a result, some energy sources were dropped from a building's list of energy sources used, even though these energy sources had end uses reported. Conversely, no associated end uses were coded for energy sources that were added for a building.

Table B7. Energy Sources Used as Reported on Building Questionnaire and Energy Supplier Survey, Number of Buildings (Thousand)

Reported Use	Energy Sources					
	Electricity	Natural Gas	Fuel Oil	District Steam	District Hot Water	District Chilled Water
Total Reported on Building Questionnaire	4,297	2,439	586	87	26	25
Unchanged Based on Energy Supplier Survey	4,294	2,420	580	81	24	24
Deleted Based on Energy Supplier Survey . . .	3	19	6	6	2	1
Added Based on Energy Supplier Survey	NC	NC	*	NC	NC	*
Total Based on Energy Supplier Survey (Final Resolution)	4,294	2,420	581	81	24	24
Not Used Based on Both Building and Energy Supplier Survey	231	2,089	3,941	4,441	4,502	4,502

* Value rounds to zero in the units displayed.

NC No cases in responding sample.

Note: See the "Glossary" for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Table B8. Energy Sources Used as Reported on Building Questionnaire and Energy Supplier Survey, Floorspace (Million Square Feet)

Reported Use	Energy Sources					
	Electricity	Natural Gas	Fuel Oil	District Steam	District Hot Water	District Chilled Water
Total Reported on Building Questionnaire	61,587	41,593	12,684	5,550	1,810	2,101
Unchanged Based on Energy Supplier Survey	61,563	41,143	12,552	5,326	1,675	1,906
Deleted Based on Energy Supplier Survey . .	24	450	132	224	135	194
Added Based on Energy Supplier Survey . . .	NC	NC	48	NC	NC	20
Total Based on Energy Supplier Survey (Final Resolution)	61,563	41,143	12,600	5,326	1,675	1,927
Not Used Based on Both Building and Energy Supplier Survey	1,597	21,591	50,452	57,633	61,374	61,063

NC No cases in responding survey.

Note: See the "Glossary" for explanation of abbreviations and definitions of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

For any energy source whose use was changed from "yes" to "no" for a particular building, the use of that energy source for any given end use was also changed to "no." However, the end use was still treated as having been performed in the building. That is, it was assumed that the building respondent correctly reported, which end uses were performed, even if the energy source used for the end use had been incorrectly reported. This approach left some buildings identified as having a particular end use, but with no energy source indicated for that use.

Gas Transported for the Account of Others

The 1989 CBECS was the first CBECS to attempt explicitly to collect data on natural gas transported for the account of others, where large natural gas users purchase their natural gas via direct purchases from the source, rather than from the local utility. The local utility then delivers the gas to the building via the local pipelines. Gas purchased directly is also referred to as direct purchase gas, spot market gas, or transportation gas--the way this gas was referred to on the 1989 CBECS survey forms. However, the more proper nomenclature is "gas transported for the account of others." For ease of reference, in this section we will refer to such gas as "transported gas." The survey form, EIA-871C-1 (Appendix F) requested: (1) consumption (excluding transported gas), (2) the volume of transported gas, and (3) total expenditures for 1 and 2 as defined above.

Since local distribution companies know the total volume of natural gas delivered, the total consumption data seem complete. (If natural gas consumption was completely missing, then the volume was imputed as described in Step 6 of "Annual Consumption and Expenditures"). The allocation of consumption between transported gas and local utility-owned gas was then imputed by hot-decking the proportion of gas that was transported gas. This method allowed imputed buildings to have both transported and local utility gas, as might happen if (1) building demand exceeded the direct purchase contract amount or (2) the building switched to or from a direct purchase contract during the year.

This report contains estimates of the number of buildings, floorspace, total natural gas consumption, and transported gas consumption (Table 7). Table 7 also includes the percentage of natural gas volume which was transported gas. Overall, 12 percent of natural gas consumed in commercial buildings was transported gas. Sixty percent of the transported gas was consumed in the Midwest, a Census region where such gas accounted for 18 percent of all natural gas consumption. Thirty-seven percent of the gas buildings under industrial accounts was transported gas, while only 7 percent of the commercial account gas was transported gas. Over 20 percent of natural gas provided to education and health care buildings was transported gas. These findings are roughly comparable to those in the *Commercial Gas Market Survey: 1989*.^[1]

Since data were requested from each supplier of natural gas named by the building respondent, it was expected that the main problem would be one of locating double-counting in cases where both the local utility and direct purchase supplier were named. Instead, the main problem involved expenditures. In many cases, the suppliers could not report the total expenditures since they did not know the purchase price of the transported gas; the only costs known by the local utility were the charges to deliver the transported gas to the building. If the supplier did not know the total expenditures for both the local utility-owned gas and the transported gas, the instructions were to leave the expenditures as unknown. However, many suppliers provided expenditures which included only transportation charges for the transported gas. The problem of identifying these cases was confounded with the problem of identifying unit-of-measure misreporting--transportation charges per thousand cubic feet (mcf) were about the same as the price for natural gas per hundred cubic feet (ccf).

Estimating expenditures for transported gas was more complicated than estimating consumption, since it was not clear which expenditures had been reported. To provide a rough adjustment, the average price was calculated for each building with reported transported gas. This price was then compared with the 1989 average wellhead price of \$0.169 per (ccf). If the average price for a building was above the average wellhead

price, the reported expenditures were assumed to be complete. If the average price was below the average wellhead price, the expenditures were assumed to reflect just transportation charges. In the latter case, an amount equal to .169 times the transported gas volume (ccf) was added to the total expenditures. Although individual buildings may have had their expenditures misstated (especially if the average price was originally in the vicinity of \$0.169 per (ccf)), this adjustment should bring aggregate natural gas expenditures, as well as total energy expenditures, closer to the correct amount. The proportion of transported gas (12 percent) is small enough that any remaining bias would be small, relative to the sampling errors of the estimates.

For the 1992 CBECS, the natural gas suppliers form will be redesigned to allow respondents to report separately, expenditures for gas purchased from the utility and transportation charges for transported gas. Average prices by Census division (as published annually in EIA's *Natural Gas Annual*) will also be used to provide more sophisticated adjustments for partially reported expenditures.

Fuel-Switching Capability Calculations

Estimation of Consumption

The 1989 CBECS obtained information on the ability to switch from one main heating fuel to a different fuel within a short period of time, in order to estimate the capability for fuel switching in the commercial sector. The following discussion focuses on buildings that heat with fuel oil¹⁵ (see the discussion on fuel switching in the main text for a more general discussion of fuel-switching capability).

For buildings with reported consumption, the billing data were examined to determine the percentage of consumption that occurred in each of the following seasons: March through May, June through August, September through November, and December through February. A seasonal percentage was determined for each Census region using the weighted consumption totals for buildings reporting their consumption. Two sets of percentages were calculated: (1) for all buildings that use fuel oil, and (2) for buildings which use fuel oil for their primary heating fuel. These percentages vary by region (Tables B9 and B10).

It was assumed that the final, aggregated fuel oil consumption for each building, reported or imputed, could be divided among the four seasons using these percentages. The estimated consumption of fuel oil in the United States for each season is presented below (Table B11). The 166 thousand barrels per day represent a total yearly consumption of almost 61 million barrels of fuel oil in the commercial buildings in the United States. However, it should be noted that over 33 million barrels of this estimate, or more than 55 percent, are estimated from buildings for which the total fuel oil consumption required imputation.

¹⁵Preliminary estimates were presented in the *Commercial Buildings Characteristics 1989* (Energy Information Administration, June 1991).

Table B9. Seasonal Proportion of Fuel Oil Consumption for Buildings Using Fuel Oil, 1989
(Percent)

Season	Census Region				
	All Buildings	Northeast	Midwest	South	West
Annual	100.00	100.00	100.00	100.00	100.00
March - May	23.67	25.87	17.98	20.48	22.07
June - August	7.80	7.97	4.85	10.63	7.52
September - November	16.02	18.72	10.88	10.53	10.54
December - February	52.52	47.44	66.29	58.36	59.87

Note: Relative Standard Errors were not computed for these proportions.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Surveys.

Table B10. Seasonal Proportion of Fuel Oil Consumption for Buildings Using Fuel Oil for Main Heating, 1989
(Percent)

Season	Census Region				
	All Buildings	Northeast	Midwest	South	West
Annual	100.00	100.00	100.00	100.00	100.00
March - May	25.82	26.88	24.66	21.05	17.69
June - August	7.77	8.21	0.69	11.90	5.57
September - November	16.54	17.27	10.90	18.07	9.02
December - February	49.87	47.64	63.75	48.99	67.72

Note: Relative Standard Errors were not computed for these proportions.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Surveys.

Table B11. Consumption of Fuel Oil in All Buildings Using Fuel Oil, 1989

Census Region	Average Consumption (thousand barrels per day)				
	Mar. - May	Jun. - Aug.	Sep. - Nov.	Dec. - Feb.	Annual
Total United States	157.5	51.9	106.6	349.4	166.3
Census Region					
Northeast	114.1	35.2	82.6	209.3	110.3
Midwest	20.4	5.5	12.4	75.4	28.4
South	19.1	9.9	9.8	54.4	23.3
West	3.8	1.3	1.8	10.4	4.3

Notes: •These figures include only those buildings that receive fuel oil deliveries. •Not included are buildings that heat with district steam produced by a central plant, even if that plant uses fuel oil.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Surveys.

Because the only questions concerning fuel switching included in the questionnaire involved possible alternatives to the building's main heating fuel, it is not possible to separate the consumption of all buildings using fuel oil into switchable and nonswitchable components. However, these statistics are presented here for comparison with the amount of consumption that occurs in buildings heating primarily with fuel oil and also the portion of this amount that is switchable to another fuel (Table B12).

Table B12 presents national and Northeast Census region figures of average consumption per day in buildings that heat primarily with fuel oil. (The Northeast Census Region consumption estimates are presented here along with the national estimates since most of the fuel oil consumption occurred in this region). For the most part, the statistics for total consumption in Census regions other than the Northeast were publishable. However, the estimates for switchable and nonswitchable consumption in these Census regions were not publishable due to RSE's that were greater than 50 percent.

The consumption by buildings using fuel oil for main heat is a large proportion of total fuel oil consumption. Therefore, it is not surprising that a large portion of fuel oil consumption occurs during the winter (December through February). Over three-fourths of fuel oil consumption by buildings heating primarily with fuel oil cannot be readily replaced with an alternative heating fuel. For consumption that can be replaced, the amount switchable to natural gas is almost equal to the combined amounts switchable to all other fuels.

District Heating and Cooling

The 1989 CBECS continued to improve the collection of information pertaining to district heating and cooling systems through the incorporation of loop information and the Facility Form. (See Appendix A, "How the Survey Was Conducted," for details on these two improvements)

Some buildings specifically reported that they were not billed for district heating and cooling. In these cases, their expenditures were considered to be zero. For many other buildings with nonutility district heat, expenditures data were not provided. Treating expenditures as zero for these buildings would have the effect

Table B12. Estimates of Consumption of Fuel Oil in Buildings Heating Primarily with Fuel Oil, 1989

	Average Consumption (thousand barrels per day)				
	Mar. - May	Jun. - Aug.	Sep. - Nov.	Dec. - Feb.	Annual
Total United States					
Total Consumption	138.5	41.7	88.8	267.5	134.1
Not Switchable	107.5	32.5	68.9	206.0	103.7
Switchable	31.1	9.2	19.9	61.5	30.4
To Natural Gas Only	20.9	6.0	13.2	40.7	20.2
To Electricity Only	4.1	1.5	2.8	8.6	4.3
To Propane Only	3.0	0.8	1.9	6.4	3.0
No Single Fuel/Other	3.1	1.0	2.0	5.8	3.0
Northeast Census Region					
Total Consumption	109.1	33.3	70.1	193.4	101.5
Not Switchable	86.9	26.6	55.9	154.1	80.9
Switchable	22.2	6.8	14.2	39.3	20.6
To Natural Gas Only	15.8	4.8	10.1	27.9	14.7
To Electricity Only	Q	Q	Q	Q	Q
To Propane Only	Q	Q	Q	Q	Q
No Single Fuel/Other	Q	Q	Q	Q	Q

Q - Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or data were reported for fewer than 20 buildings.

Notes: • The numbers from the alternate fuel subcategories may not add up to the total switchable consumption due to rounding. However, the RSE of the floorspace estimates used to derive these figures was in some cases too high to justify inclusion of the estimate. Those cases are marked with a 'Q'. • These figures include only those buildings that heat primarily with fuel oil. Not included are buildings that use fuel oil for some purpose other than heating, and buildings that heat with district steam produced by a central plant, even if that plant uses fuel oil. All fuel oil consumption by the included buildings is presented, even if some fuel oil is consumed for purposes other than heating.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Surveys.

of assuming that the energy was cost-free. In these cases, all missing district heat expenditures were imputed by the same procedures, without regard to the type of district heat reported. As a result, the expenditures imputed for district heat represent an equivalent cost as if all the district heat had been purchased, rather than a sum of direct costs to the buildings.

District cooling data were also collected in the 1989 CBECS. In the same manner as district heating expenditures, all missing district chilled water expenditures were imputed, thus treating all district cooling as purchased. No correction was made for primary energy association with district heat.

The quantities reported for district heating are increasing with each CBECS iteration. However, this increase may be more a result of better identification than actual increases. Most of the increase is recorded in older(pre-1980) buildings rather than in new construction (Table B13). We would expect estimates from

future CBECS to remain in the range of the 1989 estimate. In the 1989 survey, the amount estimated for buildings constructed between 1980 and 1989 was unpublishable due to an RSE exceeding 50 percent. The upper limit of the 95 percent confidence level was approximately 80 trillion Btu.

The improved identification of district heating situations not only affects district heating estimates. Estimates of natural gas, fuel oil, and fuels commonly used as central plant inputs are also affected. Estimates of these fuels may also be decreased, since these amounts were formerly associated with commercial buildings and are now correctly identified as inputs to central physical plant buildings. The 1989 CBECS Facility Survey was intended to capture the consumption of energy in these central plants, as well as to identify cogeneration. Central plants are more likely to include cogeneration systems than ordinary commercial buildings.

Table B13. Estimates of District Heat Floorspace, Consumption, and Intensity for Buildings Constructed 1979 or Before, by Survey Year

Survey Year	Floorspace (million sq.ft.)	Consumption (trillion Btu)	Intensity (MBtu/sq.ft.)
1979	3,593	192	53
1983	3,883	253	65
1986	4,367	390	89
1989	5,722	548	96

Note: The 1979 and 1983 CBECS asked for purchased steam; the 1986 CBECS asked for purchased and nonpurchased steam and hot water; the 1989 CBECS asked for district steam or district hot water piped into the building.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1979, 1983, 1986 and 1989 Commercial Buildings Energy Consumption Surveys.

Estimation of Sampling Errors

Sampling error, as described in the introduction to this appendix, is the random difference between the survey estimate and the true population value. This difference arises because a random subset, rather than the whole population, is observed. The typical magnitude of the sampling error is measured by the standard error of the estimate. The standard error is the root-mean-square difference between the estimate based on a particular sample and the value that would be obtained by averaging estimates over all possible samples.

If the estimates are unbiased, meaning there is no systematic error, this average over all possible samples is the true population value. In this case, the standard error is simply the root-mean-square difference between the survey estimate and the true population value. If systematic error is present, however, this bias is not included in the error measured by the standard error. Thus, the standard error tends to understate the total estimation error if there are nonnegligible biases.

In principle, random errors can be contributed to the estimate by sources other than the sampling process. Such additional sources of random error include random errors by respondents and by data entry staff, and random unit nonresponse. To recognize these additional sources of variation, the definition of the sampling process can be expanded to include not just the selection of buildings but all steps required to obtain a set of responses. Under this expanded definition, all random errors can be regarded as sampling errors. The procedures designed to estimate the sampling error must, therefore, incorporate all random components of the estimation process.

Jackknife Replication

Throughout this report, standard errors are given as percents of their estimated values, that is, as RSE's. Computations of standard errors are more conveniently described, however, in terms of the estimation variance, which is the square of the standard error.

For some types of surveys, a convenient algebraic formula for computing variances can be obtained. However, the CBECS used a list-supplemented, multistage area sample design (see Appendix A, "How the Survey Was Conducted") of such complexity that it is virtually impossible to construct an exact algebraic expression for estimating variances. In particular, convenient formulas based on an assumption of simple random sampling, typical of most standard statistical packages, are entirely inappropriate for the CBECS estimates. Such formulas tend to give severely understated standard errors, making the estimates appear much more accurate than is the case.

The method used to estimate sampling variances for this survey was a jackknife replication method.[9 and 10] The idea behind replication methods is to form several pseudoreplicates of the sample by selecting subsets of the full sample. The subsets are selected in such a way that the observed variance of estimates based on the different pseudoreplicates estimates the sampling variance in the overall estimate.

The replication method used begins by pairing first-stage sampling units, such that the two units in each pair represent two independent draws from the same pool of first-stage units, and draws for different pairs are also independent. This pairing of first-stage sampling units must be done in accordance with the way the sampling was actually conducted. For the 1989 CBECS, 40 pairs of first-stage sampling units were created in this way.

The k^{th} jackknife pseudoreplicate sample set is obtained by deleting all observations from one of the two members in the k^{th} pair and multiplying the weights on all cases in the other pair member by 2. Observations in all other pairs are unaffected. The k^{th} pseudoestimate is then obtained from this pseudoreplicate sample by following all the steps used to construct the full-sample estimate.

The variances are estimated from the pseudoestimates in the following way. Let X' be a survey estimate (based on the full sample) of characteristic X for a certain category of buildings. For example, X may be the total square footage of buildings using natural gas in the Midwest. Let X'_k be the pseudoestimate of X based on the k^{th} pseudoreplicate sample. The estimated variance of the full-sample estimate X' is then given by:

$$S_{X'}^2 = \sum_{k=1}^{40} (X'_k - X')^2 . \quad (7)$$

The standard error of X' is given by:

$$S_{X'} = \sqrt{S_{X'}^2} . \quad (8)$$

The relative standard error (percent) of X' is obtained from this standard error as:

$$RSE_{X'} = \left(\frac{S_{X'}}{X'} \right) \times 100 . \quad (9)$$

Effects of Missing Data on Error Estimation

Earlier in this appendix the procedures used to adjust for unit and item nonresponse were described. Because the missing cases and the responding cases used to adjust for them arise randomly (within adjustment groups) nonresponse contributes to the estimation variance, even when appropriate adjustment procedures are used to remove the nonresponse bias. Half-sample replication estimates of variance account for this component of variance only if adjustments are made separately for each replicate.

To capture the effect of random nonresponse on the variance of estimates, a separate unit nonresponse adjustment factor, as described in the section on "Unit Nonresponse Adjustment," was computed for each pseudoreplicate. Thus, each replicate estimate was computed using a slightly different set of adjusted weights.

As in previous CBECS's, RSE's of consumption, expenditures, and peak-demand related items were computed excluding cases that were imputed by regression. RSE's of consumption and expenditures for the sum of major fuels were computed excluding cases where more than half of the quantity had been imputed by regression. The practice of eliminating imputed values was supported by a nonresponse simulation study, which found the resulting RSE estimates to be reasonable approximations to the true RSE's.[2] However, basing estimated RSE's on reported cases is an ad hoc procedure. This practice may be misleading, especially for fuel oil and district heat, where a substantial portion of the estimated totals were imputed (see Tables B4 and B5).

A variance estimation procedure, which explicitly accounted for imputation effects, was tested for a limited number of building characteristics, including floorspace.[3 and 6]

Generalized Variances

For every estimate in this report, the RSE was computed by the methods described above. This was the RSE used for any statistical tests or confidence intervals given in the text, or to determine if the estimate was too inaccurate to publish (RSE greater than 50 percent).

Space limitations prevent publishing the complete set of RSE's with this document. Instead, a generalized variance technique is provided, by which the reader can compute an approximate RSE for each of the estimates in the main summary tables. For an estimate in the i^{th} row and j^{th} column of a particular table, the approximate RSE is given by the simple formula:

$$RSE_{ij} = R_i C_j \quad (10)$$

where R_i is the RSE row factor given in the last column of row i , and C_j is the RSE column factor given at the top of column j . (See "Detailed Tables" for a discussion of how to use the RSE Row and Column factors in this report.)

Derivation of Row and Column Factors

The row and column factors are determined from a two-factor analysis of the table of RSE's, on the basis of the model:

$$\log(RSE_{ij}) = m + a_i + b_j \quad (11)$$

The least-squares estimates for this model are given by:

$$m = \overline{\log(RSE)} \quad (12)$$

$$a_i = \overline{\log(RSE_i)} - \overline{\log(RSE)} \quad (13)$$

$$b_j = \overline{\log(RSE_j)} - \overline{\log(RSE)} , \quad (14)$$

where $\overline{\log(RSE)}$ is the mean of $\log(RSE_{i,j})$ over all rows i and columns j , $\overline{\log(RSE_i)}$ is the mean over all columns j for a particular row i , and $\overline{\log(RSE_j)}$ is the mean over all rows i for a particular column j . The row and column RSE factors are then computed as:

$$R_i = \log^{-1}(m + a_i) = \log^{-1}(\overline{\log(RSE_i)}) \quad (15)$$

$$C_j = \log^{-1}(b_j) = \log^{-1}(\overline{\log(RSE_j)} - \overline{\log(RSE)}) . \quad (16)$$

The RSE row factor, R_i , is thus the geometric mean of the RSE's in row i , and the RSE column factor, C_j , is an adjustment factor with geometric mean equal to 1.0.

For a few table cells, there were no sample cases, hence, no estimate and no RSE. As a result, some of the arrays of direct estimates $RSE_{i,j}$ had a few missing values. In such cases, the formulas given above for row and column factors still apply, but only after appropriate estimates have been substituted for the missing values.[4] In cases where a statistic was not publishable, because of a high RSE or small cell sample size, the value of $RSE_{i,j}$ was set to missing, so that the computed row and column factors are based only on published cases. A description of the automated system used to produce both the RSE's and the row and column factors appearing in this report can be found in Gargiullo and Goldberg 1989[7].

CBECS Comparisons Over Time

The CBECS has been conducted four times (1979, 1983, 1986, and 1989.) Over the 10-year span there have been changes in the data collection instruments and updates in the survey frame. While representing improvements to the CBECS survey procedures, these departures from the initial survey practices complicate comparisons across the surveys. This is especially evident between the 1979/1983 CBECS and the 1986 CBECS when the population of buildings covered changed. There have been four major changes in the coverage of the CBECS:

1. The 1986 and subsequent CBECS samples were drawn from a frame of all commercial buildings in the United States specially designed for CBECS use. (For details on this design, see the Sample Design section of Appendix A, "How the Survey was Conducted.") Previously, for the 1979 and 1983 surveys, a sample frame originally designed for another purpose was used.
2. Buildings of 1,000 square feet and under were deleted from the report tables in the 1986 CBECS and are no longer considered "in scope" for subsequent CBECS's.
3. Buildings whose use was 50 percent or more residential were deleted from the report tables in the 1986 CBECS and are no longer considered "in scope" for subsequent CBECS's.

4. Geographic coverage for the CBECS was increased by including Alaska and Hawaii in the 1986 and subsequent surveys.

For the first two CBECS's (1979 and 1983), a sampling design was adapted from one which had previously been developed for a private office machine company and utilized 1970 population distributions updated to 1980. For the 1986 and subsequent CBECS's, EIA has constructed its own multistage area probability sampling design specific to the needs of energy end-use surveys. A consequence of the redesign was better coverage of the commercial buildings' population, which would tend to increase floorspace estimates. Table B14 compares the CBECS coverage completeness by survey year.

These coverage changes are confounded with the fact that changes in floorspace data are also the result of "real world" processes, such as building demolitions, conversions of buildings from commercial to noncommercial use (and vice versa), and floorspace additions to existing buildings. Comparisons of electricity, natural gas, and fuel oil consumption and expenditures per square foot for 1979, 1983, 1986 and 1989 are provided in Table B15.

In response to our users' requests, EIA is assessing the effect of coverage changes between the 1979/1983 CBECS's and subsequent surveys. Preliminary analysis suggests that the comparisons across survey years of consumption indices such as those in Table B15 are reliable. However, comparisons of the amount of floorspace in commercial buildings between the 1979/1983 surveys and more recent ones are more problematic. An analysis is being conducted of the changes in floorspace based on a common definition of the commercial buildings population. The results of this analysis will be published in a separate analytic report.

Table B14. CBECS Coverage Completeness by Survey Year

Buildings Population	Survey Year		
	1979	1983	1986 and 1989
Agricultural	Excluded	Excluded	Excluded
Manufacturing	Excluded	Excluded	Excluded
100% Residential	Excluded	Excluded	Excluded
50 to 99% Residential	Included	Included	Excluded
1000 sq.ft. or smaller	Included	Included	Excluded
1980-83 construction under 50,000 sq.ft.		Incomplete	Included
Smaller Buildings over 1000 sq.ft.	Incomplete	Incomplete	Included
Alaska and Hawaii	Excluded	Excluded	Included

Source: Energy Information Administration, Office of Energy Markets and End Use, 1979, 1983, 1986, and 1989 Commercial Buildings Energy Consumption Surveys.

Table B15. Consumption and Expenditure Indices by Survey Year

Consumption and Expenditure Indices	Survey Year			
	1979	1983	1986	1989
Electricity				
Floorspace Fraction	0.99	0.98	0.97	0.97
Conditional Energy Intensity (MBtu/sq.ft.)	43.	44	44	45
Expenditures per Square Foot (dollars)	0.54	0.81	0.84	0.91
Aggregate Price (dollars per MMBtu)	12.58	18.56	19.74	20.17
Natural Gas				
Floorspace Fraction	0.70	0.69	0.64	0.65
Conditional Energy Intensity (MBtu/sq.ft.)	70	62	46	50
Expenditures per Square Foot (dollars)	0.19	0.34	0.22	0.22
Aggregate Price (dollars per MMBtu)	2.69	5.52	4.85	4.44
Fuel Oil				
Floorspace Fraction	0.26	0.19	0.19	0.20
Conditional Energy Intensity (MBtu/sq.ft.)	61	35	40	28
Expenditures per Square Foot (dollars)	0.25	0.23	0.19	0.14
Aggregate Price (dollars per MMBtu)	4.10	6.69	4.66	5.10

Notes: • Floorspace Fraction is the amount of floorspace for buildings using the energy source divided by floorspace in buildings using any major energy source. • Conditional Energy Intensity, Expenditures per Square Foot, and Aggregate Price are based only on buildings that actually use the particular energy source.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1979, 1983, 1986, and 1989 Commercial Buildings Energy Consumption Surveys.

Analytical Supporting Data

This section provides supplemental data that are not published in the Detailed Tables Section, but were used in analyzing the 1989 CBECS.

Regression Methodology

The purpose of the multiple regression analysis described in "Factors Related to Specific Energy Source Consumption" was to examine whether the relationships suggested by the aggregate intensity comparisons held at the individual building level. Six explanatory variables for energy intensity were used:

- The concentration of workers per square foot
- Weekly operating hours
- Building age (calculated as 1990 minus the year constructed)
- Heating degree-days

- Cooling degree-days, and
- The principal building activity.

Nine principal building activity categories were used: assembly, education, food sales and service, health care, lodging, mercantile and service, office, warehouse, and a ninth category consisting of the remaining buildings. Technically, an analysis of covariance was performed, with one categorical variable (principal activity) and five numeric covariates.

Not all buildings in the sample were used in the regression analysis. For the sum of major energy sources, the regressions eliminated buildings where 50 percent or more of the consumption had been imputed. For specific energy sources, the regressions eliminated buildings where the consumption had been imputed by regression or by hot-decking. (See "Annual Consumption and Expenditures" for details on consumption imputations.) The regressions also eliminated cases where the categorical versions of the explanatory variables had been imputed (number of workers, square footage, weekly operating hours, or year constructed). Cases with zero reported for consumption amount, number of workers, or weekly operating hours were also eliminated. After deleting cases with imputed data or reported zeroes, there remained 4,219 cases for the major fuel intensity analysis, 4,093 for electricity, 2,646 for natural gas, 385 for fuel oil, and 220 for district heat.

For intensity, and all explanatory variables except the principal building activity, logarithms were used. The logarithmic transformation is commonly used with skewed data and produces a model in which the effects of the explanatory variables are multiplicative. The section "Annual Consumption and Expenditures," which describes the consumption imputation regressions, contains further discussion of the rationale for log transformations.

Results for the regression analyses are presented in Table B16. The R^2 is a statistic which measures how well the regression performed relative to the overall variance of the intensities. About one-third of the variation in major fuel intensities, electricity intensities, and fuel oil intensities was accounted for by the regressor variables. The R^2 values for the natural gas and district heat intensities were lower, but still statistically significant.

Table B16. Results of Energy Intensity Regressions

Explanatory Variables	Energy Source				
	Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat
R^2	.32	.36	.15	.31	.12
Workers per Floorspace	x	x	x	x	x
Operating Hours	x	x	-	-	-
Age of Building	-	x	-	x	-
Heating Degree-days	x	-	x	x	-
Cooling Degree-days	-	x	-	-	-
Principal Building Activity	x	x	x	x	x

Notes: • x = Significant relationship at the 95-percent confidence level. • - = Relationship not significant.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, Public Use Data.

Supplemental Tables

Table B17 provides historical data that were used in analyzing the change in energy consumption over time. Because the sample coverage differed between 1979 and 1989, the statistics in Table B17 for survey years 1979, 1983, and 1986 have been adjusted to reflect the same composition as the 1989 CBECS sample: (1) For the 1979 and 1983 CBECS, buildings of 1,000 square feet or less were removed from the data set. Agricultural, residential, and industrial buildings were removed also. (2) For the 1979, 1983, and 1986 CBECS, LPG removed from the "all major fuels" category. (See the previous section, "CBECS Comparisons Over Time," for further discussion.)

Table B17. Selected Building Characteristics and Energy Consumption by Survey Year

Building Characteristics and Consumption	Survey Year			
	1989	Adjusted 1986	Adjusted 1983	Adjusted 1979
Total Floorspace (million sq.ft.)	63,183	58,199	49,471	43,546
Floorspace in Buildings Using (million sq.ft)				
Electricity	61,563	56,508	48,327	43,153
Natural Gas	41,143	37,263	33,935	30,477
Fuel Oil	12,600	11,005	9,409	11,397
District Heat	6,578	4,625	4,454	3,722
Square Foot-Hours ¹ (trillion sq.ft.)	251	206	194	165
Number of Workers (thousand)	70,663	73,425	73,873	58,946
Net Energy Consumption (trillion Btu)				
All Major Fuels	5,788	4,977	4,823	4,965
Electricity	2,733	2,390	2,129	1,908
Natural Gas	2,073	1,723	2,091	2,174
Fuel Oil	357	442	314	681
District Heat	585	422	289	201

¹See Table B18 for discussion of Square Foot-Hours.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, CBECS Public Use Data.

Because the economic activity in commercial buildings does not have a direct measure, such as value of shipments or added value which are commonly understood measures in the industrial sector, two surrogate measures were used in order to create an index of consumption per economic activity: the floorspace of a building and its annual operating hours. For each building, the square footage is multiplied by the annual operating hours; and for each building characteristic, this factor is weighted and summed over all relevant buildings. Table B18 provides the square foot-hours by various building categories. This measure is used in the calculation of energy consumption per operating hour.

Table B18. Square Foot-Hours by Building Characteristics

Building Category	Sum of Square Foot-Hours (billion)
All Buildings	250,868
Year Constructed	
1945 or before	49,615
1946-1959	38,027
1960-1969	51,028
1970-1979	55,770
1980-1989	55,364
Building Activity	
Assembly	22,214
Education	27,225
Food Sales	4,420
Food Service	6,105
Health Care	15,282
Laboratory	3,709
Lodging	29,858
Mercantile and Service	46,831
Office	41,649
Parking Garage	5,866
Public Order and Safety	4,097
Warehouse	31,587
Other	3,103
Vacant	8,922

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey, CBECS Public Use Data.

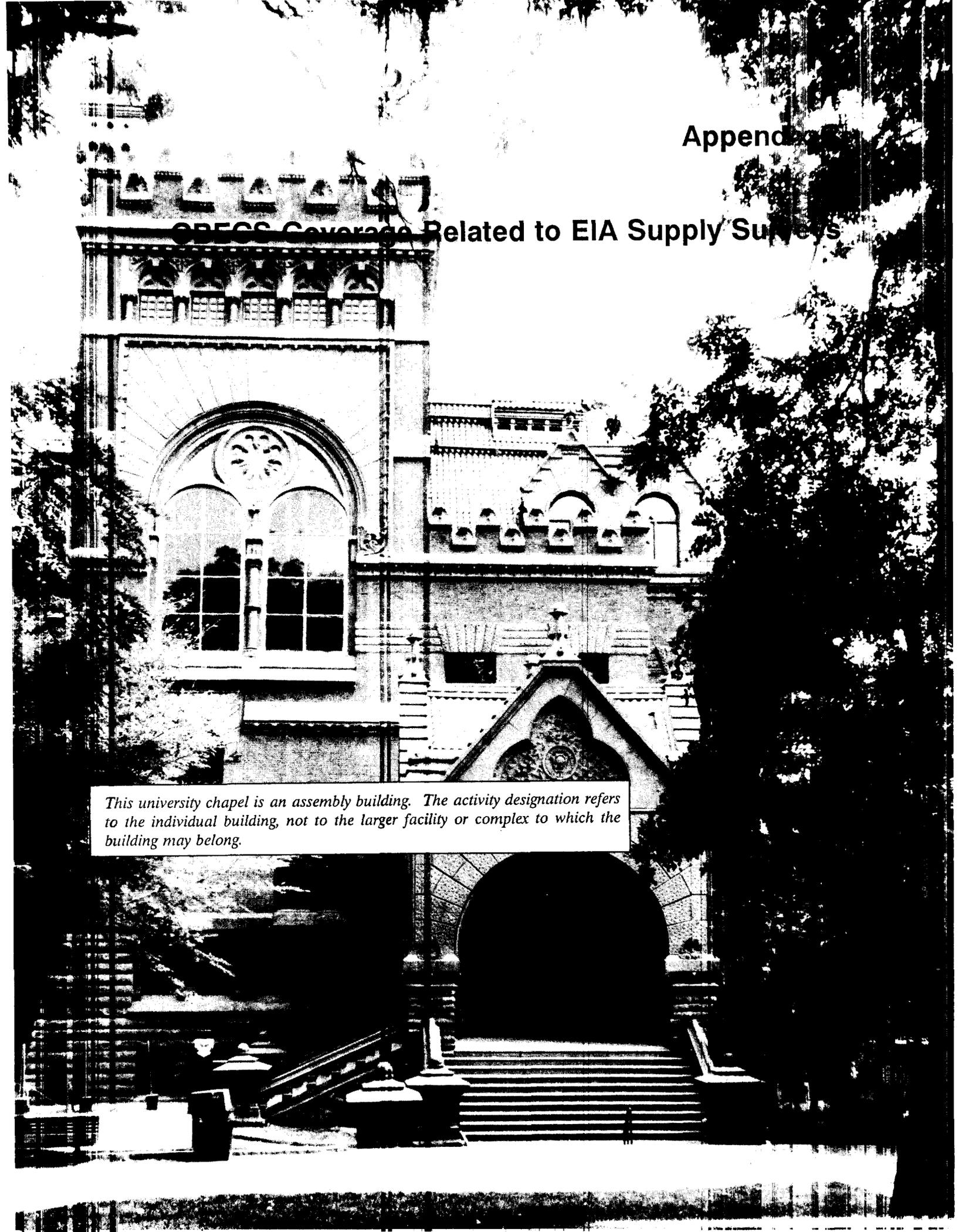
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Appendix B

CEFCO Coverage Related to EIA Supply Surveys



This university chapel is an assembly building. The activity designation refers to the individual building, not to the larger facility or complex to which the building may belong.

Appendix C

CBECS Coverage Related to EIA Supply Surveys

The primary purpose of the Commercial Buildings Energy Consumption Survey (CBECS) is to collect accurate estimates of energy consumption totals disaggregated by building characteristics. The Energy Information Administration (EIA) also collects data on total energy supply (sales). For this information on sales totals, a different reporting system is used for each fuel and the boundaries between the different sectors (eg., residential, commercial, industrial) are drawn differently for each fuel. A detailed examination of these differences and the differences between the supply and consumption surveys has recently been conducted by the EIA.[3] EIA's sales data on the different fuels are compiled in individual fuel reports and summarized at the national as well as State level in EIA's *State Energy Data Report (SEDR)*. [2] When comparing the CBECS totals with the national commercial totals from the SEDR, only electricity, natural gas, and fuel oil can be compared directly. CBECS does not collect data on coal consumption, and SEDR does not collect district heating information.

Differences between CBECS totals and sales totals can result from: (a) consumption that is included in the CBECS but not in the sales totals; and conversely, (b) consumption that is included in commercial sales totals but outside of commercial buildings and, therefore, excluded from CBECS totals.

The principal reason that a component of consumption may be in the CBECS totals but not in the sales totals or vice versa, results from differences in how *buildings* are classified for CBECS, versus how *accounts* serving those buildings are classified in the sales reporting systems. Each energy supplier has its own system of classifying accounts. When reporting sales totals to EIA by end-use sector, the supplier uses EIA guidelines as well as the supplier's own account classification to determine whether a particular account belongs to the residential, commercial, industrial, or transportation sector.

For the commercial sector, there are several general differences between the CBECS coverage and the set of accounts classified as commercial in the sales totals that are provided by the supply-side surveys:

1. CBECS covers consumption in buildings only. Accounts classified as commercial sales are not necessarily associated with only buildings, but may also be associated with unenclosed equipment or outdoor lighting.
2. CBECS covers all consumption in buildings whose principal activity is commercial and none in other buildings. Consumption for commercial activity in noncommercial buildings is not included, but consumption for noncommercial activity in commercial buildings is included. Accounts within a building may be classified as commercial or noncommercial sales.
3. The activities included as commercial differ between the CBECS and the supply-side reporting systems. On the supply side, as noted, the definitions also differ among fuels.

Consumption Totals Included in CBECS but Excluded From SEDR Commercial Sales

To help understand the relationship between CBECS consumption totals and EIA's commercial sales totals, the 1989 CBECS Energy Suppliers Survey collected information on the supplier's classification of each of the accounts for the CBECS sample. Analysis of the account classification information indicates the amount of consumption in commercial buildings that is likely to be excluded from commercial sales totals. In most cases, the relationship between the supplier's classification and the EIA end-use sales sector is straightforward.

Accounts classified by the supplier as residential or industrial are ordinarily included in EIA's sales totals for those sectors, not in commercial sales. Accounts classified by the supplier as commercial, school, government, or institutional are ordinarily included in EIA's commercial sales total. Accounts with hybrid or combination classifications, however, are probably included partly in commercial and partly in noncommercial totals.

For electricity, 15 percent of the CBECS consumption estimate was in accounts classified as residential or industrial. Another 10 percent was in accounts with a mixed classification by the supplier. The remaining 75 percent of CBECS electricity consumption was in accounts that would ordinarily be included in EIA's commercial sector sales totals. For natural gas and fuel oil, 82 and 74 percent of CBECS consumption, respectively, should be included in EIA's commercial sector sales totals (Table C1).

Table C1. Commercial Buildings Energy Consumption by Account Classification and Energy Source

Supplier Account Classification	Corresponding EIA Sales Sector	Commercial Buildings Energy Consumption by Fuel					
		Electricity		Fuel Oil		Natural Gas	
		Trillion Btu	Percent	Trillion Btu	Percent	Trillion Btu	Percent
All Buildings, All Accounts		2,773	100.0	357	100.0	2,073	100.0
Commercial	Commercial	2,003	72.2	208	58.3	1,639	79.1
School		36	1.3	22	6.2	44	2.1
Government (nonschool)		37	1.3	27	7.6	21	1.0
Institutional		1	0.03	6	1.7	NC	NC
Commercial/Industrial	Mixed	251	9.1	34	9.5	52	2.5
Commercial/Residential		13	0.5	2	0.6	8	0.4
Combination	Noncommercial	4	0.1	21	5.9	52	2.5
Other		11	0.4	12	3.4	8	0.4
Residential	Residential	16	0.6	6	1.7	42	2.0
Industrial	Industrial	399	14.4	20	5.6	209	10.1

NC No cases.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A through F of the 1989 Commercial Buildings Energy Consumption Survey.

Consumption Totals Included in SEDR Commercial Sales but Excluded From CBECS

Differences between CBECS and the sales totals work in both directions. Consumption totals can be included in commercial sales, but outside of commercial buildings, and, therefore, excluded from CBECS. However, by definition of its purpose and coverage, the CBECS has no way of measuring this excluded consumption component directly.

A large portion of the component of commercial sales that is excluded from CBECS is energy consumption by central physical plants providing district heating or cooling to commercial complexes. In most cases, a central heating plant would be in a building identified in CBECS as noncommercial, and, therefore, excluding the energy consumption in that plant from the CBECS total. However, because the plant is part of a commercial facility, the fuel supplied to the plant would probably be included in SEDR's commercial sales totals. The Facility Survey, added to the 1989 CBECS, was designed to quantify this component of energy consumption. Complete results from that Survey are not yet available, but will be published in a separate report.

The data currently available from the Facility Survey do indicate the rough magnitude of energy consumed by central physical plants on commercial facilities. Of the estimated 585 trillion Btu of district heat delivered to commercial buildings in 1989, approximately 476 trillion Btu was supplied by a central physical plant located on the same commercial complex. Assuming a system efficiency of 50 percent, this quantity implies about 952 trillion Btu of fossil fuel consumption by central plants on commercial facilities.

Net Comparison of CBECS and SEDR

Over the 10 years that the CBECS has been conducted, the CBECS buildings consumption totals for electricity, natural gas, and fuel oil have been roughly one quadrillion Btu less than the corresponding SEDR sales totals (Figure C1). The discrepancy has been relatively small for electricity, 7 percent or less. The discrepancies for natural gas and fuel oil have changed in opposite directions, perhaps indicating switching between these two fuels for nonbuilding consumption.

A large proportion of the fuel oil discrepancy is residual fuel oil, which averaged over 30 percent of commercial sales of fuel oil and kerosene according to SEDR. In 1989 (the only year for which a reliable decomposition is available) residual fuel oil was only about 7 percent of the CBECS buildings total fuel oil consumption. As indicated above, a large fraction of the discrepancy for fuel oil and natural gas, might be attributed to primary fuel consumption by central plants on commercial complexes.

In the last two cycles of the CBECS, 1986 and 1989, the gap between the SEDR and CBECS totals for natural gas has widened to over 25 percent. The SEDR-CBECS difference for natural gas can be attributed to several sources:

- Sales to commercial accounts not associated with buildings, including agricultural uses
- Sales to commercial accounts associated with central heating plants for multibuilding facilities
- Direct purchase of natural gas, also known as transportation gas, resulting in an understatement of commercial buildings consumption by the 1986 CBECS. Transportation gas has become increasingly more prevalent in recent years.

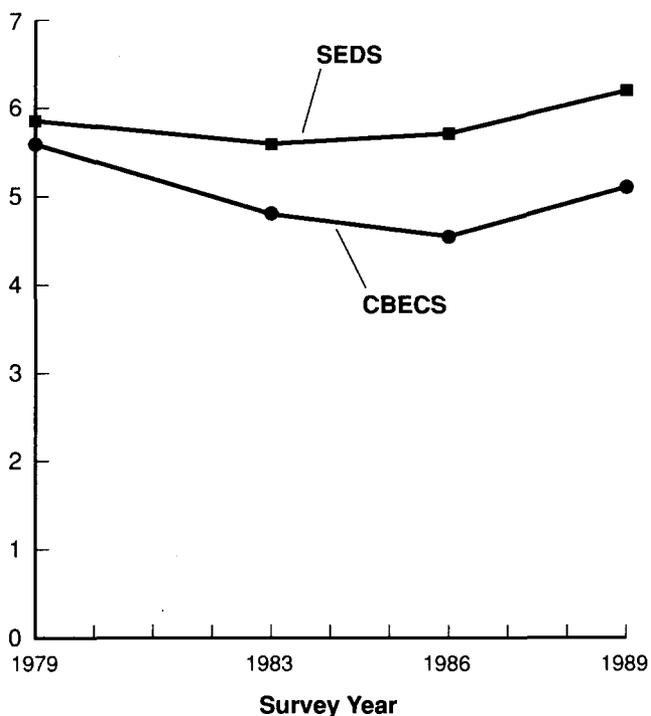
The first two discrepancy sources relate to the classification differences discussed above. These represent differences in the populations intended to be represented by CBECS and by SEDS. The third discrepancy source, natural gas direct purchases, corresponds to a partial failure of CBECS to include all that is intended to include.

During the period 1983 to 1986, when transportation gas was becoming more common, SEDR commercial sales of natural gas showed a decline of 0.1 quadrillion Btu, while the CBECS commercial total showed a decline of 0.5 quadrillion Btu. If this change in the coverage difference between SEDR and CBECS reflects an increase in transportation gas unaccounted for by CBECS, as much as 0.4 quadrillion Btu of the 1986 SEDR-CBECS difference may be attributable to transportation gas.

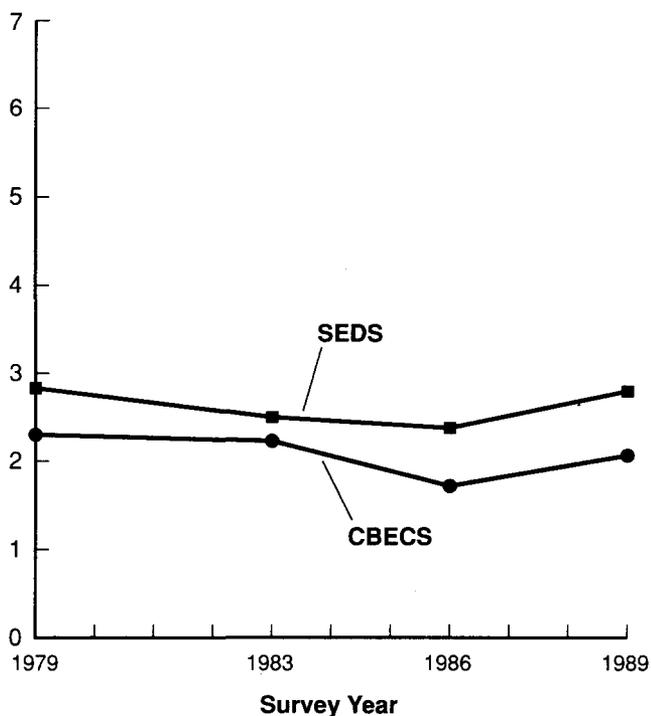
The 1989 CBECS attempted to address the issue of direct purchase of natural gas by explicitly asking natural gas suppliers to report volumes transported to customers, even if that supplier was not the seller. (See Appendix F for a copy of the Natural Gas Form.) Nonetheless, because of the diversity of accounting procedures, it is still possible that substantial quantities of direct-purchase gas supplied to commercial buildings was unaccounted for by the 1989 CBECS. Of the 2.1 quadrillion Btu of natural gas estimated by the 1989 CBECS, 12 percent was transportation gas. By contrast, the American Gas Association estimates 19 percent of commercial sales as transportation gas in 1989.[1] The transportation gas data collection is discussed in more detail in Appendix B, "Nonsampling and Sampling Errors."

**Figure C1. State Energy Data System (SEDS) Versus Commercial Buildings Energy Consumption Survey (CBECS)
(Quadrillion Btu)**

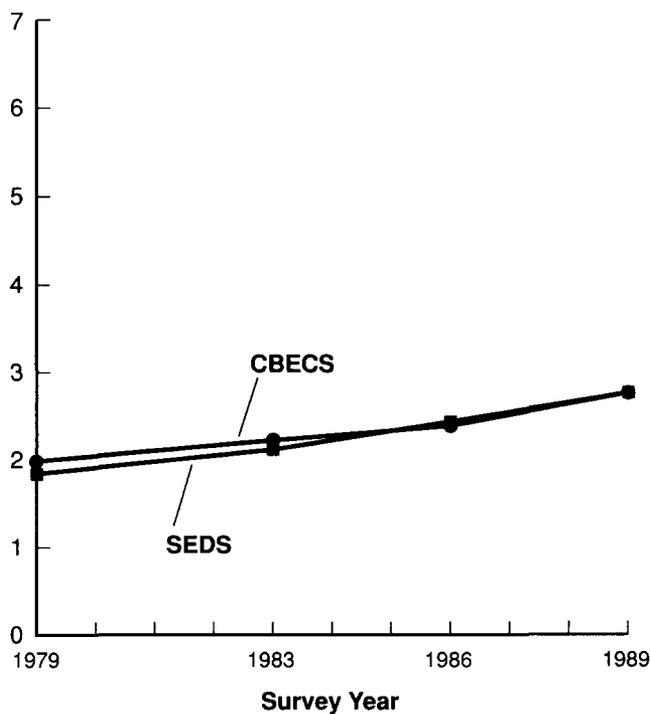
a. Electric, Gas, and Fuel Oil



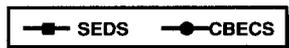
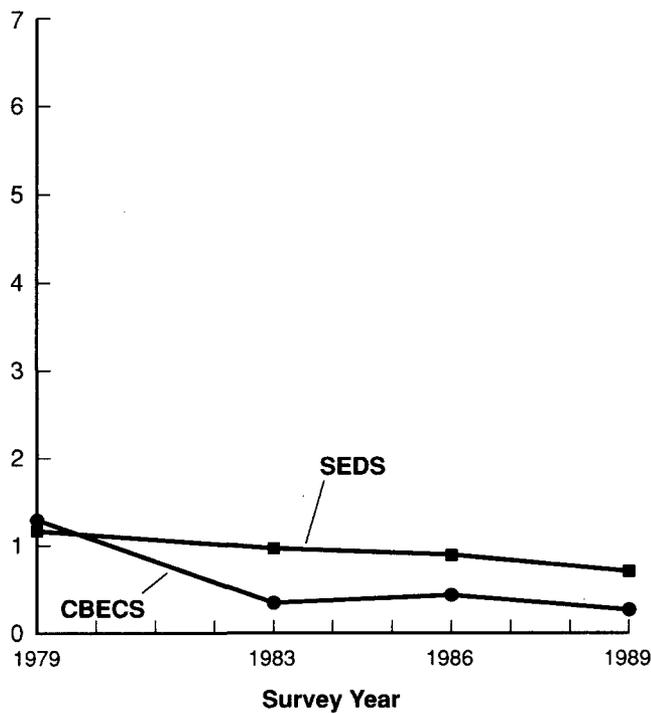
b. Natural Gas



c. Electricity



d. Fuel Oil



Sources: Energy Information Administration, Office of Energy Markets and End Use, 1979, 1983, 1986, and 1989 Commercial Buildings Energy Consumption Surveys and the *State Energy Data Report: Consumption Estimates 1960-1989*, Table II, page 25.

Another factor that may contribute to the widening gap between the CBECS and sales totals for natural gas is the improved identification of district heating by the CBECS. In earlier surveys, when less attention was paid to distinguishing boilers serving individual buildings from central boilers serving several buildings, natural gas used in a noncommercial (by CBECS definition) central plant could often have been included (incorrectly) in CBECS commercial building consumption estimates. With the improved procedures currently in place, the steam and hot water supplied to commercial buildings would be included in the CBECS total, but the natural gas used in the noncommercial central plant would not. Thus, the increase in the CBECS district heating estimate from 1979 to 1989 may be directly related to the increasing CBECS-SEDS gap in natural gas.

EIA is continuing to explore the relationship among estimates from different sources and to improve data collection procedures to increase consistency among sources. Further analysis of the 1989 CBECS data on transportation gas and data from the Facility Survey should shed more light on the problems discussed above. In addition, revisions to the survey forms for the 1992 CBECS may reduce some of these problems.

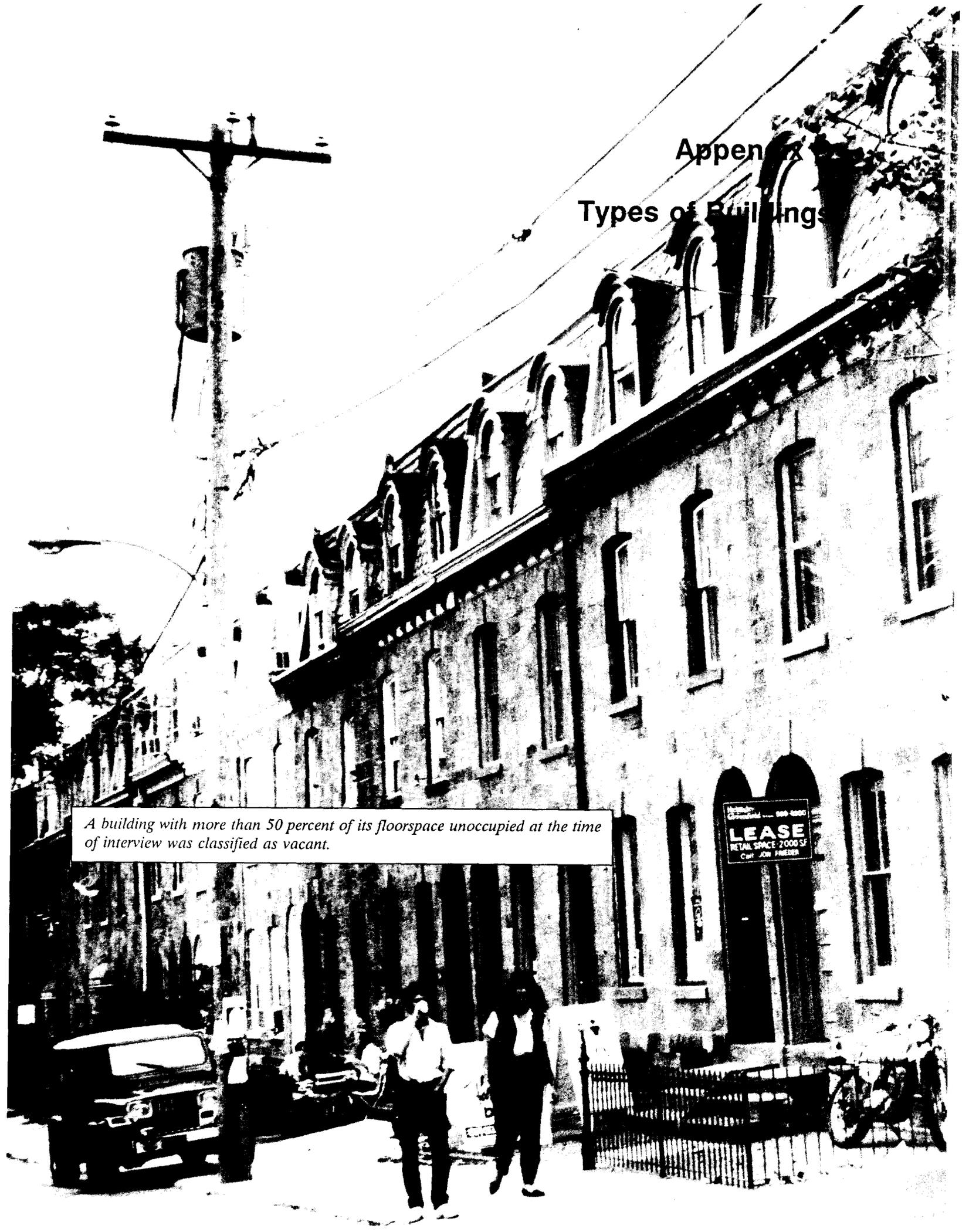
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3. Energy Information Administration. Office of Energy Markets and End Use. *Energy Consumption by End-Use Sector: A Comparison of Measures by Consumption and Supply Surveys*. DOE/EIA-0533. (Washington, DC, April 1990.)

Appendix Types of Buildings

A building with more than 50 percent of its floorspace unoccupied at the time of interview was classified as vacant.

LEASE
RETAIL SPACE 2000 SF
Call JON FRIEDER



Appendix D

Types of Buildings

Buildings were classified according to principal activity, which was the primary business, commerce, or function carried on within each building. Buildings used for more than one of the activities described below were assigned to the activity occupying the most floorspace at the time of the interview. Thus, a building assigned to a particular principal activity category may have housed other activities in a portion of its space or at some time during the year.

Each of the principal activity categories is listed alphabetically and described below. Lists of specific types of buildings included in each category are presented for clarification, but are not intended to be exhaustive.

1. **Agricultural:** See **Other**.

2. **Assembly:** signifies buildings used for the gathering of people for social, recreational, or religious activities whether in private or nonprivate meeting halls. Included in this category are the following types of buildings:

Entertainment Building:

- Archive/art gallery/exhibit hall/library/museum
- Coliseum/arena (enclosed)
- Concert hall
- Observatory/planetarium
- Nightclub
- Radio/TV station or studio
- Theater/movie house/cinema

Recreational Facility:

- Amusement arcade
- Bowling alley
- Gymnasium/YMCA or YWCA/indoor racket sports, recreation center/athletic facility
- Indoor pool
- Poolroom
- Skating rink (ice skating or roller skating)

Religious Assembly:

- Chapel
- Church
- Mosque
- Synagogue

Social/Public/Civic Assembly:

- Assembly hall
- Auditorium
- Convention hall
- Funeral home
- Lecture hall
- Lodge hall
- Meeting hall
- Student union
- Town hall

Other Enclosed Assembly Building:

Armory
Passenger terminal
Stadium

3. **Education:** refers to buildings that house academic or technical classroom instruction. This category includes the following:

Schools:

Preschool
Elementary
Junior high
Senior high
College or university classrooms/Laboratories
Vocational school

Other activities that occur on school campuses are reported separately:

Administration (see Office)
Auditorium (see Assembly)
Dormitory (see Lodging)
Gymnasium (see Assembly)
Infirmary (see Health Care)
Library (see Assembly)
Museum (see Assembly)
School for the Mentally Retarded (see Health Care)
Stadium (see Assembly)
Student Union (see Assembly)

4. **Food Sales:** involves retail or wholesale of food.

Convenience store or market
Farmer's market, Fruit/Vegetable market
Meat/Seafood store
Retail bakery
Specialty food store
Supermarket/Grocery store

5. **Food Service:** Activities involve preparation and sale of food and beverages for consumption.

Prepared-Meal Services:

Cafeteria

Carryout-Service:

Caterer
Fast-food establishment
Pizza parlor
Sandwich shop

Full-Service Restaurant:

Bar
Bar and grill

Coffee shop
Diner
Full-menu-service establishment

6. **Health Care:** covers diagnostic and treatment facilities for both inpatient and outpatient care.

Inpatient facilities treat the mentally or physically ill. Buildings for overnight care are in this grouping. This type of building includes the following:

Medical Care Hospital:

Chronic disease
Ear, eye, nose, and throat
General medical and surgical
Maternity
Medical infirmary (connected with an institution)
Orthopedic
Tuberculosis/other respiratory disease

Mental Facility:

Mental retardation/schools for the mentally retarded
Psychiatric

Rehabilitation Facility:

Alcoholism
Substance abuse/narcotics/drug addiction
Physical therapy

Veterinary Facility:

Hospital for animals
Kennel

(Excluded from this group are skilled nursing or other residential care facilities (nursing homes). These buildings are classified as "Lodging" buildings.)

Outpatient care may be medical, dental, or psychiatric. A building housing outpatient veterinary practices also falls into this category. Buildings of this type include:

Dental Clinic

Medical Clinic:

Abortion/birth control
Ear, eye, nose, and throat
Emergency walk-in
General

Mental health/psychiatric clinic

Veterinary clinic

(Inpatient and outpatient buildings are combined in the detailed tables of this report.)

7. **Industrial/Manufacturing:** See **Other**.

8. **Laboratory:** activities utilize equipment for experimental testing or for analysis. Included are:

- Mechanical/Electrical laboratory
- Medical/Dental laboratory
- Agricultural laboratory

(Laboratory buildings are included in the "Other" category in the detailed tables of this report.)

9. **Lodging:** refers to buildings that offer multiple accommodations for short-term or long-term residents (including nursing homes). The following types are included:

Short-term residence:

- Convention hotel
- Hotel
- Inn
- Motel
- Shelter home
- Tourist home

Long-term residence:

- Boarding house
- Convent/monastery
- Dormitory/sorority/fraternity
- Orphanage

Skilled nursing homes are included in the "Lodging" category in the detailed tables of this report.

10. **Mercantile and Service:** refers to buildings containing sales and displays of goods or services (excluding food). The category includes the following:

Automotive Sales and Service:

- Automobile dealers
- Gasoline stations
- Motor vehicle repair/service

Retail Sales:

- Building materials, garden supply, hardware store
- Department stores, apparel stores
- Drugstores
- Furniture, home-furnishings and home-equipment stores
- Multiretail establishments

Services (Except Food):

- Laundry/dry cleaner/car wash
- Multiservice establishment
- Personal services
- Post office

Shopping mall

Strip shopping center

Wholesale goods (except food)

11. **Nonrefrigerated Warehouse or Storage:** See **Warehouse and Storage**.
12. **Office:** refers to buildings used for general office space, professional offices, and administrative offices. The category includes the following:

Data Processing:
Computer center
Data entry/Key punch

Financial Office Building:
Bank
Brokerage firm
Insurance
Real estate
Securities

Professional Office Building:
Administration of an institution
Consulting
Corporate
Engineering
Law
Management
Medical
Mixed professional

13. **Other:** covers buildings that do not fit into any of the previously named categories. This category includes the following:

Crematorium
Hangar
Public restrooms/showers
Telephone exchange

(Also included in the "Other" category are buildings that are 50 percent or more commercial, but whose principal activity is agricultural, industrial/manufacturing, or residential.

Laboratory buildings are also included in the "Other" category in the Detailed Tables section of this report.)

14. **Parking Garage:** refers to buildings used to park cars. Buildings in this category need not be totally enclosed by walls. (In previous surveys, Parking Garages have been classified under **Other**.)
15. **Public Order and Safety:** describes buildings used in the preservation of law and order or safety. The following are included:

Courthouse
Fire station
Jail/Prison
Penitentiary
Police station
Reformatory
Sheriff's Office

16. **Refrigerated Warehouse or Storage:** See **Warehouse and Storage**.
17. **Residential:** See **Other**.
18. **Skilled Nursing/Other Residential Care** facilities refers to buildings offering 24-hour nursing/medical care. This category includes the following:

- Homes for the aged
- Nursing homes

Skilled nursing homes are included in the "Lodging" category in the detailed tables of this report.

19. **Warehouse and Storage:** describes buildings used to store goods, manufactured products, merchandise, or raw materials. This category includes the following:

- Refrigerated Storage
- Nonrefrigerated Warehouse

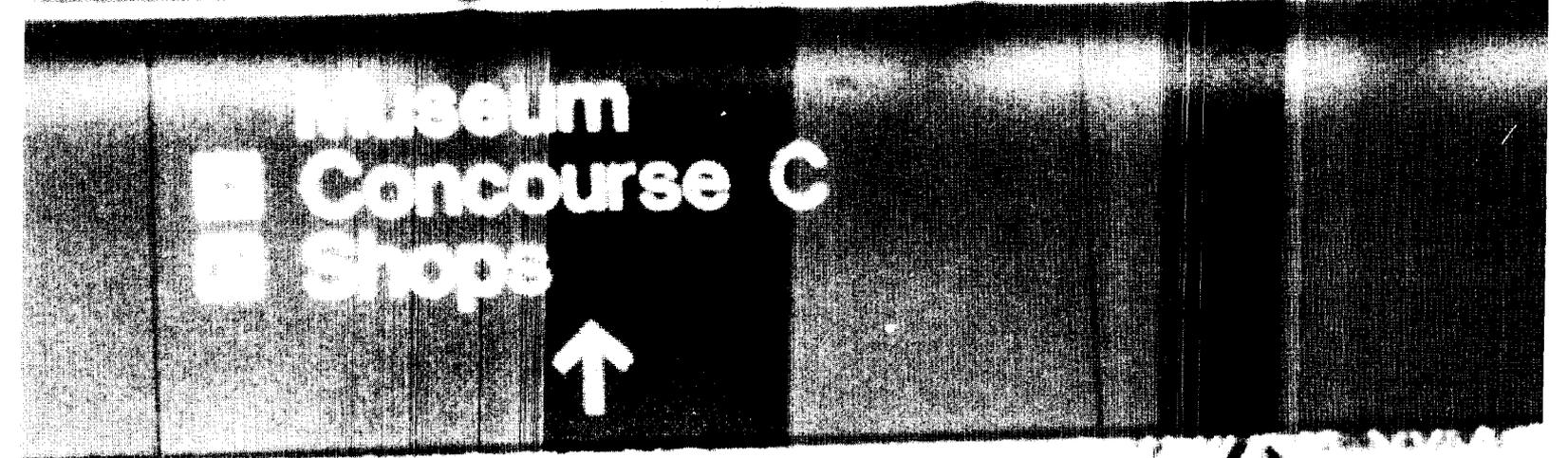
(Refrigerated storage is specifically designed to store perishable goods or merchandise under refrigeration. Includes "cold storage" facilities, which store products at temperatures between 0 °F. and 50 °F and "freezer facilities" which store products at between 0 °F and -20 °F.

Refrigerated and nonrefrigerated warehouses are combined in the detailed tables of this report.)

20. **Vacant:** designates buildings in which more floorspace was vacant than was used for any single activity (as defined above) at the time of interview. A vacant building, thus, may have some occupied floorspace.



**Assemble Zone and
Concourse Regions and Divisions Maps**

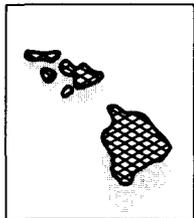
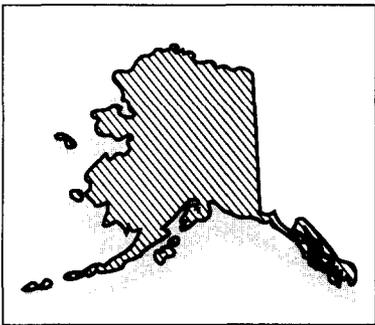
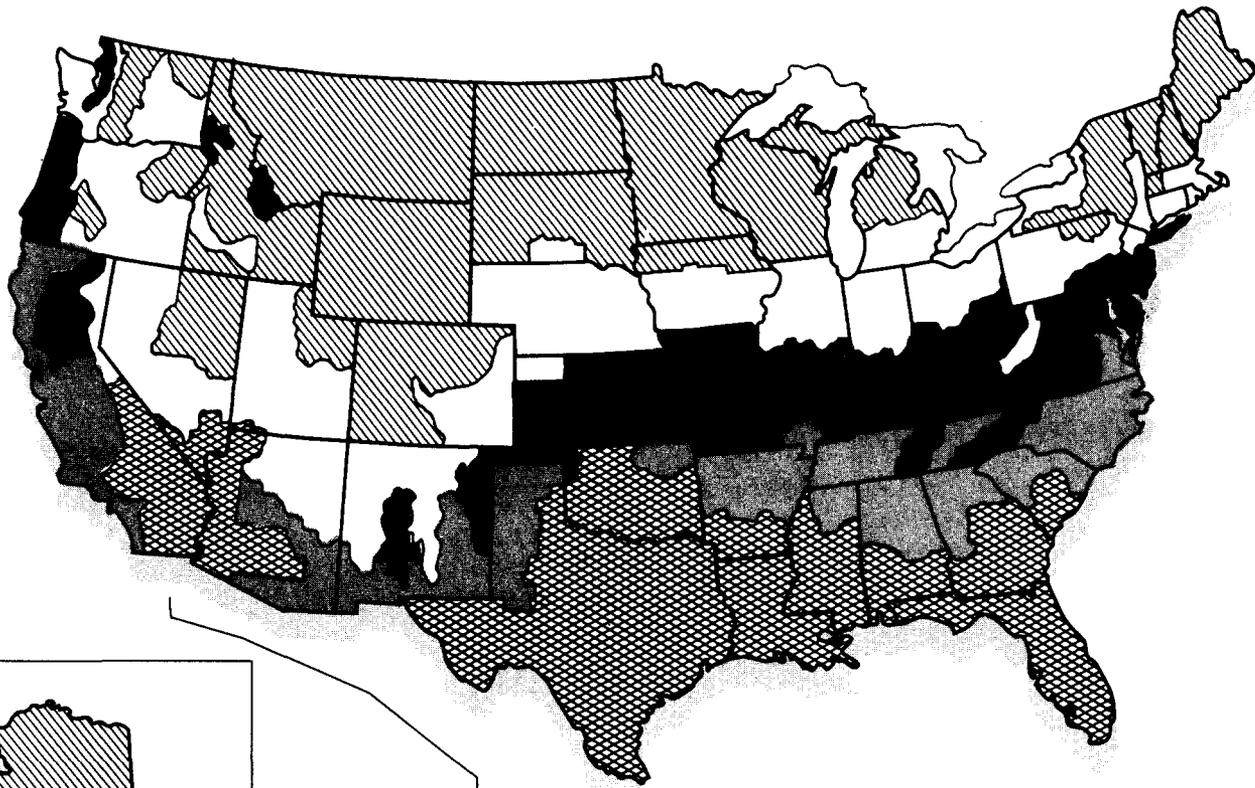


Museum
Concourse C
Shops
↑



Though generally including some sales activity, most airport, train, and bus terminals fall into the assembly building category.

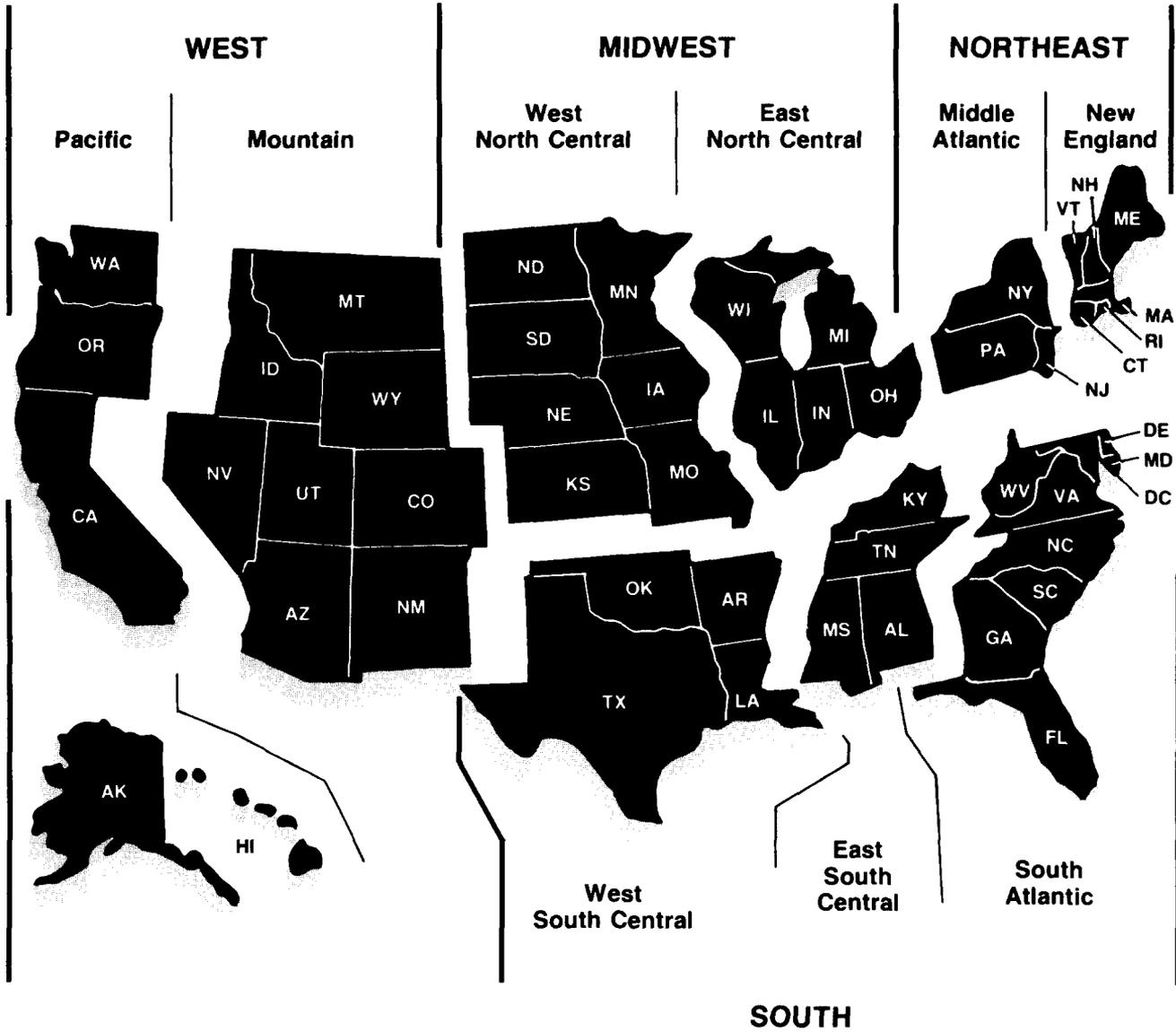
U.S. Climate Zone Map



Climate Zones

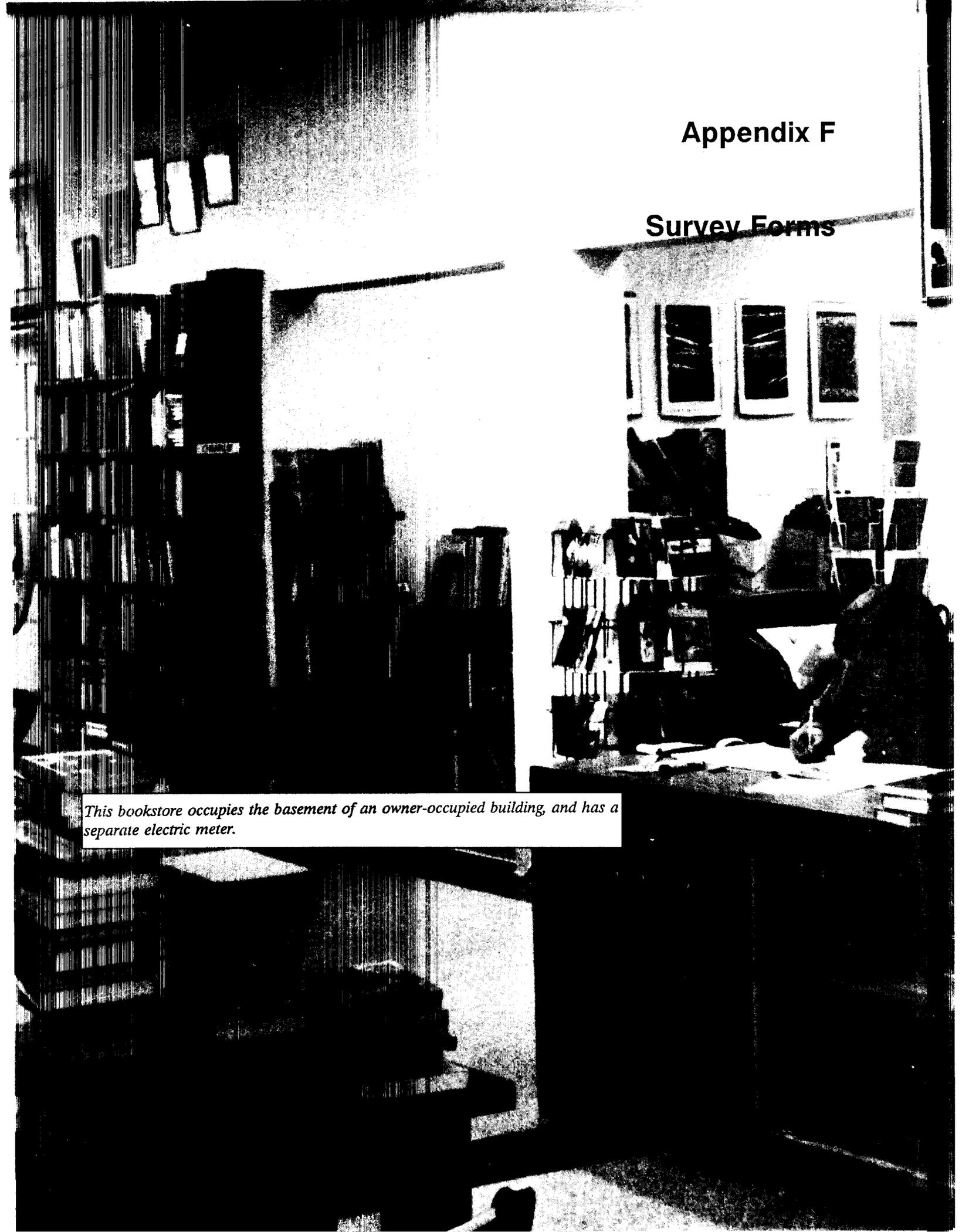
-  Zone 1 is less than 2,000 CDD and greater than 7,000 HDD.
-  Zone 2 is less than 2,000 CDD and 5,500-7,000 HDD.
-  Zone 3 is less than 2,000 CDD and 4,000-5,499 HDD.
-  Zone 4 is less than 2,000 CDD and less than 4,000 HDD.
-  Zone 5 is 2,000 CDD or more and less than 4,000 HDD.

U.S. Census Regions and Divisions



Appendix F

Survey Forms



This bookstore occupies the basement of an owner-occupied building, and has a separate electric meter.

Appendix F

Survey Forms

This appendix contains the following data collection forms used in the 1989 Commercial Buildings Energy Consumption Survey:

- Form EIA-871A--Building Questionnaire (actual form was white)
- Form EIA-871A--Authorization Form (Waiver). This is included as the last two pages of the Building Questionnaire.
- Form EIA-871G--Construction Improvement and Maintenance and Repairs Supplement (collected for the U.S. Bureau of the Census). This is included as Section S of the Building Questionnaire.
- Form EIA-871H--Asbestos in Buildings (collected for the U.S. Environmental Protection Agency). This is included as Section R of the Building Questionnaire.
- Form EIA-871B--Facility Form (actual form was gold)
- Form EIA-871C-1--Building Natural Gas Usage Form (actual form was pink)
- Form EIA-871C-2--Worksheet for Natural Gas Usage (actual form was pink)
- Form EIA-871D--District Heating and Cooling Usage Form (actual form was blue)
- Form EIA-871E-1--Building Electricity Usage Form (actual form was yellow)
- Form EIA-871E-2--Worksheet for Electricity Usage (actual form was yellow)
- Form EIA-871F--Building Fuel Oil Usage Form (actual form was green)

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)



Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

U.S. DEPARTMENT OF ENERGY COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989 BUILDING QUESTIONNAIRE

ID: _____
BUILDING NAME: _____
ADDRESS: _____ STREET

CITY STATE ZIP
COMMENTS: _____

INITIAL CONTACT TO DETERMINE RESPONDENT

I'm _____ from Westat, Inc., a social science research firm. We are conducting a study for the U.S. Department of Energy about energy consumption in nonresidential buildings. May I speak with the building manager or a person knowledgeable about the types of energy coming into the building? May I have that person's name, title and address at which he or she might be located?

NAME: _____

TITLE: _____

LOCATION: _____ PHONE (____) _____

INTRODUCTION TO INTERVIEW

Hello, I'm _____ from Westat, Inc., a social science research firm. We are conducting a study for the U.S. Department of Energy about energy consumption in nonresidential buildings (HAND LETTER). Although your response is voluntary, we hope you will participate in this important study of energy use.

IF ASKED ABOUT CONFIDENTIALITY, READ:

Any information we collect that would permit identification of respondents or their buildings will be confidential and used only for statistical purposes. Data that can be identified with individual respondents will not be disclosed or released to anyone, including the Department of Energy, for any other purpose, except as required by law.

INTERVIEWER NAME: _____ ID NO. _____

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TIME BEGAN: _____

A. BUILDING IDENTIFICATION QUESTIONS

BOX 1 IF BUILDING IS A SHOPPING CENTER/MALL, CHECK BOX AND SKIP TO A-7 ON PAGE 4. <input type="checkbox"/>
--

First, I need to make sure we have correctly described the building we want you to answer questions about. The original records indicate the building as (ADDRESS OR DESCRIPTION FROM LABEL OR LISTING).

A-1. INTERVIEWER OBSERVATION: DOES THE ADDRESS OR DESCRIPTION FROM LABEL OR LISTING REPRESENT AN ENTIRELY FREESTANDING STRUCTURE OR IS THERE ANOTHER STRUCTURE ATTACHED TO OR ABUTTING IT?

STRUCTURE IS FREESTANDING 1 (A-2)
STRUCTURE ATTACHED TO OTHER 2 (A-5)

SAMPLED STRUCTURE IS FREE STANDING	
A-2. Is the entire structure owned by the same person or organization?	
	YES 1 (A-3) NO 2 (A-4)
A-3. Is this structure subdivided into separate parts by walls extending from ground to roof without pass-through?	
	YES 1 (A-4) NO 2 →
	GO TO BOX 3 AND CHECK A.
A-4. What are the addresses of the (separate/separately owned) parts of this structure? IF PARTS OF STRUCTURE DO NOT HAVE ADDRESSES, OBTAIN DISTINGUISHING DESCRIPTIONS.	
(1) _____	
(2) _____	
(3) _____	
(4) _____	
↓	
GO TO BOX 3 AND CHECK B.	

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SAMPLED STRUCTURE IS ATTACHED TO ANOTHER

A-5. What are the addresses of the different parts of this structure attached to (COMPLETE ADDRESS OR DESCRIPTION FROM LABEL OR LISTING)?

A-6. Are there walls extending from ground to roof without pass-through between (ADDRESS OR DESCRIPTION FROM LABEL OR LISTING) and (ADDRESS OR DESCRIPTION OF ATTACHED PART)?

	<u>YES</u>	<u>NO</u>
(1) _____	1	2
(2) _____	1	2
(3) _____	1	2
(4) _____	1	2

BOX 2

SEE A-6. ARE ALL ANSWERS "YES"?

- | | | |
|---------------------|---|--------------------------|
| ALL "YES" | 1 | GO TO BOX 3 AND CHECK A. |
| NOT ALL "YES" | 2 | GO TO BOX 3 AND CHECK C. |

BOX 3

LISTING IS:

- A. CORRECT. STRUCTURE ON LABEL OR LISTING IS ONE BUILDING. CONDUCT ONE INTERVIEW. GO TO A-7.
- B. INCORRECT. STRUCTURE ON LABEL OR LISTING IS MORE THAN ONE BUILDING. BE SURE TO CROSS OFF ANY ADDRESSES YOU ADDED WHICH ARE ALREADY LISTED. CONDUCT A SEPARATE INTERVIEW FOR EACH BUILDING (EACH PART SEPARATELY OWNED OR SEPARATED BY WALLS) RECORDED AT A-4. GO TO A-7.
- C. INCORRECT. STRUCTURE ON LABEL OR LISTING IS PART OF A LARGER BUILDING. CONDUCT ONE INTERVIEW, INVOLVING ALL PARTS OF THE BUILDING THAT ARE NOT SEPARATED FROM THE LISTED STRUCTURE BY WALLS WITHOUT PASS-THROUGH. GO TO A-7.

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A-7. The questions I will be asking refer to the building at (COMPLETE BUILDING ADDRESS). Does this building, as we have described it, have any other addresses associated with it?

RECORD VERIFIED STREET ADDRESS: _____

RECORD ADDITIONAL STREET ADDRESS(ES): _____

A-8. What is the name of this building?

VERIFIED NAME: _____ (BOX 4)

OR

BUILDING HAS NO NAME (A-9)

BOX 4

VERIFIED BUILDING NAME IS: (CHECK ONE)

- NAME OF BUILDING OR ONLY ESTABLISHMENT IN BUILDING
- NAME OF MAJOR ESTABLISHMENT IN BUILDING
- NAME OF ESTABLISHMENT BUT NOT MAJOR

A-9. What is the building's ZIP Code?

ZIP Code

BOX 5

IF AREA SAMPLE: CHECK TO SEE IF THE BUILDING'S ZIP MATCHES ZIP ON THE LABEL (CHECK ONE BOX)

- BUILDING ZIP MATCHES LABEL: CONTINUE WITH INTERVIEW.
- BUILDING ZIP DOES NOT MATCH LABEL: VERIFY THAT YOU ARE AT THE CORRECT ADDRESS AND WITHIN THE SEGMENT BOUNDARIES. IF YOU ARE, CONTINUE WITH INTERVIEW. IF NOT, DISCONTINUE AND CALL SUPERVISOR.

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B. PRINCIPAL BUILDING ACTIVITIES

B-1. What is the gross or total square feet of all the space, both finished and unfinished, enclosed within the exterior walls of this building including: basements, indoor parking facilities, hallways, lobbies, stairways and elevator shafts?

_____ **TOTAL SQUARE FEET**

**IF 1,000 OR LESS, GO TO B-8; ON PAGE 8,
OTHERWISE, RECORD ON FOLD-OUT
AND GO TO B-3.**

DON'T KNOW 9-8 (B-2)

B-2. Here is a card that has categories of total square feet. **HAND CARD 1.** Which category in your estimation best describes the total square feet in this building including all the areas just mentioned? **CIRCLE CODE BELOW AND ENTER B-2 RANGE ON FOLD-OUT PAGE.**

**HAND
CARD
1**

- 1,000 SQUARE FEET OR LESS 01 (B-8)
- 1,001 TO 5,000 SQUARE FEET 02
- 5,001 TO 10,000 SQUARE FEET 03
- 10,001 TO 25,000 SQUARE FEET 04
- 25,001 TO 50,000 SQUARE FEET 05
- 50,001 TO 100,000 SQUARE FEET 06
- 100,001 TO 200,000 SQUARE FEET 07
- 200,001 TO 500,000 SQUARE FEET 08
- 500,001 TO 1 MILLION SQUARE FEET 09
- OVER 1 MILLION SQUARE FEET 10
- DON'T KNOW 98

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B-3. INTERVIEWER:
CODE BEST DESCRIPTION BASED ON YOUR
OBSERVATION.

The purpose of the next few questions is to find out about the kinds of activities that occur within this building. By activity we mean what the building is used for. For example, space in a building may be used for (YOUR OBSERVATION).

B-4. Here is a card that shows how building activities are categorized for this study. HAND CARD 2. Considering all of the (B-1/B-2 SQUARE FEET) square feet in this building, would you estimate that 75 percent or more of this space (is used for/is) (YOUR OBSERVATION)?



	<u>CIRCLE ONE</u>	<u>YES</u>	<u>NO</u>
a. VACANT	01	1 (B-7a)	2 (B-5)
b. OFFICE/PROFESSIONAL	02	1 (C-1)	2 (B-5)
c. SHOPPING CENTER/MALL/RETAIL/SERVICE	03	1 (C-1)	2 (B-5)
d. PUBLIC ASSEMBLY	04	1 (C-1)	2 (B-5)
e. FOOD SALES	05	1 (C-1)	2 (B-5)
f. PUBLIC ORDER AND SAFETY	06	1 (C-1)	2 (B-5)
g. OUTPATIENT HEALTH SERVICES/CLINIC	07	1 (C-1)	2 (B-5)
h. INDUSTRIAL PROCESSING AND MANUFACTURING	08	1 (GO TO B-8)	2 (B-5)
i. AGRICULTURAL PURPOSES	09	1 (GO TO B-8)	2 (B-5)
j. LABORATORY	10	1 (C-1)	2 (B-5)
k. REFRIGERATED WAREHOUSE OR STORAGE	11	1 (C-1)	2 (B-5)
l. NONREFRIGERATED WAREHOUSE OR STORAGE	12	1 (C-1)	2 (B-5)
m. EDUCATION	13	1 (B-7m)	2 (B-5)
n. FOOD SERVICES	14	1 (B-7n)	2 (B-5)
o. HOSPITAL/INPATIENT HEALTH SERVICES	15	1 (B-7o)	2 (B-5)
p. SKILLED NURSING/OTHER RESIDENTIAL CARE (NURSING HOME)	16	1 (B-7p)	2 (B-5)
q. HOTEL/MOTEL/DORM, ETC.	17	1 (B-7q)	2 (B-5)
r. RESIDENTIAL (LIVING QUARTERS WITH KITCHEN FACILITIES)	18	1 (GO TO B-8)	2 (B-5)
s. INDOOR ENCLOSED PARKING GARAGE	19	1 (C-1)	2 (B-5)
t. OTHER (SPECIFY):	20	1 (C-1)	2 (B-5)

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B-5. Please tell me which activities occupy space in this building.

CIRCLE
ALL
ACTIVITIES
MENTIONED

B-6. Of the (B-1/B-2 SQUARE FEET) square feet in this building, approximately what percentage of space does this activity occupy?

ASK ALL APPROPRIATE B-7 QUESTIONS
BEFORE C-1

a.	01	%	→
b.	02	%	
c.	03	%	
d.	04	%	
e.	05	%	
f.	06	%	
g.	07	%	
h.	08	%	IF 50% OR MORE, GO TO B-8
i.	09	%	IF 50% OR MORE, GO TO B-8.
j.	10	%	
k.	11	%	
l.	12	%	

B-7.

a. 50% OR MORE VACANT, ASK: What was this vacant space previously used for?/OR IF NEVER USED: What was this space intended to be used for?

m.	13	_____ %	→	B-7.	m. How many students can be seated in all of the classrooms in the building at one time? _____ STUDENTS
n.	14	_____ %	→	n.	What is the total seating capacity of the food service areas of the building? _____ SEATS
o.	15	_____ %	→	o.	What is the licensed bed capacity of the building? _____ BEDS
p.	16	_____ %	→	p.	What is the licensed bed capacity of the building? _____ BEDS
q.	17	_____ %	→	q.	How many guest rooms are there in the building? _____ ROOMS
r.	18	_____ %			IF 50% OR MORE, GO TO B-8.
s.	19	_____ %			
t.	20	_____ %			

TOTAL SHOULD EQUAL 100%

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BEGIN AT B-8 ONLY IF:

- 50% OR MORE OF THE FLOOR SPACE IN THE BUILDING IS AGRICULTURAL, INDUSTRIAL, OR RESIDENTIAL
- OR
- BUILDING HAS 1,000 SQUARE FEET OR LESS

B-8. Is the building part of a multibuilding facility or complex? By a multibuilding facility or complex, we mean a group of two or more buildings on the same site owned or operated by a single organization, business or individual.

YES 1 (BOX 6)
NO 2 (B-14)

BOX 6

B-9 THROUGH B-13 SHOULD ONLY BE ASKED OF THE FIRST SAMPLED BUILDING AT THE FACILITY. IF THE ANSWERS TO THESE QUESTIONS (OR J-2 THROUGH J-6) ARE RECORDED IN ANOTHER QUESTIONNAIRE, ENTER THE ID NUMBER FOR THAT BUILDING AND GO TO B-14.

ID OF Q'NAIRE WITH FACILITY INFORMATION

B-9. What is the full name of the facility?

FACILITY

B-10. Does this facility have a central physical plant that produces district heating, district cooling, or electricity?

YES 1
NO 2 (B-14)

B-11. Is the central physical plant for this facility located in the building we have been talking about?

YES 1 (B-13)
NO 2
DON'T KNOW 8 (B-13)

B-12. What is the full name and address of the building containing the central physical plant?

BUILDING NAME

BUILDING STREET ADDRESS

CITY, STATE, ZIP

B-13. What is the name and phone number of a contact person for this central physical plant?

CONTACT NAME

CONTACT PHONE NUMBER

TERMINATE:

B-14. This completes the interview. Thank you very much for your time and help. TIME END: _____

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C. ENERGY SOURCES AND END USES

C-1. Here is a list of various types of fuels or energy sources. Which of these fuels or energy sources were used in this building during the past 12 months? **HAND CARD 3.**

**HAND
CARD
3**

- | | |
|--|---|
| <p>ELECTRICITY</p> <p>NATURAL GAS</p> <p>FUEL OIL, DIESEL OR KEROSENE</p> <p>BOTTLED GAS, LPG OR PROPANE</p> <p>DISTRICT STEAM PIPED INTO THE BUILDING FROM A CENTRAL PLANT OR UTILITY</p> | <p>DISTRICT HOT WATER PIPED INTO THE BUILDING FROM A CENTRAL PLANT OR UTILITY</p> <p>DISTRICT CHILLED WATER PIPED INTO THE BUILDING FROM A CENTRAL PLANT OR UTILITY</p> <p>WOOD</p> <p>COAL</p> <p>ACTIVE SOLAR WITH COLLECTOR PANELS</p> |
|--|---|

FOR EACH ENERGY SOURCE USED, PLACE A CHECK (✓) IN COLUMN C-1 ON THE FOLD-OUT PAGE

C-2. In addition to (NAMES OF ENERGY SOURCES), were there any other energy sources used in this building during the past 12 months?

- YES 1 RECORD ON FOLD-OUT PAGE
 NO 2 (C-3)

C-3. Which of the energy sources you just mentioned were used in the past 12 months:

RECORD ON
FOLD-OUT PAGE

- | | |
|--|--|
| <p>a. As the main fuel for heating this building?</p> <p>b. As the secondary or backup fuel for heating this building?</p> <p>c. For cooling this building?</p> <p>d. For heating water, other than for heating this building?</p> <p>e. For commercial or institutional cooking?</p> <p>f. For manufacturing or any other type of industrial activity?</p> <p>g. For electricity generation</p> | <p>(CHECK ONLY ONE)</p>

<p>(CHECK ALL THAT APPLY)</p> |
|--|--|

C-4. SCAN ACROSS THE ROWS ON THE FOLD-OUT PAGE. DOES EACH REPORTED ENERGY SOURCE, OTHER THAN ELECTRICITY, HAVE AT LEAST ONE END-USE REPORTED?

- YES
 NO: How was (ENERGY SOURCE) used in the building during the past 12 months?

C-5. SCAN EACH COLUMN ON THE FOLD-OUT PAGE. HAS AT LEAST ONE BOX BEEN CHECKED IN EACH COLUMN?

- YES
 NO: What energy source was used for (END-USE) during the past 12 months?

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D. HEATING AND COOLING SYSTEMS

BOX 7

IF 'NOT PERFORMED' IS CHECKED IN COLUMN C-3a ON THE FOLD-OUT PAGE, GO TO BOX 8 ON PAGE 12.

D-1. During the heating season in the past 12 months, what percentage of the (B-1/B-2 SQUARE FEET) square feet in the building was heated to at least 50° Fahrenheit? Be sure to include basements and enclosed garages if they are heated to at least 50 degrees.

PERCENTAGE	
[RECONFIRM C-3a] BUILDING NOT HEATED	000 (BOX 8)
DON'T KNOW	998

D-2. Do most of the people who work in the building, other than maintenance personnel, have any control over the amount of heat in the building?

YES	1
NO	2 (D-4)
DON'T KNOW	8 (D-4)

D-3. Can most of the people who work in the building set the temperature in their areas by using a thermostat?

YES	1
NO	2
DON'T KNOW	8

D-4. Is there usually a reduction in the heat produced by the system during the hours the building is not in full use?

(That is, in the evening, on weekends and holidays, during the off-season and so forth?)

YES	1
NO	2
BUILDING ALWAYS IN FULL USE	7
DON'T KNOW	8

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D-5. Here is a card showing different types of equipment that may be part of the building's heating system. **HAND CARD 4.** During the past 12 months, did this building use any:

**HAND
CARD
4**

	<u>HEATING EQUIPMENT</u>	<u>YES</u>	<u>NO</u>	<u>DK</u>
a. Boilers inside the building that produce steam or hot water? <i>(Also include boilers just outside of the building that are primarily associated with it.)</i>		1	2	8
b. Furnaces that heat air directly, without using steam or hot water? <i>(Similar to a residential furnace)</i>		1	2	8
c. Individual space heaters, free standing or mounted in wall, ceiling, or window? <i>(This would include portable heaters, hanging unit heaters, heating panels, electric baseboards, wood stoves, and fireplaces.)</i>		1	2	8
d. Packaged heating units, usually mounted on the roof or on a slab beside the building? <i>(These are self-contained units, usually serving more than one room, which contain both heating equipment and fans.)</i>		1	2	8
e. Heat pump for heating?		1	2	8
f. Air ducts or air handling units?		1	2	8
g. Heating or reheating coils in the air ducts or air handling units?		1	2	8
h. Circulating hot water with fans? <i>(That is, fan-coil units.)</i>		1	2	8
i. Steam or hot water baseboards or radiators?		1	2	8
j. Any other equipment for heating? <i>(SPECIFY)</i> _____ _____ _____		1	2	8

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BOX 8

IF "NOT PERFORMED" IS CHECKED IN COLUMN C-3c ON THE FOLD-OUT PAGE, GO TO D-13 ON PAGE 14.

D-6. During the cooling season in the past 12 months, what percentage of the (B-1/B-2 SQUARE FEET) square feet in the building was cooled by air-conditioning equipment?

PERCENTAGE

[RECONFIRM C-3c] BUILDING NOT COOLED 000 (D-13)
DON'T KNOW 998

D-7. Do most of the people who work in the building, other than maintenance personnel, have any control over the amount of cooling in the building?

YES 1
NO 2 (D-9)
DON'T KNOW 8 (D-9)

D-8. Can most of the people who work in the building set the temperature in their areas by using a thermostat?

YES 1
NO 2
DON'T KNOW 8

D-9. Is there usually a reduction in the cooling produced by the system during the hours the building is not in full use?

(That is, in the evening, on weekends and holidays, during the off-season and so forth?)

YES 1
NO 2
BUILDING ALWAYS IN FULL USE 7
DON'T KNOW 8

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D-10. Here is a card showing different types of equipment that may be part of the building's cooling system.
HAND CARD 5. During the past 12 months, did this building use any:

HAND
CARD
5

	<u>YES</u>	<u>NO</u>	<u>DK</u>
<p>a. Central chillers inside the building that chill water for air conditioning? <i>(Also include chillers just outside of the building that are primarily associated with it.)</i></p>	1	2	8
b. Individual room air conditioners mounted in a window or wall?	1	2	8
<p>c. Packaged air conditioning units, usually mounted on the roof or on a slab beside the building? <i>(These are self-contained units, usually serving more than one room, which contain both cooling equipment and fans.)</i></p>	1	2	8
d. Heat pump for cooling?	1	2	8
e. Air ducts or air handling units?	1	2	8
<p>f. Circulating chilled water with fans? <i>(That is, fan-coil units.)</i></p>	1	2	8
<p>g. Any other equipment for cooling? (SPECIFY) _____ _____ _____</p>	1	2	8

BOX 9

IF NO CENTRAL CHILLER (D-10a = "NO"), GO TO BOX 10 ON PAGE 14.

D-11. HAND CARD 6. When was the building's main central chiller installed?

HAND
CARD
6

- 1959 OR BEFORE 1
- 1960 - 1969 2
- 1970 - 1979 3
- 1980 - 1986 4
- 1987 - 1989 5
- DON'T KNOW 8

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BOX 10
IF NO PACKAGED AIR CONDITIONING
(D-10c = "NO"), GO TO D-13

D-12. HAND CARD 6. When was the building's main packaged air conditioning system installed?

**HAND
CARD
6**

- 1959 OR BEFORE 1
- 1960 - 1969 2
- 1970 - 1979 3
- 1980 - 1986 4
- 1987 - 1989 5
- DON'T KNOW 8

D-13. Are any of the following types of equipment present in this building:

	<u>YES</u>	<u>NO</u>	<u>DK</u>
a. Commercial refrigeration units for the sale or storage of perishable materials, such as food or medical supplies?	1	2	8
b. Commercial freezers for the sale or storage of perishable materials, such as food or medical supplies?	1	2	8
c. Residential-type refrigerators?	1	2	8
d. Residential-type freezers?	1	2	8
e. Ice-making machines?	1	2	8
f. Soda or any other refrigerated vending machines?	1	2	8
g. Water coolers?	1	2	8
h. Any other refrigeration equipment, excluding air conditioning?	1	2	8

(SPECIFY) _____

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E. BUILDING OWNERSHIP AND OCCUPANCY CHARACTERISTICS

E-1. The next few questions are about the ownership and occupancy of the building. Is the building owned by a government agency?

- YES 1
- NO 2 (E-3)
- DON'T KNOW 8 (E-3)

E-2. Is the building owned by a Federal, State, or local government agency? CIRCLE ONLY ONE.

- FEDERAL GOVERNMENT AGENCY 1
- STATE GOVERNMENT AGENCY 2
- LOCAL GOVERNMENT AGENCY 3

E-3. Here is a card that lists different ways establishments or organizations can occupy a building. By "occupy", we mean to hold or lease space on a full-time basis. HAND CARD 7. Please tell me which category best applies to this building. RECORD HERE AND ON FOLD-OUT PAGE.



- ONE OCCUPANT: THE OWNER OR OWNER'S REPRESENTATIVE 1 (E-6)
- ONE OCCUPANT: NOT THE OWNER OR OWNER'S REPRESENTATIVE 2 (E-6)
- MORE THAN ONE OCCUPANT, INCLUDING THE OWNER OR OWNER'S REPRESENTATIVE 3
- MORE THAN ONE OCCUPANT, BUT NOT THE OWNER OR OWNER'S REPRESENTATIVE 4
- CURRENTLY UNOCCUPIED 5 (E-6)

E-4. (Including the owner or owner's representative), how many establishments or organizations currently occupy the building?

- _____ (E-6)
NUMBER OF OCCUPANTS
- DON'T KNOW 9-8

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E-5. **HAND CARD 8.** Which category on this card best describes the number of establishments or organizations currently occupying the building?



- 2 - 5 1
- 6 - 10 2
- 11 - 20 3
- 21 - 49 4
- 50 - 99 5
- 100 or more 6
- DONT KNOW 8

E-6. Was any space in the building vacant or unoccupied for at least 3 consecutive months during the past 12 months?

- YES 1
- NO 2 (E-8)
- DONT KNOW 8 (E-8)

E-7. Approximately what percentage of the square feet was vacant or unoccupied during that time?

- _____
- PERCENTAGE VACANT
- DONT KNOW 998

E-8. How many months out of the past 12 months was this building in use?

- _____
- NUMBER OF MONTHS
- NOT IN USE DURING PAST 12 MONTHS 00 (F-1)
 - DONT KNOW 98

E-9. During the months when the building was in use, what were the usual operating hours on:

DAY(S)	TIME	OPEN 24 HOURS	NOT OPEN	OR →	HOURS VARY
a. Monday through Friday?	___ AM to ___ AM PM PM	<input type="checkbox"/>	<input type="checkbox"/>	} GO TO E-11	<input type="checkbox"/> E-10
b. Saturday?	___ AM to ___ AM PM PM	<input type="checkbox"/>	<input type="checkbox"/>		
c. Sunday?	___ AM to ___ AM PM PM	<input type="checkbox"/>	<input type="checkbox"/>		

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E-10. **HAND CARD 9.** Which category on the card best describes the number of operating hours per week for most of the building when it was in use?



0 HOURS	0
1-39 HOURS	1
40-48 HOURS	2
49-60 HOURS	3
61-84 HOURS	4
85-167 HOURS	5
OPEN CONTINUOUSLY	7
DON'T KNOW	8

E-11. During the months the building was in use, how many people worked in the building during its main shift? Do not include employees who worked out of the building such as drivers with delivery routes, customers, patients, or students. Do include volunteer workers.

_____	(F-1)
NUMBER OF PEOPLE	
DON'T KNOW	9-8

E-12. **HAND CARD 10.** Which category on this card best describes the number of people who worked in the building during its main shift in the months it was in use?



0	00
1-4	01
5-9	02
10-19	03
20-49	04
50-99	05
100-249	06
250-499	07
500-999	08
1,000-2,499	09
2,500-4,999	10
5,000 or more	11
DON'T KNOW	98

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F. BUILDING ENVELOPE CHARACTERISTICS

F-1. Now I would like to ask you some questions about the construction of the building.

When was the construction of the major or largest portion of the (B-1/B-2 SQUARE FEET) square feet completed?

_____ YEAR

IF COMPLETED IN 1989, ASK F-2;
IF COMPLETED BEFORE 1989,
GO TO F-4

DONT KNOW 9-8 (F-3)

F-2. In what month of 1989 was the building first open for occupancy?

_____ MONTH (F-4)

DONT KNOW 98 (F-4)

F-3. Here is a card with categories of years. HAND CARD 11. In your estimation, which category contains the year the largest portion of the building was completed?

HAND
CARD
11

1899 or before 01	1970 - 1979 06
1900 - 1919 02	1980 - 1983 07
1920 - 1945 03	1984 - 1986 08
1946 - 1959 04	1987 - 1989 09
1960 - 1969 05	DONT KNOW 98

F-4. How many floors are in the tallest section of the building? Please include basements, floors that may be used as a parking garage, or any other floors below ground level.

_____ # OF FLOORS

DONT KNOW 998

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F-5. Here is a card that shows different types of construction materials. HAND CARD 12. Which best describes the major type of exterior wall construction material used on this building? CIRCLE ONLY ONE.

HAND
CARD
12

- WINDOW OR VISION GLASS (GLASS THAT CAN BE SEEN THROUGH) 01
- DECORATIVE OR CONSTRUCTION GLASS 02
- CONCRETE PANELS 03
- BRICK, STONE, STUCCO, OR OTHER MASONRY 04
- WOOD, PLASTIC OR METAL SIDING, SHINGLES OR SHAKES 05
- PRE-ENGINEERED METAL OR LIGHT-WEIGHT METAL PANELS 06
- OTHER (SPECIFY) _____ 07
- DON'T KNOW 98

F-6. Here is a card with different types of roofing materials. HAND CARD 13. Which best describes the building's major type of exterior roof surface? CIRCLE ONLY ONE.

HAND
CARD
13

- WOOD SHINGLES, SHAKES OR OTHER WOODEN MATERIALS 01
- SLATE OR TILE SHINGLES 02
- ASPHALT, FIBERGLASS, OR OTHER SHINGLES 03
- BUILT-UP (TAR, FELTS OR FIBERGLASS AND A BALLAST, SUCH AS STONE) 04
- METAL SURFACING 05
- PLASTIC, RUBBER, OR SYNTHETIC SHEETING (SINGLE OR MULTIPLE PLY) 06
- CONCRETE 07
- OTHER (SPECIFY) _____ 08
- DON'T KNOW 98

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G. THE LIGHTING SYSTEM

The next set of questions pertains to the lighting system used in this building during the past 12 months.

G-1. What percentage of the (B-1/B-2 SQUARE FEET) square feet of the interior of this building was lit...

a. During usual operating hours?

_____ %
 NOT IN USE DURING PAST
 12 MONTHS997
 DON'T KNOW998

b. During off-hours? Do not include the space lit by emergency lighting.

_____ %
 NO OFF-HOURS997
 DON'T KNOW998

IF ANY PERCENTAGE OF THE BUILDING WAS LIT DURING THE PAST 12 MONTHS, CONTINUE WITH G-2; OTHERWISE SKIP TO SECTION H.

COLUMN A	COLUMN B																													
G-2. During the past 12 months, was any of the square footage in this building lit by: <u>LIGHTING TYPE</u>	IF "YES" IN COLUMN A: What percentage of the electrically lighted interior space in the building is lit by (LIGHTING TYPE):																													
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 10%; text-align: center;">YES</th> <th style="width: 10%; text-align: center;">NO</th> <th style="width: 10%; text-align: center;">DK</th> </tr> </thead> </table>		YES	NO	DK																										
	YES	NO	DK																											
<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 80%;">a. Incandescent bulbs?</td> <td style="width: 10%; text-align: center;">1</td> <td style="width: 10%; text-align: center;">2</td> <td style="width: 10%; text-align: center;">8</td> </tr> <tr> <td>b. Fluorescent lights?</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">8</td> </tr> <tr> <td>c. High-Intensity Discharge lights such as mercury vapor, metal halide or high pressure sodium?</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">8</td> </tr> <tr> <td>d. Some other lighting equipment?</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">8</td> </tr> <tr> <td>(SPECIFY) _____</td> <td></td> <td></td> <td></td> </tr> <tr> <td>_____</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	a. Incandescent bulbs?	1	2	8	b. Fluorescent lights?	1	2	8	c. High-Intensity Discharge lights such as mercury vapor, metal halide or high pressure sodium?	1	2	8	d. Some other lighting equipment?	1	2	8	(SPECIFY) _____				_____				<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 80%; text-align: right;">_____ %</td> </tr> <tr> <td style="text-align: right;">TOTAL MUST BE AT LEAST 100%</td> </tr> </tbody> </table>	_____ %	_____ %	_____ %	_____ %	TOTAL MUST BE AT LEAST 100%
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b. Fluorescent lights?	1	2	8																											
c. High-Intensity Discharge lights such as mercury vapor, metal halide or high pressure sodium?	1	2	8																											
d. Some other lighting equipment?	1	2	8																											
(SPECIFY) _____																														

_____ %																														
_____ %																														
_____ %																														
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TOTAL MUST BE AT LEAST 100%																														

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H. ENERGY CONSERVATION FEATURES OR PRACTICES

COLUMN A	COLUMN B	COLUMN C												
<p>This next section deals with energy conservation features or practices.</p> <p style="text-align: center;">FEATURE</p> <p>H-1. As of July 1, 1989 were any of the following features present in this building?</p>	<p>IF "YES" IN COLUMN A ASK: (Was/Were) the (FEATURE) installed during building construction or added afterwards?</p>	<p>IF "ADDED" IN COLUMN B ASK: When was the (FEATURE) added? Was it in 1989, between 1984 and 1988, or before 1984?</p>												
	DK INSTALLED ADDED	<table style="margin: auto; border: none;"> <tr> <td></td> <td style="text-align: center;">1984-</td> <td style="text-align: center;">BEFORE</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">1989</td> <td style="text-align: center;">1988</td> <td style="text-align: center;">1984</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">DK</td> </tr> </table>		1984-	BEFORE			1989	1988	1984				DK
	1984-	BEFORE												
	1989	1988	1984											
			DK											
<p>a. Roof or ceiling insulation?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>b. Insulation in exterior walls?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>c. Storm windows, storm doors or double- or triple-paned glass?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>d. Tinted or reflective glass or shading films?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>e. Exterior or interior shadings or awnings?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>f. Weather stripping or caulking?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												
<p>g. High-efficiency ballasts for lighting?</p> <p>YES 1 _____></p> <p>NO 2</p> <p>DON'T KNOW 8</p>	<p>8 1 2 —></p>	<p>1 2 3 8</p>												

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H-2. As of July 1, 1989, did the building have a computerized energy management and control system (EMCS)?

YES 1
 NO 2 (H-4)
 DON'T KNOW 8 (H-4)

H-3. As of July 1, 1989, did the EMCS control:

		<u>YES</u>	<u>NO</u>	<u>DK</u>
a.	Lighting?	1	2	8
b.	Heating and cooling (HVAC)?	1	2	8
c.	Anything else?	1	2	8
	SPECIFY _____			

H-4. As of July 1, 1989, was there a regularly scheduled maintenance and repair program for the heating and cooling system in the building?

YES 1
 NO 2
 DON'T KNOW 8

H-5. As of July 1, 1989, did the building have any environmentally controlled space for computers; that is, a computer area with a separate air conditioning system?

YES 1
 NO 2
 DON'T KNOW 8

H-6. As of July 1, 1989, had the building ever participated in a utility sponsored conservation program to improve the efficiency of the lighting system, the efficiency of any equipment, or the thermal efficiency of the building's shell?

YES 1
 NO 2
 DON'T KNOW 8

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I. COGENERATION

I-1. Is there equipment in the building that can generate electricity for any purpose other than emergency or backup power?

YES 1
 NO 2 (J-1)
 DON'T KNOW 8 (J-1)

I-2. Does the building have a cogeneration system? That is, does it have equipment that produces both electricity and usable heat?

YES 1
 NO 2 (I-6)
 DON'T KNOW 8 (I-6)

I-3. During the past 12 months, how many kilowatt-hours of electricity were cogenerated in the building?

KILOWATTHOURS

ELECTRICITY NOT GENERATED IN
 PAST 12 MONTHS 0-0
 DON'T KNOW 9-8

I-4. What was the total nameplate capacity of all cogeneration units that were in place in the building on December 31, 1988?

KILOWATTS

DON'T KNOW 9-8

I-5. As of December 31, 1988, was the building's cogeneration system electrically interconnected with an electric utility? That is, was it able to deliver electricity to the grid as well as receive electricity?

YES 1
 NO 2
 DON'T KNOW 8

I-6. Is the building currently designated as a Qualifying Facility under the Public Utilities Regulatory Policies Act of 1978, or PURPA?

YES 1
 NO 2
 DON'T KNOW 8

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J. CENTRAL PHYSICAL PLANT/FACILITIES

J-1. Is the building part of a multibuilding facility or complex? By a multibuilding facility or complex, we mean a group of two or more buildings on the same site owned or operated by a single organization, business or individual.

YES 1 (BOX 11)
NO 2 (BOX 12)

BOX 11

J-2 THROUGH J-6 SHOULD ONLY BE ASKED OF THE FIRST SAMPLED BUILDING AT THE FACILITY. IF THE ANSWERS TO THESE QUESTIONS (OR B-9 THROUGH B-13) ARE RECORDED IN ANOTHER QUESTIONNAIRE, ENTER THE ID NUMBER FOR THAT BUILDING AND GO TO BOX 12.

ID OF Q'NAIRE WITH FACILITY INFORMATION

J-2. What is the full name of the facility?

FACILITY

J-3. Does this facility have a central physical plant that produces district heating, district cooling, or electricity?

YES 1
NO 2 (BOX 12)

J-4. Is the central physical plant for this facility located in the building we have been talking about?

YES 1 (J-6)
NO 2
DON'T KNOW 8 (J-6)

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J-5. What is the full name and address of the building containing the central plant?

BUILDING NAME

BUILDING STREET ADDRESS

CITY, STATE, ZIP

J-6. What is the name and phone number of a contact person for this plant?

CONTACT NAME

CONTACT PHONE NUMBER

BOX 12

SCAN C-1 COLUMN ON THE FOLD-OUT PAGE. DOES THIS BUILDING HAVE
AT LEAST ONE SHADED ENERGY SOURCE CHECKED?

YES (J-7)

NO (SKIP TO Q-2 ON PAGE 38)

J-7. The next few questions are about the companies or organizations that supplied the building with energy during the past 12 months. An energy supplier may be a utility or private dealer, or it may be a central physical plant or distribution center.

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K. ELECTRICITY PAGE

NO ELECTRICITY USED IN BUILDING. GO TO NATURAL GAS PAGE.

K-1. What is the name and address of the electric utility or central physical plant that supplied electricity to the building during the past 12 months?

Has any other supplier provided electricity to the building in the past 12 months? ASK K-1 UNTIL THE RESPONDENT ANSWERS "NO" AND CHECK THE "NO OTHER SUPPLIERS" BOX.

IF ONE OCCUPANT OR VACANT, GO TO K-5.

MULTIPLE OCCUPANTS

K-2. Is the electricity bill or statement from (SUPPLIER) for the entire building or do any of the tenants or establishments have separate statements?

K-3. How many separate bills or statements are there? PROBE IF ANSWER IS "DON'T KNOW": Could you give an estimate or the approximate number of separate bills or statements?

K-4. Please tell me the name of each company, organization or agency that received a bill or statement from (SUPPLIER) for electricity during the past 12 months.

IF LIST IS NOT PROVIDED, COMPLETE
A "SUPPLIER CUSTOMER SHEET."

ONE OCCUPANT OR VACANT

K-5. Does the bill or statement from (SUPPLIER) cover just this building or does it cover other buildings as well?

K-6. What is the approximate square footage of the other buildings that are included on this bill or statement?

BOX K

ASK ABOUT NEXT ELECTRICITY SUPPLIER. IF NO ADDITIONAL
SUPPLIERS, GO TO NATURAL GAS PAGE.

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K. ELECTRICITY PAGE

	SUPPLIER NO. 1	SUPPLIER NO. 2	SUPPLIER NO. 3
K-1.	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS
K-2.	ONE BILL/STATEMENT 1 (K-5) SEPARATE STATEMENTS 2 (K-3)	ONE BILL/STATEMENT 1 (K-5) SEPARATE STATEMENTS 2 (K-3)	ONE BILL/STATEMENT 1 (K-5) SEPARATE STATEMENTS 2 (K-3)
K-3.	_____ NUMBER OF BILLS/STATEMENTS	_____ NUMBER OF BILLS/STATEMENTS	_____ NUMBER OF BILLS/STATEMENTS
K-4.	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">GO TO BOX K</div>	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">GO TO BOX K</div>	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">GO TO BOX K</div>

K-5.	JUST THIS BUILDING 1 (BOX K) OTHER BUILDING(S) 2 (K-6) DON'T KNOW 8 (BOX K)	JUST THIS BUILDING 1 (BOX K) OTHER BUILDING(S) 2 (K-6) DON'T KNOW 8 (BOX K)	JUST THIS BUILDING 1 (BOX K) OTHER BUILDING(S) 2 (K-6) DON'T KNOW 8 (BOX K)
K-6.	_____ SQUARE FOOTAGE DON'T KNOW 8	_____ SQUARE FOOTAGE DON'T KNOW 8	_____ SQUARE FOOTAGE DON'T KNOW 8

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L. NATURAL GAS PAGE

NO NATURAL GAS USED IN BUILDING. GO TO FUEL OIL/DIESEL/KEROSENE PAGE.

L-1. What is the name and address of the company that supplied natural gas to this building during the past 12 months?

Has any other company supplied natural gas to the building in the past 12 months? ASK L-1 UNTIL THE RESPONDENT ANSWERS "NO" AND CHECK THE "NO OTHER SUPPLIERS" BOX.

IF ONE OCCUPANT OR VACANT, GO TO L-5.

MULTIPLE OCCUPANTS

L-2. Is the natural gas bill from (SUPPLIER) for the entire building or do any of the tenants or establishments have separate bills?

L-3. How many separate bills are there? PROBE IF ANSWER IS "DON'T KNOW": Could you give an estimate or the approximate number of separate bills?

L-4. Please tell me the name of each company, organization or agency that received a bill from (SUPPLIER) for natural gas during the past 12 months.

IF LIST IS NOT PROVIDED, COMPLETE
A "SUPPLIER CUSTOMER SHEET."

ONE OCCUPANT OR VACANT

L-5. Does the bill from (SUPPLIER) cover just this building or does it cover other buildings as well?

L-6. What is the approximate square footage of the other buildings that are included on this bill?

BOX L

ASK ABOUT NEXT NATURAL GAS SUPPLIER. IF NO ADDITIONAL SUPPLIERS, GO TO FUEL OIL/DIESEL/KEROSENE PAGE.

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L. NATURAL GAS PAGE

	SUPPLIER NO. 1	SUPPLIER NO. 2	SUPPLIER NO. 3
L-1.	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS	NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____ <input type="checkbox"/> NO OTHER SUPPLIERS
L-2.	ONE BILL/STATEMENT 1 (L-5) SEPARATE STATEMENTS 2 (L-3)	ONE BILL/STATEMENT 1 (L-5) SEPARATE STATEMENTS 2 (L-3)	ONE BILL/STATEMENT 1 (L-5) SEPARATE STATEMENTS 2 (L-3)
L-3.	_____ NUMBER OF BILLS/STATEMENTS	_____ NUMBER OF BILLS/STATEMENTS	_____ NUMBER OF BILLS/STATEMENTS
L-4.	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">GO TO BOX L</div>	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">GO TO BOX L</div>	LIST PROVIDED 1 NOT PROVIDED 2 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">GO TO BOX L</div>

L-5.	JUST THIS BUILDING 1 (BOX L) OTHER BUILDING(S) 2 (L-6) DON'T KNOW 8 (BOX L)	JUST THIS BUILDING 1 (BOX L) OTHER BUILDING(S) 2 (L-6) DON'T KNOW 8 (BOX L)	JUST THIS BUILDING 1 (BOX L) OTHER BUILDING(S) 2 (L-6) DON'T KNOW 8 (BOX L)
L-6.	_____ SQUARE FOOTAGE DON'T KNOW 8	_____ SQUARE FOOTAGE DON'T KNOW 8	_____ SQUARE FOOTAGE DON'T KNOW 8

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M. FUEL OIL/DIESEL/KEROSENE PAGE

NO FUEL OIL/DIESEL/KEROSENE USED IN BUILDING. GO TO STEAM/HOT WATER/CHILLED WATER PAGE.

M-1. What is the name and address of the company that supplied (fuel oil/diesel/kerosene) to this building during the past 12 months?

Has any other company supplied (fuel oil/diesel/kerosene) to the building in the past 12 months? ASK M-1 UNTIL THE RESPONDENT ANSWERS "NO" AND CHECK THE "NO OTHER SUPPLIERS" BOX.

IF ONE OCCUPANT OR VACANT, GO TO M-5.

MULTIPLE OCCUPANTS

M-2. Is the (fuel oil/diesel/kerosene) bill from (SUPPLIER) for the entire building or do any of the tenants or establishments have separate bills?

M-3. How many separate bills are there? PROBE IF ANSWER IS "DON'T KNOW": Could you give an estimate or the approximate number of separate bills?

M-4. Please tell me the name of each company, organization or agency that received a bill from (SUPPLIER) for (fuel oil/diesel/kerosene) during the past 12 months.

IF LIST IS NOT PROVIDED, COMPLETE A "SUPPLIER CUSTOMER SHEET."

ONE OCCUPANT OR VACANT

M-5. Does the bill from (SUPPLIER) cover just this building or does it cover other buildings as well?

M-6. What is the approximate square footage of the other buildings that are included on this bill?

BOX M

ASK ABOUT NEXT SUPPLIER. IF NO ADDITIONAL SUPPLIERS, GO TO STEAM/HOT WATER/CHILLED WATER PAGE. IF MORE THAN THREE FUEL OIL/DIESEL/KEROSENE SUPPLIERS, GO TO "ADDITIONAL SUPPLIER PAGE."

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M. FUEL OIL/DIESEL/KEROSENE PAGE

SUPPLIER NO. 1	SUPPLIER NO. 2	SUPPLIER NO. 3
<p>M-1. NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>	<p>NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>	<p>NAME _____ _____ ST. ADD. _____ PO BOX _____ CITY _____ STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>
<p>M-2. ONE BILL/STATEMENT 1 (M-5) SEPARATE STATEMENTS 2 (M-3)</p>	<p>ONE BILL/STATEMENT 1 (M-5) SEPARATE STATEMENTS 2 (M-3)</p>	<p>ONE BILL/STATEMENT 1 (M-5) SEPARATE STATEMENTS 2 (M-3)</p>
<p>M-3. _____ NUMBER OF BILLS/STATEMENTS</p>	<p>_____</p> <p>NUMBER OF BILLS/STATEMENTS</p>	<p>_____</p> <p>NUMBER OF BILLS/STATEMENTS</p>
<p>M-4. LIST PROVIDED 1 NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 5px;">GO TO BOX M</p>	<p>LIST PROVIDED 1 NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 5px;">GO TO BOX M</p>	<p>LIST PROVIDED 1 NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 5px;">GO TO BOX M</p>
<p>M-5. JUST THIS BUILDING 1 (BOX M) OTHER BUILDING(S) 2 (M-6) DON'T KNOW 8 (BOX M)</p>	<p>JUST THIS BUILDING 1 (BOX M) OTHER BUILDING(S) 2 (M-6) DON'T KNOW 8 (BOX M)</p>	<p>JUST THIS BUILDING 1 (BOX M) OTHER BUILDING(S) 2 (M-6) DON'T KNOW 8 (BOX M)</p>
<p>M-6. _____ SQUARE FOOTAGE DON'T KNOW 8</p>	<p>_____</p> <p>SQUARE FOOTAGE DON'T KNOW 8</p>	<p>_____</p> <p>SQUARE FOOTAGE DON'T KNOW 8</p>

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N. STEAM/HOT WATER/CHILLED WATER PAGE

NO STEAM, HOT WATER, OR CHILLED WATER USED IN BUILDING. GO TO SECTION O.
CHECK BOX ABOVE COLUMNS ON NEXT PAGE FOR EACH DISTRICT ENERGY SOURCE USED.

N-1. What is the name and address of the company or organization that supplied (steam/hot water/chilled water) to the building during the past 12 months?

IF CENTRAL PLANT WITH NAME AND ADDRESS RECORDED IN SECTION B OR J:
ENTER "CP" IN COLUMN AND GO TO N-5.

IF NOT CENTRAL PLANT: RECORD NAME AND ADDRESS IN COLUMN.

IF ONE OCCUPANT OR VACANT, GO TO N-5a.

MULTIPLE OCCUPANTS

N-2. Is the bill from (SUPPLIER) for (steam/hot water/chilled water) for the entire building or do any of the tenants have separate bills?

N-3. How many separate bills are there? PROBE IF ANSWER IS "DON'T KNOW": Could you give me an estimate or the approximate number of separate bills?

N-4. Please tell me the name of each company, organization or agency that received a bill from (SUPPLIER) during the past 12 months.

IF LIST IS NOT PROVIDED, COMPLETE A "SUPPLIER CUSTOMER SHEET."

ONE OCCUPANT OR VACANT

IF CENTRAL PLANT:

N-5. Is there a statement indicating how much (steam/hot water/chilled water) the central physical plant pipes into just this building or does the statement cover other buildings as well?

N-6. What is the approximate square footage of the other buildings on the district loop that serves this building?

IF NOT CENTRAL PLANT:

N-5a. Does the bill from (SUPPLIER) cover just this building or does it cover other buildings as well?

N-6a. What is the approximate square footage of the other buildings that are included on this bill?

BOX N

ASK ABOUT NEXT DISTRICT ENERGY SOURCE. IF NO ADDITIONAL DISTRICT SOURCES, GO TO SECTION P.

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N. STEAM, HOT WATER, OR CHILLED WATER PAGE

<input type="checkbox"/> STEAM	<input type="checkbox"/> HOT WATER	<input type="checkbox"/> CHILLED WATER
<p>N-1.</p> <p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p>	<p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p>	<p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p>
<p>N-2. ONE BILL 1 (N-5a)</p> <p>SEPARATE BILLS 2 (N-3)</p>	<p>ONE BILL 1 (N-5a)</p> <p>SEPARATE BILLS 2 (N-3)</p>	<p>ONE BILL 1 (N-5a)</p> <p>SEPARATE BILLS 2 (N-3)</p>
<p>N-3. _____</p> <p style="text-align: center;">NUMBER OF BILLS</p>	<p>_____</p> <p style="text-align: center;">NUMBER OF BILLS</p>	<p>_____</p> <p style="text-align: center;">NUMBER OF BILLS</p>
<p>N-4. LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">GO TO BOX N</p>	<p>LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">GO TO BOX N</p>	<p>LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">GO TO BOX N</p>

<p>N-5. STATEMENT FOR BUILDING ONLY 1 (BOX N)</p> <p>STATEMENT INCLUDES OTHER BUILDING(S) 2 (N-6)</p> <p>NO STATEMENT 7 (BOX N)</p> <p>DON'T KNOW 8 (BOX N)</p>	<p>STATEMENT FOR BUILDING ONLY 1 (BOX N)</p> <p>STATEMENT INCLUDES OTHER BUILDING(S) 2 (N-6)</p> <p>NO STATEMENT 7 (BOX N)</p> <p>DON'T KNOW 8 (BOX N)</p>	<p>STATEMENT FOR BUILDING ONLY 1 (BOX N)</p> <p>STATEMENT INCLUDES OTHER BUILDING(S) 2 (N-6)</p> <p>NO STATEMENT 7 (BOX N)</p> <p>DON'T KNOW 8 (BOX N)</p>
<p>N-6. _____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>
<p>N-5a. BILL FOR BUILDING ONLY 1 (BOX N)</p> <p>BILL INCLUDES OTHER BUILDING(S) 2 (N-6A)</p> <p>DON'T KNOW 8 (BOX N)</p>	<p>BILL FOR BUILDING ONLY 1 (BOX N)</p> <p>BILL INCLUDES OTHER BUILDING(S) 2 (N-6A)</p> <p>DON'T KNOW 8 (BOX N)</p>	<p>BILL FOR BUILDING ONLY 1 (BOX N)</p> <p>BILL INCLUDES OTHER BUILDING(S) 2 (N-6A)</p> <p>DON'T KNOW 8 (BOX N)</p>
<p>N-6a. _____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

O. **ADDITIONAL SUPPLIER PAGE** (FOR USE WHEN MORE THAN THREE SUPPLIERS FOR ANY ENERGY SOURCE)

- O-1. Has any other company supplied (ENERGY SOURCE) to the building in the past 12 months? ASK O-1 UNTIL THE RESPONDENT ANSWERS "NO" AND CHECK THE "NO OTHER SUPPLIERS" BOX.

IF ONE OCCUPANT OR VACANT, GO TO O-5.

MULTIPLE OCCUPANTS

O-2. Is the (ENERGY SOURCE) bill from (SUPPLIER) for the entire building or do any of the tenants or establishments have separate bills?

O-3. How many separate bills are there? PROBE IF ANSWER IS "DON'T KNOW": Could you give an estimate or the approximate number of separate bills?

O-4. Please tell me the name of each company, organization or agency that received a bill from (SUPPLIER) for (ENERGY SOURCE) during the past 12 months.

IF LIST IS NOT PROVIDED, COMPLETE A "SUPPLIER CUSTOMER SHEET."

ONE OCCUPANT OR VACANT

O-5. Does the bill from (SUPPLIER) cover just this building or does it cover other buildings as well?

O-6. What is the approximate square footage of the other buildings that are included on this bill?

BOX O

ASK ABOUT NEXT SUPPLIER. IF NO ADDITIONAL SUPPLIERS, RETURN TO APPROPRIATE ENERGY SOURCE PAGE.

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

O. ADDITIONAL SUPPLIERS

<p style="text-align: center;">ENERGY SOURCE</p> <p>O-1.</p> <p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>	<p style="text-align: center;">ENERGY SOURCE</p> <p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>	<p style="text-align: center;">ENERGY SOURCE</p> <p>NAME _____</p> <p>ST. ADD. _____</p> <p>PO BOX _____</p> <p>CITY _____</p> <p>STATE/ZIP _____</p> <p><input type="checkbox"/> NO OTHER SUPPLIERS</p>
<p>O-2. ONE BILL/STATEMENT 1 (O-5)</p> <p>SEPARATE STATEMENTS 2 (O-3)</p>	<p>ONE BILL/STATEMENT 1 (O-5)</p> <p>SEPARATE STATEMENTS 2 (O-3)</p>	<p>ONE BILL/STATEMENT 1 (O-5)</p> <p>SEPARATE STATEMENTS 2 (O-3)</p>
<p>O-3. _____</p> <p style="text-align: center;">NUMBER OF BILLS/STATEMENTS</p>	<p>_____</p> <p style="text-align: center;">NUMBER OF BILLS/STATEMENTS</p>	<p>_____</p> <p style="text-align: center;">NUMBER OF BILLS/STATEMENTS</p>
<p>O-4. LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 10px auto; padding: 2px 10px;">GO TO BOX O</div>	<p>LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 10px auto; padding: 2px 10px;">GO TO BOX O</div>	<p>LIST PROVIDED 1</p> <p>NOT PROVIDED 2</p> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 10px auto; padding: 2px 10px;">GO TO BOX O</div>
<p>O-5. JUST THIS BUILDING 1 (BOX O)</p> <p>OTHER BUILDING(S) 2 (O-6)</p> <p>DON'T KNOW 8 (BOX O)</p>	<p>JUST THIS BUILDING 1 (BOX O)</p> <p>OTHER BUILDING(S) 2 (O-6)</p> <p>DON'T KNOW 8 (BOX O)</p>	<p>JUST THIS BUILDING 1 (BOX O)</p> <p>OTHER BUILDING(S) 2 (O-6)</p> <p>DON'T KNOW 8 (BOX O)</p>
<p>O-6. _____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>	<p>_____</p> <p style="text-align: center;">SQUARE FOOTAGE</p> <p>DON'T KNOW 8</p>

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

P. ENERGY SOURCE DELIVERY

P-1. NO ELECTRICITY USED IN BUILDING. GO TO P-2.

Earlier you mentioned that the building used electricity. This card lists different features found in electric rate schedules or tariffs. HAND CARD 14. Do any of the electricity accounts of the building have:

	RATE FEATURES	YES	NO	DK
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> HAND CARD 14 </div>	a. Seasonal pricing? <i>(The price depends on the season of the year.)</i>	1	2	8
	b. Time-of-day pricing? <i>(The pricing depends on the time of day.)</i>	1	2	8
	c. Time-of-day lock-out or limit? <i>(Use is prohibited or restricted to a reduced level at fixed times of the day.)</i>	1	2	8
	d. Interruptible or curtailable rate? <i>(Service is temporarily cut off or demand must be reduced by the customer on short notice to maintain service for higher priority users.)</i>	1	2	8
	e. Metered peak demand?	1	2	8

P-2. NO NATURAL GAS USED IN BUILDING. GO TO P-3.

Earlier you mentioned that the building used natural gas. During most of the past 12 months, were any of the natural gas accounts in the building on an interruptible service rate?

(This is a special rate offered by gas companies to customers that allows the gas company to cut back on the amount of gas supplied to the building during periods of high demand.)

YES 1
NO 2
DON'T KNOW 8

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

P-3. NO FUEL OIL OR DIESEL USED IN BUILDING. GO TO P-4.

Earlier you said the building used (fuel oil/diesel). Think about all the fuel oil storage tanks for this building. What is the total capacity, in gallons, of all the fuel oil storage tanks?

_____ GALLONS
DON'T KNOW9-8

P-4. BUILDING NOT HEATED. GO TO SECTION Q.

Could this building switch to a different main heating fuel within one week's time without substantially reducing the area heated or the temperature maintained in the heated area?

YES 1
NO 2 (SECTION Q)
DON'T KNOW 8 (SECTION Q)

P-5. If the building did have to switch the main heating fuel within one week's time, what fuels would be used instead of (ENERGY SOURCE FROM C-3a)? CIRCLE ALL MENTIONED.

ELECTRICITY 01
NATURAL GAS 02
FUEL OIL/KEROSENE/DIESEL 03
DISTRICT STEAM 04
DISTRICT HOT WATER 05
OTHER (SPECIFY)..... 06

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

Q. WAIVERS

Q-1. As I mentioned, the purpose of this study is to relate building characteristics with energy consumption and expenditures. This information can only be obtained by going directly to each energy supplier of the building. In order for the energy company to release this information to Westat, we need to have an authorization form from you, or some other representative of your company. **We also need account numbers for the building.**

a. Should the authorization form be signed by you or someone else?

RESPONDENT 1
SOMEONE ELSE (SPECIFY) 2

NAME: _____
TITLE: _____
ADDRESS: _____
CITY, STATE, ZIP: _____
PHONE NUMBER: () _____

b. Should the account number(s) be obtained from you or someone else?

RESPONDENT 1
INDIVIDUAL LISTED ABOVE 2
SOMEONE ELSE (SPECIFY) 3

NAME: _____
TITLE: _____
ADDRESS: _____
CITY, STATE, ZIP: _____
PHONE NUMBER: () _____

<i>BOX 13</i>			
<i>AFTER WAIVER OBTAINED, CODE STATUS OF ACCOUNT NUMBER EFFORT</i>			
		<i>NOT</i>	
	<i>OBTAINED</i>	<i>OBTAINED</i>	<i>INAPPLICABLE</i>
<i>ELECTRICITY</i>	1	2	3
<i>NATURAL GAS</i>	1	2	3

Q-2. RECORD TIME ENDED AND CONTINUE WITH SECTION S, THE CENSUS SUPPLEMENT.

TIME ENDED: _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (07/88)
Collected for the U.S. Environmental
Protection Agency

OMB No: 2070-0104 Approval Expires: 10/12/1989

Public reporting burden for this collection of information is estimated to average six (6) minutes per response, including time for reviewing and responding to each of five questions. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460; and to the Office of Management and Budget, Paperwork Reduction Project (2070-0104), Washington, D.C. 20503.

R. ASBESTOS IN BUILDINGS

LABEL

Now I would like to ask you a few questions about any asbestos the building may contain and any asbestos treatment that may have taken place. This information will be used to help establish environmental policies.

(Asbestos is a group of naturally occurring minerals that separate into long, thin fibers. It was used for many years to insulate and to fire-proof buildings.)

In this series of questions, we are only concerned with asbestos-containing materials inside the building. Asbestos in the attic, in the basement, or in the crawl spaces under the building is considered to be inside the building. We are not interested in asbestos used on the exterior of the building such as for roofing shingles or exterior wall shingles or siding.

R-1. Does the building, excluding the exterior roof and walls, currently contain asbestos?

YES 1
NO 2 (R-3)
DON'T KNOW 8 (R-3)

R-2. Here is a card showing types of asbestos found in buildings. HAND CARD 14A. Does the building contain asbestos in:

HAND
CARD
14A

	YES	NO	DK
a. Heating or cooling system insulation wrap?	1	2	8
b. Sprayed on or trowelled on surfacing material?	1	2	8
c. Ceiling tiles?	1	2	8
d. Flooring tiles?	1	2	8
e. Some other form? RECORD BELOW	1	2	8

R-3. Has any asbestos ever been removed from or treated in the building?

YES 1
NO 2 (R-5)
DON'T KNOW 8 (R-5)

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871H (07/89)

COLUMN A	COLUMN B																
<p>R-4. Here is a card showing different ways asbestos may have been treated in the building. HAND CARD 14B. At any time, was any asbestos:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;"> <p style="text-align: center;">HAND CARD 14B</p> </div> <p style="text-align: center; margin-left: 100px;"><u>TREATMENT</u></p> <p>a. Removed?</p> <p style="margin-left: 20px;">YES 1 →</p> <p style="margin-left: 20px;">NO 2</p> <p style="margin-left: 20px;">DON'T KNOW 8</p> <p>b. Encapsulated or sealed with a protective coating?</p> <p style="margin-left: 20px;">YES 1 →</p> <p style="margin-left: 20px;">NO 2</p> <p style="margin-left: 20px;">DON'T KNOW 8</p> <p>c. Enclosed behind an airtight permanent barrier?</p> <p style="margin-left: 20px;">YES 1 →</p> <p style="margin-left: 20px;">NO 2</p> <p style="margin-left: 20px;">DON'T KNOW 8</p> <p>d. Treated in some other way?</p> <p style="margin-left: 20px;">YES (SPECIFY) _____ 1 →</p> <p style="margin-left: 20px;">_____</p> <p style="margin-left: 20px;">_____</p> <p style="margin-left: 20px;">NO 2</p> <p style="margin-left: 20px;">DON'T KNOW 8</p> <p>e. RESPONDENT MENTIONS THAT SOMETHING WAS DONE BUT DOES NOT KNOW SPECIFICALLY WHAT WAS DONE.</p> <p style="margin-left: 20px;">YES 1 →</p> <p style="margin-left: 20px;">NO 2</p>	<p>IF "YES" IN COLUMN A, ASK FOLLOWING FOR EACH OF THREE TIME PERIODS:</p> <p>Was any of this work done:</p> <table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;">(1) Since January 1, 1989?</td> <td style="width: 33%;">(2) During 1988?</td> <td style="width: 33%;">(3) Before 1988?</td> </tr> <tr> <td></td> <td>YES NO DK</td> <td>YES NO DK</td> <td>YES NO DK</td> </tr> </table>										(1) Since January 1, 1989?	(2) During 1988?	(3) Before 1988?		YES NO DK	YES NO DK	YES NO DK
	(1) Since January 1, 1989?	(2) During 1988?	(3) Before 1988?														
	YES NO DK	YES NO DK	YES NO DK														
	1 2 8	1 2 8	1 2 8		1 2 8	1 2 8	1 2 8		1 2 8								
	1 2 8	1 2 8	1 2 8		1 2 8	1 2 8	1 2 8		1 2 8								
	1 2 8	1 2 8	1 2 8		1 2 8	1 2 8	1 2 8		1 2 8								
	1 2 8	1 2 8	1 2 8		1 2 8	1 2 8	1 2 8		1 2 8								

R-5. Has the building been inspected for asbestos by an EPA or State certified inspector?

- YES 1
- NO 2
- R MENTIONS INSPECTOR BUT DOES NOT KNOW IF CERTIFIED 3
- DON'T KNOW 8

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871G (06/89)

S-1c. How much money will the owner spend on construction improvements to this building during calendar year 1989?

\$ _____ (S-1e)
DOLLARS

DON'T KNOW 9-8 (S-1d)

S-1d. What is the name, address, and telephone number of the person who is most likely to know how much the owner will spend on construction improvements to this building?

NAME: _____ (S-1e)

ADDRESS: _____

CITY, STATE, ZIP: _____

PHONE NUMBER: (_____) _____

DONT KNOW 8 (S-2)

S-1e. CURRENTLY UNOCCUPIED. SKIP TO S-2.

S-1f. How much (additional) money will the current tenant spend on construction improvements to this building during calendar year 1989?

\$ _____ (S-2)
DOLLARS

DON'T KNOW 9-8 (S-1g)

S-1g. What is the name, address, and telephone number of the current tenant in this building?

NAME: _____ (S-2)

ADDRESS: _____

CITY, STATE, ZIP: _____

PHONE NUMBER: (_____) _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871G (06/89)

S-2. The next question is about expenditures for maintenance and repairs to the building. This refers to the cost for the upkeep of the building rather than additional investment in it and is described in more detail on this card. **HAND CARD 16.**

Approximately, what is the total amount of money that will be spent in calendar year 1989 by all persons and businesses for maintenance and repairs to the building? **Include expenditures to date plus estimated expenditures for the remainder of the year.**

**HAND
CARD
16**

\$ _____ (S-2e)
DOLLARS

NEEDS A FEW DAYS TO COMPILE DATA ... 9-6 (S-2a)

DON'T KNOW OR NO ONE PERSON

KNOWS 9-8 (BOX 15)

S-2a. When can I call you back to get this information?

_____ (S-2e)
DATE TIME

BOX 15

CHECK QUESTIONS E-3 AND E-4 ON PAGE 15 AND CIRCLE ONE:

CURRENTLY UNOCCUPIED (E-3 = 5) 1 (S-2b)

ONE OCCUPANT: THE OWNER (E-3 = 1) 2 (S-2e)

ONE OCCUPANT: A TENANT (E-3 = 2) 3 (S-2b)

TWO OCCUPANTS: THE OWNER AND A TENANT
(E-3 = 3 AND E-4 = 2) 4 (S-2b)

ALL OTHER SITUATIONS (MORE THAN ONE TENANT) 5 (S-2e)

S-2b. How much money will the owner spend on maintenance and repairs to this building during calendar year 1989?

\$ _____ (S-2c)
DOLLARS

DON'T KNOW 9-8 (S-2e)

S-2c. CURRENTLY UNOCCUPIED. SKIP TO S-2e.

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871G (06/89)

S-2d. How much (additional) money will the current tenant spend on maintenance and repairs for this building during calendar year 1989?

\$ _____ (S-2e)
DOLLARS

DON'T KNOW 9-8 (S-2e)

S-2e. END: This completes the interview. Thank you very much for your time and help.

TIME ENDED: _____

BOX 16		
<i>INDICATE WHO PROVIDED THE EXPENDITURE INFORMATION FOR CONSTRUCTION IMPROVEMENTS AND MAINTENANCE AND REPAIRS:</i>		
	S-3	S-4
	CONSTRUCTION IMPROVEMENTS (CIRCLE ONE)	MAINTENANCE AND REPAIRS (CIRCLE ONE)
a. OWNER	1	1
b. OWNER'S BUSINESS OR REPRESENTATIVE	2	2
c. TENANT	3	3
d. TENANT REPRESENTATIVE	4	4
e. OTHER (SPECIFY)	5	5

RESPONDENT NAME: _____		
TELEPHONE: (_____) _____		

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

INTERVIEWER OBSERVATIONS

FILL THIS OUT IF YOU COMPLETE THE BUILDING INTERVIEW.

1. Building is, or is part of a facility that is, a (CIRCLE ONE):

- Hospital 1
- College/University 2
- Elementary/Middle/High School 3
- Post Office 4
- Other 5

2. Does the interview's definition of the building agree with the listing sheet (BOX 3 = "CORRECT")?

- YES, AGREES WITH LISTING 1 (4)
- NO 2
- INAPPLICABLE (SHOPPING CENTER) 7 (4)

3. A. Please indicate the name and address(es) of the building from the listing sheet.

NAME: _____
ADDRESS: _____

B. Please indicate the name and address(es) of the building as defined for the interview.

(A-8) NAME: _____
(A-7) ADDRESS: _____

C. Please explain the circumstances of the disagreement between listing and interview definition of the building.

4. The individual who completed all or most of the questionnaire should be recorded on the front cover. Did any other person respond to the questionnaire?

- YES 1
- NO 2 (6)

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

5. Please list all other respondents.

NAME: _____

TITLE: _____

LOCATION: _____ PHONE NO. (____) _____

NAME: _____

TITLE: _____

LOCATION: _____ PHONE NO. (____) _____

6. What is your observation of the type of building or kind of business that occurs within the building? Please be thorough in your description.

7. Is this building, as defined for the interview, freestanding or attached to another building?

FREESTANDING 1
ATTACHED 2

8. Please describe any unusual circumstances you may have encountered in obtaining the waiver. (If you did not obtain the waiver or account numbers, explain why.)

9. Is this a strip shopping center or enclosed mall?

STRIP SHOPPING CENTER 1
ENCLOSED MALL 2
NOT A STRIP CENTER/MALL 3 (END)

10. Approximately how many establishments are in this shopping center/mall?

2-5 1
6-10 2
11-20 3
21-49 4
50-99 5
100 OR MORE 6

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

NONINTERVIEW REPORT

FILL THIS OUT IF YOU DID NOT COMPLETE
THE BUILDING INTERVIEW.

1. Why were you unable to complete the interview?

REFUSAL/BREAKOFF 1
INELIGIBLE BUILDING 2 (4)
RESPONDENT COULD NOT BE
CONTACTED 3

2. IF NOT RECORDED ON FRONT COVER: What is the name, title, and telephone number of the individual who refused, broke off, or could not be contacted for the interview?

NAME: _____

TITLE: _____

TELEPHONE NO. () _____

3. Why did the respondent refuse? (RECORD VERBATIM) OR: Why were there problems contacting the respondent?

SKIP TO 5

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

4. Please explain in detail why the building was ineligible for the interview.

5. What is your observation of the type of building or kind of business that occurs within the building?

6. How many floors does the building have, ground level and above?

_____ # OF FLOORS

IF INELIGIBLE BUILDING: END.

7. IF INDUSTRIAL, AGRICULTURAL, OR RESIDENTIAL MENTIONED IN 5: Would you estimate that 50% or more of the space in this building is used for (industrial/agricultural/residential) activities?

YES 1
NO 2
DON'T KNOW 8

8. Which category in your estimation best applies to the total square feet in this building?

1,000 square feet or less 1
1,001 to 50,000 square feet 2
Over 50,000 square feet 3
DON'T KNOW 8

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

SUPPLIER CUSTOMER SHEET

ENERGY SOURCE: _____

SUPPLIER'S NAME: _____

LIST OF RECIPIENTS OF SEPARATE BILLS	ADDITIONAL INFORMATION TO EXPLAIN BILLING
1. Name _____ Address _____	_____ _____
2. Name _____ Address _____	_____ _____
3. Name _____ Address _____	_____ _____
4. Name _____ Address _____	_____ _____
5. Name _____ Address _____	_____ _____
6. Name _____ Address _____	_____ _____
7. Name _____ Address _____	_____ _____
8. Name _____ Address _____	_____ _____
9. Name _____ Address _____	_____ _____
10. Name _____ Address _____	_____ _____
11. Name _____ Address _____	_____ _____
12. Name _____ Address _____	_____ _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

SUPPLIER CUSTOMER SHEET

ENERGY SOURCE: _____

SUPPLIER'S NAME: _____

LIST OF RECIPIENTS OF SEPARATE BILLS	ADDITIONAL INFORMATION TO EXPLAIN BILLING
13. Name _____ Address _____	_____ _____
14. Name _____ Address _____	_____ _____
15. Name _____ Address _____	_____ _____
16. Name _____ Address _____	_____ _____
17. Name _____ Address _____	_____ _____
18. Name _____ Address _____	_____ _____
19. Name _____ Address _____	_____ _____
20. Name _____ Address _____	_____ _____
21. Name _____ Address _____	_____ _____
22. Name _____ Address _____	_____ _____
23. Name _____ Address _____	_____ _____
24. Name _____ Address _____	_____ _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

SUPPLIER CUSTOMER SHEET

ENERGY SOURCE: _____

SUPPLIER'S NAME: _____

LIST OF RECIPIENTS OF SEPARATE BILLS	ADDITIONAL INFORMATION TO EXPLAIN BILLING
25. Name _____ Address _____	_____ _____
26. Name _____ Address _____	_____ _____
27. Name _____ Address _____	_____ _____
28. Name _____ Address _____	_____ _____
29. Name _____ Address _____	_____ _____
30. Name _____ Address _____	_____ _____
31. Name _____ Address _____	_____ _____
32. Name _____ Address _____	_____ _____
33. Name _____ Address _____	_____ _____
34. Name _____ Address _____	_____ _____
35. Name _____ Address _____	_____ _____
36. Name _____ Address _____	_____ _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

SUPPLIER CUSTOMER SHEET

ENERGY SOURCE: _____

SUPPLIER'S NAME: _____

LIST OF RECIPIENTS OF SEPARATE BILLS	ADDITIONAL INFORMATION TO EXPLAIN BILLING
37. Name _____ Address _____	_____ _____
38. Name _____ Address _____	_____ _____
39. Name _____ Address _____	_____ _____
40. Name _____ Address _____	_____ _____
41. Name _____ Address _____	_____ _____
42. Name _____ Address _____	_____ _____
43. Name _____ Address _____	_____ _____
44. Name _____ Address _____	_____ _____
45. Name _____ Address _____	_____ _____
46. Name _____ Address _____	_____ _____
47. Name _____ Address _____	_____ _____
48. Name _____ Address _____	_____ _____

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

FOLD-OUT PAGE

KEY BUILDING CHARACTERISTICS	
<p>B-1/B-2 - SQUARE FEET:</p> <hr style="width: 80%; margin-left: 0;"/>	<p>E-3 OCCUPANT STATUS:</p> <p>1 ONE OCCUPANT: THE OWNER</p> <p>2 ONE OCCUPANT: NOT THE OWNER</p> <p>3 MORE THAN ONE OCCUPANT, INCLUDING THE OWNER</p> <p>4 MORE THAN ONE OCCUPANT, NOT INCLUDING THE OWNER</p> <p>5 CURRENTLY UNOCCUPIED</p>

	C-3. WHICH ENERGY SOURCES WERE USED IN PAST 12 MONTHS:						
	a. Main fuel for heating	b. Secondary or backup fuel for heating	c. Fuel for cooling	d. Fuel for domestic hot water	e. Fuel for commercial/ institutional cooking	f. Fuel for manufacturing/ industrial activity	g. Fuel for electricity generation
NOT PERFORMED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C-1. ENERGY SOURCES (CHECK ALL USED)	CHECK ONE	CHECK ALL THAT APPLY	CHECK ALL THAT APPLY	CHECK ALL THAT APPLY	CHECK ALL THAT APPLY	CHECK ALL THAT APPLY	CHECK ALL THAT APPLY
a. Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Natural Gas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Fuel Oil/Diesel/ Kerosene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Bottled Gas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. District Steam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. District Hot Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. District Chilled Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Wood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Coal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Active Solar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other (Specify) <hr style="width: 80%; margin-left: 0;"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
END USE PERFORMED BUT ENERGY SOURCE NOT KNOWN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

Form Approval:
OMB No: 1905-0145
Expires: May 31, 1992

UNITED STATES DEPARTMENT OF ENERGY COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY AUTHORIZATION FORM

I hereby give permission to Westat, Inc. to obtain energy consumption information for confidential use in connection with their survey for the U.S. Department of Energy.

This authorization covers the total amount of fuels and the total price charged for the fuels consumed during the 26-month period of December 1, 1988 to January 31, 1991 by the building/establishment identified below.

Companies are authorized to provide this information by monthly periods or by delivery date, whichever is applicable. A photocopy of this authorization may be accepted with the same authority as the original.

Building name		
Address		
City	State	ZIP

Please print name of authorizing person	Employed by _____ () Telephone _____
<input checked="" type="checkbox"/> Signature of authorizing person	Address (if different than above) _____
Title _____	City _____ State _____ ZIP _____

PLEASE COMPLETE ONE BLOCK FOR EACH COMPANY THAT SUPPLIED FUEL
USED BY THE ABOVE NONRESIDENTIAL BUILDING SINCE DECEMBER 1, 1988.

Energy Source _____	Print full name of company _____ Address (if known) _____ City and State _____ ZIP _____ () _____ Telephone _____ Account Number(s) _____
Energy Source _____	Print full name of company _____ Address (if known) _____ City and State _____ ZIP _____ () _____ Telephone _____ Account Number(s) _____
Energy Source _____	Print full name of company _____ Address (if known) _____ City and State _____ ZIP _____ () _____ Telephone _____ Account Number(s) _____

CONTINUED ON REVERSE SIDE

Commercial Buildings Energy Consumption Survey for 1989 Building Questionnaire, Form EIA-871A

Form EIA-871A (06/89)

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY AUTHORIZATION FORM (Continued)

<input checked="" type="checkbox"/> _____ Signature of Authorizing Person
--

_____ Energy Source	_____ Print full name of company
_____ Energy Source	_____ Address (if known) City and State ZIP (_____) Telephone
_____ Energy Source	_____ Account Number(s)
_____ Energy Source	_____ Print full name of company
_____ Energy Source	_____ Address (if known) City and State ZIP (_____) Telephone
_____ Energy Source	_____ Account Number(s)
_____ Energy Source	_____ Print full name of company
_____ Energy Source	_____ Address (if known) City and State ZIP (_____) Telephone
_____ Energy Source	_____ Account Number(s)
_____ Energy Source	_____ Print full name of company
_____ Energy Source	_____ Address (if known) City and State ZIP (_____) Telephone
_____ Energy Source	_____ Account Number(s)
_____ Energy Source	_____ Print full name of company
_____ Energy Source	_____ Address (if known) City and State ZIP (_____) Telephone
_____ Energy Source	_____ Account Number(s)

Facility Form, Form EIA-871B

Form EIA-871B (10/25/89)

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992



U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989 FACILITY FORM

Label

Information is to be provided for the facility described on the label.

Data may be submitted directly on the reporting form inside this folder, or in any other format, such as computer-generated listing, which provides the same information and is convenient for your company.

Whatever format is used to submit data, answers to all questions on this form must be included with the submission.

Additional instructions for completing the form are inside this folder.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL 800-937-6232
TOLL FREE AND ASK FOR THE SUPPLIER SURVEY SPECIALIST.

This report is mandatory under Public Law 93-275, as amended. Failure to comply may result in criminal fines, civil penalties, and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see the General Instructions. Public reporting burden for this collection of information is estimated to average 60 minutes per response, including the time of reviewing instructions, searching existing data records, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards EI-73, Mail Station: 1H-023, 1000 Independence Avenue SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Please use the enclosed self-addressed, postage-paid envelope to return the completed forms, or mail the forms to:

U.S. Department of Energy
c/o Westat, Inc.
P.O. Box 6422
Rockville, MD 20850

Facility Form, Form EIA-871B

Form EIA-871B (10/25/89)
Facility Form

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

1. What is the principal activity of this facility or complex? (Circle one.)

- | | | | |
|--|----|--|----|
| College or university | 01 | Hotel/Motel | 09 |
| Secondary school | 02 | Prison/Jail/Reformatory | 10 |
| Elementary school | 03 | Entertainment or sports complex/Museum | 11 |
| Office | 04 | Other activity such as laboratory or | |
| Shopping center/Mall | 05 | warehouse | 12 |
| Hospital or other inpatient health service | 06 | (specify) _____ | |
| Industrial/Manufacturing | 07 | | |
| Agricultural | 08 | | |

2a. How many buildings were on this facility as of December 31, 1989?
NOTE: Include all buildings, regardless of size or primary purpose.

2a. _____
Number of buildings

2b. What was the total enclosed square footage of the buildings reported in 2a?

2b. _____
Square feet

3a. Excluding (1) buildings 1000 square feet or smaller and (2) those whose primary purpose is agricultural, industrial, or residential, how many buildings were there on this facility as of December 31, 1989? (See "Instructions for Specific Items" for definitions.)

3a. _____
Number of buildings

3b. What was the total enclosed square footage of the buildings reported in 3a?

3b. _____
Square feet

4. As of December 31, 1989, was this facility designated as a Qualifying Facility (QF) under the Public Utilities Regulatory Policies Act of 1978 (PURPA)?

- Yes
- No
- Don't Know

5. Is there a central power plant on this facility that produces steam, hot water, chilled water, or electricity?

- Yes
- No (Skip to Item 11)

6. Does the central power plant on this facility have a cogeneration system; that is, does it have equipment that produces both electricity and usable heat from the same input fuel?

- Yes
- No (Skip to Item 9)

7. What was the total nameplate capacity of all cogeneration units that were in place at this facility on December 31, 1989?

7. _____
Kilowatts

8. As of December 31, 1989, was the generation system on this facility electrically interconnected with an electric utility (that is, able to deliver electricity to the grid as well as receive it)?

- Yes
- No
- Don't Know

Facility Form, Form EIA-871B

Form EIA-871B (10/25/89)
Facility Form

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

9. SYSTEM INPUTS

In the table below, please provide the total input fuels consumed by the central power plant and the expenditures for those fuels from January 1, 1989 through December 31, 1989, or the closest time period for which the information is available. Please indicate the consumption units and type of fuel.

INPUT FUELS	CONSUMPTION PERIOD		TOTAL CONSUMPTION INPUT FUEL	TOTAL EXPENDITURES FOR INPUT FUEL		
	Beginning Date	Ending Date				
<p style="text-align: center;">FUEL OIL</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> UNITS <input type="checkbox"/> Gallons <input type="checkbox"/> Barrels <input type="checkbox"/> Other _____ _____ </td> <td style="width: 50%; vertical-align: top;"> TYPE <input type="checkbox"/> Distillate <input type="checkbox"/> Residual <input type="checkbox"/> Other _____ _____ </td> </tr> </table>	UNITS <input type="checkbox"/> Gallons <input type="checkbox"/> Barrels <input type="checkbox"/> Other _____ _____	TYPE <input type="checkbox"/> Distillate <input type="checkbox"/> Residual <input type="checkbox"/> Other _____ _____	_____	_____	_____	\$ _____
UNITS <input type="checkbox"/> Gallons <input type="checkbox"/> Barrels <input type="checkbox"/> Other _____ _____	TYPE <input type="checkbox"/> Distillate <input type="checkbox"/> Residual <input type="checkbox"/> Other _____ _____					
<p style="text-align: center;">NATURAL GAS</p> UNITS <input type="checkbox"/> 100 Cubic Feet (Ccf) <input type="checkbox"/> 1000 Cubic Feet (Mcf) <input type="checkbox"/> Therms <input type="checkbox"/> Decatherms <input type="checkbox"/> Other _____ _____	_____	_____	_____	\$ _____		
<p style="text-align: center;">COAL</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> UNITS <input type="checkbox"/> Tons <input type="checkbox"/> Other _____ _____ </td> <td style="width: 50%; vertical-align: top;"> TYPE <input type="checkbox"/> Anthracite <input type="checkbox"/> Bituminous <input type="checkbox"/> Other _____ _____ </td> </tr> </table>	UNITS <input type="checkbox"/> Tons <input type="checkbox"/> Other _____ _____	TYPE <input type="checkbox"/> Anthracite <input type="checkbox"/> Bituminous <input type="checkbox"/> Other _____ _____	_____	_____	_____	\$ _____
UNITS <input type="checkbox"/> Tons <input type="checkbox"/> Other _____ _____	TYPE <input type="checkbox"/> Anthracite <input type="checkbox"/> Bituminous <input type="checkbox"/> Other _____ _____					
<p style="text-align: center;">SYSTEM INPUT ELECTRICITY</p> <input type="checkbox"/> Million Kilowatthours <input type="checkbox"/> Thousand Kilowatthours <input type="checkbox"/> Kilowatthours	_____	_____	_____	\$ _____		
<p style="text-align: center;">OTHER</p> Input Fuel: _____ Units: _____	_____	_____	_____	\$ _____		

Facility Form, Form EIA-871B

Form EIA-871B (10/25/89)
Facility Form

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

10. TOTAL SYSTEM OUTPUT FROM PLANT TO DISTRICT SYSTEM

In the space provided below, provide the plant outputs to the district system from January 1, 1989 through December 31, 1989, or the closest time period for which the information is available. If at all possible, the time period used should be the same as for Item 9, System Inputs.

OUTPUT FUELS	OUTPUT PERIOD		TOTAL YEARLY PLANT OUTPUT	TOTAL NUMBER OF BUILDINGS SERVED BY OUTPUT ENERGY*	TOTAL SQUARE FOOTAGE SERVED BY OUTPUT ENERGY*
	Beginning Date	Ending Date			
STEAM <input type="checkbox"/> Million Btu <input type="checkbox"/> Thousand pounds <input type="checkbox"/> Pounds <input type="checkbox"/> Other _____	_____ mo/da/yr	_____ mo/da/yr	_____	_____ no. of buildings	_____ square footage
HOT WATER <input type="checkbox"/> Million Btu <input type="checkbox"/> Other _____	_____ mo/da/yr	_____ mo/da/yr	_____	_____ no. of buildings	_____ square footage
CHILLED WATER <input type="checkbox"/> Ton-hours <input type="checkbox"/> Other _____	_____ mo/da/yr	_____ mo/da/yr	_____	_____ no. of buildings	_____ square footage
ELECTRICITY -- TOTAL <input type="checkbox"/> Kilowatthours <input type="checkbox"/> Other _____	_____ mo/da/yr	_____ mo/da/yr	_____	_____ no. of buildings	_____ square footage
ELECTRICITY -- COGENERATED <input type="checkbox"/> Kilowatthours <input type="checkbox"/> Other _____	_____ mo/da/yr	_____ mo/da/yr	_____	_____ no. of buildings	_____ square footage

*Include all buildings served, regardless of size or primary purpose.

11. Form completed by:

NAME: _____ TELEPHONE: (____) _____ DATE: _____
(Please print) Area code

TITLE: _____

Building Natural Gas Usage Form, Form EIA-871C-1

Form EIA-871C-1 (10/25/89)



Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989 BUILDING NATURAL GAS USAGE FORM

Label

Consumption data are to be provided for the entire building described on the label. A copy of the authorization form signed by the building owner/manager is included inside.

Data may be submitted directly on the reporting form inside this folder, or in any other format, such as computer print-out, which provides the same information and is convenient for your company.

Whatever format is used to submit data, answers to all questions on this form must be included with the submission.

See the separate Instructions Booklet for additional instructions for completing the form.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL 800-937-6232
TOLL FREE AND ASK FOR THE SUPPLIER SURVEY SPECIALIST.

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Please use the enclosed self-addressed, postage-paid envelope to return the completed forms, or mail the forms to:

U.S. Department of Energy
c/o Westat, Inc.
P.O. Box 6422
Rockville, MD 20850

Building Natural Gas Usage Form, Form EIA-871C-1

Form EIA-871C-1 (10/25/89)
Natural Gas Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

1. In the table below, please report total natural gas consumption in this building during the period from December 1, 1988 through January 31, 1990.

Time Period	CONSUMPTION PERIOD		NUMBER OF ACCOUNTS		CONSUMPTION DATA		Column C Quantities reported in Cols. A and B are: A = All Actual E = Some or All Estimated (CIRCLE ONE)	Column D TOTAL DOLLAR AMOUNT FOR ALL CONSUMPTION* (Cols. A + B)	
	IF ONLY ONE ACCOUNT OR IF ALL ACCOUNTS ARE ON THE SAME BILLING CYCLE		New Accounts Opened in this Building	Old Accounts Closed in this Building	Indicate unit of measure for the quantities reported below:				
	Beginning Date	Ending Date			IF ACCOUNTS ARE ON DIFFERENT BILLING CYCLES, RECORD MONTH	<input type="checkbox"/> Therms			<input type="checkbox"/> 100 cu.ft. (Ccf)
						<input type="checkbox"/> Cu ft. (cf)			<input type="checkbox"/> 1000 cu. ft. (Mcf)
				QUANTITY USED					
				Column A Consumption (excluding transportation gas)	Column B If this building is a transportation gas customer, report volumes below				
1							A	E	
2							A	E	
3							A	E	
4							A	E	
5							A	E	
6							A	E	
7							A	E	
8							A	E	
9							A	E	
10							A	E	
11							A	E	
12							A	E	
13							A	E	
14							A	E	

***TOTAL DOLLAR AMOUNT should include:**

- . State and local taxes,
- . Fuel adjustment charges,
- . System charges (minimum bill or base charge),
- . Demand charges, and
- . Transportation charges.

***TOTAL DOLLAR AMOUNT should exclude:**

- . Merchandise,
- . Repair charges,
- . Service charges (hookup or disconnect fees, late payment fees, etc.), and
- . Any other charges not specifically listed at left.

IF ANY CUSTOMERS IN THIS BUILDING ARE ON A BUDGETED BILLING CYCLE, DO NOT REPORT FIGURES FROM THE BUDGETED BILL. INSTEAD, PLEASE REPORT THE TOTAL DOLLAR AMOUNT FOR THE COST OF ACTUAL CONSUMPTION DURING EACH CONSUMPTION PERIOD.

Building Natural Gas Usage Form, Form EIA-871C-1

Form EIA-871C-1 (10/25/89)
Natural Gas Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

2. Does the response to Item 1 above include all accounts active in this building as of January 31, 1990? Yes No Don't Know

3. Does the information in Item 1 above include consumption in any building(s) other than the building shown on the label on the cover of this folder? Yes No Don't Know

4. How do you classify this building/account in your records? (CHECK ONE)

- Residential
- Commercial
- Industrial
- Commercial/Industrial
- Other _____ (specify)

NOTE: Please provide the reported information for this building even if this is not a commercial building according to your definition or records.

5. Form completed by:

NAME (Please Print) () _____
Area Code TELEPHONE DATE

TITLE

Worksheet for Natural Gas Usage, Form EIA-871C-2

Form EIA-871C-2 (10/25/89)

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

WORKSHEET FOR NATURAL GAS USAGE*

For each of the buildings below, enter the requested information for the period of December 1, 1988 through January 31, 1990. Then sum the consumption and expenditures for all the buildings and provide the totals on the last line of this form. The colored page, which should be returned to Westat, will conceal the figures for individual buildings and display only the final totals.

Name/Address of Building	How do you classify these buildings in your records? (CHECK ONE) R - Residential C - Commercial I - Industrial C/I - Comm/Ind. O - Other	CONSUMPTION PERIOD		QUANTITY USED Consumption amounts reported in: (CHECK ONE) <input type="checkbox"/> Therms <input type="checkbox"/> 100 cu. ft. (Ccf) <input type="checkbox"/> Cu. ft. (cf) <input type="checkbox"/> 1000 cu. ft. (Mcf) <input type="checkbox"/> Other (SPECIFY)	TOTAL DOLLAR AMOUNT
		Beginning Date	Ending Date		
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O				
TOTALS					

*Retain this page for your organization. Return only the second (colored) page to Westat. See the back of this form for further instructions.

District Heating and Cooling Usage Form, Form EIA-871D

Form EIA-871D (10/25/89)

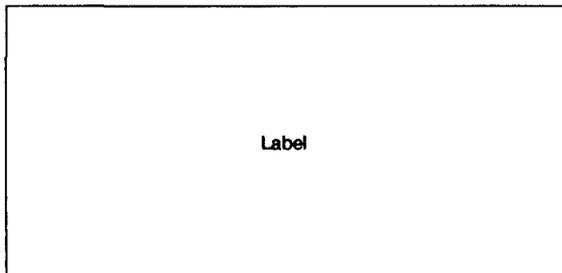
Form Approval
OMB No: 1905-0145
Expires: May 31, 1992



U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989

DISTRICT HEATING AND COOLING FORM



Consumption data are to be provided for the entire building described on the label.

A copy of the authorization form signed by the building owner/manager is included inside.

Data may be submitted directly on the reporting form inside this folder, or in any other format, such as computer-generated listing, which provides the same information and is convenient for your company.

Whatever format is used to submit data, answers to all questions on this form must be included with the submission.

Additional instructions for completing the form are included in this folder.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL 800-937-6232
TOLL FREE AND ASK FOR THE SUPPLIER SURVEY SPECIALIST.

This report is mandatory under Public Law 93-275, as amended. Failure to comply may result in criminal fines, civil penalties, and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see the General Instructions. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time of reviewing instructions, searching existing data records, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards EI-73, Mail Station: 1H-023, 1000 Independence Avenue SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Please use the enclosed self-addressed, postage-paid envelope to return the completed forms, or mail the forms to:

U.S. Department of Energy
c/o Westat, Inc.
P. O. Box 6422
Rockville, MD 20850

District Heating and Cooling Usage Form, Form EIA-871D

Form EIA-871D (10/25/89)
District Heating and Cooling Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

1. In the table below, please report all steam, hot water, and chilled water delivered to this building during the period from December 1, 1988, through January 31, 1990. The checkbox indicates the sources reported during an interview with a representative from the building. If you are unable to isolate the information for the specific building, report the entire consumption for the system and refer to Item 2 for making estimates about the building.

Time Period	CONSUMPTION PERIOD		<input type="checkbox"/> STEAM Indicate Units: <input type="checkbox"/> Million Btu <input type="checkbox"/> Thousand pounds <input type="checkbox"/> Pounds <input type="checkbox"/> Other _____		<input type="checkbox"/> HOT WATER Indicate Units: <input type="checkbox"/> Million Btu <input type="checkbox"/> Other _____		<input type="checkbox"/> CHILLED WATER Indicate Units: <input type="checkbox"/> Ton-hours <input type="checkbox"/> Other _____	
	Beginning Date	Ending Date	QUANTITY	TOTAL DOLLAR AMOUNT*	QUANTITY	TOTAL DOLLAR AMOUNT*	QUANTITY	TOTAL DOLLAR AMOUNT*
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

*TOTAL DOLLAR AMOUNT should include State and local taxes and exclude all merchandise or repair charges.

District Heating and Cooling Usage Form, Form EIA-871D

Form EIA-871D (10/25/89)
District Heating and Cooling Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

- | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| | Steam | Hot Water | Chilled Water |
| 2. Does the information in Item 1 above include consumption in any building(s) other than the building shown on the label on the cover of this folder? (CHECK ONE BOX FOR EACH TYPE OF DISTRICT HEATING OR COOLING SUPPLIED.) | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No | <input type="checkbox"/> No | <input type="checkbox"/> No |
| | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know |

For each YES, please help us estimate the percentage used in the building shown on the label by answering ONE of the following (that is, either 2a OR 2b and 2c):

- | | | | |
|--|---|---|---------------------------|
| 2a. What is your estimate of the percentage of the reported quantity used by the building? | 2a. _____ % | _____ % | _____ % |
| OR | 2b. What is the square footage of the building on the label? | 2b. _____ AND _____
building square feet | |
| | 2c. What is the square footage of all the buildings on this district loop, including the building on the label? | 2c. _____
loop square feet | _____
loop square feet |

- | | | | |
|---|---|---|---|
| 3. Does the information in Item 1 above include all district heating/cooling supplied by your system to all portions of the building on the label during the time periods reported? | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No | <input type="checkbox"/> No | <input type="checkbox"/> No |
| | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know |
| 4a. Was service to this building or to any portion of this building interrupted or terminated between December 1, 1988 and January 31, 1990? | 4a. <input type="checkbox"/> Yes (go to 4b) | <input type="checkbox"/> Yes (go to 4b) | <input type="checkbox"/> Yes (go to 4b) |
| | <input type="checkbox"/> No | <input type="checkbox"/> No | <input type="checkbox"/> No |
| | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know |
| 4b. If yes, please indicate the date of each initiation or termination and the fraction of the building's floorspace that began or ended service on that date. Do not include seasonal interruptions and resumptions of services. | 4b. _____ | _____ | _____ |
| | _____ | _____ | _____ |
| | _____ | _____ | _____ |
| 5. Is the building identified on the label billed for the steam, hot water, or chilled water piped into it? | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No | <input type="checkbox"/> No | <input type="checkbox"/> No |
| | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know | <input type="checkbox"/> Don't Know |
| 6. Is the building identified on the label a heating or cooling plant, that is, does it contain equipment used to heat or cool other buildings? | <input type="checkbox"/> Yes | | |
| | <input type="checkbox"/> No | | |
| | <input type="checkbox"/> Don't Know | | |

7. Form completed by: _____ () _____
NAME (Please Print) TITLE Area Code TELEPHONE DATE

Building Electricity Usage Form, Form EIA-871E-1

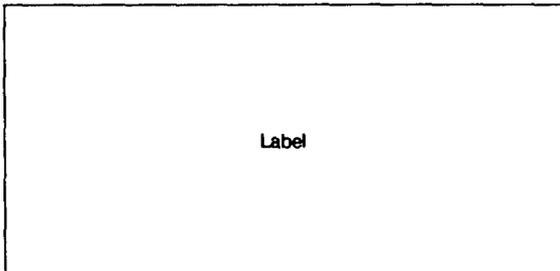
Form EIA-871E-1 (10/25/89)



Form Approval
OMB No: 1905-1045
Expires: May 31, 1992

U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989 BUILDING ELECTRICITY USAGE FORM



Consumption data are to be provided for the entire building described on the label.
A copy of the authorization form signed by the building owner/manager is included inside.

Data may be submitted directly on the reporting form inside this folder, or in any other format, such as computer print-out, which provides the same information and is convenient for your company.

Whatever format is used to submit data, answers to all questions on this form must be included with the submission.

See the separate Instructions Booklet for additional instructions for completing the form.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL 800-937-8232
TOLL FREE AND ASK FOR THE SUPPLIER SURVEY SPECIALIST.

This report is mandatory under Public Law 93-275, as amended. Failure to comply may result in criminal fines, civil penalties, and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see the General Instructions. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time of reviewing instructions, searching existing data records, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards EI-73, Mail Station: 1H-023, 1000 Independence Avenue SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Please use the enclosed self-addressed, postage-paid envelope to return the completed forms, or mail the forms to:

U.S. Department of Energy
c/o Westat, Inc.
P.O. Box 6422
Rockville, MD 20850

Building Electricity Usage Form, Form EIA-871E-1

Form EIA-871E-1 (10/25/89)
Electricity Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

1. In the table below, please report total electricity consumption in this building during the period from December 1, 1988 through January 31, 1990.

Time Period	CONSUMPTION PERIOD			NO. OF ACCOUNTS		CONSUMPTION DATA		BILLING DATA		
	IF ONLY ONE ACCOUNT OR IF ALL ACCOUNTS ARE ON THE SAME BILLING CYCLE		IF ACCOUNTS ARE ON DIFFERENT BILLING CYCLES, RECORD MONTH	New Accounts Opened in this Building	Old Accounts Closed in this Building	TOTAL kWh USED	METERED KILOWATT (kW) DEMAND	Quantities Reported Are: A = All Actual E = Some or All Estimated (Circle One)		TOTAL DOLLAR AMOUNT*
	Beginning Date	Ending Date						A	E	
1								A	E	
2								A	E	
3								A	E	
4								A	E	
5								A	E	
6								A	E	
7								A	E	
8								A	E	
9								A	E	
10								A	E	
11								A	E	
12								A	E	
13								A	E	
14								A	E	

*TOTAL DOLLAR AMOUNT should include:

- . State and local taxes,
- . Fuel adjustment charges,
- . System charges (minimum bill or base charge), and
- . Demand charges.

*TOTAL DOLLAR AMOUNT should exclude:

- . Merchandise,
- . Repair charges,
- . Service charges (hookup or disconnect fees, late payment fees, etc.), and
- . Any other charges not specifically listed at left.

IF ANY CUSTOMERS IN THIS BUILDING ARE ON A BUDGETED BILLING CYCLE, DO NOT REPORT FIGURES FROM THE BUDGETED BILL. INSTEAD, PLEASE REPORT THE TOTAL DOLLAR AMOUNT FOR THE COST OF ACTUAL CONSUMPTION DURING EACH CONSUMPTION PERIOD.

Building Electricity Usage Form, Form EIA-871E-1

Form EIA-871E-1 (10/25/89)
Electricity Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

2. Does the response to Item 1 above include all accounts active in this building as of January 31, 1990? Yes No Don't Know
3. Does the information in Item 1 above include consumption in any building(s) other than the building shown on the label on the cover of this folder? Yes No Don't Know
4. How do you classify this building/account in your records? (CHECK ONE)
- Residential
 - Commercial
 - Industrial
 - Commercial/Industrial
 - Other _____
(specify)

NOTE: Please provide the reported information for this building even if this is not a commercial building according to your definition or records.

5. Form completed by:

NAME (Please Print)

(_____) _____
Area Code

TELEPHONE

DATE

TITLE

Worksheet for Electricity Usage, Form EIA-871E-2

Form EIA-871E-2 (10/25/89)

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

WORKSHEET FOR ELECTRICITY USAGE*

For each of the buildings below, enter the requested information for the period of December 1, 1988 through January 31, 1990. Then sum the consumption and expenditures for all of the buildings and provide the totals on the last line of this form. The colored page, which should be returned to Westat, will conceal the figures for individual buildings and display only the final totals.

Name/Address of Building	How do you classify these buildings in your records? (CHECK ONE) R - Residential C - Commercial I - Industrial C/I - Comm/Ind. O - Other	CONSUMPTION PERIOD		CONSUMPTION	TOTAL DOLLAR AMOUNT
		Beginning Date	Ending Date	Kilowatthours (kWh) Used	
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R C I C/I O				
				TOTALS	

*Retain this page for your organization. Return only the second (colored) page to Westat. See the back of this form for further instructions.

Building Fuel Oil Usage Form, Form EIA-871F

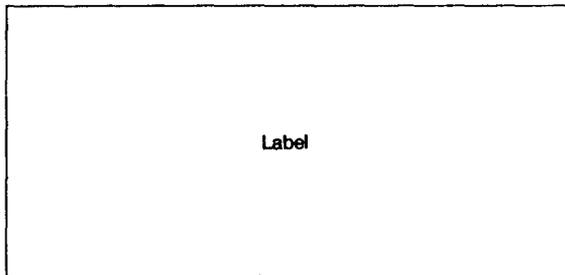
Form EIA-871F (10/25/89)

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992



U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY FOR 1989 BUILDING FUEL OIL USAGE FORM



Consumption data are to be provided for the entire building described on the label.
A copy of the authorization form signed by the building owner/manager is included inside.

Data may be submitted directly on the reporting form inside this folder, or in any other format, such as computer-generated listing, which provides the same information and is convenient for your company.

Whatever format is used to submit data, answers to all questions on this form must be included with the submission.

Additional instructions for completing the form are included in this folder.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL 800-937-6232
TOLL FREE AND ASK FOR THE SUPPLIER SURVEY SPECIALIST.

This report is mandatory under Public Law 93-275, as amended. Failure to comply may result in criminal fines, civil penalties, and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see the General Instructions. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time of reviewing instructions, searching existing data records, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards EI-73, Mail Station: 1H-023, 1000 Independence Avenue SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Please use the enclosed self-addressed, postage-paid envelope to return the completed forms, or mail the forms to:

U.S. Department of Energy
c/o Westat, Inc.
P.O. Box 6422
Rockville, MD 20850

Building Fuel Oil Usage Form, Form EIA-871F

Form EIA-871F (10/25/89)
Fuel Oil Usage

Form Approval
OMB No: 1905-0145
Expires: May 31, 1992

1. In the table below, please report the date, quantity delivered, and dollar amount for all deliveries of fuel oil to this building during the period from December 1, 1988 through January 31, 1990, beginning at Time Period 1. Indicate for Time Period 0 the date of the last delivery prior to those for which quantities are reported.

Time Period	Delivery Date	Check (✓) if first delivery to a new customer	Gallons Delivered	Did this delivery fill the tank(s)? Circle One Answer (DK = Don't Know)	TOTAL DOLLAR AMOUNT*
0					
1				YES NO DK	
2				YES NO DK	
3				YES NO DK	
4				YES NO DK	
5				YES NO DK	
6				YES NO DK	
7				YES NO DK	
8				YES NO DK	
9				YES NO DK	
10				YES NO DK	
11				YES NO DK	
12				YES NO DK	
13				YES NO DK	
14				YES NO DK	

*TOTAL DOLLAR AMOUNT should include State and local taxes, and exclude merchandise, repair or service charges.

3. Does the response to Item 1 include all accounts or customers active in this building as of January 31, 1990?

- Yes
- No
- Don't Know

4. Does the information in Item 1 include deliveries to any building(s) other than the building shown on the label on the cover of this folder?

- Yes
- No
- Don't Know

5. How do you classify this building/account in your records? (CHECK ONE)

- Residential
- Commercial
- Industrial
- Commercial/Industrial
- Other (please specify): _____

NOTE: Please provide the requested information for this building even if this is not a commercial building according to your definition.

6. Form completed by:

NAME (Please Print)

TITLE

(_____) _____
Area Code TELEPHONE

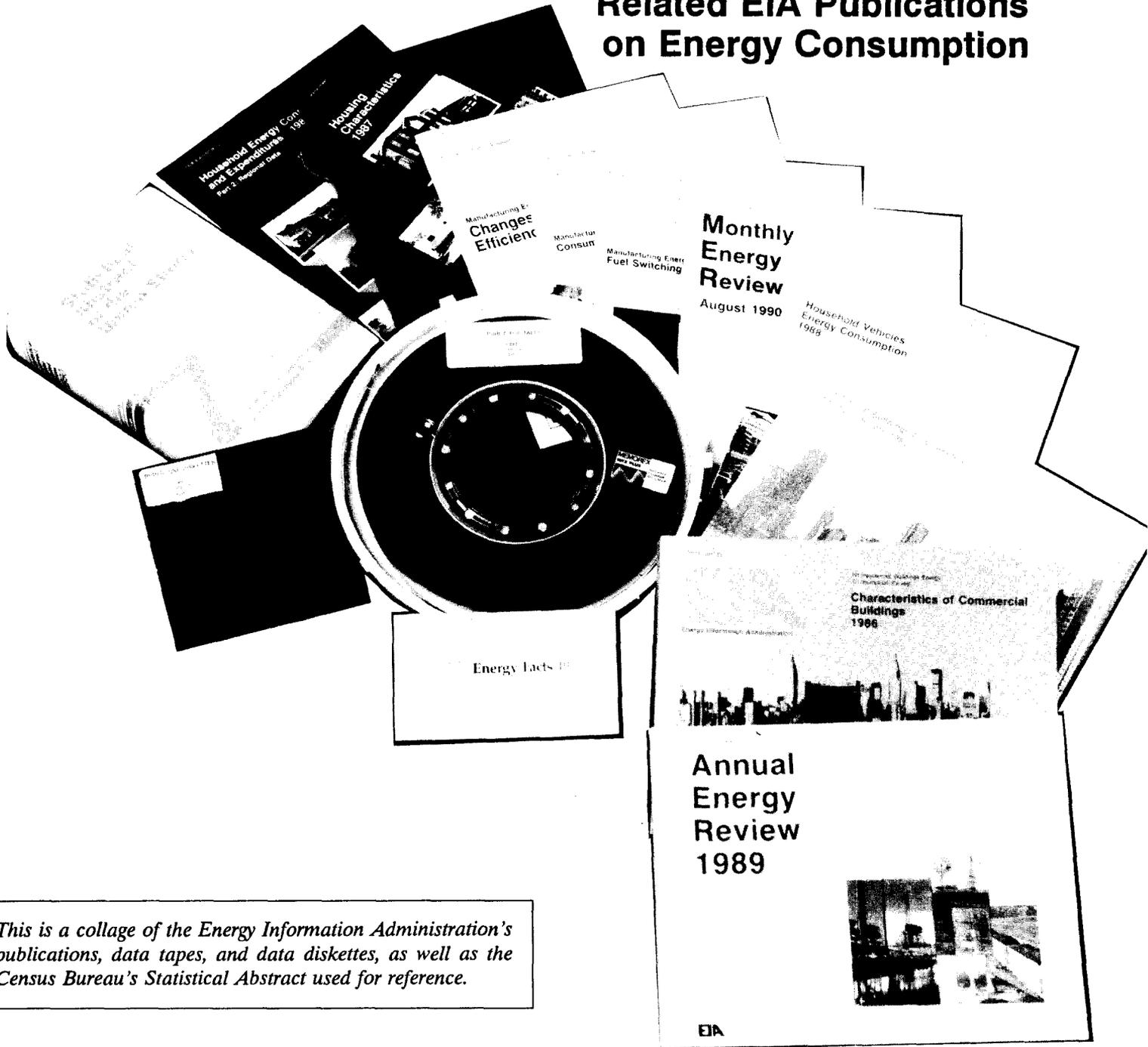
DATE

2. Types of fuel oil delivered. Please check box(es) to indicate type(s) of the fuel oil supplied to this building:

- Distillate (#1, #2, and #4 fuel oil; #1 and #2 diesel oil)
- Residual (#5 and #6 fuel oil)
- Kerosene
- Other (please specify): _____

Appendix G

Related EIA Publications on Energy Consumption



This is a collage of the Energy Information Administration's publications, data tapes, and data diskettes, as well as the Census Bureau's Statistical Abstract used for reference.

Appendix G

Related EIA Publications on Energy Consumption

For information about how to obtain these publications, see the inside cover of this report. Please note that the prices quoted here are subject to change.

In addition to the reports listed below, public use data tapes and data diskettes for the residential, residential transportation and commercial sectors are available from the National Technical Information Service (NTIS). To obtain information on how to order the tapes/diskettes, you may call NTIS at 703/487-4807, FAX number 703/321-8547. Data diskettes can also be obtained from GPO. For ordering information call 202/275-0186.

Commercial Sector

Note: The name of the Nonresidential Buildings Energy Consumption Survey was changed to the Commercial Buildings Energy Consumption Survey, beginning with the 1989 survey. The survey name was also dropped from the report title.

Characteristics of Buildings

Commercial Buildings Characteristics 1989; June 1991, DOE/EIA-0246(89), GPO Stock No. 061-003-00699-0, \$18.00.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1986; September 1988, DOE/EIA-0246(86), GPO Stock No. 061-003-00580-2, \$16.00.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; July 1985, DOE/EIA-0246(83), GPO Stock No. 061-003-00439-3, \$7.50.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings,

1983; A Supplemental Reference, DOE/EIA-M008, \$22.95. Available from the NTIS, Order No. DE-85015581.

Nonresidential Buildings Energy Consumption Survey: Fuel Characteristics and Conservation Practices; June 1981, DOE/EIA-0278, GPO Stock No. 061-00300200-5, \$9.00.

Nonresidential Buildings Energy Consumption Survey: Building Characteristics; March 1981, DOE/EIA-0246, GPO Stock No. 061-003-00171-8, \$6.50.

Consumption and Expenditures

Nonresidential Buildings Energy Consumption Survey: Commercial Buildings Consumption and Expenditures 1986; May 1989, DOE/EIA-0318(86), GPO Stock No. 061-003-00613-2, \$19.00.

Nonresidential Buildings Energy Consumption Survey: Commercial Buildings, Consumption and Expenditures 1983; September 1986, DOE/EIA-0318(83), GPO Stock No. 061-003-00496-2, \$13.00.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 1: Natural Gas and Electricity; March 1983, DOE/EIA-0318/1, GPO Stock No. 061-003-00298-6, \$9.50.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 2: Steam, Coal, Fuel Oil, LPG, and Total Fuels; December 1983, DOE/EIA-0318(79)/2, GPO Stock No. 061003-00366-4, \$6.00.

Other Publications on the Commercial Sector

Analysis Report: Lighting in Commercial Buildings; March 1992, DOE/EIA-0555(92)/1, GPO Stock No. 061-003-00749-0, \$6.50.

Residential Transportation Sector

Note: The survey name was dropped from the beginning of the report title starting with the 1988 data report, and the report title changed to "Household Vehicles Energy Consumption 1988."

Household Vehicles Energy Consumption 1988; February 1990, DOE/EIA-0464(88), GPO Stock No. 061-003-00652-3, \$11.00.

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles 1985; April 1987, DOE/EIA-0464(85), GPO Stock No. 061-003-00521-7, \$8.50.

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles, 1983; January 1985, DOE/EIA-0464(83), GPO Stock No. 061-003-00420-2, \$4.50.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, Supplement: January 1981 to September 1981; February 1983, DOE/EIA-0328, GPO Stock No. 061-003-00297-8, \$4.75.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, June 1979 to December 1980; April 1982, DOE/EIA-0319 (no GPO Stock No.).

Residential Sector

Housing Characteristics

Note: The survey name was dropped from the beginning of the report title starting with the 1987 data reports.

Housing Characteristics 1987; May 1989, DOE/EIA-0314(87), GPO Stock No. 061-003-00619-1, \$13.00.

Residential Energy Consumption Survey: Housing Characteristics 1984; October 1986, DOE/EIA-0314(84), GPO Stock No. 061-003-00499-7, \$12.00.

Residential Energy Consumption Survey: Housing Characteristics, 1982; August 1984, DOE/EIA-0314(82), GPO Stock No. 061-003-00393-1, \$7.00.

Residential Energy Consumption Survey Housing Characteristics, 1981; August 1983, DOE/EIA-0314(81), GPO Stock No. 061-003-00330-3, \$6.50.

Residential Energy Consumption Survey: Housing Characteristics, 1980; June 1982, DOE/EIA-0314, GPO Stock No. 061-003-00256-1, \$11.00.

Residential Energy Consumption Survey: Characteristics of the Housing Stock and Households, 1978; February 1980, DOE/EIA-0207/2, GPO Stock No. 061-003-00093-2, \$4.25.

Residential Energy Consumption Survey: Conservation; February 1980, DOE/EIA-0207/3, GPO Stock No. 061003-00087-8, \$6.00.

Preliminary Conservation Tables from the National Interim Energy Consumption Survey; August 1979, DOE/EIA-0193/P (no GPO Stock No.).

Characteristics of the Housing Stock and Households: Preliminary Findings from the National Interim Energy Consumption Survey; October 1979, DOE/EIA-0199/P (no GPO Stock No. available).

Consumption and Expenditures

Note: The survey name was dropped from the beginning of the report title starting with the 1987 data reports. The titles were changed to *Household Energy Consumption and Expenditures 1987, Part 1: National and Part 2: Regional*.

Household Energy Consumption and Expenditures 1987, Part 1: National Data; October 1989, DOE/EIA-0321/1(87), GPO Stock No. 061-003-00635-3, \$15.00. Note: Energy end-use data are included in this report.

Household Energy Consumption and Expenditures 1987, Part 2: Regional Data; DOE/EIA-0321/2(87) (no GPO Stock No available), \$16.00.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 Through March 1985, Part 1: National Data; March 1987, DOE/EIA-0321/1(84), GPO Stock No. 061-003-00519-5, \$9.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 Through March 1985, Part 2: Regional Data; May 1987, DOE/EIA-

0321/2(84), GPO Stock No. 061-003-00528-4, \$17.00. Note: Energy end-use data are included in this report.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1982 Through March 1983, Part 1: National Data; November 1984, DOE/EIA-0321/1(82), GPO Stock No. 061-003-00411-3, \$7.00.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1982 Through March 1983, Part 2: Regional Data; December 1984, DOE/EIA-0321/2(82), GPO Stock No. 061-003-00414-8, \$9.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1981 Through March 1982, Part 1: National Data; September 1983, DOE/EIA-0321/1(81), GPO Stock No. 061-003-00340-1, \$6.00.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1981 Through March 1982, Part 2: Regional Data; October 1983, DOE/EIA-0321/2(81), GPO Stock No. 061-003-00357-5, \$8.00.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1980 Through March 1981, Part 1: National Data; September 1982, DOE/EIA-0321/1(80), GPO Stock No. 061-003-00278-1, \$7.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1980 Through March 1981, Part 2: Regional Data; June 1983, DOE/EIA-0321/2(80), GPO Stock No. 061-00300319-2, \$7.00.

Residential Energy Consumption Survey: 1979-1980 Consumption and Expenditures, Part I: National Data (Including Conservation); April 1981, DOE/EIA-0262/1, GPO Stock No. 061-00300191-2, \$6.50.

Residential Energy Consumption Survey: 1979-1980 Consumption and Expenditures, Part II: Regional Data; May 1981, DOE/EIA-0262/2, GPO Stock No. 061-003-00189-1, \$8.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1978 Through March

1979; July 1980, DOE/EIA-0207/5, GPO Stock No. 061-003-00131-9, \$7.50.

Single-Family Households: Fuel Oil Inventories and Expenditures: National Interim Energy Consumption Survey; December 1979, DOE/EIA-0207/1, GPO Stock No. 061-003-00075-4, \$3.50.

Other Publications on the Residential Sector

"End-Use Consumption of Residential Energy" (Article), pp. vii-xiv, *Monthly Energy Review*, July 1987, DOE/EIA-0035(87/07).

Residential Energy Consumption Survey: Trends in Consumption and Expenditures 1978-1984 June 1987, DOE/EIA-0482, GPO Stock No. 061-003-00535-7, \$12.00.

Residential Conservation Measures; July 1986, SR/EEUD/86/01 (no GPO Stock No.). *An Economic Evaluation of Energy Conservation and Renewable Energy Tax Credits*; October 1985, Service Report (no GPO Stock No.).

Residential Energy Consumption and Expenditures by End Use for 1978, 1980, and 1981; December 1984, DOE/EIA-0458, GPO Stock No. 061-003-00415-6, \$4.50.

Weatherization Program Evaluation, SR-EEUD-84-1; August 1984 (available from the Office of the Assistant Secretary for Conservation and Renewable Energy, Department of Energy).

Residential Energy Consumption Survey: Regression Analysis of Energy Consumption by End Use; October 1983, DOE/EIA-0431, GPO Stock No. 061-00300347-8, \$5.00.

National Interim Energy Consumption Survey: Exploring the Variability In Energy Consumption; July 1981, DOE/EIA-0272, GPO Stock No. 061-003-00205-6, \$5.00.

National Interim Energy Consumption Survey: Exploring the Variability in Energy Consumption--A Supplement; October 1981, DOE/EIA-0272/S, GPO Stock No. 061-003-00217-0, \$4.50.

Energy Use by U.S. Households; November 1980, DOE/EIA-0248 (brochure, no GPO Stock No.).

Industrial Sector

Manufacturing Energy Consumption Survey: Changes in Energy Intensity in the Manufacturing Sector 1980 - 1988; DOE/EIA-0552(80-88). GPO Stock No. 061-003-00734-1, \$4.75.

Manufacturing Energy Consumption Survey: Manufacturing Fuel-Switching Capability 1988; September 1991, DOE/EIA-0515(88), GPO Stock No. 061-003-00720-1, \$9.00.

Manufacturing Energy Consumption Survey: Consumption of Energy, 1988; May 1991, DOE/EIA 0512(88), GPO Stock No. 061-003-00703-8, \$11.00.

Manufacturing Energy Consumption Survey: Energy Efficiency in Manufacturing, 1985; January 1990, DOE/EIA-0516(85), GPO Stock No. 061-00300650-7, \$4.25.

Manufacturing Energy Consumption Survey: Fuel-Switching Capability, 1985; December 1988, DOE/EIA-0515(85), GPO Stock No. 061-003-00601-9, \$3.50.

Manufacturing Energy Consumption Survey: Methodological Report, 1985; November 1988, DOE/EIA-0514(85), GPO Stock No. 061-00300595-1, \$6.00.

Manufacturing Energy Consumption Survey: Consumption of Energy, 1985; November 1988, DOE/EIA-0512(85), GPO Stock No. 061-003-00594-2, \$6.00.

"*Manufacturing Sector Energy Consumption 1985 Provisional Estimates*," *Monthly Energy Review*, January 1987, DOE/EIA-0035(87/01), pp. vii-x. *Report on the 1980 Manufacturing Industries' Energy Consumption Study and Survey of Large Combustors*; February 1983, DOE/EIA-0358, GPO Stock No. 061-003-00293-5, \$5.00.

Industrial Energy Consumption, "Survey of Large Combustors: Report on Alternate Fuel-Burning Capabilities of Large Boilers in 1979"; February 1982, DOE/EIA-0304, GPO Stock No. 061-003-0233-1, \$2.50.

Methodological Report of the 1980 Manufacturing Industries Survey of Large Combustors (EIA-463); March 1982, DOE/EIA-0306 (no GPO Stock No.).

Cross-Sector

Energy Consumption by End-Use Sector: A Comparison of Measures by Consumption and Supply Surveys; April 6, 1990, DOE/EIA-0533 (no GPO Stock No. available), \$2.50.

Natural Gas: Use and Expenditures; April 1983, DOE/EIA-0382, GPO Stock No. 061-003-00307-9, \$5.50.

Public Use Tapes

Note: All tapes are available through the NTIS.

Residential and Residential Transportation Sectors

Residential Energy Consumption Survey: 1987 and Residential Transportation Energy Consumption Survey, 1988, Order No. PB90-501461, \$220.

Residential Energy Consumption Survey: 1984 and Residential Transportation Energy Consumption Survey, 1985; Order No. PB87-186540, \$220.

Residential Energy Consumption Survey: 1982 and Residential Transportation Energy Consumption Survey, 1983; Order No. PB85-221760, \$220.

Residential Energy Consumption Survey: Consumption and Expenditures, 1980-1981; Monthly Billing Data; Order No. PB84-166230, \$220.

Residential Energy Consumption Survey: Housing Characteristics, 1981; Consumption and Expenditures, 1981-1982; Monthly Billing Data; Order No. PB84-120476, \$220.

Residential Energy Consumption Survey: Housing Characteristics, Annualized Consumption and Expenditures, 1980-1981; Order No. PB83-199554, \$220.

Residential Energy Consumption Survey: Household Transportation Panel Monthly Gas Purchases and Vehicle and Household Characteristics, 6/79-9/81; Order No. PB84-162452, \$220.

Residential Energy Consumption Survey: Household Screener Survey, 1979-1980; Order No. PB82-114877, \$220.

Residential Energy Consumption Survey: Household Monthly Energy Consumption and Expenditures, 1978-1979; Order No. PB82-114901, \$220.

National Interim Energy Consumption Survey (Residential), 1978; Order No. PB81-108714, \$220.

Commercial Sector

Nonresidential Buildings Energy Consumption Survey: 1986 Data; Order No. PB90-500034, \$220.

Nonresidential Buildings Energy Consumption Survey: 1979 and 1983 Data; Order No. PB88-245162, \$220.

Public Use Diskettes

Note: Diskettes are available through the NTIS and GPO.

Residential Energy Consumption Survey 1987 data, NTIS - ASCII format: Order No. PB-91-505115, \$130, and dBASE format: Order No. PB-91-505107, \$130. GPO - ASCII/dBASE format, order by title, \$45 for each set.

Commercial Buildings Energy Consumption Survey 1989 data diskettes planned for release in June 1992.

Nonresidential Buildings Energy Consumption Survey 1986 Data, NTIS ASCII format: Order No. PB91-506808, \$130.

Residential Transportation Energy Consumption Survey 1988 data, NTIS - ASCII format: Order No.

PB91- 507269, dBASE format: Order No. PB91-507277, \$50 each. GPO - ASCII/dBASE format, order by title, \$15 for each set.

Planned Publications

Manufacturing Energy Consumption Survey: Changes in Energy Consumption 1985 - 1988; planned, 1993.

Housing Characteristics 1990; planned for April 1992.

Household Energy Consumption and Expenditures 1990; planned for December 1992.

Household Vehicles Energy Consumption 1991; planned for December 1992.

Development Methodology for the 1991 MECS Based on Data Users and Industry Input, planned for May 1992.

Derived Annual Estimates of Purchased Energy in Manufacturing, 1974-1988; planned for September 1992.

Commercial Campuses and Complexes 1989: A Pilot Study of District Heating and Cooling; planned for December 1992.

Note: the Energy Information Administration also publishes the *State Energy Data Report Consumption Estimates* DOE/EIA-0214 annually. This report contains State-level annual consumption information derived from EIA Supply surveys.

Glossary

Ability to Switch Main Heating Fuel: See **Fuel-Switching Capability**.

Account Classification: As used in this report, this term refers to the way in which suppliers of electricity, natural gas, or fuel oil classify and bill their customers. Commonly used account classifications are "Commercial," "Industrial," and "Residential." Suppliers' definitions of these terms vary from supplier to supplier and from the definitions used in CBECS. In addition, the same customer may be classified differently by each of its energy suppliers.

Active Solar: As an energy source, energy from the sun collected and stored using mechanical pumps or fans to circulate heat-laden fluids or air between solar collectors and the building. Examples include the use of solar collectors for water or space heating. The 1989 CBECS did not gather consumption and expenditures data for active solar. Data on the passive collection of solar energy, such as by trombe walls, were not collected on the 1989 CBECS. (See **Energy Source**.)

Agricultural: As used in this survey, activities involving the manufacturing, processing, sale, storage, or housing of agricultural products, including livestock. These buildings were listed during the listing stage. However, buildings that had 50 percent or more of the floorspace devoted to agricultural activity were considered out of scope and were dropped from the sample during the interview phase. Farms and farm buildings (silos, grain elevators, and barns) were out of scope for the CBECS and were not listed during the listing stage. (See **Commercial Building, Out of Scope, Nonresidential Building, Building, Principal Building Activity**, and Appendix A, "How the Survey was Conducted.")

Air Conditioning: See **Cooling**.

Air Ducts or Air-Handling Units: A vehicle for channeling warm or cool air to different parts of a building. The process of moving the conditioned air often involves passing air over heating or cooling coils and forcing it from a central location through ducts or air-handling units. Air-handling units are hidden in the walls or ceilings, where they use steam or hot water to heat the air or chilled water to cool the air, inside the duct work. (See **Cooling, Duct, and Space Heating**.)

Alternate Main Heating Fuel: The fuel that would be used in place of the usual main heating fuel, if the building had to switch fuels. (See **Fuel-Switching Capability**.)

Authorization Form: A form signed by the respondent from a building, authorizing energy supplier companies that serve the building to release information on the amounts and costs of energy consumed in the building during a specified period. (See **Energy Supplier** and Appendix A, "How the Survey Was Conducted.")

Ballast: See **High-Efficiency Ballast**.

Barrel: A volumetric unit of measure for crude oil and petroleum products equivalent to 42 U.S. gallons. (See **Gallon**.)

Baseboard: As a type of heating equipment, a system in which either electric resistance coils or finned tubes carrying steam or hot water are mounted behind shallow panels along baseboards. Baseboards rely on passive convection to distribute heated air in the space. Electric baseboards are an example of an "Individual Space Heater." (See **Individual Space Heater**.)

Boiler: A type of space-heating equipment consisting of a vessel or tank where heat produced from the combustion of fuels such as natural gas, fuel oil, or coal is used to generate hot water or steam. Many buildings have their own boilers, while other buildings have steam or hot water piped in from a central plant.

For this survey, only boilers inside the building (or serving only that particular building) are counted as part of the building's heating system. Steam or hot water piped into a building from a central plant is considered district heat. (See **Furnace, HVAC, and District Heat.**)

Bottled Gas: See **Liquefied Petroleum Gas (LPG)** and **Propane.**

British Thermal Unit: See **Btu.**

Btu (British Thermal Unit): A unit of energy consumed by or delivered to a building. A Btu is defined as the amount of energy required to increase the temperature of 1 pound of water by 1 degree Fahrenheit, at normal atmospheric pressure. Energy consumption is expressed in Btu in this report to allow for consumption comparisons among fuels that are measured in different units. (See **Metric Conversion Factors.**)

Btu Conversion Factors: The Btu conversion factors for this survey are as follows:

	Btu Equivalent	Unit
Electricity	3,412	Kilowatthour
Natural Gas	1,030	cubic foot
Distillate Fuel Oils (Nos. 1,2, and 4)	138,690	gallon
Residual Fuel Oils (Nos. 5 and 6)	149,690	gallon
Kerosene	135,000	gallon
District Heat (Steam and Hot Water)	1,000	pound

Note: Btu of district hot water have been converted into equivalent pounds of steam using the conversion 1,000 Btu hot water \approx 1 pound steam.

Sources: Energy Information Administration, *Monthly Energy Review* (June 1991), pp. 125-129 for electricity, natural gas, distillate, residual, and kerosene; and *Methodological Issues In the Nonresidential Buildings Energy Consumption Survey* (September 1983) pp. 173-175 for district steam.

Building: For this survey, a structure totally enclosed by walls extending from the foundation to the roof, containing over 1,000 square feet of floorspace, and intended for human occupancy. Structures that were included in the survey as a specific exception were parking garages not totally enclosed by walls and a roof, as well as structures erected on pillars to elevate the first fully enclosed level, but leaving the sides at ground level open.

Excluded from the survey as nonbuildings were the following: structures (other than the exceptions just noted) that were not totally enclosed by walls and a roof (such as oil refineries, steel mills, and water towers); street lights, pumps, billboards, bridges, swimming pools, and construction sites; mobile homes and trailers, even if they housed commercial activity; and oil storage tanks. (See **Commercial Building and Nonresidential Building.**)

Building Floorspace: See **Floorspace.**

Building Shell (Envelope): The thermal envelope of the building, that is, the roof, exterior walls, and bottom floors that enclose conditioned space through which thermal energy may be transferred to or from the exterior.

Building Shell Conservation Feature: A building feature designed to reduce the energy loss or gain through the shell or envelope of the building. The 1989 CBECS collected data on the following specific building shell energy conservation features: roof, ceiling or wall insulation; storm windows or double- or triple-paned glass (multiple glazing); tinted or reflective glass or shading films; exterior or interior shadings or awnings; and weather stripping or caulking. (See **Roof or Ceiling Insulation, Wall Insulation, Reflective or Shading Glass or Film, Storm or Multiple Glazing, Building Shell (Envelope), Exterior or Interior Shadings or Awnings, and Weather Stripping or Caulking.**)

Built-Up Roof: A roof covering consisting of several successive layers (each of which is called a ply) usually of roofing felt with moppings of hot asphalt between layers and topped by a mineral-surfaced layer or by gravel embedded in a heavy coat of asphalt.

Campus or Complex: See **Multibuilding Facility**.

Caulking: See **Weather Stripping or Caulking**.

CDD: See **Cooling Degree-Days (CDD)**.

Census Division: A geographic area consisting of several States defined by the U.S. Department of Commerce, Bureau of the Census. (See the Census Regions and Divisions map in Appendix E.) The States are grouped into nine divisions and four regions:

Region	Division	States
Northeast	New England	Connecticut, Maine, Massachusetts, New Hampshire, Vermont, and Rhode Island
	Middle Atlantic	New Jersey, New York, and Pennsylvania
Midwest	East North Central	Illinois, Indiana, Michigan, Ohio, and Wisconsin
	West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota
South	South Atlantic	Delaware, the District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia
	East South Central	Alabama, Kentucky, Mississippi, and Tennessee
	West South Central	Arkansas, Louisiana, Oklahoma, and Texas
West	Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming
	Pacific	Alaska, California, Hawaii, Oregon, and Washington

Census Region: See **Census Division** and the Census Regions and Divisions map in Appendix E.

Central Chiller: Any centrally located air-conditioning system that produces chilled water in order to cool air. The chilled water or cold air is then distributed throughout the building using pipes or air ducts, or both. These systems are also commonly known as "chillers," "centrifugal chillers," "reciprocating chillers" or "absorption chillers." Chillers are generally located in or just outside the building they serve. Buildings receiving district chilled water are served by chillers located at central physical plants. (See **Cooling, District Chilled Water, Central Physical Plant, and HVAC**.)

Central Physical Plant: A plant that is owned by, and on the grounds of, a multibuilding facility and that provides district heating, district cooling, or electricity to other buildings on the same facility. To qualify as a central plant for this survey, the plant must provide district heat, district chilled water, or electricity to at least one other building. The central physical plant may be by itself in a separate building or may be located in a building where other activities occur. (See **Multibuilding Facility**; **District Heat**; and **District Chilled Water**.)

Chiller: See **Central Chiller**.

Climate Zone: One of five climatically distinct areas defined by long-term weather conditions affecting the heating and cooling loads in buildings. The zones were developed by the Energy End Use and Integrated Statistics Division (EEUIDS) from seven distinct climate categories originally identified by the American Institute of Architects (AIA) for the U.S. Department of Energy and the U.S. Department of Housing and Urban Development.

The zones were determined according to the 45-year average (1931-1975) of the annual heating and cooling degree-days (base 65 degrees Fahrenheit). An individual building was assigned to a climate zone according to the 45-year average annual degree-days for its NOAA Division. (See **Heating Degree-Days (HDD)**, **Cooling Degree-Days (CDD)**, **Degree-Days 45-Year Average** and **NOAA Division**.)

The zones are defined as follows:

AIA Group	EEUD Climate Zone	Average Annual Cooling Degree-Days	Average Annual Heating Degree-Days
1	1	Less than 2,000	More than 7,000
2	2	Less than 2,000	5,500 to 7,000
3	3	Less than 2,000	4,000 to 5,499
4	4	Less than 2,000	2,000 to 3,999
5	4	Less than 2,000	Less than 2,000
6	5	2,000 or more	Less than 2,000
7	5	2,000 or more	2,000 to 3,999

Coal: In this report, the term includes anthracite, bituminous, and subbituminous coal, as well as the derivative of coal known as coke. The 1989 CBECS determined if coal was used in the commercial building but did not collect consumption and expenditure data on the use of coal as an energy source. (See **Energy Source**.)

Cogeneration: The sequential generation of electric power and useful heat by a single process. In essence, cogeneration involves the recovery of waste-heat from electric power generation. Neither generation of electricity without use of the byproduct heat, nor waste-heat recovery from processes other than electricity generation is included in the definition of cogeneration. (See **Electricity Generation**.)

Commercial Building: A building with more than 50 percent of its floorspace used for commercial activities. Commercial buildings include, but are not limited to, stores, offices, schools, churches, gymnasiums, libraries, museums, hospitals, clinics, warehouses, and jails. Government buildings were included except for buildings on site with restricted access, such as some military bases or reservations. Farms and buildings located on farms (such as silos, grain elevators, and barns) were excluded from the survey. For a more complete list of buildings in the survey, see Appendix D, "Types of Buildings." (See **Building, Commercial, Residential, Manufacturing/Industrial, Agricultural, Nonresidential Building, and Principal Building Activity**.)

Commercial Freezer: See **Refrigeration Equipment**.

Commercial Refrigeration Unit: See Refrigeration Equipment.

Commercial: Neither residential, manufacturing, nor agricultural. (See Residential, Manufacturing/Industrial, Agricultural, and Commercial Building.)

Computer Area with Separate Air-Conditioning System: In this survey, this term is used to denote space specifically designed and equipped to meet the needs of computer equipment for controlled temperatures and/or humidity. The air-conditioning system for this area is separate from that used to control the environment in other parts of the building.

Computerized Energy Management and Control System: See Energy Management and Control System (EMCS).

Concrete Panel: A wall construction panel made of concrete, which is either prefabricated in a factory or poured at the site and then hoisted onto the structure.

Concrete Roof: For this survey, a poured concrete roof, often intended to bear the load of a parking garage that occupies the roof area of a building.

Conditional Energy Intensity: Total consumption of a particular energy source(s) or fuel(s) divided by the total floorspace of buildings that use the energy source(s) or fuel(s), i.e., the ratio of consumption to energy source-specific floorspace. (See Energy Source-Specific Floorspace.)

Confidence Interval: A range that is estimated to include the population value at a given confidence level. The range is calculated from the sample data. The confidence level is the expected fraction of such confidence intervals that actually do include the corresponding, unknown population value. (See Appendix B, "Nonsampling and Sampling Errors.")

Conservation Feature: A feature in the building designed to reduce the usage of energy. (See Building Shell Conservation Feature, HVAC Conservation Feature, and Lighting Conservation Feature.)

Consumption: The amount of energy used by, or delivered to, a building during a given period of time. For this report, all consumption statistics unless otherwise noted, are net energy consumption, which includes electric utility sales to commercial buildings but excludes electrical system and district heat energy losses. In contrast, primary energy consumption takes into account the fuels that are required to generate electricity. Statistics for this report are presented on an annual basis for the 365-day period of calendar year 1989. Data on energy consumption were not collected by end uses separately. For example, although it might be known that electricity was used in some buildings for heating, the consumption of electricity reported for those buildings would typically include other uses of electricity as well (such as lighting and water heating). (See Btu, Delivered Energy, Energy Supplier, Expenditures, and "Annual Consumption and Expenditures" in Appendix B, "Nonsampling and Sampling Errors.")

Consumption per Square Foot: The aggregate ratio of total consumption for a particular set of buildings to the total floorspace of those buildings. (See Consumption, Energy Intensity, and Floorspace.)

Consumption per Worker: The aggregate ratio of total consumption to total number of workers. (See Consumption and Number of Workers in the Building.)

Continuous-Delivery Energy Sources: Those energy sources provided continuously to a building. In this report, continuous delivery energy sources are electricity, natural gas, and district heating and cooling. (See Energy Source and Discrete-Delivery Energy Sources.)

Conversion Factors: See Btu and Metric Conversion Factors.

Cooking: In this report, the use of energy for commercial or institutional food preparation. The 1989 CBECS asked specifically about "commercial or institutional cooking," which was intended to include any kitchen facility that was not part of a residence. This is one of six energy end uses specifically asked for in this survey. (See **Energy End Use**.)

Cooling: Conditioning of room air for human comfort by a refrigeration unit (such as an air-conditioner or heat pump) or by circulating chilled water through a central cooling or district cooling system. Use of fans or blowers by themselves, without chilled air or water, is not included in this definition of cooling. This is one of six end uses specifically asked for in this survey. (See **Energy End Use, Central Cooling, Heat Pump, and HVAC**.)

Cooling Degree-Days (CDD): A measure of how hot a location was over a period of time, relative to a base temperature. In this report, the base temperature is 65 degrees Fahrenheit, and the period of time is 1 year. The cooling degree-days for a single day is the difference between that day's average temperature and the base temperature if the daily average is greater than the base and zero if the daily average temperature is less than or equal to the base temperature. The cooling degree-days for a longer period of time is the sum of the daily cooling degree-days for the days in that period. (See **Heating Degree-Days (HDD)** and **Climate Zone**.)

Cubic Foot (cf): As a natural gas measure, the volume of gas contained in a cube with an edge that is 1 foot long at standard temperature and pressure (60 degrees Fahrenheit and 14.73 pounds standard per square inch.) The thermal content varies by the composition of the gas. (See **Natural Gas and Btu**.)

Decorative or Construction Glass: An exterior building wall material of glass decorative coverings such as glass blocks or spandrels, that are not window or vision (see-through) glass. Structural glass or glass curtain walls used on the outside of buildings are also included in this category. For this report, decorative or construction glass was included in the "Other" exterior wall material category. (See **Window or Vision Glass**.)

Degree-Days 1989: The total annual heating and cooling degree-days (base 65 degrees Fahrenheit) during calendar year 1989. For this report, each building was assigned to a National Oceanic and Atmospheric Administration (NOAA) Division, and the division's daily temperature averages were used to compute degree-days for 1989. The daily temperature data were obtained from NOAA. (See **Heating Degree-Days (HDD)**, **Cooling Degree-Days (CDD)**, **Degree-Days 45-Year Average**, and **NOAA Division**.)

Degree-Days 45-Year Average: The average of the 45 total annual heating and cooling degree days (base, 65 Degrees Fahrenheit) in each NOAA Division, for the years 1931 through 1975. Computed from the Division's daily temperature averages for each year in question. Used to assign individual buildings to climate zones. (See **Heating Degree-Days (HDD)**, **Cooling Degree-Days (CDD)**, **Degree-Days 1989**, **NOAA Division**, and **Climate Zone**.)

Delivered Energy: In this report, the amount of energy delivered to the site (building); no adjustment was made for the fuels consumed to produce electricity or district sources. This is also referred to as net energy.

Demand: The rate of energy consumption per unit time. The term is most commonly applied to electricity, for which demand is typically measured in watts (W) or kilowatts (kW). (See **Consumption and Peak Demand**.)

Demand-Metered: Having a meter to measure peak demand (in addition to total consumption) during a billing period. The 1989 CBECS collected data on metered demand only for electricity. Demand is not usually metered for other energy sources. (See **Demand**, **Peak Demand**, and **"Peak Electricity Demand"** in Appendix B, "Nonsampling and Sampling Errors.")

Demand-Side Management (DSM) Programs: These are organized utility-sponsored activities that are intended to affect the amount and timing of customer electricity use.

Discrete-Delivery Energy Sources: Energy sources that must be delivered to a site. In this report, fuel oil is the only discrete delivery energy source. (See **Energy Source** and **Continuous-Delivery Energy Sources**.)

District Chilled Water: Chilled water from an outside source used as an energy source for cooling in a building. The water is chilled in a central plant and piped into the building. Chilled water may be purchased from a utility or provided by a central physical plant in a separate building that is part of the same multibuilding facility (for example, a hospital complex or university). (See **Energy Source**, **Central Physical Plant**, and **Multibuilding Facility**.)

District Heat: Steam or hot water from an outside source used as an energy source for space heating or another end use in a building. The steam or hot water is produced in a central plant and piped into the building. The district heat may be purchased from a utility or provided by a central physical plant in a separate building that is part of the same multibuilding facility (for example, a hospital complex or university). For this report, district steam and district hot water are usually reported together as district heat. (See **Energy Source**, **Central Physical Plant**, and **Multibuilding Facility**.)

District Hot Water: District heat in the form of hot water. (See **District Heat**.)

District Steam: District heat in the form of steam. (See **District Heat**.)

DSM: See **Demand-Side Management Programs**.

Duct: A passageway made of sheet metal or other suitable material to convey air from the heating, ventilating, and cooling systems to and from the point of utilization.

Electric Baseboard: An individual space heater with electric resistance coils mounted behind shallow panels along baseboards. Electric baseboards rely on passive convection to distribute heated air to the space. (See **Individual Space Heater** and **Baseboard**.)

Electricity: As an energy source for this report, electric energy supplied to a building by a central utility via power lines or from a central physical plant in a separate building that is part of the same multibuilding facility. Electric power generated within a building for exclusive use in that building is specifically excluded from the definition of electricity as an energy source. (See **Energy Source**, **Central Physical Plant**, and **Multibuilding Facility**.)

Electricity Generation: The onsite production of electricity using electricity generators on either a regular or emergency basis. This is one of the end uses of energy specifically asked for in this survey. Not included in this survey were electricity-generating plants belonging to utility companies, which produce electric power for sale to other buildings. (See **Energy End Use**, **Electricity**, **Multibuilding Facility**, and **Cogeneration**.)

EMCS: See **Energy Management and Control System (EMCS)**

Energy End Use: A use for which energy is consumed in a building. Information on six specific end uses was collected in this survey. However, data are reported on five end uses in the tables in this report, since buildings reported electricity generation as an end use. (See **Cooking**, **Cooling**, **Space Heating**, **Electricity Generation**, **Manufacturing**, and **Water Heating**.)

Energy Intensity: The ratio of consumption to floorspace. In this report, energy intensity is usually given on an aggregate basis, as the ratio of the total consumption for a set of buildings to the total floorspace in those buildings. This report presents both conditional energy intensity and gross energy intensity. The energy intensity can also be computed for individual buildings. (See **Consumption**, **Conditional Energy Intensity**, **Gross Energy Intensity**, and **Floorspace**.)

Energy Management and Control System (EMCS): An energy conservation feature that uses mini/microcomputers, instrumentation, control equipment, and software to manage a building's use of energy for heating, ventilation, air conditioning, lighting, and/or business-related processes. These systems can also manage fire control, safety, and security. Not included as EMCS are time-clock thermostats. (See **Occupant Control of Heating**, and **Occupant Control of Cooling**.)

Energy Source: A type of energy or fuel consumed in the building. For this report, the energy sources for which consumption and expenditures statistics are presented are electricity, natural gas, fuel oil, district heat, and district chilled water. The 1989 CBECS also collected information on the use, but not on the amounts consumed of, or spent for, these energy sources: propane, wood, coal, and active solar. (See **Electricity, Natural Gas, Fuel Oil, District Heat, District Chilled Water, Liquefied Petroleum Gas (LPG), Propane, Wood, Coal, and Active Solar**.)

Energy Source-Specific Floorspace: Total floorspace of those buildings that use a particular fuel. (See **Conditional Energy Intensity**.)

Energy Supplier: A company that provides electricity, natural gas, fuel oil, or other sources of energy to a building. In the 1989 CBECS, only suppliers of electricity, natural gas, fuel oil, and district heat or chilled water were sent the Supplier Survey. (See **Energy Source**.)

Envelope: See **Building Shell (Envelope)**.

Establishment: As defined by the Standard Industrial Classification Manual developed by the Office of Management and Budget, "an economic unit, generally, at a single physical location where business is conducted or where services or industrial operations are performed." However, "establishment" is not synonymous with "building." In this survey, respondents were asked how many establishments or organizations occupy the building (i.e., hold or lease space in it on a full-time basis).

Evaporative Cooler ("Swamp" Cooler): A type of cooling equipment using the evaporation of water to cool air. This type of equipment is commonly found in warm, dry climates. In this report, evaporative coolers are included under "Other Cooling Equipment." (See **Cooling**.)

Expenditures: Funds spent for the energy consumed in, or delivered to, a building during a given period of time. For this report, all expenditure statistics are presented on an annual basis, for calendar year 1989. The total dollar amount includes State and local taxes, fuel adjustment charges, system charges, and demand charges. The total dollar amount excludes merchandise, repair charges, and service charges. Data on energy expenditures were not collected by end uses separately. For example, although it might be known that electricity was used in some buildings for heating, the expenditures for electricity reported for those buildings would typically include other uses of electricity as well (such as lighting and water heating). (See **Consumption, Energy Supplier**, and "Annual Consumption and Expenditures" in Appendix B, "Nonsampling and Sampling Errors.")

Expenditures per Million Btu: The aggregate ratio of a group of buildings' total expenditures for a given fuel to the total consumption of that fuel. (See **Expenditures and Consumption**.)

Expenditures per Square Foot: The aggregate ratio of a group of buildings' total expenditures for a given fuel to the total floorspace in those buildings. (See **Expenditures and Total Floorspace**.)

Exterior or Interior Shadings or Awnings: A covering designed to reduce the flux of light into a building. Exterior shadings or awnings include any type of shading (including architectural) or awning on the outside of the building designed to limit solar penetration. Interior shadings are drapes, venetian blinds, shades or any other means of covering a window from the inside to limit the amount of solar or thermal penetration. (See **Building Shell Conservation Feature**.)

Facility: At the sampling stage, an economic unit that operates in more than one building at a single location. Examples include college campuses and large hospital complexes. The building represents the interviewed sampling unit for this survey. Listings for the area sample ordinarily identified each building individually. However, the listings for the large and specialized buildings lists sometimes included a facility with several buildings. If an intended sampling unit turned out to be a cluster of buildings such as a campus, sampling proceeded in one of two ways: (1) If there were three or fewer buildings in the cluster, all buildings were sampled; or (2) If there were four or more buildings, subsampling from the cluster was performed.

At the interview stage, a survey question determined whether the sampled building was part of a multibuilding facility. In many cases, a building was reported at interview to be part of a multibuilding facility even though the building had not been identified as part of a facility at the sampling stage. More rarely, a building identified as part of a facility during sampling was reported not to be part of a multibuilding facility at interview. (See **Building, List Sample, Multibuilding Facility**, and Appendix A, "How the Survey was Conducted.")

Fan-Coil Unit: A type of heating and cooling distribution equipment using circulating hot or chilled water with fans. Fan-coil units have thermostatically controlled built-in fans that draw air from the room and then across finned tubes containing hot water, steam, or chilled water. The hot water, steam or chilled water can be produced by equipment within the building or be piped into the building as part of a district heating or cooling system. (See **Space Heating and Cooling**.)

Floors: The number of levels in the tallest section of a building, including parking areas, basements, or other floors below ground level.

Floorspace: All the area enclosed by the exterior walls of a building, including indoor parking facilities, basements, hallways, lobbies, stairways, and elevator shafts. For aggregate floorspace statistics, floorspace was summed or aggregated over all buildings in a category (such as all office buildings in the United States). (See **Energy Source-Specific Floorspace, Gross Floorspace, Square Footage, and Weight**.)

Fluorescent Lamp: A lamp made of a glass tube coated on the inside with fluorescent material. The lamp produces light by passing electricity through mercury vapor, which causes the fluorescent coating to glow or fluoresce. (See **Lamp**.)

Fuel: See **Energy Source**.

Fuel Oil: A liquid petroleum product less volatile than gasoline, used as an energy source. In this report, fuel oil includes distillate fuel oil (No. 1, No. 2, and No. 4), residual fuel oil (No. 5 and No. 6), and kerosene. (See **Energy Source**.)

Fuel-Switching Capability: As used in this report, the ability to change to a different main heating fuel within 1 week's time without substantially reducing the area heated or the temperature maintained in the heated area. This is intended to represent reversible substitutions using equipment already in place. (See **Alternate Main Heating Fuel**.)

Furnace: Space heating equipment consisting of an enclosed chamber where fuel is burned or electrical resistance is used to heat air directly, without using steam or hot water. The warm air is for heating, which is distributed throughout the building, typically by air ducts. (See **Boiler, Ducts, Space Heating, and HVAC**.)

Gallon: A volumetric measure equal to 4 quarts (231 cubic inches) used to measure fuel oil. One barrel equals 42 gallons. (See **Barrel**.)

Gas Transported for the Account of Others: See **Transported Gas**.

Government Owned: Owned by a Federal, State, or local government agency. The building may be occupied by agencies of more than one government and may also be shared with nongovernment establishments.

Gross Floorspace: Total floorspace of a group of buildings, regardless of which end uses are present or which energy sources or fuels are used within the buildings. (See **Energy Source-Specific Floorspace** and **Energy Intensity**.)

Gross Energy Intensity: Total consumption of a particular energy source(s) or fuel(s) by a group of buildings, divided by the total floorspace of those buildings, including buildings and floorspace where the energy source or fuel is not used, i.e., the ratio of consumption to gross floorspace. (See **Energy Intensity** and **Conditional Energy Intensity**.)

HDD: See **Heating Degree-Days (HDD)**.

Heat Pump: Heating and/or cooling equipment that, during the heating season, draws heat into a building from outside and, during the cooling season, ejects heat from the building to the outside. Heat pumps are vapor-compression refrigeration systems whose indoor/outdoor coils are used reversibly as condensers or evaporators, depending on the need for heating or cooling. (See **Cooling**, **Space Heating**, **Central Cooling**, and **HVAC**.)

Heating: See **Space Heating**.

Heating or Reheating Coils: See **Reheating Coils**.

Heating Degree-Days (HDD): A measure of how cold a location was over a period of time, relative to a base temperature. In this report, the base temperature used is 65 degrees Fahrenheit, and the period of time is 1 year. The heating degree-days for a single day is the difference between the base temperature and the day's average temperature if the daily average is less than the base, and zero if the daily average temperature is greater than or equal to the base temperature. The heating degree-days for a longer period of time is the sum of the daily heating degree-days for days in that period. (See **Cooling Degree-Days (CDD)**, **Climate Zone**, and **NOAA Division**.)

HID: See **High-Intensity Discharge (HID) Lamp**.

High-Efficiency Ballast: A lighting conservation feature consisting of an energy-efficient version of a conventional electromagnetic ballast. The ballast is the transformer for fluorescent and HID lamps, which provides the necessary current, voltage, and wave-form conditions to operate the lamp. A high-efficiency ballast requires lower power input than a conventional ballast to operate HID and fluorescent lamps.

High-Efficiency Lighting: As used in this report, lighting provided by high-intensity discharge (HID) lamps and/or fluorescent lamps. (See **High-Intensity Discharge (HID) Lamp** and **Fluorescent Lamp**.)

High-Intensity Discharge (HID) Lamp: A lamp that produces light by passing electricity through gas, which causes the gas to glow. Examples of HID lamps are mercury vapor lamps, metal halide lamps, and high-pressure sodium lamps. (See **Lamp**.)

Hot-Deck Imputation: An imputation procedure using random resampling from nonmissing cases to fill in values for missing cases. (See **Imputation** and Appendix B, "Nonsampling and Sampling Errors.")

Hours of Operation: See **Weekly Operating Hours**.

HVAC: An abbreviation for the heating, ventilation, and air-conditioning system; the system or systems that condition air in a building.

HVAC Conservation Feature: A building feature designed to reduce the amount of energy consumed by the heating, cooling, and ventilating equipment. The 1989 Building Characteristics Survey collected data on the presence of two HVAC conservation features: preventive maintenance program for the heating and cooling equipment and energy management and control systems. (See **Preventive Maintenance Program for the Heating and/or Cooling Equipment, Occupant Control of Heating, Occupant Control of Cooling, Reduced Use--Off Hours, and Energy Management and Control System (EMCS).**)

Imputation: A statistical method used to fill in values for missing items, designed to minimize the bias of estimates based on the filled-in data set. (See **Hot-Deck Imputation**, and Appendix B, "Nonsampling and Sampling Errors.")

Ice-Making Machines: See **Refrigeration Equipment**.

Incandescent Lamp: A lamp that produces light by electrically heating a filament so that it glows. Included in this category are the familiar household light bulbs which screw into sockets, as well as energy-efficient incandescent bulbs such as Tungsten Halogen (spotlights), Reflector or R-Lamps (accent and task lighting), Parabolic Aluminized Reflector (PAR) lamps (flood and spot lighting), and Ellipsoidal Reflector (ER) lamps (recessed lighting). (See **Lamp**.)

Individual Air Conditioners in Walls or Windows: Self-contained air-conditioning units installed in either walls or windows (with heat-radiating condensers exposed to the outdoor air). These units are characterized by a lack of pipes or duct work for distributing the cool air; the units condition air only in the room or areas where they are located. (See **Cooling**.)

Individual Space Heater: A free-standing or self-contained unit that generates and delivers heat to a local zone within the building. The heater may be permanently mounted in a wall or floor, or may be portable. Examples of individual space heaters include electric baseboards, electric radiant or quartz heaters, heating panels, gas- or kerosene-fired unit heaters, wood stoves, and infrared radiant heaters. These heaters are characterized by a lack of pipes or duct work for distributing hot water, steam, or warm air through the building. (See **Electric Baseboard**.)

Industrial: See **Manufacturing/Industrial**.

In Scope: Meeting the requirements for eligibility in the CBECS, and, therefore, included in the population covered by the survey. For the 1989 survey, these eligibility requirements were (a) that the structure be a building, according to the CBECS definition; (b) that the building be larger than 1,000 square feet; and (c) that more than 50 percent of the floorspace be used for commercial activities. (See **Building, Commercial, Floorspace**, and Appendix A, "How the Survey Was Conducted.")

Insulation: A building shell conservation feature consisting of material placed between the interior of a building and the outdoor environment to reduce the rate of heat loss to the environment or heat gain from the environment. Examples include glass-wool fill and foam board. (See **Roof or Ceiling Insulation, Wall Insulation, and Building Shell Conservation Feature**.)

Intensity: The amount of a quantity per unit floorspace. This is a method of adjusting either the amount of energy consumed or expenditures spent, for the effects of various building characteristics, such as size of the building, number of workers, or number of operating hours, to facilitate comparisons of energy across time, fuels and buildings. (See **Conditional Energy Intensity, Energy Intensity, Expenditures per Square Foot, Gross Energy Intensity, Intensity per Hour of Operation, and Peak Intensity**.)

Intensity per Hour: Total consumption of a particular fuel(s) divided by the total floorspace of buildings that use the fuel(s) divided by total annual hours of operation.

Interruptible or Curtailable Rate: A special electricity or natural gas rate under which, in return for lower rates, the customer must either reduce energy demand on short notice or allow the electric or natural gas utility to temporarily cut off the energy supply so that the utility can maintain service for higher priority users. This interruption or reduction in demand typically occurs during periods of high demand for the energy (summer for electricity and winter for natural gas). (See **Rate Features**.)

Kerosene: A petroleum distillate with properties similar to No. 1 fuel oil, used primarily in space heaters, cooking stoves, and water heaters. In this report, no distinction is made between kerosene and fuel oil. (See **Fuel Oil**.)

Kilowatthour (kWh): A unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One Kwh is equivalent to 3,412 Btu. (See **Btu, Electricity, and Consumption**.)

Lamp: A term generally used to describe a manmade source of light. The term is often used when referring to a "bulb" or "tube." The CBECS collects data about lamps that only use electricity. (See **Incandescent Lamp, Fluorescent Lamp, and High-Intensity Discharge (HID) Lamp**.)

Large and Specialized Buildings Lists: Lists that were used to select a supplementary sample of buildings for the CBECS. The sample of buildings drawn from these lists was used to supplement the Multistage Area Probability Sample within each selected PSU. (See **Multistage Area Probability Sample, List Sample, and Appendix A, "How the Survey was Conducted."**)

Licensed Bed Capacity: The number of beds that a hospital, inpatient health service, skilled nursing, or residential care facility is licensed to have. (See **Principal Building Activity, Special Measures of Occupancy, and Appendix D, "Types of Buildings."**)

Lighting Conservation Feature: A building feature or practice designed to reduce the amount of energy consumed by the lighting system. The 1989 CBECS collected data on one lighting conservation feature--high-efficiency ballasts. (See **High-Efficiency Ballast**.)

Liquefied Petroleum Gas (LPG): Gas fuel in liquid form supplied to a building as an energy source. The fuel is usually delivered by tank trucks and stored near the building in a tank or cylinder until used. LPG contains mostly propane, but can contain such gases as butane, propylene, butylene, or ethane. For this report, any LPG reported was assumed to be propane. The 1989 CBECS did not collect consumption and expenditures data for LPG. (See **Energy Source, Propane, and Natural Gas**.)

List Sample: A sample drawn from the large and specialized building lists used to supplement the area probability sample. (See **Large and Specialized Buildings Lists and Appendix A, "How the Survey Was Conducted."**)

Load Factor: The ratio of average demand to peak demand, usually computed only for electricity demand. In this report, load factors were determined on an annual basis, for calendar year 1989, as

$$\text{Load Factor} = \frac{\text{Annual Consumption (kWh)}}{(365 \times 24 \text{ Hours}) \times \text{Annual Peak Demand (kW)}}$$

Load Factors were computed only for individual buildings, not for aggregates, since aggregate peak demand could not be meaningfully determined. (See **Consumption, Demand, Peak Demand, and "Electricity Peak Demand"** in Appendix B, "Nonsampling and Sampling Errors.")

LPG: See **Liquefied Petroleum Gas (LPG)**.

Major Energy Sources: The energy sources or fuels for which consumption and expenditures data were collected on the 1989 CBECS. These fuels or energy sources are electricity; fuel oil; natural gas; district steam;

district hot water, and district chilled water. District chilled water is not included in any totals for the sum of major energy sources or fuels; all other major fuels are included in these totals. Unlike previous CBECS's, liquefied petroleum gas (LPG) was not included as a major energy source or fuel in the 1989 survey.

Major Fuels: See **Major Energy Sources**.

Manufacturing: As an energy end use, any of the energy-using operations required for manufacturing/industrial processes. Manufacturing is one of the six end uses of energy specifically requested in this survey. (See **Energy End Use and Manufacturing/Industrial**.)

Manufacturing/Industrial: As a building activity in this survey, activities involving the processing or procurement of goods, merchandise, raw materials, or food. These activities include: food processing; leather/textile mills; light assembly factories, such as those for apparel and electronic instruments; heavy assembly factories, such as those for machinery and other heavy equipment; paper processing; chemical or petroleum processing, metalworks, glassworks, and other similar manufacturing plants; printing and publishing; generation, transmission, or distribution of electricity, natural gas, steam, or other utility or sanitary service; and construction and natural resource procurement.

In this survey, manufacturing/industrial buildings were excluded from the population covered. Such buildings could be included in the sample during the listing stage. However, buildings that had 50 percent or more of their square footage devoted to manufacturing or industrial activities were dropped from the sample during the interview stage. (See **Principal Building Activity**, Appendix A, "How the Survey Was Conducted," and Appendix D, "Types of Buildings.")

Masonry: A general term covering wall construction using masonry materials such as brick, concrete block, stone, and tile that are set in mortar; also included in this category is stucco. This category does not include concrete panels since concrete panels represent a different method of constructing buildings. Concrete panels are reported separately. (See **Concrete Panel**.)

Master-Metering: Measurement of electricity or natural gas consumption in a building using a single meter to measure the total consumption by several tenants or establishments in the building. (See **Separate Metering**.)

Mean: The simple arithmetic average for a population; that is, the sum of all the values in a population divided by the size of the population. For this report, population means are estimated by computing the weighted sum of the sample values, then dividing by the sum of the sample weights. (See **Median and Weight**.)

Measures of Occupancy: See **Special Measures of Occupancy**.

Median: The middle value in the population. Half the population has a value above the median and half has a value below. The median is different from the mean in that its estimate is not influenced much by extremes in the sample. An estimate of the mean square feet per building would be affected by the inclusion of some very large buildings and would not express square footage for a "typical" building. In contrast, the median square feet would not be so affected. (See **Mean**.)

Metal Panel: An exterior wall construction material made of aluminum or galvanized steel panels fabricated in factories and fastened to the frame of the building to form outside walls. Pre-engineered metal buildings are also included in this category.

Metal Surfacing: Light-gauge metal sheets used for roofing.

Metered Peak Demand: The presence of a device to measure the maximum rate of electricity consumption per unit of time. This device allows electric utility companies to bill their customers for maximum rate of consumption, as well as for total consumption. (See **Rate Features**.)

Metric Conversion Factors: In this report, estimates are presented in customary U.S. units. Floorspace estimates may be converted to metric units by using the relationship, 1 square foot is approximately equal to .0929 square meters. Energy estimates may be converted to metric units by using the relationship, 1 Btu is approximately equal to 1,055 joules. One kilowatthour is exactly to 3,600,000 joules. One gigajoule is approximately 278 kilowatthours (kWh). (See **Btu**.)

Metropolitan: Buildings located within Metropolitan Statistical Areas (MSA's) as defined in the 1980 Census. Except in New England, an MSA is a county or a group of contiguous counties that contains at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. The contiguous counties are included in an MSA if they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, MSA's consist of towns and cities rather than counties. (See **Nonmetropolitan**.)

Metropolitan Status: A building classification, either metropolitan or nonmetropolitan. (See **Metropolitan** and **Nonmetropolitan**.)

MSA: See **Metropolitan**.

Multibuilding Establishment: An establishment that operates in a multibuilding facility. (See **Multibuilding Facility**.)

Multibuilding Facility: A group of two or more buildings on the same site owned or operated by a single organization, business, or individual. Examples include university campuses and hospital complexes. (See **Building, Facility**, and Appendix A, "How the Survey Was Conducted.")

Multistage Area Probability Sample: A sample design executed in stages with geographic "clusters" of sampling units selected at each stage. This procedure reduces survey expense while maintaining national coverage. (See Appendix A, "How the Survey Was Conducted.")

Multiple-Establishment Building: A single building that houses more than one establishment. Examples include enclosed shopping malls and office suites. In this survey, the building was the interviewed sampling unit. If establishments in the building were billed for an energy source using separate meters or accounts, the utility (or energy supplier) was asked to provide data on consumption and expenditures for the entire building, on an "aggregate" reporting form that was provided. (See **Establishment, Single-Establishment Building, Multibuilding Establishment**, and **Building**.)

Natural Gas: Hydrocarbon gas (mostly methane) supplied as an energy source to individual buildings by pipelines from a central utility company. Natural gas does not refer to liquefied petroleum gas or to privately owned gas wells operated by a building owner. (See **Energy Source, Liquefied Petroleum Gas (LPG)**, and **Propane**.)

Net Energy: See **Consumption and Delivered Energy**.

No Peaking: Having no metered peak demand. (See **Metered Peak Demand**.)

NOAA Division: One of the 356 weather divisions designated by the National Oceanic and Atmospheric Administration (NOAA), encompassing the United States and the District of Columbia. These divisions usually follow county borders to encompass counties with similar weather conditions. However, the NOAA Division does not follow county borders when weather conditions vary considerably within a county, as is likely to be the case when a county borders the ocean or contains high mountains. (See **Climate Zone, Cooling Degree-Days (CDD)**, and **Heating Degree-Days (HDD)**.)

Nominal Dollars: As used in this report, dollar values expressed in the current dollars at the time of the specific CBECS data collection. The dollar amounts are not directly comparable across time periods since they

have not been adjusted for the effects of inflation. In contrast, real dollars have been adjusted for the effects of inflation.

Nonmetropolitan: Buildings not located within Metropolitan Statistical Areas as defined in the 1980 Census. (See **Metropolitan.**)

Nonresidential Building: A building used for some purpose other than residential. Nonresidential buildings comprise three groups: commercial, manufacturing/industrial, and agricultural. Commercial buildings are the focus of this report. See **Commercial Building, Manufacturing/Industrial, Building, Residential, Principal Building Activity, Out of Scope,** and Appendix D, "Types of Buildings.")

Number of Rooms - Lodging: The number of guest rooms or quarters in a short-term residential building, such as a motel, tourist home, or hotel; or the number of bedrooms or residential suites in a long-term facility, such as a dormitory, boarding house, orphanage, convent, monastery, fraternity, or sorority house. (See **Principal Building Activity, Special Measures of Occupancy,** and Appendix D, "Types of Buildings.")

Number of Workers in the Building: The number of people working in a building during the main shift on a typical workday during the year. Included in this definition are self-employed workers and volunteers. Excluded from this definition are customers, patients, and students, unless they are working for establishments in the building. Also excluded are employees who work out of the office, such as salespeople who report in, delivery people with routes, and messengers. (See Appendix B, "Nonsampling and Sampling Errors.")

Occupant Control of Cooling: Control by individuals, other than maintenance personnel, of the cooling equipment in a building.

Occupant Control of Heating: Control by individuals, other than maintenance personnel, of the heating equipment in a building.

Out of Scope: Violating one or more of the requirements for eligibility in the survey, therefore not included in the population covered by the 1989 CBECS. (See **In Scope.**)

Owner Occupied: Having the owner or the owner's business represented at the site. A building is considered owner occupied if an employee or representative of the owner (such as a building engineer or building manager) maintains office space in the building. Similarly, a chain store is considered owner occupied even though the actual owner may not be in the building but headquartered elsewhere. Other examples of the owner's business occupying a building include State-owned university buildings, elementary and secondary schools owned by a public school district, and a post office where the building is owned by the U.S. Postal Service.

Packaged Cooling Units: See **Packaged Units.**

Packaged Heating Units: See **Packaged Units.**

Packaged Units: Units built and assembled at a factory and installed as a self-contained unit to heat or cool all or portions of a building. Packaged units are in contrast to engineer-specified units built up from individual components for use in a given building. "Packaged Units" is a term that can apply to heating equipment, cooling equipment, or combined heating and cooling equipment. Some types of electric packaged units are also called "Direct Expansion" or DX units. (See **Cooling, HVAC,** and **Space Heating.**)

Peak Demand: The maximum rate of energy consumption per unit time over a period of measurement (also called "peak load"). In this report, peak demand was determined on an annual basis for calendar year 1989 and peak demand data were presented only for electricity. Peak demand was computed only for individual buildings, not for aggregates, since aggregate peak demand could not be meaningfully determined. (See **Demand** and "Peak Electricity Demand" in Appendix B, "Nonsampling and Sampling Errors.")

Peak Intensity: The ratio of peak demand to floorspace, usually determined only for electricity. [In this report, peak intensity was computed only for individual buildings, not for aggregates, since aggregate peak demand could not be meaningfully determined.] (See **Peak Demand**, **Floorspace**, and "Electricity Peak Demand" in Appendix B, "Nonsampling and Sampling Errors.")

Peak Load: See **Peak Demand**.

Percent Cooled: The percentage of the building's square footage that is cooled to meet the comfort requirements of the occupants. For the 1989 CBECS, the point of reference for the percent cooled was the cooling season during the 12 months prior to the interview. (See **Square Footage and Cooling**.)

Percent Heated: The percentage of the building's square footage designed to be heated to at least 50 degrees Fahrenheit. For the 1989 CBECS, the percent heated was for the heating season during the 12 months prior to the interview. (See **Total Square Footage and Space Heating**.)

Percent Lit When Closed: The percentage of the building's square footage that was lit electrically during all hours other than the usual operating hours during the 12 months prior to the interview. (See **Percent Lit When Open**, **Square Footage**, and **Weekly Operating Hours**.)

Percent Lit When Open: The percentage of the building's square footage that was lit electrically during usual operating hours during the 12 months prior to the interview. (See **Percent Lit When Closed**, **Square Footage**, and **Weekly Operating Hours**.)

Potential Consumption: The total amount of consumption that would have occurred had the intensity of consumption remained the same over a period of time.

Pounds (District Heat): A weight quantity of steam, also used in this report to denote a quantity of energy in the form of steam. The amount of usable energy obtained from a pound of steam depends on its temperature and pressure at the point of consumption and on the drop in pressure after consumption. For the CBECS, a conversion factor of 1,000 Btu per pound was used for steam. Hot water, always reported in Btu, was converted to equivalent pounds of steam using the same factor of 1,000 Btu per pound. (See **Btu**, **District Steam**, and **District Heat**.)

Preventive Maintenance Program for Heating and/or Cooling Equipment: As used in this report, a HVAC conservation feature consisting of a program of routine inspection and service for the heating and/or cooling equipment. The inspection is performed on a regular basis, even if there are no apparent problems. (See **HVAC Conservation Feature**.)

Primary Energy: See **Consumption**.

Primary Sampling Unit (PSU): The sampling units selected at the first stage in a multistage area probability sample. A PSU typically consists of one to several contiguous counties--for example, a metropolitan area with surrounding suburban counties. (See **Multistage Area Probability Sample**, **Metropolitan**, and Appendix A, "How the Survey Was Conducted.")

Principal Building Activity: The activity or function occupying the most floorspace in the building. The categories were designed to group buildings that have similar patterns of energy consumption. Examples of various types of principal activity include office, health care, lodging, and mercantile and service. (See Appendix D, "Types of Buildings.")

Propane: A gaseous petroleum product that liquefies under pressure; propane is a major component in liquefied petroleum gas, or LPG. Any LPG usage reported in the CBECS was assumed to be propane. (See **Liquefied Petroleum Gas (LPG)**.)

PSU: See **Primary Sampling Unit (PSU)**.

Quad: Quadrillion (10^{15}) Btu. (See **Btu.**)

Radiator: Space-heating equipment that transfers heat from steam or hot water to air by a combination of direct radiation, conduction, and convection. Typically, a radiator is a freestanding, cast-iron fixture exposed in the space it heats. (See **Space Heating**.)

Rate Features: Special rate schedules or tariffs offered to customers by electric and/or natural gas utilities. In this survey, information was collected on five electric rate features: seasonal pricing, time-of-day pricing, time-of-day lock-out or limit, interruptible or curtailable rate, and metered peak demand. Natural gas customers were asked about an interruptible service rate. (See **Seasonal Pricing, Time-of-Day Pricing, Time-of-Day Lock-out or Limit, Interruptible or Curtailable Rate, Metered Peak Demand**, and Appendix B, "Nonsampling and Sampling Errors.")

Reduced Use--Off Hours: A conservation feature consisting of manually or automatically reducing the amount of heating or cooling produced during the hours a building is not in full use. (See **Space Heating, Cooling and Conservation Feature**.)

Real Dollars: The value of the dollar after adjusting for the effects of inflation. Also referred to as constant dollars.

Reflective or Shading Glass or Film: A building shell energy conservation feature consisting of tinted or reflective glass or shading films installed on the exterior glazing of a building to reduce the rate of solar penetration into the building. (See **Building Shell Conservation Feature**.)

Refrigerated Vending Machines: See **Refrigeration Equipment**.

Refrigeration Equipment: A type of equipment such as commercial refrigeration/freezer units for the sale or storage of perishable materials; residential-type refrigerators/freezers; ice-making machines; soda or any other refrigerated vending machines; water coolers; or any other refrigeration equipment, excluding air conditioning. Freezers are designed to keep their contents below the freezing point (32 degrees Fahrenheit), and refrigeration equipment is designed to maintain the stored items below room temperature, but above the freezing point. In the 1989 CBECS, data were collected on refrigeration/freezer equipment inside and/or adjacent to the building.

Regression: A statistical procedure used in this report to estimate consumption of, or expenditures for, energy when data were unavailable. The procedure takes into account many characteristics of buildings (such as size, age, principal activity, heating fuels). (See **Imputation** and Appendix B, "Nonsampling and Sampling Errors.")

Regular HVAC Maintenance: See **Preventive Maintenance Program for Heating and/or Cooling Equipment**.

Reheating Coils: A part of some air-conditioning systems. Electric coils in air ducts used primarily to raise the temperature of circulated air after it was over cooled to remove moisture. Some buildings report reheating coils as their sole heating source. (See **Space Heating, Cooling, and Air Duct or Air-Handling Units**.)

Relative Standard Error: See **RSE (Relative Standard Error)**.

Residential: As used in this survey, activities related to use as a dwelling for one or more households. In this survey, residential buildings that contained commercial activities were included in the sample during the listing stage. However, buildings that had 50 percent or more of their square footage devoted to residential activities were considered out of scope and were dropped from the sample during the interview stage. (See **Principal Building Activity, In Scope, Commercial Building**, and Appendix A, "How the Survey Was Conducted.")

Residential Freezers: See Refrigeration Equipment.

Residential Refrigerators: See Refrigeration Equipment.

Roof or Ceiling Insulation: A building shell conservation feature consisting of insulation placed in the roof (below the waterproofing layer) or in the ceiling of the top floor in the building. (See **Insulation and Building Shell Conservation Feature**.)

RSE (Relative Standard Error): A measure of the reliability or precision of a survey statistic. The Relative Standard Error, or RSE, is defined as the standard error of a survey estimate, expressed as a percent of the estimate. For example, an RSE of 10 percent means that the standard error is one-tenth as large as the survey estimate. (See **Standard Error** and "Generalized Variances" in Appendix B, "Nonsampling and Sampling Errors.")

RSE Column Factor: An adjustment factor used to compute RSE's. For a survey estimate in a particular row and a column of a table (that is, a particular "cell"), the approximate RSE is obtained by multiplying the RSE row factor by the RSE column factor for that cell. (See **RSE (Relative Standard Error)**, **RSE Row Factor**, and "Generalized Variances" in Appendix B, "Nonsampling and Sampling Errors.")

RSE Row Factor: A factor used to compute RSE's. The row factor is equal to the geometric mean of the RSE's in a particular row of the main tables. For a survey estimate in a particular row and column of a table (that is, a particular "cell"), the approximate RSE is obtained by multiplying the RSE row factor by the RSE column factor for that cell. (See **RSE (Relative Standard Error)**, **RSE Column Factor**, and "Generalized Variances" in Appendix B, "Nonsampling and Sampling Errors.")

Sales Accounts: See Account Classification.

Sampling: The procedure used to select cases (in this survey, buildings) for interview from the population (commercial buildings in the United States). (See **Multistage Area Probability Sampling** and Appendix A, "How the Survey Was Conducted.")

Seasonal Pricing: A special electric rate feature under which the price per unit of energy depends on the season of the year. (See **Rate Features**.)

Seating Capacity - Classrooms: The number of students that can be seated in the classrooms and/or lecture halls of an education building at a given time. (See **Principal Building Activity**, **Special Measures of Occupancy**, and Appendix D, "Types of Buildings.")

Seating Capacity - Food Service: The number of patrons that can be seated in a food service building at a given time. (See **Principal Building Activity**, **Special Measures of Occupancy**, and Appendix D, "Types of Buildings.")

Separate Metering: Measurement of electricity or natural gas consumption in a building using a separate meter for each of several tenants or establishments in the building. (See **Master-Metering**.)

Shadings or Awnings: See Exterior or Interior Shadings or Awning.

Shakes: Flat pieces of weatherproof material laid with others in a series of overlapping rows as covering for roofs and sometimes the sides of buildings. Shakes are similar to wood shingles, but instead of having a cut and smoothly planed surface, shakes have textured grooves and a rough or "split" appearance to give a rustic feeling. (See **Shingles**, **Siding**, and **Wooden Materials**.)

Shingles: Flat pieces of weatherproof material laid with others in a series of overlapping rows as covering for roofs and sometimes the sides of buildings. Shingles are manufactured in a variety of materials including

fiberglass, wood, plastic, baked clay, tile, asbestos, asphalt, and aluminum. (See **Siding, Shakes, and Wooden Materials.**)

Siding: An exterior wall covering material made of wood, plastic (including vinyl), or metal. Siding is generally produced in the shape of boards and is applied to the outside of a building in overlapping rows.

Single-Establishment Building: A building that houses only one establishment, for example, a building dedicated to the offices of a single corporation. (See **Establishment, Multibuilding Establishment, Multiple-Establishment Building, and Building.**)

Slate or Tile: A type of roofing material. Tile refers to any thin, square, or rectangular piece of baked clay, stone, or concrete used as a roofing material. Slate refers to a particular stone used for roofing.

Solely or in Combination: In the CBECS tables, a row stub accompanied by this phrase indicates overlapping categories, so that a particular building may be included in more than one line under this stub. In general, row stubs without this designation are exclusive; that is, they divide the population of buildings into distinct groups so that a particular building is represented in no more than one line under this stub.

Space Heating: The use of mechanical equipment (including wood stoves and active solar heating devices) to heat all, or part, of a building to at least 50 degrees Fahrenheit. This is one of the six end uses of energy specifically asked for in this survey. (See **Energy End Use.**)

Special Measures of Occupancy: A measure relating to the use of a building for certain types of buildings. For example, the number of licensed beds in a hospital or the number of guest rooms in a hotel. (See **Seating Capacity - Classrooms, Seating Capacity - Food Service, Number of Rooms - Lodging, and Licensed Bed Capacity.**)

Square Feet per Worker: The ratio of the total square footage in a category to the total number of workers in the category.

Square Footage: Floorspace, in units of square feet. One square foot is approximately equal to 0.0929 square meters. (See **Floorspace and Metric Conversion.**)

Standard Error: A measure of the precision of an estimate, equal to the square root of the variance. (See **Variance, RSE (Relative Standard Error), and Appendix B, "Nonsampling and Sampling Errors."**)

Steam: See **District Steam.**

Steam or Hot Water Radiators: See **Baseboard and Radiator.**

Storm or Multiple Glazing: A building shell conservation feature consisting of storm windows, storm doors, or double- or triple-paned glass that are placed on the exterior of the building to reduce the rate of heat loss. (See **Building Shell Conservation Feature.**)

Summer and Winter Peaking: Having the annual peak demand reached both during the summer months (May through October) and during the winter months (November through April). (See **Peak Demand, Summer Peaking, Winter Peaking, and "Peak Electricity Demand" in Appendix B, "Nonsampling and Sampling Errors."**)

Summer Peaking: Having the annual peak demand falling during the summer. In this report, a building was classified as summer peaking if its annual peak demand was reached during any of the months from May through October. (See **Peak Demand and "Peak Electricity Demand" in Appendix B, "Nonsampling and Sampling Errors."**)

Switch: See **Fuel-Switching Capabilities.**

Synthetic or Rubber Roofing: A layer (either single- or multi-ply) of heavy gauge plastic or rubber used for roofing.

Thermostat: A device that adjusts the amount of heating and cooling produced and/or distributed by automatically responding to the temperature in the environment.

Time-of-Day Lock-out or Limit: A special electric rate feature under which electricity usage is prohibited or restricted to a reduced level at fixed times of the day, in return for a reduction in the price per kilowatthour. (See **Rate Features**.)

Time-of-Day Pricing: A special electric rate feature under which the price per kilowatthour depends on the time of day. (See **Rate Features**.)

Tinted Glass: See **Reflective or Shading Glass or Film**.

Total Square Footage: Square footage of floorspace summed or aggregated over all buildings in a category (such as all office buildings in the United States). In this survey, aggregate square footage was estimated by multiplying each building's square footage by its weight, then summing over all sample buildings of interest to represent nationwide totals. (See **Floorspace and Weight**.)

Transported Gas: Natural gas physically delivered to a building by a local utility, but not bought from that utility. A separate transaction was made to purchase the volume of gas and the utility was paid for the use of its pipeline to deliver the gas. Also called "Direct-Purchase Gas," "Spot Market Gas," "Spot Gas," "Gas for the Account of Others", and "Self-Help Gas." (See Appendix B, "Nonsampling and Sampling Errors.")

Trillion Btu: Equivalent to 1,000,000,000,000 (10^{12}) Btu. (See **Btu**.)

Utility-Sponsored Conservation Program: Any program sponsored by an electric and/or natural gas utility to review operating practices, equipment and construction features in buildings, and advise on ways to increase the energy efficiency of buildings. Also included are utility-sponsored demand-side management programs to encourage the use of more energy-efficient equipment or practices. Included in this survey were programs to improve the energy efficiency in the lighting system or building equipment, or the thermal efficiency of the building shell. (See **Demand-Side Management (DSM) Programs**.)

Vacant: As a principal building activity, the designation for a building in which most of the floorspace was not occupied by any tenant or establishment. A vacant building may contain occupants who are using up to 50 percent of the floorspace. The CBECS also measures vacancy in terms of the fraction of space vacant within an individual building and the fraction of time the building was in use. For all buildings, data were collected on the percent of floorspace vacant three or more months, and on the number of months the building was in use. (See **Principal Building Activity**, and Appendix D, "Types of Buildings.")

Variance: A measure of the variability of a set of observations that are subject to some chance variation, equal to the expected squared difference between a single observation and the average of all possible observations obtained in the same manner. The variance is the square of the standard error of estimates. For statistics presented in this report, the variance indicates the likely difference between the value computed from the CBECS sample and the average of the values that could have been computed from all possible samples that might have been obtained by the same sample selection process. (See **Standard Error**, Appendix A, "How the Survey was Conducted" and Appendix B, "Nonsampling and Sampling Errors.")

Vintage: The year of origin or age. As used in the CBECS report, the year of construction for the building, as in "building vintage," or the age of the central chillers or packaged refrigeration units, as in "vintage of refrigeration equipment." (See **Year Constructed**, **Central Chillers**, and **Packaged Units**.)

Wall Insulation: A building shell conservation feature consisting of insulation placed between the exterior and interior walls of a building. (See **Insulation and Building Shell Conservation Feature**.)

Warm-Air Furnace: See **Furnace**.

Water Coolers: See **Refrigeration Equipment**.

Water Heating: The use of energy to heat water for purposes other than space heating. This is one of the six end uses of energy specifically asked for in this survey. (See **Energy End Use**.)

Weather Stripping or Caulking: A building shell conservation feature that includes any material placed between the door or window and the door frame or window frame to reduce the rate of loss of heat or cold caused by air infiltration. (See **Building Shell Conservation Feature**.)

Weekly Operating Hours: The number of hours per week that a building is used, excluding hours when the building is occupied only by maintenance, security, or other support personnel. For buildings with a schedule that varied during the year, "weekly operating hours" refers to the total weekly hours for the schedule most often followed. If operating hours varied throughout a building, the usual operating hours of the largest business in the building (based on square footage) determined the operating hours for the building.

Weight: The number of buildings in the United States that a particular sample building represents. To estimate the total value of an attribute (such as square footage) in the U.S. commercial building population as a whole, each sample building's value is multiplied by the building's weight. Summing the weighted sample values provides an estimate of the nationwide total. (See **Multistage Area Probability Sample, Total Square Footage**, and Appendix B, "Nonsampling and Sampling Errors.")

Window or Vision Glass: An exterior wall construction material made of glass that can be seen through from the inside of the building--the glass especially found in windows. Walls that are glass covered or constructed of glass material, but cannot be seen through, are excluded from this category. (See **Decorative or Construction Glass**.)

Winter Peaking: Having the annual peak demand occurring during the winter. In this report, a building was classified as winter peaking if its annual peak demand was reached during any of the months from November through April. (See **Peak Demand** and "Peak Electricity Demand" in Appendix B, "Nonsampling and Sampling Errors.")

Wood: As an energy source, wood logs, chips, or wood products that are used as fuel. In the 1989 CBECS, information about the use of wood as fuel in commercial buildings was obtained, but consumption and expenditures data for wood were not collected. (See **Energy Source**.)

Wooden Materials: Wood shingles, wood shakes, or other wooden materials used as roofing materials. (See **Shingles and Shakes**.)

Workers: See **Number of Workers in the Building**.

Year Constructed: The year in which the major part or the largest portion of a building was constructed.

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