

PAUL M. GARGIULLO

Nonresidential Buildings Energy  
Consumption Survey:

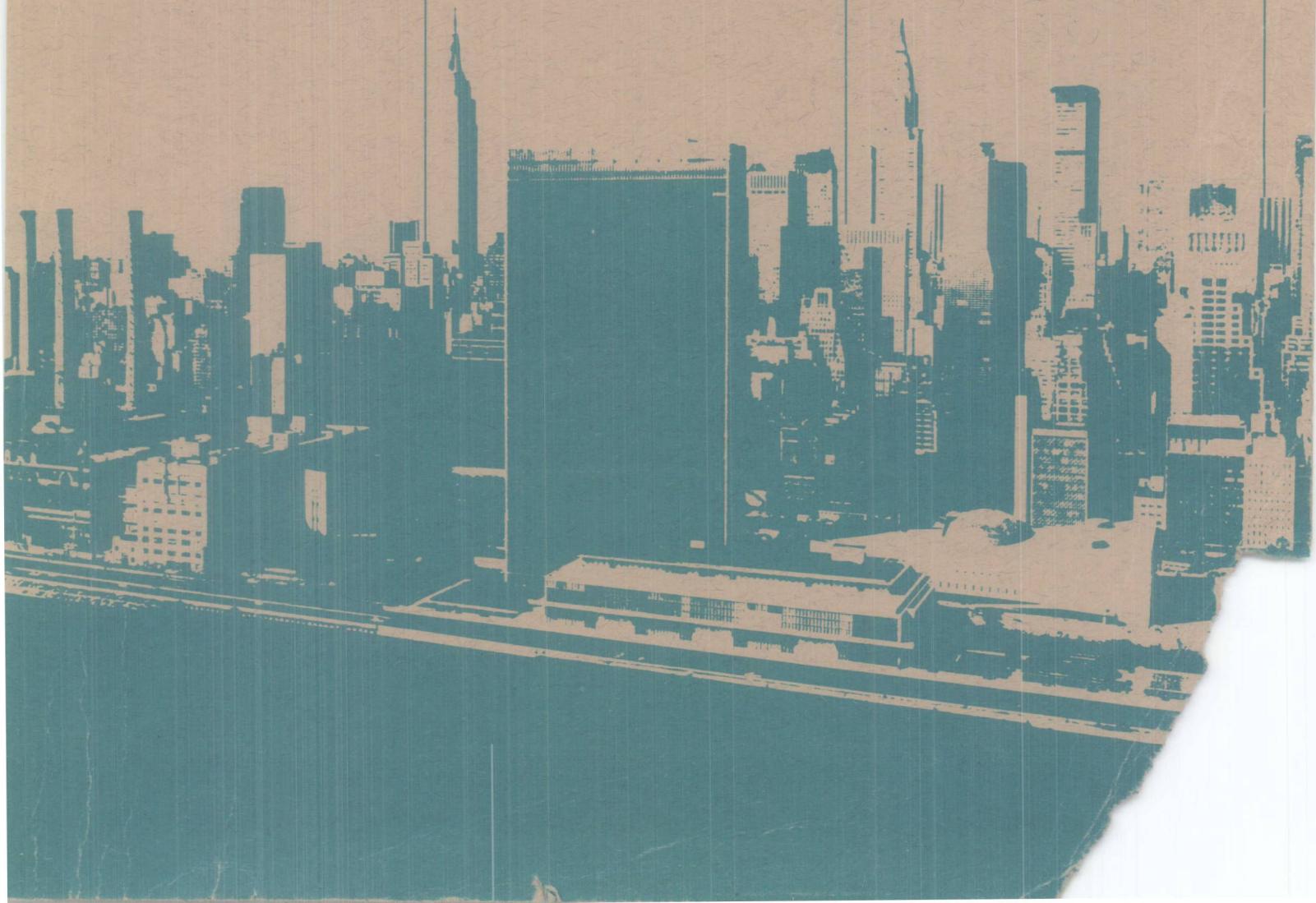
Energy Information Administration  
Washington, DC

# Characteristics of Commercial Buildings 1983



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July 1985



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# Characteristics of Commercial Buildings 1983

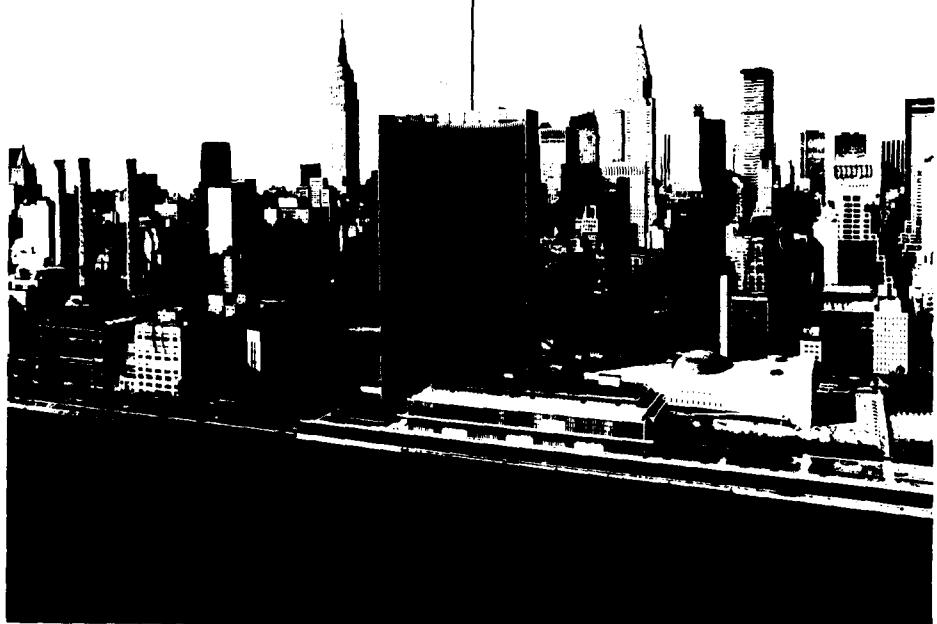


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# **Executive Summary**

## **Introduction**

The Energy Information Administration (EIA) of the U. S. Department of Energy has an ongoing program of national sample surveys covering the energy consumption of the residential (including residential transportation), manufacturing, and nonresidential buildings sectors. The surveys are currently conducted on a triennial cycle with only one of the surveys being conducted each year.

As part of this program, EIA conducted the Nonresidential Buildings Energy Consumption Survey (NBECS) in 1979 and again in 1983. The focus of this report, the first to be issued from the 1983 NBECS, is commercial buildings and their characteristics, energy sources, and conservation practices. A future report will cover data on fuel consumption and expenditures for these buildings. Data on industrial buildings are specifically excluded from this report, although they are presented in two previous reports from the first nonresidential buildings survey conducted in 1979.

The major findings are summarized below. An overview of the characteristics of commercial buildings and changes in the building stock from 1979 is presented first. This discussion is followed by a look at the energy sources, the end uses of energy, and the conservation measures in commercial buildings. The numbers given in parentheses following the estimates represent the 95 percent confidence limits due to sampling error.

## **Highlights**

### **Building Characteristics**

- As of mid-1983, there were 3,948,000 ( $\pm 387,000$ ) commercial buildings in the United States containing a total floor space of 52.3 ( $\pm 7.0$ ) billion square feet.
- As of mid-1983, 3.0 ( $\pm 0.7$ ) percent of the commercial buildings existing in late 1979 had been demolished.
- As of mid-1983, 22.3 ( $\pm 1.7$ ) percent of the commercial buildings and 30.1 ( $\pm 5.5$ ) percent of the total square footage were constructed after 1970, while 35.5 ( $\pm 1.8$ ) percent of the buildings and 32.6 ( $\pm 4.4$ ) percent of the square footage were constructed before 1946.
- The average floor space per building for all commercial buildings was 13,300 ( $\pm 1,300$ ) square feet, while the median was 4,000 ( $\pm 200$ ) square feet per building.
- The South and the North Central Census regions had the largest share of commercial buildings, with 37.8 ( $\pm 5.6$ ) percent located in the South and 30.7 ( $\pm 4.5$ ) percent located in the North Central region. The Northeast and the West each had about the same percentage of buildings, 17.0 ( $\pm 3.0$ ) percent and 14.5 ( $\pm 4.1$ ) percent, respectively.

- Metropolitan areas contained 57.1 ( $\pm 4.9$ ) percent of the commercial buildings and 71.8 ( $\pm 6.0$ ) percent of the total commercial square footage.
- Single-establishment buildings accounted for 80.2 ( $\pm 2.1$ ) percent of all commercial buildings. This proportion varied by the size of the building. While 85.9 ( $\pm 1.9$ ) percent of all buildings containing less than 5,000 square feet were single-establishment buildings, 55.6 ( $\pm 7.6$ ) percent of the buildings of more than 200,000 square feet were single-establishment.
- The 8.8 ( $\pm 1.4$ ) percent of commercial buildings occupied by government agencies contained 19.3 ( $\pm 4.3$ ) percent of the total commercial square footage.

## **Energy Sources and End Use**

- Of the 3,948,000 ( $\pm 387,000$ ) commercial buildings, 95.8 ( $\pm 1.7$ ) percent used electricity as a source of energy in 1983. Natural gas was used as an energy source in 58.6 ( $\pm 6.2$ ) percent of the buildings, followed by fuel oil (16.0 ( $\pm 2.8$ ) percent) and propane (6.6 ( $\pm 2.2$ ) percent).
- The number of buildings using fuel oil as an energy source decreased by 20.3 ( $\pm 5.6$ ) percent between 1979 and 1983.
- Natural gas was the most commonly used energy source for space heating, used in 57.3 ( $\pm 6.8$ ) percent of the heated buildings, followed by electricity which was used in 31.5 ( $\pm 7.2$ ) percent of the heated buildings, and fuel oil which was used in 16.1 ( $\pm 2.9$ ) percent of the heated buildings.
- Natural gas and electricity were used with almost equal frequency as a source of energy for water heating. Natural gas was used in 47.9 ( $\pm 5.9$ ) percent of the commercial buildings, while electricity was used in 47.1 ( $\pm 5.3$ ) percent.
- Electricity was the dominant energy source for cooling. Of the 66.8 ( $\pm 5.7$ ) percent of the commercial buildings using an energy source for air-conditioning, electricity was used in 95.4 ( $\pm 1.0$ ) percent. Only 5.3 ( $\pm 1.3$ ) percent of all air-conditioned buildings used natural gas.
- Cooking facilities were present in 37.2 percent ( $\pm 1.8$ ) of all commercial buildings. Of these buildings, 60.5 ( $\pm 4.5$ ) percent used electricity for cooking and 44.8 ( $\pm 5.9$ ) percent of the buildings used natural gas for cooking.

## **Heating and Cooling Practices and Equipment**

- As of mid-1983, 61.5 ( $\pm 3.6$ ) percent of all commercial buildings were totally heated, 27.4 ( $\pm 2.4$ ) percent were partially heated, and 11.1 ( $\pm 2.0$ ) percent were unheated.

- Of the commercial buildings with heat, 82.8 ( $\pm 2.3$ ) percent had central heating systems and 16.6 ( $\pm 2.4$ ) percent were heated only by self-contained units.
- As of mid-1983, 18.6 ( $\pm 2.3$ ) percent of the commercial buildings had boilers. Boilers were found in 33.7 ( $\pm 10.2$ ) percent of the buildings constructed in 1900 or earlier, but only in 11.4 ( $\pm 2.2$ ) percent of the buildings constructed between 1980 and 1983.
- As of mid-1983, 66.9 ( $\pm 6.9$ ) percent of the commercial buildings had air-conditioning. Of these, 66.1 ( $\pm 3.0$ ) percent had central systems, 30.7 ( $\pm 3.8$ ) percent had window units, 15.4 ( $\pm 1.9$ ) percent had wall units, 6.4 ( $\pm 1.8$ ) percent had heat pumps, and 1.7 ( $\pm 0.6$ ) percent used well water for cooling.
- The percentage of buildings with central cooling systems ranged from 48.9 ( $\pm 8.9$ ) for the buildings constructed in 1900 or before to 89.9 ( $\pm 4.1$ ) for buildings constructed between 1980 and 1983. The percentage of buildings with window units was 49.6 ( $\pm 9.8$ ) of those built in 1900 or earlier and 4.3 ( $\pm 2.7$ ) of those built between 1980 and 1983.

## **Conservation Measures**

- As of mid-1983, 48.2 ( $\pm 2.5$ ) percent of the commercial buildings had roof or ceiling insulation, 34.6 ( $\pm 2.2$ ) percent had exterior wall insulation, and 37.7 ( $\pm 4.0$ ) percent had conservation glass.
- Between January 1, 1980, and July 1, 1983, weatherstripping or caulking was added to 31.3 ( $\pm 2.3$ ) percent of all commercial buildings. Roof insulation was added to 10.2 ( $\pm 1.1$ ) percent, exterior wall insulation was added to 6.4 ( $\pm 1.3$ ) percent, and conservation glass was added to 10.2 ( $\pm 7.7$ ) percent.
- Overall, 11.0 ( $\pm 1.8$ ) percent of the buildings reported having a professional energy audit in the 12 months prior to the survey.
- Computerized systems controlled the heating and cooling equipment in 2.9 ( $\pm 0.5$ ) percent of all commercial buildings. The percentage of buildings constructed between 1980 and 1983 with computerized control systems was 9.2 ( $\pm 2.1$ ).

# Overview

This report presents data collected in the 1983 Nonresidential Buildings Energy Consumption Survey (NBECS), the second national sample survey of nonresidential buildings and their fuel suppliers conducted by the Energy Information Administration. Geographically, the surveys covered the 48 contiguous States and the District of Columbia. NBECS was designed primarily to provide information on energy-related characteristics of buildings, as well as information on the consumption of and expenditures for energy used in nonresidential buildings, primarily those in the commercial sector. For both surveys, "Nonresidential buildings" was defined as roofed and walled structures that housed some kind of commercial or industrial activity, excluding buildings on military installations. Buildings that were primarily residential, but showed evidence of commercial or industrial activity also fell within the scope of the survey. "Commercial buildings" was defined as a subset of nonresidential buildings that excluded those in which industrial or agricultural activities occupied more of the total floor space than any other type of activity. This definition of commercial buildings includes buildings such as schools, churches, and other buildings occupied by nonprofit establishments, as well as office buildings, and retail stores.

The 1983 NBECS recontacted the buildings surveyed in the 1979 NBECS (the original sample) and also contacted a sample of buildings constructed between 1979 and mid-1983 (the new buildings sample). A total of 7,140 interviews were conducted, 5,845 from the original sample and 1,295 from the new buildings sample. All data were collected through telephone interviews conducted with building representatives between April and August 1983. Although participation by the buildings owners and managers was not mandatory, a high rate of cooperation was achieved, with 89 percent of the contacted buildings participating.<sup>1</sup> The estimates presented throughout this report are weighted to represent the entire population of commercial buildings in the United States.

Data from the 1979 NBECS were published in four reports. The present report corresponds to two of the 1979 reports which covered characteristics of buildings, fuel characteristics, and conservation practices.<sup>2</sup> The 1979 and 1983 NBECS reports differ in that the two 1979 reports included data on industrial buildings, which are omitted from this report. Subsequent reports from the 1983 NBECS will focus on consumption of and expenditures for various energy sources, new construction (those built from 1979 through 1983), and a detailed analysis of changes occurring in the originally sampled buildings between 1979 and 1983.

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<sup>1</sup> For details on survey methodology, see Appendix A, "How the Survey was Conducted."

<sup>2</sup> The two reports from the 1979 NBECS are Nonresidential Buildings Energy Consumption Survey: Building Characteristics, DOE/EIA-0246, (Washington, DC, March 1981) and Nonresidential Buildings Energy Consumption Survey: Fuel Characteristics and Conservation Practices, DOE/EIA-278, (Washington, DC, June 1981).

The data presented in this report cover basic descriptions of commercial buildings, including principal activities, age and size of buildings, location, and occupancy patterns; energy sources used in commercial buildings; heating and cooling practices and equipment; and conservation practices. On the basis of the sample of buildings included in both the 1979 and the 1983 NBECS, data are also provided for changes that occurred between 1979 and 1983 for a few important building characteristics, such as changes in fuels supplied to the building and changes in the percentage of heated floor space.

This report is intended for a wide range of users, such as building managers, utility company analysts, government policy-makers, and architects. The Executive Summary, Overview, and Tables 1 through 39 present the findings of the survey as nontechnically as possible. More statistically oriented readers, and others desiring to assess the quality of the data, are referred to a supplemental reference volume (available through the National Technical Information Service) and the discussion of Data Quality in <sup>3</sup> Appendix B. The 1983 NBECS data will also be available on public use data tapes .

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<sup>3</sup> A supplement to this report, titled Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; A Supplemental Reference (DOE/EIA-M008), contains percentage tables which are analogous to the point estimate tables, relative standard errors for the point estimates, and relative standard errors for the percentages. This volume is available from the National Technical Information Service, Computer Products Division, 5285 Port Royal Road, Springfield, Virginia 22161 (Telephone: 703-487-4650). Public use data tapes will also be available at the same address (Telephone: 703-487-4808).

# Building Characteristics

## Types of Buildings

### Definitions

Buildings were classified on the basis of the principal activity in the building; that is, the activity that occupied the most square footage<sup>1</sup> in the building. See Appendix C, "Building Types," for a detailed description of the activities that constituted each principal building activity. However, two building activity categories, "residential" and "vacant," deserve special mention.

The buildings classified as "residential" involved some nonresidential activity, but had more square footage devoted to residential use than to any single commercial use. An example would be an apartment building which also housed a grocery store. Estimates presented in this report for residential buildings<sup>2</sup> pertain only to residential buildings with associated nonresidential activity.

The buildings classified as "vacant" were not necessarily completely vacant; rather, this classification indicates that more square footage was vacant at the time of the interview than was occupied by any of the building activities. Conversely, buildings classified into one of the other categories could have also contained vacant square footage. Buildings classified as "vacant" in terms of building type could have been occupied by no establishments, by one establishment, or by more than one establishment. However, buildings for which the reported number of establishments was "none" could be considered completely vacant rather than only predominantly vacant.

Except in Table S2, some of the building type categories have been combined because the number of buildings in the NBECS sample was too small to permit reliable detailed estimates to be made. Accordingly, buildings that housed inpatient and outpatient health care have been combined to form a single health-care category, and both laboratory buildings and buildings that housed public-order-and-safety entities have been included in "other" buildings.

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<sup>1</sup>Throughout this report, the term "square footage" refers to the amount of floor space contained in a building.

<sup>2</sup>For estimates of the number of residential apartment buildings (with five or more units in the building) in the United States, see Residential Energy Consumption Survey: Consumption and Expenditures, April 1981 through March 1982, Part 1, National Data, DOE/EIA-321/1(81), (Washington, DC, September 1983), page 13.

## **Changes in Building Type Distributions Between the 1979 and 1983 NBECS**

The distribution of buildings in the various building type categories presented in this report is different from the distribution presented in the 1979 NBECS reports. One major reason for the difference is that the mix of the building stock has actually changed as older buildings are demolished or converted to other uses and new buildings are constructed. However, another source of apparent change stemmed from survey procedures. (See Reclassification of Building Types from the 1979 NBECS on page 7.)

### **Distribution of Commercial Buildings by Building Type**

As of mid-1983, there were 3,948,000 ( $\pm 387,000$ )<sup>3</sup> commercial buildings in the United States, with a total floor space of 52.3 ( $\pm 7.0$ ) billion square feet. Table S1 presents the estimated number and square footage of commercial buildings by building type. As shown in Figure 1, the most common building type was the mercantile/services building.<sup>4</sup> There were 1,071,000 ( $\pm 148,000$ ) buildings housing such activities, representing 27.1 ( $\pm 2.3$ ) percent of the total commercial building stock. These buildings contained 10.4 ( $\pm 3.5$ ) billion square feet, 19.9 ( $\pm 4.6$ ) percent of the total commercial floor space. The next most prevalent building type was office buildings, which comprised 575,000 ( $\pm 86,000$ ) buildings and contained 14.6 ( $\pm 1.7$ ) percent of the commercial building stock and 16.2 ( $\pm 1.8$ ) percent of the total commercial floor space.

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<sup>3</sup>The  $\pm$  value in parentheses after a statistic quoted in the tables or text represents two standard errors of the statistic. The standard error is a measure of the variability of a sample-based estimate. Standard errors should be used in making inferences about the total population. A 95 percent confidence interval can be approximated by taking twice the standard error and subtracting this value from the statistic to obtain the lower end of the interval and adding twice the standard error to the statistic to obtain the upper end of the interval. (A 95 percent confidence interval means that if the survey were repeated by using all possible samples, 95 percent of all intervals calculated in this way should contain the true value of the statistic.) The analyst should read Appendix B, "Data Quality."

<sup>4</sup>In reports from the 1983 NBECS, automotive sales and service buildings are included in the mercantile/service category. These two categories were reported separately in 1979. See Appendix C, "Building Types."

**Table S1. Number and Square Footage of Commercial Buildings by Building Type, 1983**

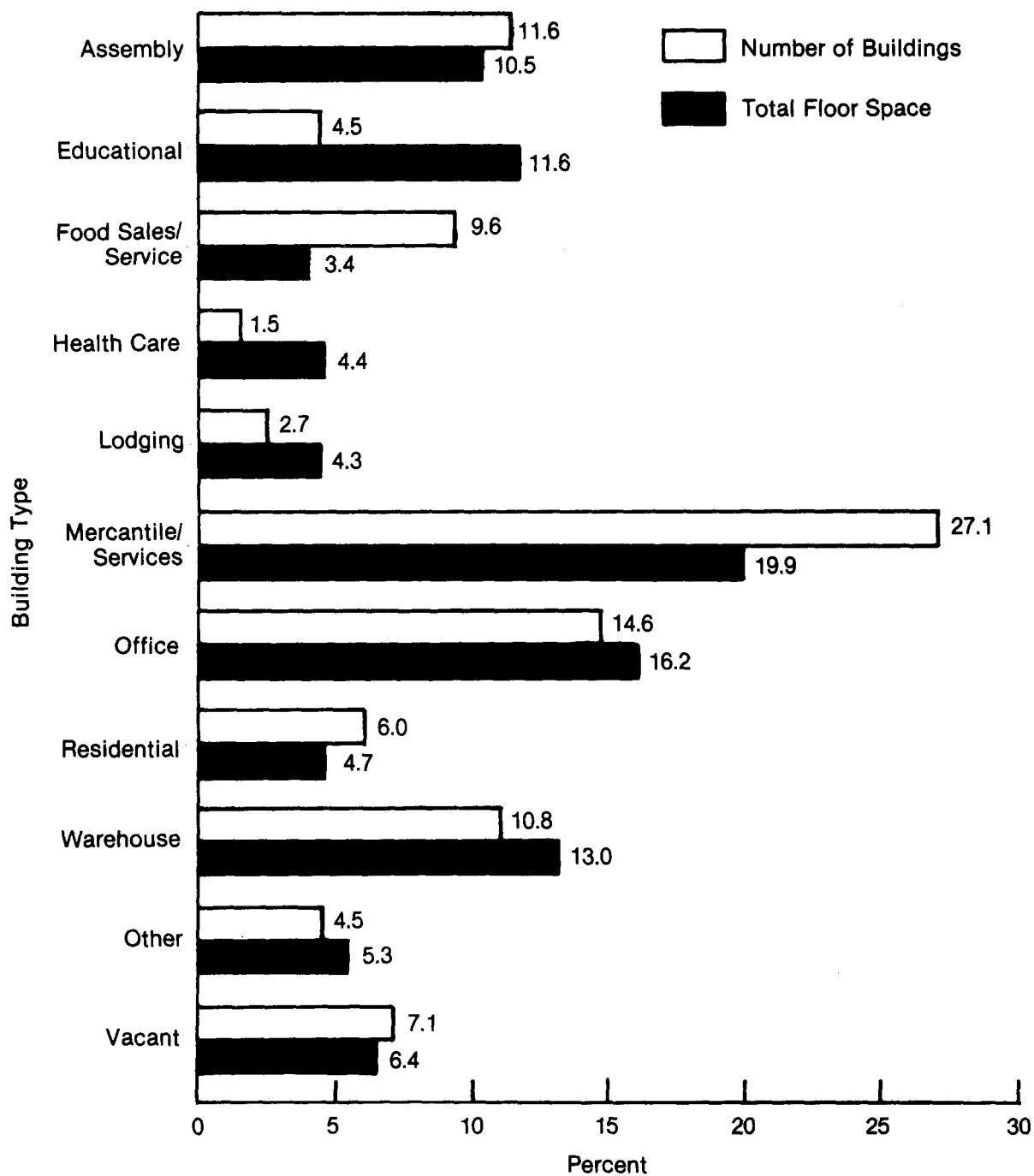
Principal Activity Within Building	Number of Buildings		Square Footage	
	Thousands	Percent	Million Square Feet	Percent
<b>Survey Estimates</b>				
Commercial Buildings.....	3,948	100.0	52,325	100.0
Assembly.....	457	11.6	5,483	10.5
Educational.....	177	4.5	6,044	11.6
Food Sales/Service.....	380	9.6	2,051	3.9
Health Care (Inpatient)....	20	0.5	1,974	3.8
Health Care (Outpatient)....	40	1.0	303	0.6
Laboratory.....	13	0.3	276	0.5
Mercantile/Services.....	1,071	27.1	10,427	19.9
Lodging.....	106	2.7	2,241	4.3
Office.....	575	14.6	8,454	16.2
Public Order and Safety.....	39	1.0	709	1.4
Residential.....	236	6.0	2,454	4.7
Warehouse.....	425	10.8	6,791	13.0
Other.....	127	3.2	1,776	3.4
Vacant.....	281	7.1	3,342	6.4
<b>Relative Standard Errors (percent)</b>				
Commercial Buildings.....	4.9	--	6.7	--
Assembly.....	9.4	9.3	13.4	12.0
Educational.....	11.7	9.9	10.0	7.3
Food Sales/Service.....	8.0	5.6	7.1	5.9
Health Care (Inpatient)....	17.1	17.0	18.4	17.7
Health Care (Outpatient)....	25.2	23.7	26.0	24.8
Laboratory.....	24.0	25.1	27.6	28.2
Mercantile/Services.....	6.9	4.2	16.7	11.5
Lodging.....	14.3	13.3	13.3	10.6
Office.....	7.5	5.7	8.1	5.7
Public Order and Safety.....	18.1	19.1	20.5	19.8
Residential.....	10.1	8.8	12.7	11.0
Warehouse.....	8.1	7.4	9.2	10.7
Other.....	9.4	6.4	15.7	17.6
Vacant.....	12.3	11.1	15.2	11.1

Q = Data unreliable either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

Note: Data may not sum to totals due to rounding. See Appendix C, Building Types. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

**Figure 1. Distribution of Commercial Building Types**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Reclassification of Building Types from the 1979 NBECs

In 1979, an effort was made to assign "mixed-use buildings"--that is, buildings which did not have at least 75 percent of their square footage devoted to a single activity--to one of the other building activities. After the 1979 reports were published, an error was discovered in the procedure used for assigning the mixed-use buildings. This table compares the results from the original building classification procedure with those from the revised procedure.

### Building Classification

Principal Activity, 1979	Original (thousands)	Revised (thousands)	Percent Change
All Buildings .....	4,267	4,267	0.0
Agricultural .....	29	30	1.3
Industrial .....	243	268	10.6
All Commercial .....	3,995	3,969	-0.7
Assembly ..... <sup>02</sup>	448	475	5.9
Educational .....	<sup>03</sup>	<sup>161</sup>	

### RECLASSIFICATION OF BUILDING TYPES FROM THE 1979 NBECs MIXED-USE BUILDINGS

Principal Activity, 1979	Original (million sqft)	Revised (million sqft)
All Buildings.....	55,014	55,014
Agricultural.....	188	198
Industrial.....	7,140	7,789
All Commercial.....	47,685	47,027
Assembly.....	5,028	5,362
Educational.....	5,851	5,975
Food Sales/Service...	1,864	1,815
Health Care.....	1,687	1,960
Lodging.....	2,012	2,099
Mercantile/Service...	9,473	10,106
Office.....	8,184	7,364
Other.....	3,129	2,150
Residential.....	3,115	2,765
Storage.....	6,070	6,042
Vacant.....	1,273	1,390

## Number of Buildings

Table S2 contains estimates for the sources of change in the number of buildings between the 1979 NBECS and the 1983 NBECS.

**Table S2. Changes in the Stock of Commercial Buildings, 1979-1983**

Number of Buildings	
1979 Building Stock <sup>1</sup>	3,973,000 ( $\pm 397,000$ )
Demolitions	-123,000 ( $\pm 29,000$ )
Conversions to All-Residential Use	-49,000 ( $\pm 26,000$ )
Conversions to Agricultural/Industrial Use	-27,000 ( $\pm 16,000$ )
Other Losses	-25,000 ( $\pm 9,000$ )
Still in Building Stock	3,755,000 ( $\pm 376,000$ )
Conversions to Commercial from Agricultural/Industrial Use	+35,000 ( $\pm 15,000$ )
New Construction	+159,000 ( $\pm 37,000$ )
1983 Building Stock <sup>2</sup>	3,948,000 ( $\pm 387,000$ )

<sup>1</sup>The estimate for the 1979 building stock differs from that published in the 1979 NBECS reports as a result of building reclassifications and reweighting of data. See Appendix C, "Building Types" for details.

<sup>2</sup>The 1983 building stock estimate may be low for two reasons. First, although conversions from commercial to all-residential buildings were covered by the survey, conversions of all-residential buildings to commercial use were not covered. Second, as discussed in Appendix B, "Data Quality," the source used to update the NBECS sample for new construction may have omitted smaller new buildings, which would have been detected by the area sampling methods employed for the original sample. These smaller buildings have relatively little effect on estimates of overall square footage or energy consumption, but have a greater impact on building count estimates.

Note : Data may not sum to totals due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Demolition of Commercial Buildings

One of the more interesting components of the change in the number of commercial buildings is the loss of buildings due to demolitions. Table S3 displays characteristics of demolished buildings.

Overall, 3.0 ( $\pm 0.7$ ) percent of the commercial buildings standing in late 1979 had been demolished by mid-1983. Buildings constructed before 1920 were demolished at about the same rate (3.4 ( $\pm 1.2$ ) percent) as buildings constructed from 1921 to 1945 (4.0 ( $\pm 1.7$ ) percent), but the demolition rate for buildings constructed since 1945 was significantly lower (1.5 ( $\pm 0.6$ ) percent). As might be expected, buildings vacant in 1979 were demolished at a higher rate (13.0 ( $\pm 7.3$ ) percent) than nonvacant buildings (2.4 ( $\pm 0.5$ ) percent). Demolition rates did not vary significantly by Census Region or metropolitan/nonmetropolitan location.

**Table S3. Detailed Demolition Rates, 1979-1983**

1979 Building Characteristics	All Buildings		Demolished	
	Number of Buildings (thousands)	Percent	Number of Buildings (thousands)	Percent
<b>Survey Estimates</b>				
Commercial Buildings.....	3,973	100.0	118	3.0
Year Constructed				
1900 or Before.....	293	100.0	10	3.5
1901 to 1920.....	377	100.0	13	3.6
1921 to 1945.....	721	100.0	29	4.0
1946 to 1979.....	2,325	100.0	34	1.5
Unknown/ <sup>1</sup> /.....	258	100.0	31	12.1
Square Footage Category				
5,000 or Less.....	2,148	100.0	60	2.8
5,001 to 10,000.....	687	100.0	Q	Q
10,001 to 25,000.....	518	100.0	10	1.9
Over 25,000.....	361	100.0	6	1.6
Unknown/ <sup>1</sup> /.....	258	100.0	31	12.1
Principal Activity within Building				
Mercantile/Services.....	1,165	100.0	28	2.4
Warehouse and Storage.....	415	100.0	17	4.1
Vacant.....	205	100.0	27	13.0
All Other.....	2,188	100.0	46	2.1
Census Region				
Northeast.....	700	100.0	22	3.1
North Central.....	1,238	100.0	46	3.7
South.....	1,471	100.0	30	2.1
West.....	564	100.0	21	3.7
Metropolitan Status				
Metropolitan.....	2,259	100.0	67	3.0
Nonmetropolitan.....	1,714	100.0	52	3.0
Number of Establishments				
Single Establishment.....	3,067	100.0	75	2.5
Multi-Establishment.....	628	100.0	11	1.8
Vacant/Unknown.....	278	100.0	31	11.3

See footnotes at end of table.

**Table S3. Detailed Demolition Rates, 1979-1983 (Continued)**

1979 Building Characteristics	All Buildings		Demolished	
	Number of Buildings (thousands)	Percent	Number of Buildings (thousands)	Percent
<b>Relative Standard Errors (percent)</b>				
Commercial Buildings.....	5.0	--	12.3	11.1
<b>Year Constructed</b>				
1900 or Before.....	15.8	--	28.4	29.9
1901 to 1920.....	10.2	--	26.9	27.0
1921 to 1945.....	7.3	--	22.9	20.7
1946 to 1979.....	5.8	--	21.7	21.1
Unknown <sup>1/</sup> .....	11.4	--	27.2	24.0
<b>Square Footage Category</b>				
5,000 or Less.....	5.4	--	17.0	16.2
5,001 to 10,000.....	7.2	--	Q	Q
10,001 to 25,000.....	8.9	--	42.4	42.0
Over 25,000.....	7.9	--	35.7	35.9
Unknown <sup>1/</sup> .....	11.4	--	27.2	24.0
<b>Principal Activity within Building</b>				
Mercantile/Services.....	6.7	--	16.6	16.6
Warehouse and Storage.....	8.5	--	28.6	27.5
Vacant.....	13.4	--	24.3	28.0
All Other.....	5.4	--	17.9	17.7
<b>Census Region</b>				
Northeast.....	10.6	--	27.8	21.3
North Central.....	9.4	--	16.4	11.3
South.....	9.4	--	29.7	31.1
West.....	14.1	--	26.3	29.7
<b>Metropolitan Status</b>				
Metropolitan.....	7.7	--	18.9	16.4
Nonmetropolitan.....	6.3	--	16.2	16.2
<b>Number of Establishments</b>				
Single Establishment.....	5.2	--	15.1	14.0
Multi-Establishment.....	8.2	--	30.5	28.0
Vacant/Unknown.....	10.7	--	27.1	23.3

<sup>1/</sup> Buildings for which no interview was obtained in 1979.

Q = Data unreliable because the RSE was greater than 50%, or fewer than 15 buildings were sampled.

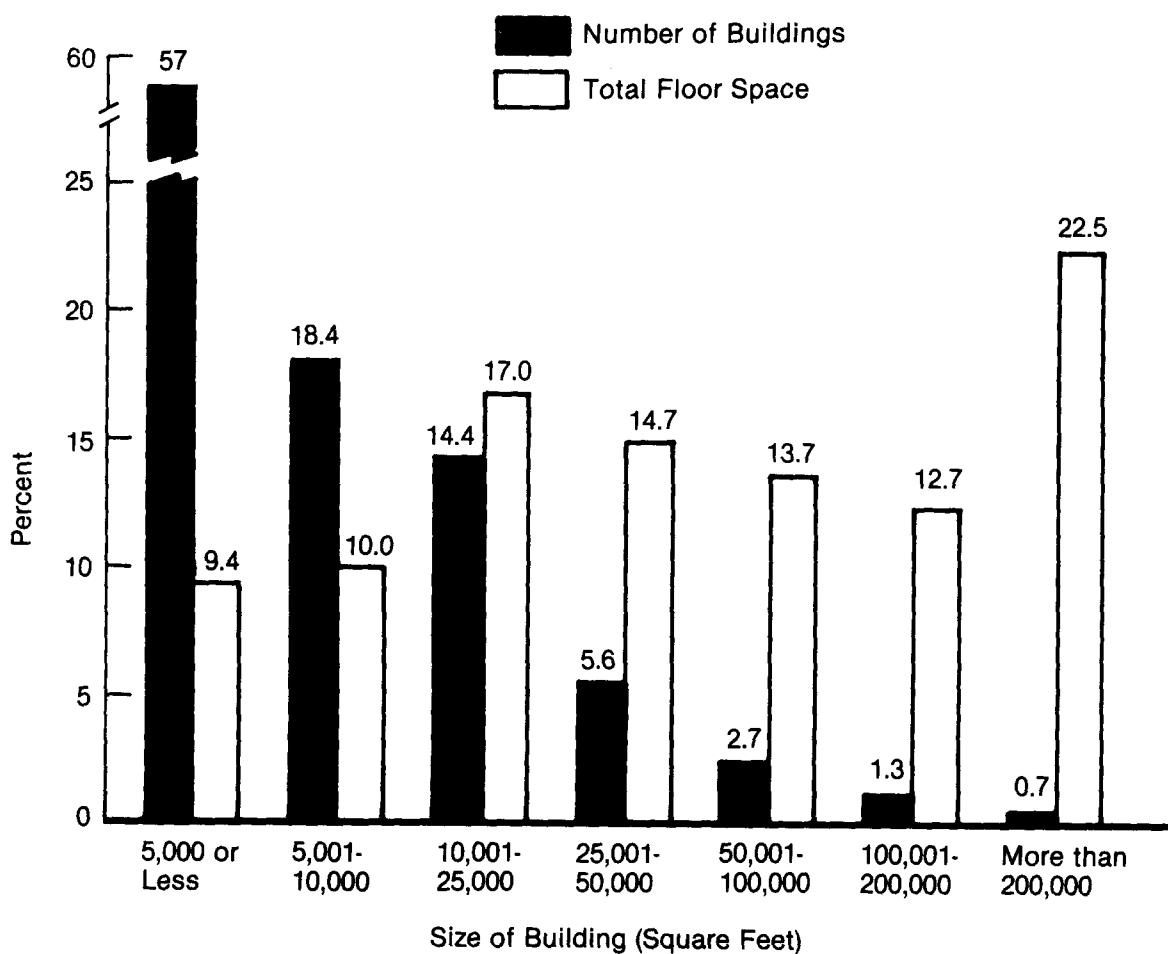
Note: Data may not sum to totals due to rounding. Percentages were calculated on unrounded numbers. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Age and Size of Buildings

Although there were fewer large buildings than small buildings, large buildings accounted for a significant share of the total commercial square footage, as shown in Figure 2. There were 29,000 ( $\pm 6,000$ ) buildings (0.7 ( $\pm 0.2$ ) percent of the total number of buildings) of more than 200,000 square feet, and 2,248,000 ( $\pm 238,000$ ) buildings (57.0 ( $\pm 2.6$ ) percent) 5,000 square feet or less. The buildings larger than 200,000 square feet, however, accounted for 22.5 ( $\pm 5.3$ ) percent of the total commercial square footage, while the buildings of 5,000 square feet or less accounted for 9.4 ( $\pm 1.0$ ) percent.

**Figure 2. Size Distribution of Commercial Buildings**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## **Age of Building**

As of mid-1983, 22.3 ( $\pm 1.7$ ) percent of all commercial buildings and 30.1 ( $\pm 5.5$ ) percent of the total square footage had been constructed after 1970, while 35.5 ( $\pm 1.8$ ) percent of the buildings and 32.6 ( $\pm 4.4$ ) percent of the square footage had been constructed before 1946.

Of all the building types, the primarily residential buildings were the oldest. Of the 236,000 ( $\pm 47,000$ ) residential buildings, 71.2 ( $\pm 13.5$ ) percent were constructed before 1946, compared with 35.5 ( $\pm 1.8$ ) percent for all commercial buildings. With the exception of the primarily residential buildings, the proportion of buildings in the various activity classes appeared fairly stable across age categories.

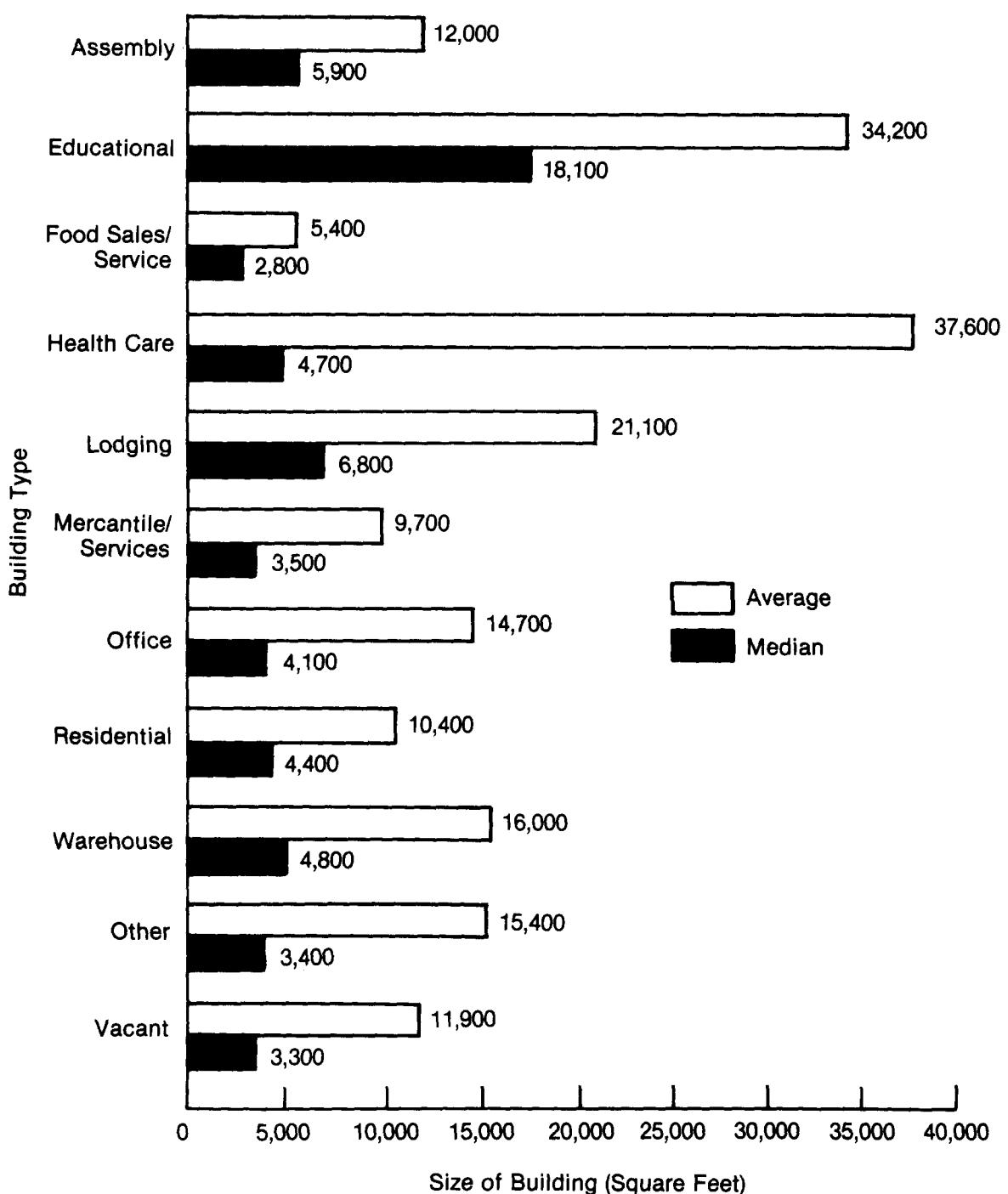
## **Average and Median Size of Building**

The average and median sizes of various building types are displayed in Figure 3. The buildings with the largest average size were health care buildings, which averaged 37,600 ( $\pm 14,600$ ) square feet, and education buildings, which averaged 34,200 ( $\pm 6,700$ ) square feet. The median size for education buildings was 18,100 ( $\pm 10,800$ ) square feet, compared with 4,700 ( $\pm 2,400$ ) square feet for health care buildings. The large difference between the average and the median square footage for health care buildings can be attributed to the small number of large buildings (mainly in-patient health care) and the large number of small buildings (mainly out-patient health care) which constitute this building type. Food sales/service buildings were the smallest buildings, averaging 5,400 ( $\pm 600$ ) square feet, with a median size of 2,800 ( $\pm 200$ ) square feet.



Food sales/service buildings such as this restaurant in Galveston, TX, are the smallest commercial buildings.

**Figure 3. Average and Median Size of Buildings by Building Type**



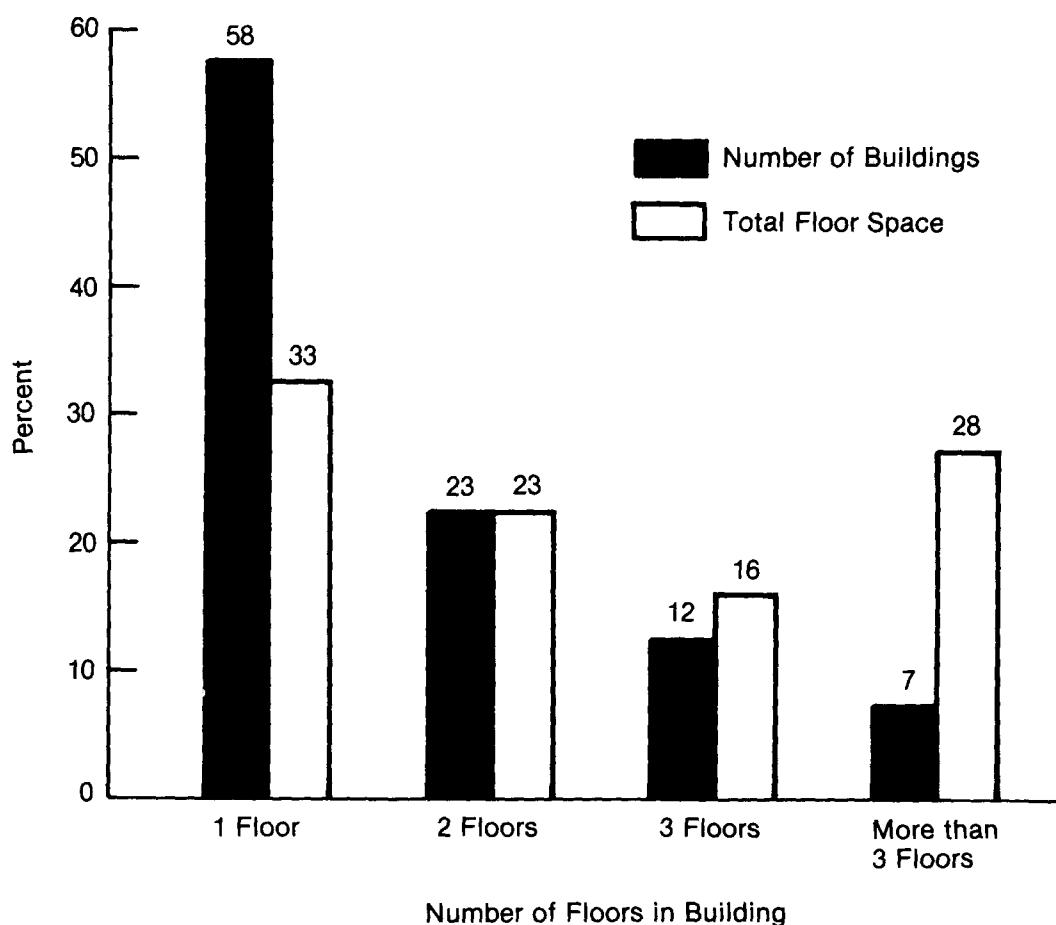
Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey; Table 2.

## Number of Floors

One-third (33.3 ( $\pm 4.0$ ) percent) of the total commercial square footage was contained in the 2,320,000 ( $\pm 288,000$ ) buildings--or 58.8 ( $\pm 4.4$ ) percent of all commercial buildings--that had only one floor. (See Figure 4.) The 269,000 ( $\pm 53,000$ ) buildings (6.8 ( $\pm 1.1$ ) percent) that had over three floors accounted for 28.4 ( $\pm 2.4$ ) percent of the square footage. Of the buildings larger than 200,000 square feet, 57.0 ( $\pm 8.0$ ) percent had more than three floors.

Older buildings tended to have more than one floor. Of the 288,000 ( $\pm 92,000$ ) buildings constructed before 1900, 82.3 ( $\pm 19.8$ ) percent, or 237,000 ( $\pm 94,000$ ), had two or more floors. However, only 29.2 ( $\pm 10.2$ ) percent of the buildings constructed after 1945 were multistory.

**Figure 4. Distribution of Commercial Buildings and Floor Space by Number of Floors**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## **Location**

### **Census Region**

The number of commercial buildings varied by Census region<sup>5</sup>. The majority of the buildings were located in the South with 1,493,000 ( $\pm 287,000$ ) commercial buildings, and the North Central with 1,211,000 ( $\pm 216,000$ ) buildings. The Northeast had 670,000 ( $\pm 131,000$ ) buildings and the West had 574,000 ( $\pm 161,000$ ) buildings.

The geographic distribution of buildings varied by the age of a building. Of the 288,000 ( $\pm 92,000$ ) buildings constructed in 1900 or earlier, 16.9 ( $\pm 10.5$ ) percent were in the South and 35.4 ( $\pm 17.0$ ) percent were in the Northeast. Among the 140,000 ( $\pm 35,000$ ) most recently constructed buildings (1980 to 1983), 45.6 ( $\pm 11.7$ ) percent were in the South, while 10.3 ( $\pm 3.4$ ) percent were in the Northeast. Differences in the distributions of buildings by year of construction between the North Central and West were not statistically significant.

The relationship between the number of buildings and the square footage of the buildings differed according to Census region. The Northeast contained a greater proportion of large buildings and the South contained a greater proportion of small buildings. Figure 5 displays the average and median sizes of buildings by Census region.

### **Metropolitan Status**

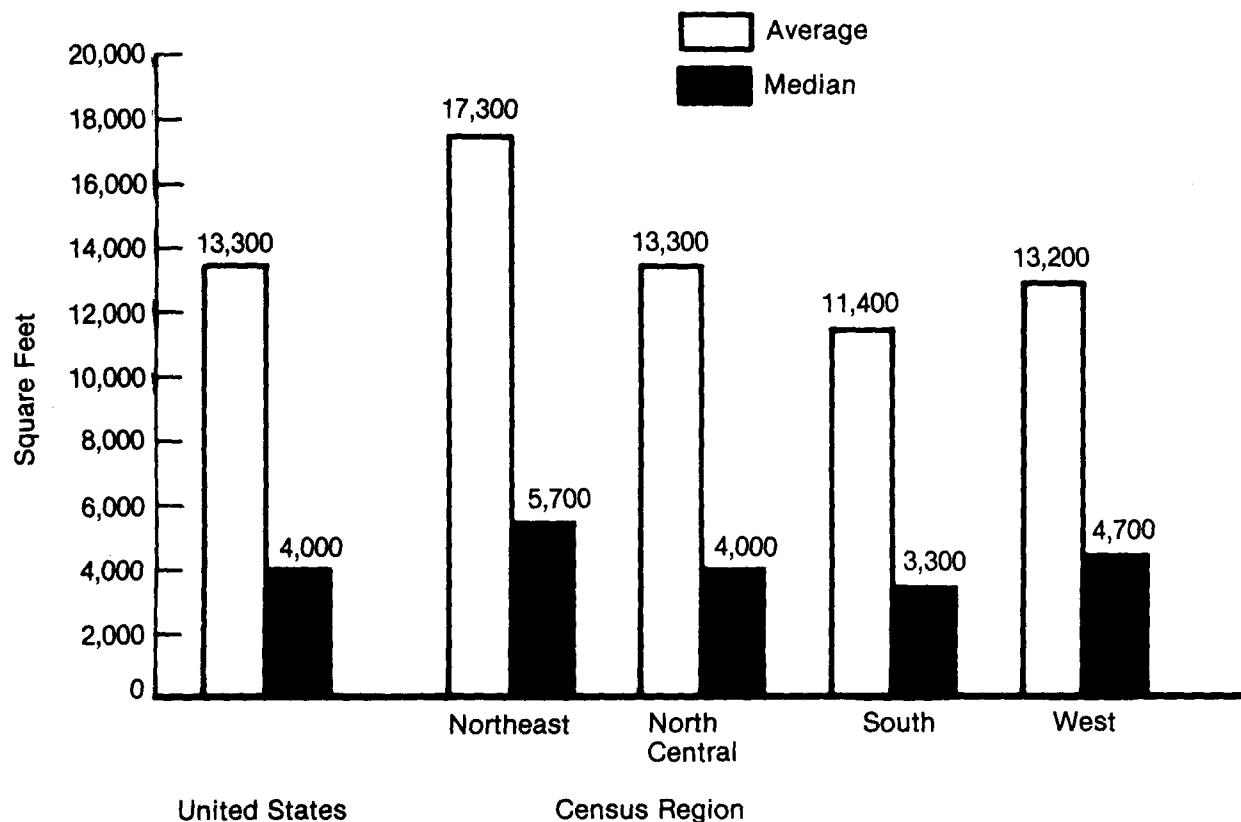
Buildings in metropolitan areas tended to be larger than those in nonmetropolitan areas. Metropolitan areas contained 57.1 ( $\pm 4.9$ ) percent of all commercial buildings, but 76.0 ( $\pm 5.1$ ) percent of the buildings larger than 25,000 square feet. The total floor space contained in buildings located in metropolitan areas was 37.6 ( $\pm 5.3$ ) billion square feet, or 71.8 ( $\pm 6.0$ ) percent of the total commercial floor space.

Although the proportion of buildings located in metropolitan areas was fairly constant over year-of-construction categories, 71.2 ( $\pm 13.1$ ) percent of the buildings constructed between 1980 and 1983 were located in metropolitan areas, compared with 56.6 ( $\pm 6.6$ ) percent for buildings constructed before 1980.

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<sup>5</sup> Appendix E contains a map of the four Census regions.

**Figure 5. Average and Median Size of Building by Census Region**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey; Table 2.

## Occupancy

### Number of Establishments

A large majority, 80.2 ( $\pm 2.1$ ) percent, of all commercial buildings were occupied by one establishment. The proportion of buildings occupied by single establishments varied by the size of the building. Of buildings under 5,000 square feet, 85.9 ( $\pm 1.9$ ) percent were occupied by one establishment, compared with 55.6 ( $\pm 7.6$ ) percent for buildings over 200,000 square feet. Office buildings were more likely to be multi-establishment (36.9 ( $\pm 6.6$ ) percent) than were other building types.

## **Hours of Operation**

In an average week, 18.7 ( $\pm 2.7$ ) percent of the commercial buildings were open fewer than 40 hours and 19.8 ( $\pm 1.7$ ) percent were open more than 84 hours (that is, more than 12 hours a day).

Large buildings were also more likely to stay open longer during the week. While 82.8 ( $\pm 6.3$ ) percent of all buildings over 200,000 square feet were open more than 48 hours during an average week, 55.0 ( $\pm 4.4$ ) percent of the buildings under 5,000 square feet were open more than 48 hours.

The building type was also related to the number of hours that buildings were open during an average week. Over half, 55.8 ( $\pm 8.8$ ) percent, of all assembly buildings were open less than 40 hours a week, while 51.2 ( $\pm 8.0$ ) percent of all food sales and service buildings were open more than 84 hours a week. Mercantile buildings were concentrated in the 40- to 84-hour range (78.2 ( $\pm 10.8$ ) percent) and office buildings in the 40- to 60-hour range (70.8 ( $\pm 5.6$ ) percent).

## **Government Occupancy**

An estimated 360,000 ( $\pm 63,000$ ) commercial buildings were owned and 346,000 ( $\pm 64,000$ ) buildings were at least partially occupied by Federal, State, or local government agencies. While the number of government-occupied buildings represented 8.8 ( $\pm 1.4$ ) percent of the total U.S. commercial building stock, these buildings contained 19.3 ( $\pm 4.3$ ) percent of the total commercial square footage.

The average size of a government-occupied building was 29,200 ( $\pm 10,300$ ) square feet, versus 11,700 ( $\pm 1,800$ ) square feet for commercial buildings not occupied by government agencies. Of those buildings which were government-occupied, 17.3 ( $\pm 3.8$ ) percent were occupied by agencies of the Federal Government, 30.1 ( $\pm 7.1$ ) percent by State government agencies, and 62.7 ( $\pm 3.9$ ) percent by local government agencies.<sup>6</sup> Federal buildings averaged 52,000 ( $\pm 45,600$ ) square feet, while State and local buildings averaged 32,300 ( $\pm 11,600$ ) and 22,700 ( $\pm 6,200$ ) square feet, respectively.

Government-occupied buildings were concentrated in the areas of education and health care. For example, 32.2 ( $\pm 9.9$ ) percent of all education buildings were government-occupied, almost all by State and local governments. On the other hand, there were few residential, food sales/service, or mercantile/services buildings occupied by government agencies.

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<sup>6</sup> Percentages may exceed 100 percent due to occupancy by more than one level of government agency.

## Number of Employees and Square Footage per Worker

Both the number of employees working in the building and the square footage per worker were related to the building type. Only 27.8 ( $\pm 11.3$ ) percent of all educational buildings and 46.6 ( $\pm 5.8$ ) percent of all office buildings contained fewer than 10 employees. On the other hand, 76.5 ( $\pm 3.4$ ) percent of all mercantile buildings and 88.2 ( $\pm 5.5$ ) percent of all residential buildings had fewer than 10 employees. Office buildings, which averaged 323 ( $\pm 31$ ) square feet per worker, and food sales buildings, which averaged 362 ( $\pm 67$ ) square feet per worker, were the most densely occupied building types. Residential, warehouse, and predominantly vacant buildings all had more than 1,000 square feet per employee. (See Figure 6.) The median floor space per worker was lower for government-occupied buildings (544 ( $\pm 123$ ) square feet per worker) than for buildings not occupied by government agencies (731 ( $\pm 66$ ) square feet per worker).

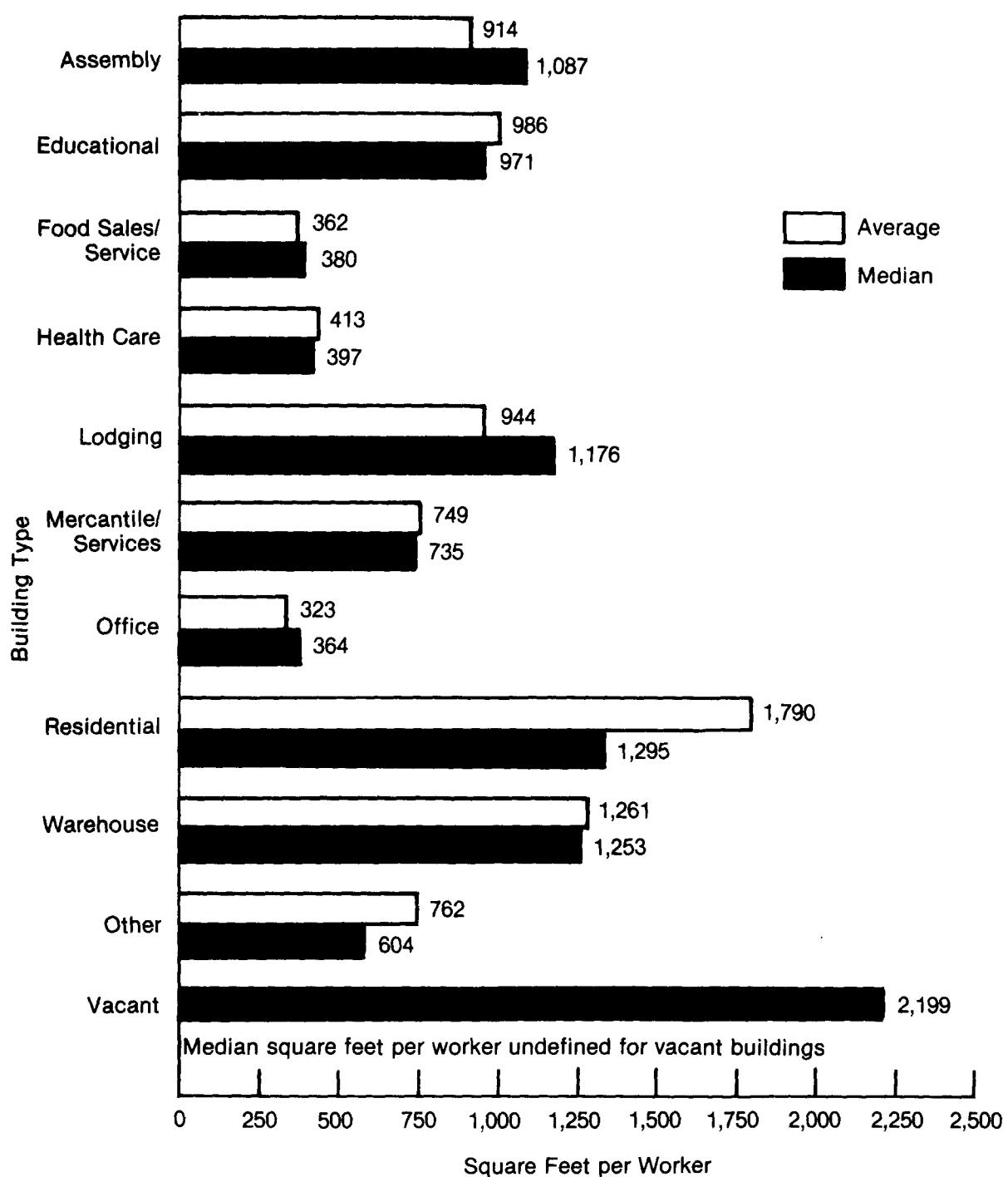
Buildings 5,000 square feet or smaller had an average of 352 ( $\pm 46$ ) square feet per worker and a median of 501 ( $\pm 41$ ) square feet per worker, smaller than any other size of building.

Average floor space per worker ranged from 958 ( $\pm 194$ ) square feet for buildings constructed between 1901 and 1920 to 513 ( $\pm 62$ ) square feet per worker for buildings constructed between 1974 and 1979. The average floor space per worker was 694 ( $\pm 268$ ) square feet for buildings constructed between 1980 and 1983.



*In 1983, over 8 percent of all commercial buildings were occupied by Federal, State, or local government agencies.*

**Figure 6. Average and Median Square Feet per Worker by Building Type**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey; Table 12.

# Energy Sources and End Uses

## Energy Sources

Electricity, natural gas, and fuel oil were the three main sources of energy supplied to commercial buildings in 1983. Of the 3,948,000 ( $\pm 387,000$ ) commercial buildings, 95.8 ( $\pm 1.7$ ) percent were supplied with electricity. Natural gas was supplied to 58.6 ( $\pm 6.2$ ) percent of all buildings. Fuel oil (including kerosene) was supplied to 16.0 ( $\pm 2.8$ ) percent of all buildings. Propane and purchased steam were also among the sources of energy supplied to commercial buildings. Propane was supplied to 6.6 ( $\pm 2.2$ ) percent of all buildings. Only 1.5 ( $\pm 0.4$ ) percent of all commercial buildings were supplied with purchased steam, however, buildings using purchased steam accounted for 8.8 ( $\pm 2.5$ ) percent of the total commercial square footage. Table S4 presents the number of buildings and the square footage served by each of the energy sources.

## Building Types

The percentage of buildings supplied with particular fuels varied between building types only for natural gas. Residential buildings were more likely to be supplied with natural gas, with 79.4 ( $\pm 7.5$ ) percent of those buildings supplied with natural gas. The percentage of all commercial buildings supplied with natural gas was 58.6 ( $\pm 6.2$ ).



In 1983, more than 95 percent of all commercial buildings were supplied with electricity.

<sup>1</sup> Respondents were asked which sources of energy were supplied to the building. Throughout this report, the terms "energy source(s) used" and "energy source(s) supplied" are used interchangeably. Note also that a building could be supplied with more than one fuel.

**Table S4. Energy Sources Used in Commercial Buildings, 1983**

Fuels Used in the Building	Number of Buildings		Square Footage	
	Thousands	Percent	Million Square Feet	Percent
<b>Survey Estimates</b>				
Commercial Buildings.....	3,948	100.0	52,325	100.0
Electricity.....	3,783	95.8	51,359	98.2
Natural Gas.....	2,314	58.6	37,090	70.9
Fuel Oil.....	633	16.0	13,313	25.4
Propane.....	260	6.6	3,007	5.7
Purchased Steam.....	60	1.5	4,594	8.8
Purchased Chilled Water.....	11	0.3	783	1.5
Coal.....	55	1.4	654	1.2
Purchased Hot Water.....	11	0.3	347	0.7
Wood.....	134	3.4	1,157	2.2
Solar.....	16	0.4	709	1.4
Other.....	71	1.8	1,291	2.5
<b>Relative Standard Errors (percent)</b>				
Commercial Buildings.....	4.9	--	6.7	--
Electricity.....	5.1	0.9	6.7	0.4
Natural Gas.....	6.8	5.3	7.8	3.0
Fuel Oil.....	9.7	8.8	8.4	7.8
Propane.....	16.8	16.6	17.9	18.3
Purchased Steam.....	14.3	13.2	16.2	14.4
Purchased Chilled Water.....	36.4	36.0	11.8	13.0
Coal.....	24.6	25.4	20.4	21.9
Purchased Hot Water.....	40.9	40.7	28.6	29.2
Wood.....	17.6	17.7	26.0	28.0
Solar.....	21.1	20.2	39.0	40.1
Other.....	26.8	26.3	19.2	15.8

Q = Data unreliable either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

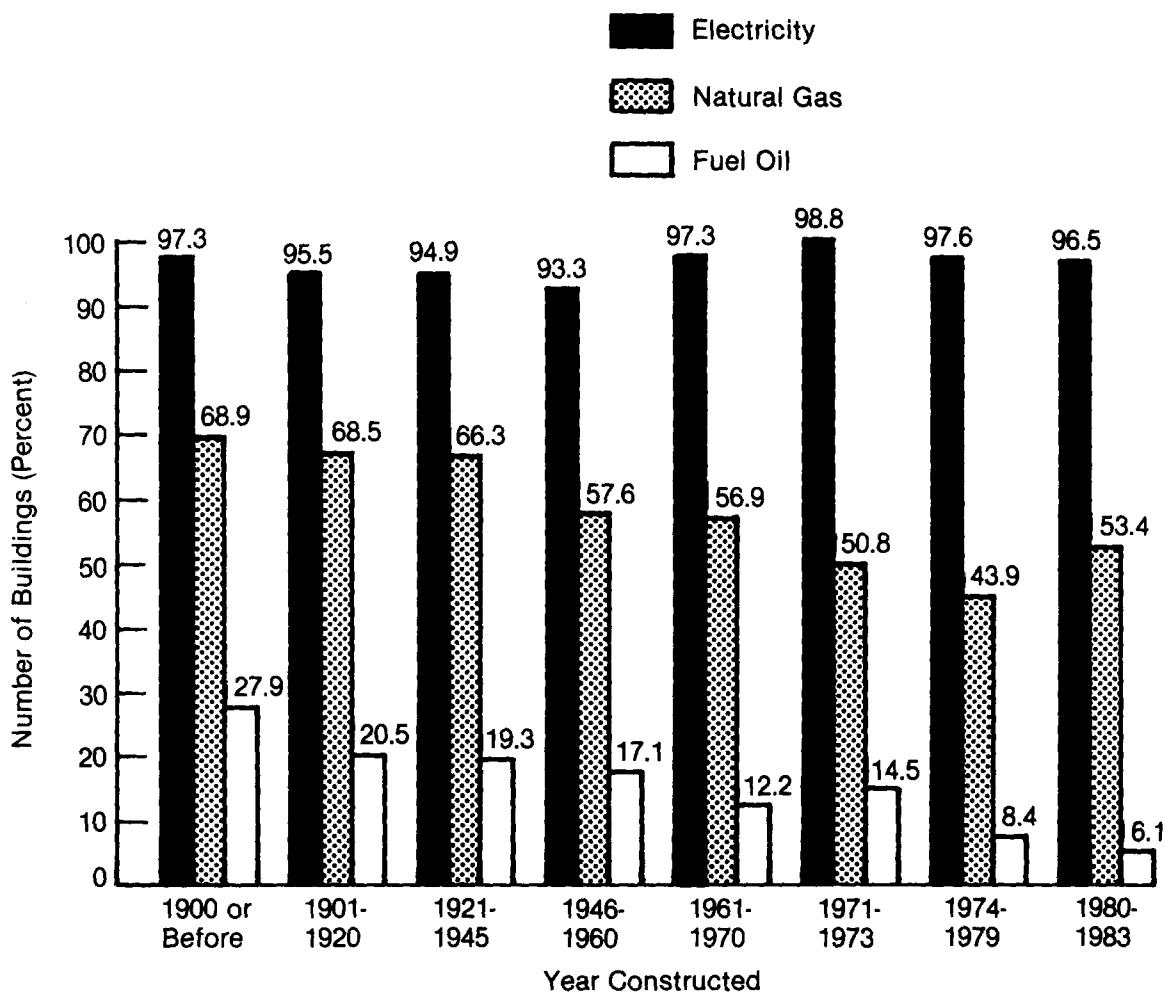
Note: Data may not sum to totals due to rounding. If a fuel is used at all in a building, then the entire square footage for that building is tabulated. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Age of Building

Figure 7 displays energy sources used in buildings, according to the year of building construction. Figure 7 shows that the number of buildings supplied with fuel oil and the number of buildings supplied with natural gas was generally smaller in newer buildings. The number of buildings supplied with fuel oil ranged from 27.9 ( $\pm 11.3$ ) percent of the buildings constructed in 1900 or before to 6.1 ( $\pm 2.1$ ) percent of the buildings constructed between 1980 and 1983. Natural gas was used in 67.4 ( $\pm 5.2$ ) percent of the buildings constructed before 1945, in 57.3 ( $\pm 4.7$ ) percent of the buildings constructed between 1946 and 1970, and in 47.1 ( $\pm 4.9$ ) percent of the buildings constructed between 1971 and 1983.

**Figure 7. Energy Sources by Year Constructed**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Size of Building

The sources of energy supplied to a building were related to the size of the building. Large buildings were more likely to be supplied with multiple energy sources; that is, all the major energy sources were most prevalent in large buildings. For example, electricity was supplied to 94.3 ( $\pm 2.6$ ) percent of all buildings containing 5,000 square feet or less, compared with 99.0 ( $\pm 1.2$ ) percent of all buildings of more than 200,000 square feet. Natural gas was supplied to 51.4 ( $\pm 6.3$ ) percent of the buildings containing less than 5,000 square feet, compared with 75.1 ( $\pm 7.1$ ) percent of the buildings of more than 200,000 square feet. Fuel oil was supplied to 13.6 ( $\pm 3.3$ ) percent of the buildings containing 5,000 square feet or less, compared with 44.1 ( $\pm 11.7$ ) percent of the buildings of more than 200,000 square feet. Purchased steam, a negligible energy source in buildings containing 5,000 square feet or less, was supplied to 20.8 ( $\pm 8.4$ ) percent of all buildings of more than 200,000 square feet.

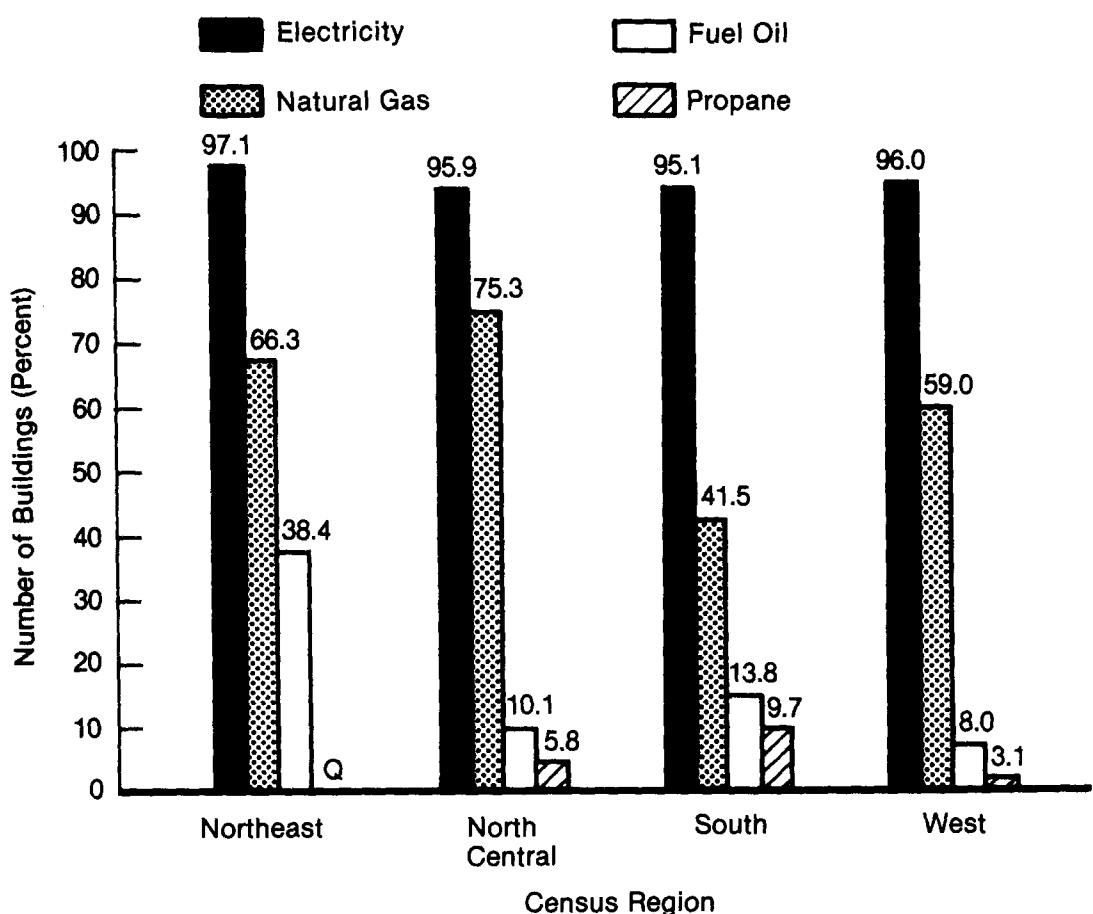
## Location

The energy sources supplied to commercial buildings varied by Census region. Natural gas was used in 66.3 ( $\pm 9.1$ ) percent of the buildings in the Northeast and in 75.3 ( $\pm 3.8$ ) percent of the buildings in the North Central region, significantly more than the 41.5 ( $\pm 13.7$ ) percent of the buildings using natural gas in the South (as shown in Figure 8). Fuel oil was used in 38.4 ( $\pm 8.5$ ) percent of the buildings in the Northeast, a higher percentage than in any other region.



*These buildings in New York City are among the more than 38 percent using fuel oil in the Northeast--a higher percentage than in any other region.*

**Figure 8. Energy Sources by Census Region**



Q = Data for propane withheld due to large variance.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey; Table A16.

The energy sources supplied to commercial buildings also varied by metropolitan status. Propane, wood, and coal were all more likely to be used in nonmetropolitan areas, whereas purchased steam was predominantly used in metropolitan areas. Natural gas was also more likely to be used by metropolitan area buildings (68.1 ( $\pm 7.4$ ) percent) than by buildings located in nonmetropolitan areas (46.0 ( $\pm 10.6$ ) percent).

## Changes in Energy Sources Since 1979

Because many of the same buildings were interviewed for both the 1979 NBECS and 1983 NBECS, it is possible to measure changes in the energy sources used in commercial buildings. These changes are summarized in Table S5. Note that for most energy sources, there was no statistically significant net change between 1979 and 1983 in the number of buildings being supplied with particular fuels.

**Table S5. Changes in Energy Sources Used in Commercial Buildings Between 1979 and 1983**

Fuels Used in the Building	Change in Use of Fuel Between 1979 and 1983			
	Used in 1979	Added Since 1979	Dropped Since 1979	Used in 1983
<b>Survey Estimates (thousand buildings)</b>				
Electricity.....	3,688	39	94	3,632
Natural Gas.....	2,184	220	163	2,241
Fuel Oil.....	783	56	215	624
Propane.....	291	42	91	241
Purchased Steam.....	48	17	7	58
Purchased Chilled Water.....	7	2	Q	6
Coal.....	53	20	18	55
Wood.....	103	65	32	137
<b>Relative Standard Errors (percent)</b>				
Electricity.....	5.2	39.7	20.3	5.1
Natural Gas.....	7.6	11.5	11.2	7.3
Fuel Oil.....	9.6	17.0	11.5	9.8
Propane.....	14.2	21.4	22.3	18.1
Purchased Steam.....	17.9	23.0	29.5	14.7
Purchased Chilled Water.....	37.2	22.9	57.8	22.8
Coal.....	23.3	49.8	40.3	26.6
Wood.....	19.2	23.3	22.6	18.1

Q = Data unreliable either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

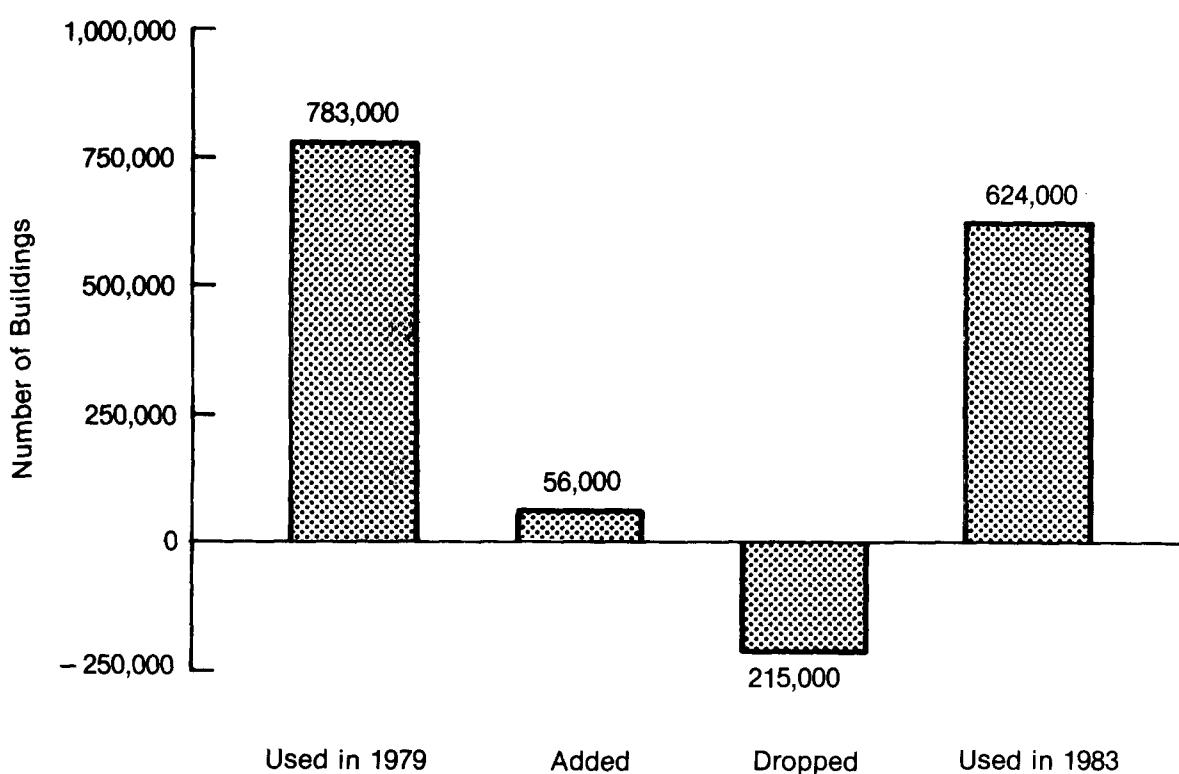
Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

Although natural gas was newly supplied to 220,000 ( $\pm 51,000$ ) commercial buildings between 1979 and 1983, it was discontinued in another 163,000 ( $\pm 37,000$ ) buildings between 1979 and 1983. The net result was that there was no significant change in the total number of buildings supplied with natural gas.

The number of buildings supplied with fuel oil, however, did show a significant decline between 1979 and 1983. The number of buildings that used fuel oil in 1983 was 624,000 ( $\pm 122,000$ ), which is 20.3 ( $\pm 5.6$ ) percent lower than the number of buildings that used it in 1979. (See Figure 9.)

**Figure 9. Changes in the Number of Buildings Supplied with Fuel Oil**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey; Table 19.

## End Uses of Energy

In addition to information on the energy sources supplied to the buildings, the NBECS also provided data on six selected end uses of the energy. These end uses are space heating, water heating, cooling, cooking, manufacturing, and electricity generation. Table S6 summarizes the energy sources by end use.<sup>2</sup>

**Table S6. Number of Buildings by Fuels for Various End Uses, 1983**

Fuels Supplied to the Building	Number of Buildings Using Fuel	End Uses for Various Fuels					
		Space Heating	Water Heating	Cooling	Cooking	Manufacturing	Electricity Generation
<b>Survey Estimates (thousand buildings)</b>							
Electricity.....	3,783	1,105	1,382	2,515	887	317	NC
Natural Gas.....	2,314	2,011	1,403	141	658	82	33
Fuel Oil.....	633	566	148	5	Q	14	31
Propane.....	260	161	54	Q	80	Q	11
Purchased Steam.....	60	55	32	2	6	Q	Q
Purchased Chilled Water.....	11	--	--	4	--	--	--
Coal.....	55	48	5	NC	Q	Q	Q
Purchased Hot Water.....	11	Q	Q	Q	Q	NC	Q
Wood.....	134	115	Q	NC	Q	Q	Q
Solar.....	16	8	6	Q	NC	NC	Q
Other.....	71	28	Q	8	Q	Q	33
<b>Relative Standard Error (percent)</b>							
Electricity.....	5.1	12.5	8.3	7.2	7.1	13.6	NC
Natural Gas.....	6.8	7.4	7.7	11.9	8.6	12.5	25.3
Fuel Oil.....	9.7	10.3	13.7	23.6	56.9	24.3	18.7
Propane.....	16.8	19.5	28.9	71.0	23.0	51.4	31.5
Purchased Steam.....	14.3	15.3	18.3	35.2	28.9	76.8	130.1
Purchased Chilled Water.....	36.4	--	--	25.8	--	--	--
Coal.....	24.6	22.6	45.1	NC	100.0	72.1	76.1
Purchased Hot Water.....	40.9	66.6	53.7	67.1	79.1	NC	146.7
Wood.....	17.6	18.7	38.6	NC	100.0	20.3	223.6
Solar.....	21.1	41.5	46.7	74.7	NC	NC	79.1
Other.....	26.8	24.2	67.9	41.5	47.5	59.4	29.4

NC = No cases in sample.

Q = Data unreliable either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

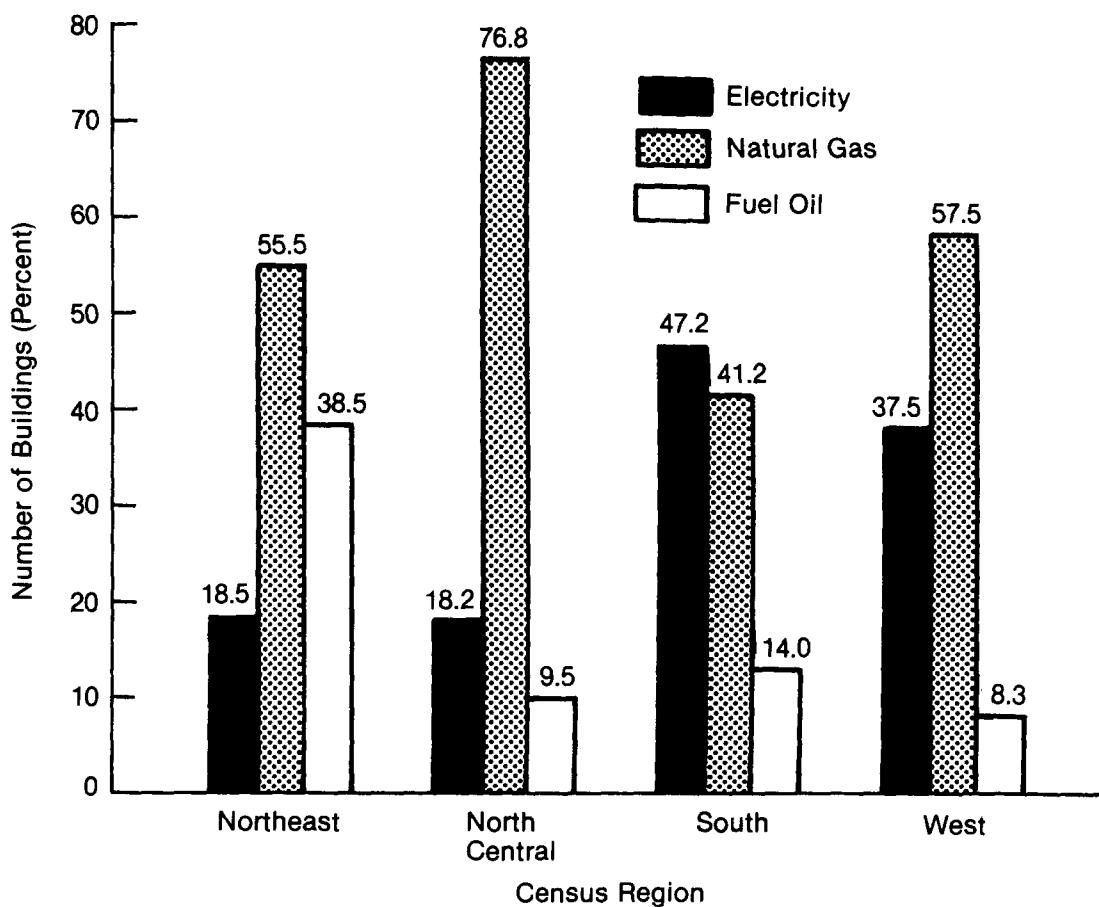
<sup>2</sup>All percentages presented in this section about end uses are based on the total number of buildings that use energy for the particular end use being discussed, except where otherwise noted.

## Space Heating

Of the six end uses reported in this survey, space heating was the most prevalent. Of the 3,948,000 ( $\pm 387,000$ ) commercial buildings, 88.8 ( $\pm 2.0$ ) percent, or 3,507,000 ( $\pm 351,000$ ) buildings, used energy for space heating. The most commonly used energy source for space heating was natural gas. Natural gas was used to space heat 57.3 ( $\pm 6.8$ ) percent of the heated buildings. Electricity was used to space heat 31.5 ( $\pm 7.2$ ) percent and fuel oil was used to space heat 16.1 ( $\pm 2.9$ ) percent of the heated buildings.

The distribution of fuels used for space heating varied by Census region. The predominant heating fuel in the Northeast was natural gas, followed by fuel oil, with 55.5 ( $\pm 9.1$ ) percent and 38.5 ( $\pm 8.9$ ) percent, respectively, of the buildings using these fuels for space heating. In the North Central, however, a majority of the buildings, 76.8 ( $\pm 5.8$ ) percent, used natural gas for space heating. Electricity and natural gas were used about equally as often as space heating fuels in the South, with 47.2 ( $\pm 17.5$ ) percent and 41.2 ( $\pm 15.2$ ) percent, respectively. The predominant heating fuels in the West were natural gas, with 57.5 ( $\pm 10.4$ ) percent, and electricity, with 37.5 ( $\pm 11.1$ ) percent. (See Figure 10.)

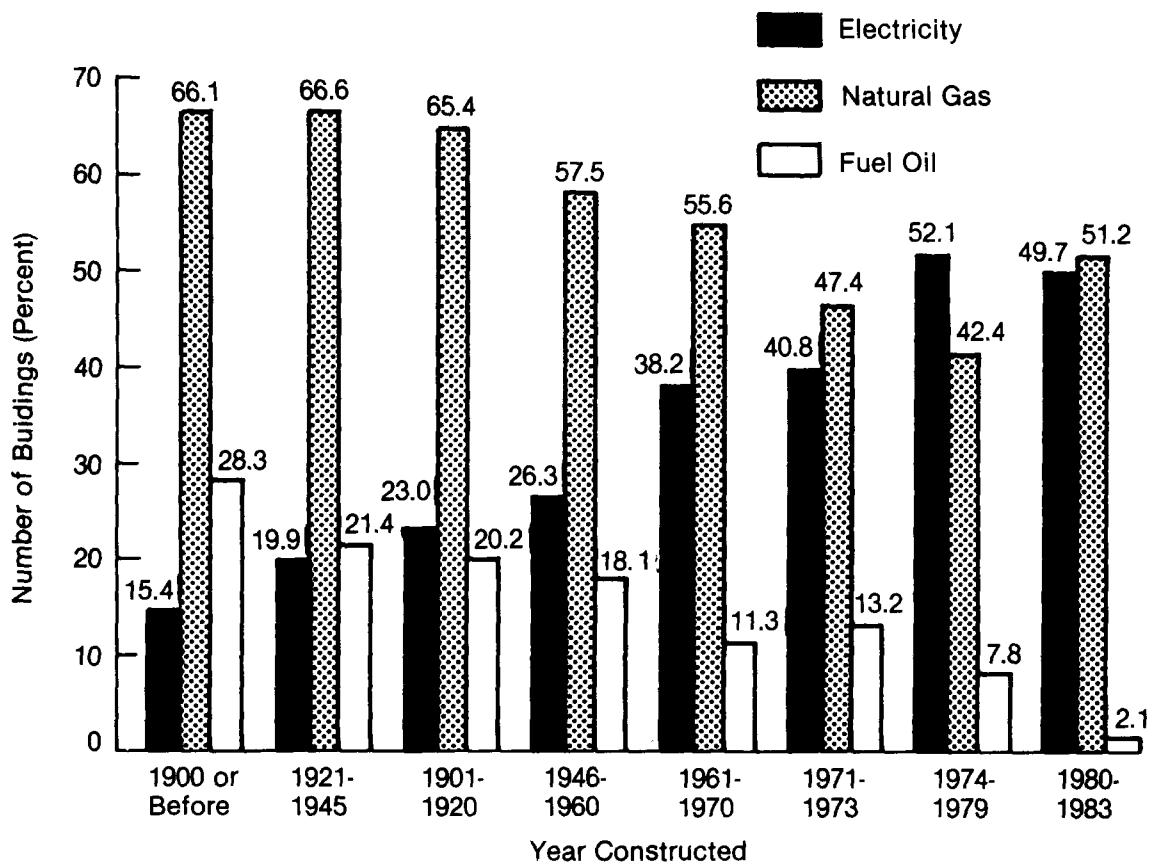
**Figure 10. Energy Sources Used for Space Heating by Census Region**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

The fuels used for space heating varied by the age of the building. In the heated buildings constructed in 1960 or earlier, natural gas was the predominant space heating energy source, used in 62.5 ( $\pm 4.3$ ) percent of these buildings. Electricity and fuel oil were the next most used fuels in these buildings, used by 22.8 ( $\pm 4.6$ ) percent and 20.6 ( $\pm 2.4$ ) percent of the buildings, respectively. However, among the most recently constructed buildings--those built between 1980 and 1983--the percentages using natural gas and electricity as a space heating fuel were almost equally distributed. (See Figure 11.) Fuel oil was used for space heating in only 2.1 ( $\pm 1.2$ ) percent of the most recently constructed buildings.

**Figure 11. Energy Sources Used for Space Heating by Year Constructed**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

The size of a building was related to the source of energy most likely to be used for space heating. Natural gas, electricity, and fuel oil were used for heating by buildings of all sizes. Propane, however, was a source of energy for space heating primarily in small buildings. Propane provided heat to 6.6 ( $\pm 3.2$ ) percent of all heated buildings containing 5,000 square feet or less, but heated very few buildings of more than 5,000 square feet. Purchased steam, on the other hand, was a source of energy for space heating primarily in large buildings. Purchased steam provided heat to 21.2 ( $\pm 8.5$ ) percent of buildings larger than 200,000 square feet.

## Water Heating

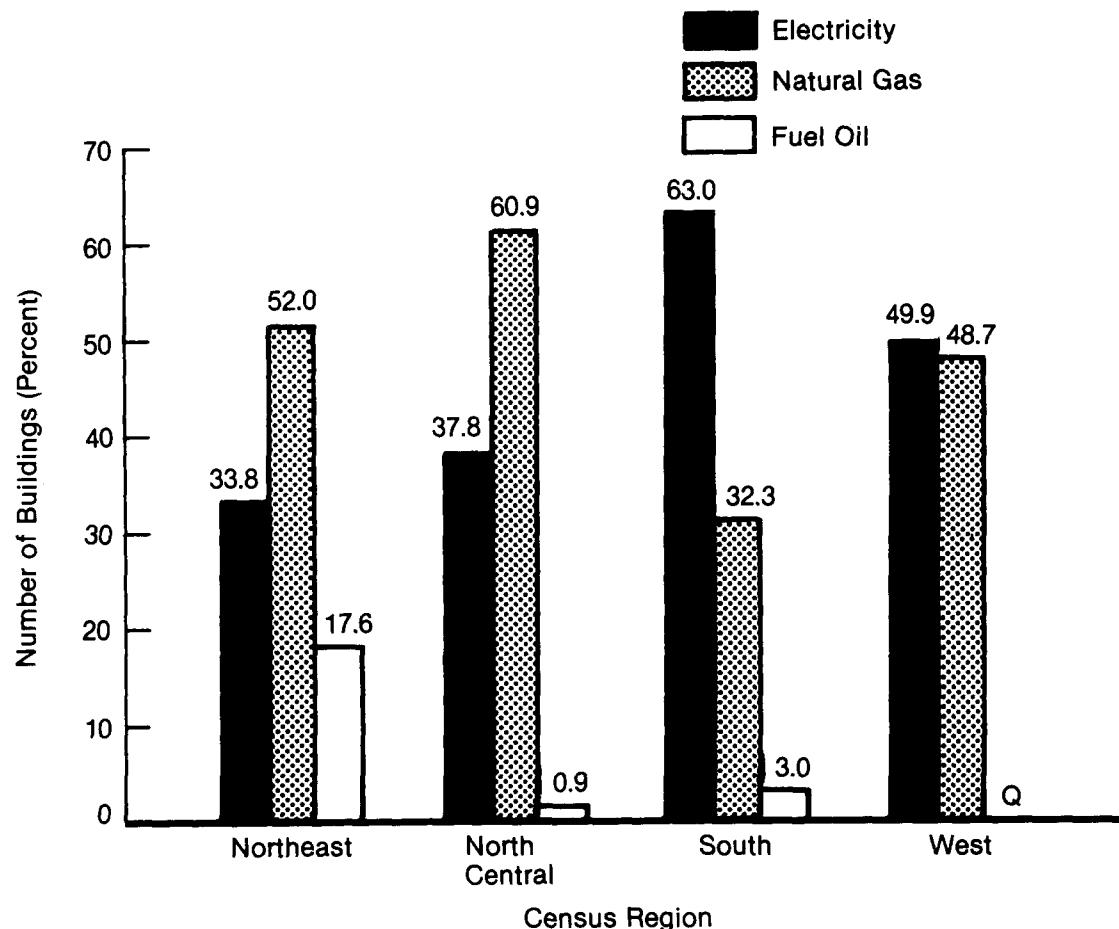
In the 74.3 ( $\pm 2.4$ ) percent of all commercial buildings that heated water, electricity and natural gas were almost equally preferred as the sources of energy to heat the water. The number of buildings that heated water with electricity was 1,382,000 ( $\pm 229,000$ ). The number of buildings that heated water with natural gas was 1,403,000 ( $\pm 216,000$ ).

The distribution of energy sources used for water heating varied by Census region. The predominant source of energy for water heating in both the Northeast and North Central was natural gas. The percentage of buildings in these regions that used natural gas to heat water was 52.0 ( $\pm 12.0$ ) percent and 60.9 ( $\pm 7.2$ ) percent, respectively. In the South, electricity heated water in 63.0 ( $\pm 9.8$ ) percent of the buildings that heated water. Electricity and natural gas were used about equally as often in the West, with 49.9 ( $\pm 12.1$ ) percent and 48.7 ( $\pm 13.5$ ) percent of the buildings that heated water using these energy sources, respectively. Fuel oil was an important source of energy for heating water only in the Northeast. (See Figure 12.)



*Of those commercial buildings constructed between 1980 and 1983, the percentage using natural gas and electricity as a space heating fuel were almost equally distributed.*

**Figure 12. Energy Sources Used for Water Heating by Census Region**



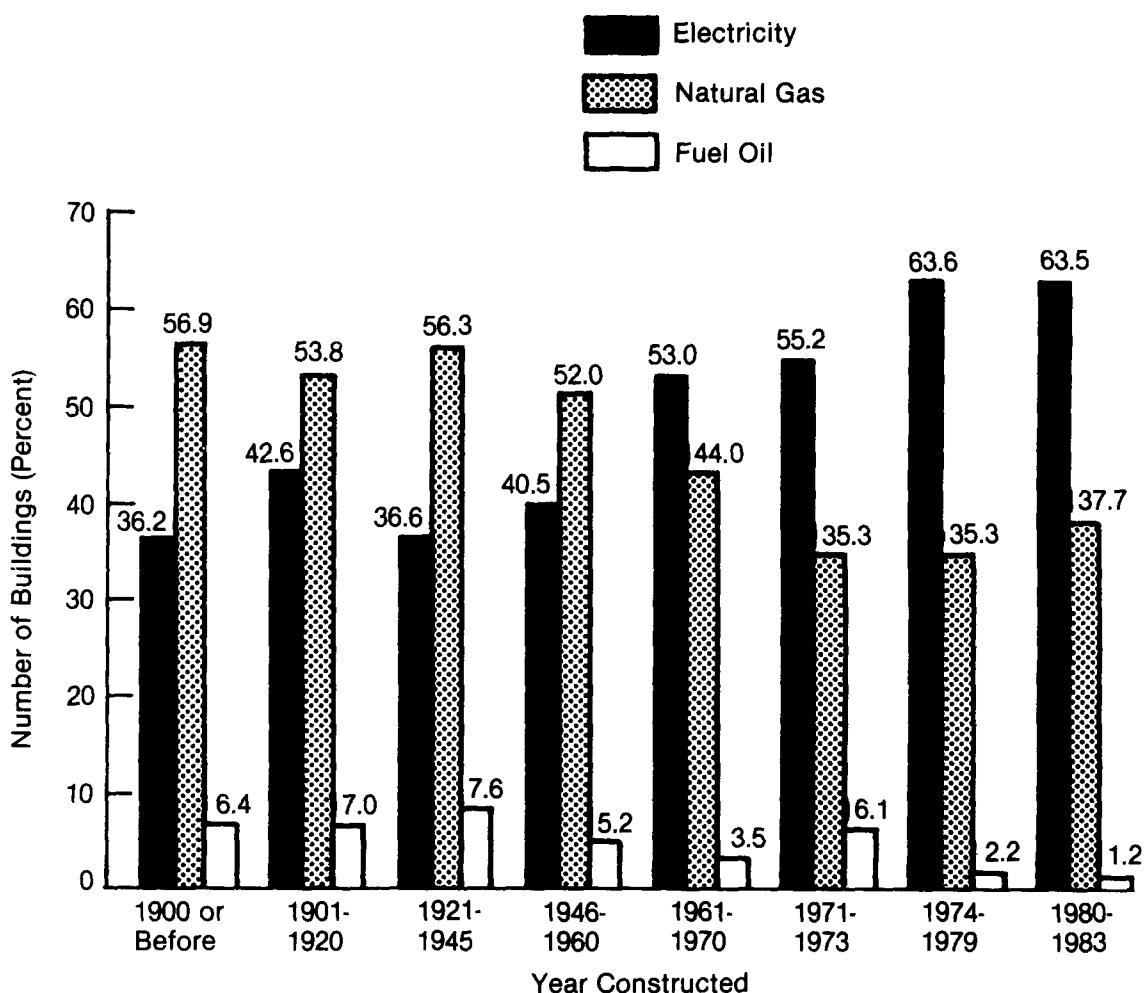
Q = Data withheld for fuel oil due to large variance.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

The age of a building was related to which sources of energy were used to heat water. As shown in Figure 13, natural gas was the leading water-heating energy source for buildings constructed through 1960. Electricity, however, was the leading energy source for buildings constructed after 1960.

The percentage of buildings that heated water varied by the size of building. This percentage ranged from 66.2 ( $\pm 2.8$ ) among buildings 5,000 square feet or less to 94.4 ( $\pm 1.9$ ) among buildings larger than 200,000 square feet. An important energy source for water heating in buildings larger than 200,000 square feet was purchased steam, which was used for water heating by 15.8 ( $\pm 5.7$ ) percent of these large buildings.

**Figure 13. Energy Sources Used for Water Heating by Year Constructed**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Cooling

At the time of the survey (mid-1983), 66.8 ( $\pm 5.7$ ) percent of all commercial buildings were air-conditioned. Almost all cooling, 95.4 ( $\pm 1.0$ ) percent, was fueled by a single energy source, electricity. Natural gas was used to cool in 5.3 ( $\pm 1.3$ ) percent of the buildings that had air-conditioning.

## Cooking

Cooking facilities were present in 37.2 ( $\pm 1.8$ ) percent of all commercial buildings, or 1,468,000 ( $\pm 173,000$ ) buildings. Electricity and natural gas were the major energy sources used for cooking in these commercial buildings, accounting for 60.5 ( $\pm 4.5$ ) percent and 44.8 ( $\pm 5.9$ ) percent of the buildings, respectively.

The presence of cooking facilities was related to the size of the building. The percentage of the buildings with cooking facilities varied from 32.0 ( $\pm 3.3$ ) percent for buildings 5,000 square feet or less to 63.5 ( $\pm 8.8$ ) percent for buildings larger than 200,000 square feet. For buildings smaller than 200,000 square feet, electricity was used more than natural gas as an energy source for cooking. For buildings larger than 200,000 square feet, natural gas was the predominant source of energy for cooking.

## Manufacturing

In commercial buildings, 9.8 ( $\pm 1.9$ ) percent, or 388,000 ( $\pm 93,000$ ) buildings, used an energy source for some type of manufacturing activity. The most commonly used energy source for manufacturing was electricity, used by 81.6 ( $\pm 3.8$ ) percent of all commercial buildings, followed by natural gas, used by 21.2 ( $\pm 4.6$ ) percent of all commercial buildings. The proportion of buildings that used energy for manufacturing was greatest among the warehouse buildings with 20.2 ( $\pm 8.2$ ) percent, and the mercantile/service buildings, with 15.8 ( $\pm 3.0$ ) percent.

## Capacity to Generate Electricity

The number of commercial buildings with the capacity to generate electricity was 108,000 ( $\pm 28,000$ ), or 2.7 ( $\pm 0.6$ ) percent of all commercial buildings.<sup>3</sup> Of the buildings with electrical generating capacity, 30.1 ( $\pm 11.2$ ) percent used natural gas, 28.3 ( $\pm 8.9$ ) percent used fuel oil, and 41.8 ( $\pm 11.4$ ) percent used some other energy source for generating electricity.

The capacity to generate electricity varied by the size of the building and was more likely to be found in large buildings. Of buildings larger than 200,000 square feet, 29.1 ( $\pm 11.8$ ) percent had the capacity to generate electricity, and these buildings were more likely to generate it using fuel oil (76.4 ( $\pm 18.2$ ) percent). In comparison, only 1.8 ( $\pm 0.9$ ) percent of all buildings of less than 5,000 square feet could generate electricity.

The percentage of buildings with the capacity to generate electricity also varied by building type. This capacity was the highest for health-care buildings (13.2 ( $\pm 7.2$ ) percent) and buildings in the "other" category (14.9 ( $\pm 7.1$ ) percent).

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<sup>3</sup>The 1983 NBECS did not ascertain whether the building was actually generating electricity or whether this electricity generating capacity was part of an emergency backup system.

## **Heating Practices and Equipment**

### **Heating Patterns**

As of mid-1983, 61.5 ( $\pm 3.6$ ) percent of all commercial buildings were completely heated, 27.4 ( $\pm 2.4$ ) percent were partially heated, and 11.1 ( $\pm 2.0$ ) percent were not heated at all. Among buildings smaller than 5,000 square feet, 61.3 ( $\pm 3.7$ ) percent of the buildings were completely heated, compared with 73.1 ( $\pm 5.8$ ) percent of the buildings larger than 200,000 square feet that were completely heated.

Buildings varied considerably by type in their heating patterns. More than 80 percent of the assembly, educational, health care, and lodging buildings were completely heated, compared with 50.5 ( $\pm 11.7$ ) percent of the buildings in the "other" category, and less than 30 percent of the storage buildings and vacant buildings.

### **Heating Systems**

Of the 3,508,000 ( $\pm 351,000$ ) commercial buildings that were heated (partially or completely), 82.8 ( $\pm 2.3$ ) percent had central heating systems, possibly combined with self-contained units and 16.6 ( $\pm 2.4$ ) percent had self-contained units only. At least <sup>4</sup> 169,000 ( $\pm 64,000$ ) commercial buildings, or 4.8 ( $\pm 1.7$ ) percent, had heat pumps.

There were significant regional differences in the types of heating systems. Although the majority of commercial buildings in all Census regions relied on central heating systems, buildings in the South and West were more likely to heat solely with self-contained units than were buildings in the Northeast and North Central regions. Among buildings with central heating systems, buildings in the Northeast and North Central were more likely to have a furnace or boiler. Heat pumps were present in at least 9.3 ( $\pm 3.4$ ) percent of the buildings in the South, where 70.4 ( $\pm 18.0$ ) percent of all heat pumps were located.

Large buildings were more likely to have central heating systems. While 95.5 ( $\pm 2.7$ ) percent of the buildings larger than 200,000 square feet had central heating systems, only 79.0 ( $\pm 3.2$ ) percent of the buildings smaller than 5,000 square feet had central heating systems.

More than 90 percent of the residential, health care, office, and assembly buildings were equipped with central heating systems. Of the buildings used for lodging, only 71.5 ( $\pm 6.4$ ) percent had central heating systems.

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<sup>4</sup>The number of heat pumps reported in this survey represents a conservative estimate, since the counts were obtained from open-ended questions about types of heating and heat distribution systems not mentioned in the questionnaire.

Central heating systems were found in 96.1 ( $\pm 1.7$ ) percent of the buildings that heated with fuel oil and in 98.5 ( $\pm 1.8$ ) percent of the buildings that heated with purchased steam. Of the buildings that heated with fuel oil, 91.6 (13.3) percent had furnaces or boilers.

Older buildings were more likely to rely on a furnace or boiler for heating. Furnaces or boilers were found in 82.6 ( $\pm 6.6$ ) percent of the heated buildings constructed in 1900 or earlier, but in only 44.6 ( $\pm 9.5$ ) percent of the heated buildings constructed between 1980 and 1983.

## Boilers and Boiler Fuels

Boilers were present in 733,000 ( $\pm 114,000$ ), or 18.6 ( $\pm 2.3$ ) percent of the 3,948,000 ( $\pm 387,000$ ) commercial buildings. The presence of boilers was related to the age and the location of the building. While 33.7 ( $\pm 10.2$ ) percent of the buildings constructed in 1900 or before and 24.2 ( $\pm 3.4$ ) percent of the buildings constructed between 1900 and 1920 relied on boilers, only 11.4 ( $\pm 2.2$ ) percent of the buildings constructed between 1980 and 1983 had boilers. In the Northeast, 39.3 ( $\pm 5.0$ ) percent of the buildings had boilers, a significantly higher percentage than in any other region.

The majority of the buildings with boilers, 67.8 ( $\pm 6.1$ ) percent, had boilers fired by natural gas. In 29.4 ( $\pm 5.6$ ) percent of the buildings, boilers were fired by fuel oil. There were regional differences in the fuels used to fire boilers. Natural gas and fuel oil were used with equal frequency as boiler fuels in the Northeast. In comparison, of the buildings in the North Central region having boilers, 88.4 ( $\pm 6.7$ ) percent were fired by natural gas, but only 9.3 ( $\pm 5.6$ ) percent were fired by fuel oil.

As shown in Table S7, 73,000 ( $\pm 21,000$ ) buildings constructed before 1980 had new boilers installed between January 1980 and July 1983. Natural gas was used to fire the new boilers in 66.7 ( $\pm 17.6$ ) percent of the buildings and fuel oil was used to fire new boilers in 30.5 ( $\pm 19.6$ ) percent of the buildings.

**Table S7. Number of Buildings with New Boilers Installed Since January 1, 1980**

Fuels Used to Fire New Boilers	Number of Buildings (Thousands)	Percentage of Buildings
All Buildings With Boilers Added .....	73 ( $\pm 21$ )	100.0
Natural Gas .....	48 ( $\pm 17$ )	66.7 ( $\pm 17.6$ )
Fuel Oil .....	22 ( $\pm 16$ )	30.5 ( $\pm 19.6$ )
Other .....	Q	Q

Q=Data unreliable, either because the relative standard error was greater than 50 percent or because fewer than 20 buildings were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Heat Distribution Systems

In the 3,508,000 ( $\pm 351,000$ ) buildings that had any heat, the most common heat distribution system was fan-forced air, used in 53.0 ( $\pm 3.0$ ) percent of the buildings. Baseboards were used in 15.3 ( $\pm 2.1$ ) percent of the buildings. Radiators, convectors, or panels were used for heat distribution in 1.7 ( $\pm 0.5$ ) percent of the buildings. Among the buildings with baseboard heating, 53.9 ( $\pm 6.6$ ) percent had electric baseboards and 42.0 ( $\pm 6.8$ ) percent had hot water baseboards.

Forced-air fans were more popular in new buildings. The proportions of heated buildings with forced-air fans was 76.2 ( $\pm 5.9$ ) percent for buildings constructed between 1980 and 1983, compared with 44.9 ( $\pm 5.4$ ) percent for buildings constructed in 1900 or before.

## Changes in Percentage of Heated Floor Space

Between 1979 and 1983, the number of buildings that had an increase in heated area about balanced those that had a decrease in heated area. Of buildings built before 1980, 304,000 ( $\pm 65,500$ ) buildings had decreases in heated floor space, while 241,000 ( $\pm 50,600$ ) had increases in heated floor space. Of buildings that were predominantly vacant in 1983, 94,000 ( $\pm 47,900$ ) buildings showed decreases in the percentage of floor space heated, which was significantly larger than the 25,000 ( $\pm 11,950$ ) buildings that showed increases in the percentage of floor space heated.

## **Unheated Buildings**

Three categories of buildings--vacant, storage, and "other" buildings--contained 70.2 ( $\pm 14.9$ ) percent of the unheated buildings. The percentages of buildings that were unheated were 51.4 ( $\pm 7.4$ ) percent of vacant buildings, 29.7 ( $\pm 6.5$ ) percent of storage buildings, and 21.7 ( $\pm 9.2$ ) of "other" buildings. Of the vacant buildings, 75.4 ( $\pm 10.0$ ) percent of those for which no establishments were reported were unheated. These unoccupied buildings accounted for 24.3 ( $\pm 8.1$ ) percent of the unheated buildings.

Small buildings were more likely to be unheated than large buildings. For example, 15.3 ( $\pm 3.2$ ) percent of all buildings smaller than 5,000 square feet were unheated, whereas only 3.6 ( $\pm 2.4$ ) percent of all buildings larger than 200,000 square feet lacked heat.

In the Northeast and the North Central Census regions, unheated buildings constituted an average of 7.4 ( $\pm 3.5$ ) percent of the buildings. In the South and West, an average of 14.5 ( $\pm 2.4$ ) percent of the buildings went without heat.

## **Cooling Practices and Equipment**

### **Cooling Patterns**

In 1983, 28.6 ( $\pm 5.5$ ) percent of all commercial buildings were totally air-conditioned, 38.3 ( $\pm 2.7$ ) percent were partially air-conditioned, and 33.0 ( $\pm 5.7$ ) percent of all commercial buildings completely lacked air-conditioning.

Size of a building was related to the presence of air-conditioning. The percentage of buildings that had air-conditioning (partial or total) ranged from 59.8 ( $\pm 6.6$ ) for buildings of less than 5,000 square feet to 92.5 ( $\pm 3.9$ ) for those buildings of more than 200,000 square feet.

### **Air-Conditioning Systems**

As of mid-1983, 2,643,000 ( $\pm 375,000$ ) commercial buildings were either partially or fully air-conditioned. Of these, 66.1 ( $\pm 3.0$ ) percent had central systems, 30.7 ( $\pm 3.8$ ) percent had window units, 15.4 ( $\pm 1.9$ ) percent had wall units, 6.4 ( $\pm 1.8$ ) percent had heat pumps, and 1.7 ( $\pm 0.6$ ) percent used well water for cooling. About 44.8 ( $\pm 3.0$ ) percent of the central systems were factory assembled, while the rest were individually constructed.

The percentage of air-conditioned buildings with central systems varied from 58.4 ( $\pm 5.0$ ) for buildings of 5,000 square feet or less to 91.9 ( $\pm 3.5$ ) for buildings of more than 200,000 square feet. The percentage of buildings with window or wall units did not vary according to the size of building.

The percentage of buildings with central systems varied from 48.9 ( $\pm 8.9$ ) for buildings constructed in 1900 or before to 89.9 ( $\pm 4.1$ ) for buildings constructed between 1980 and 1983. Over the same range, the percentage of buildings with window units varied from 49.6 ( $\pm 9.8$ ) to 4.3 ( $\pm 2.7$ ).

Types of air-conditioning systems varied by the percent of the building that was being cooled. In air-conditioned buildings that were less than half cooled, 45.2 ( $\pm 4.0$ ) percent relied on window units and 48.6 ( $\pm 3.5$ ) percent relied on central cooling systems. In totally air-conditioned buildings, 18.9 ( $\pm 5.1$ ) percent of the buildings used window units, but 79.5 ( $\pm 5.4$ ) percent relied on central cooling system.

## **Changes in Percentage of Cooled Floor Space**

Between 1979 and 1983 the percentage of the buildings' floor space that was air-conditioned increased in 370,000 ( $+33,000$ ) buildings and decreased in 284,000 ( $\pm 69,000$ ) buildings. The percentage of the building cooled was most likely to decrease in buildings that were predominantly vacant in 1983, with 23.1 ( $\pm 7.7$ ) percent of those buildings showing a decrease.

# Conservation Measures

The 1983 NBECS provided data on the presence of insulation and other energy-saving measures as well as on whether particular energy conservation features had been installed since January 1, 1980. The 1983 NBECS also provided information about the maintenance and control of heating and cooling systems, and about energy audits performed during the 12 months prior to the interview.

## Presence of Conservation Features

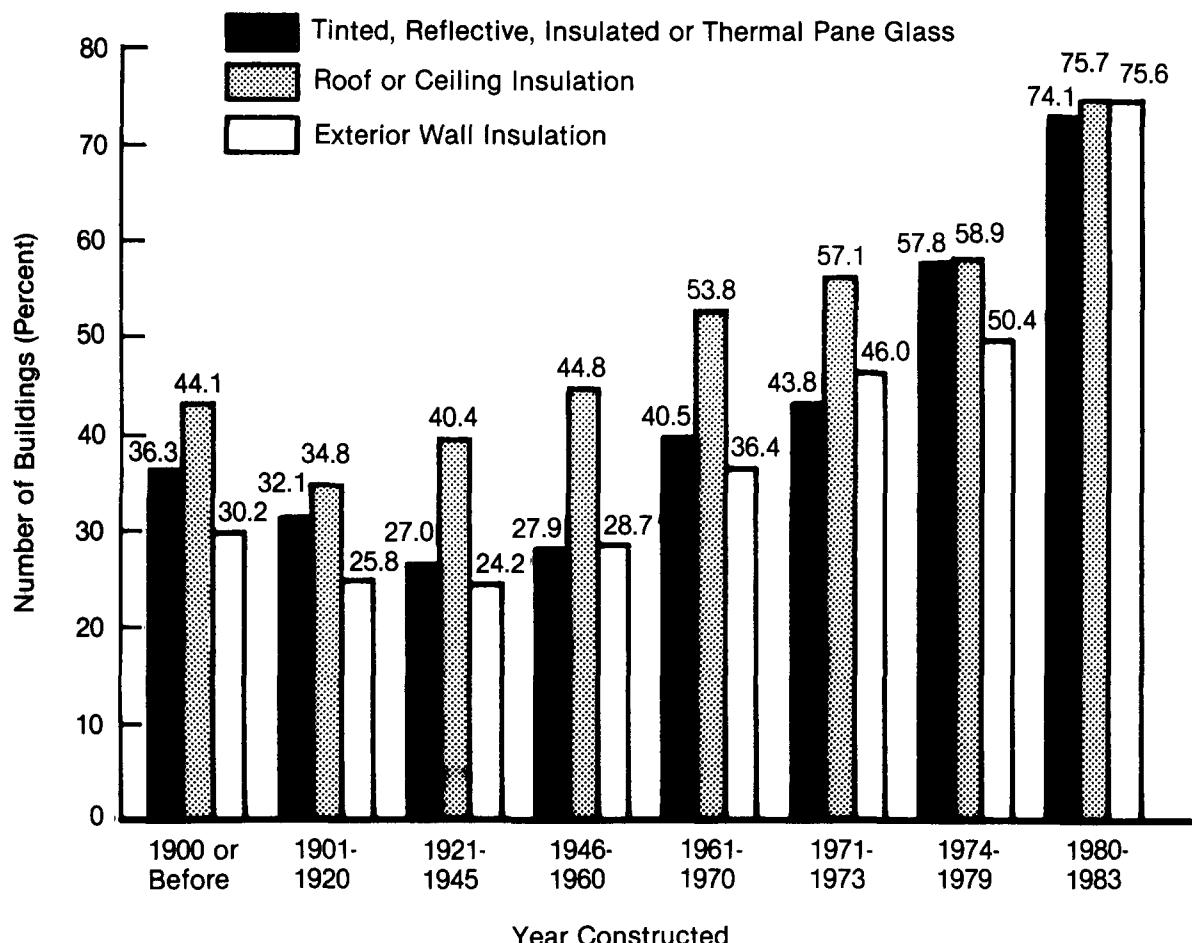
Questions were asked about the presence of roof or ceiling insulation, wall insulation, and special conservation glass. Of the three items, roof or ceiling insulation, found in 48.2 ( $\pm 2.7$ ) percent of the buildings, was the most common type of energy conservation feature in commercial buildings. About 37.7 ( $\pm 4.0$ ) percent of all buildings had special conservation glass. Exterior wall insulation was present in 34.6 ( $\pm 2.0$ ) percent of the buildings. At least one of the three conservation features was present in 69.1 ( $\pm 2.3$ ) percent of the buildings, while all three features were present in 12.9 ( $\pm 1.5$ ) percent of the buildings.

The incidence of conservation glass was higher in the newer buildings (Figure 14). The percentage of the buildings built between 1980 and 1983 that reported some form of conservation glass was 74.1 ( $\pm 6.1$ ). Exterior wall insulation was present in 75.6 ( $\pm 4.5$ ) percent of buildings constructed between 1980 and 1983. Roof or ceiling insulation was present in 75.7 ( $\pm 5.9$ ) percent of those recently constructed buildings.

The presence of the three types of energy-conservation features varied according to the size of a building. The use of conservation glass ranged from 30.7 ( $\pm 5.0$ ) percent for buildings of 5,000 square feet or less to 67.8 ( $\pm 6.2$ ) percent for buildings of more than 200,000 square feet. A similar, but not as marked, increase was noted for roof or ceiling insulation. No trend was found in the incidence of exterior wall insulation by size of building.

Conditions inside the buildings were more closely related to the presence of conservation features than conditions outside the buildings. No statistically significant differences in the presence of conservation features could be found among Census regions or among climate zones. There were, however, differences related to the percentage of the building that was heated. Among the unheated buildings, only 38.2 ( $\pm 6.8$ ) percent had one or more of the three types of conservation features in place, compared with 75.3 ( $\pm 2.6$ ) percent for the buildings that were completely heated. The differences were also significant between buildings lacking air-conditioning, where 52.0 ( $\pm 4.8$ ) percent had at least one of these energy conservation features, and totally air-conditioned buildings, where the corresponding percentage was 82.2 ( $\pm 3.6$ ) percent.

**Figure 14. Commercial Buildings With Conservation Glass and Insulation by Year Constructed**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## Energy Conservation Measures Implemented Since January 1, 1980

Four types of energy conservation measures implemented since January 1, 1980, were reported on the 1983 NBECS: weatherstripping, roof insulation, exterior wall insulation, and conservation glass. Between January 1, 1980, and July 1, 1983, one or more of these improvements were made in 39.0 ( $\pm 2.9$ ) percent of all commercial buildings. The most common improvement was weatherstripping or caulking, which was added to 31.3 ( $\pm 2.3$ ) percent of the buildings. Roof insulation was added to 10.2 ( $\pm 1.1$ ) percent of the buildings, while 6.4 ( $\pm 1.3$ ) percent of the buildings had exterior wall insulation added. Conservation glass was added to 10.2 (1.6) percent of the buildings.

Conservation improvements varied according to geographic region. The Northeast and North Central regions, the two regions with the oldest commercial building stock, had more buildings with improvements (46.0 ( $\pm 2.0$ ) percent) than did the South and West (32.7 ( $\pm 5.2$ ) percent).

As was true for existing conservation features, totally heated buildings were more likely to have had improvements than unheated buildings, 43.5 ( $\pm 3.7$ ) percent compared with 10.9 ( $\pm 5.5$ ) percent, respectively. Totally air-conditioned buildings (42.7 ( $\pm 4.7$ ) percent) were more likely to have improvements than buildings that lacked air-conditioning (28.9 ( $\pm 3.9$ ) percent).

## Maintenance and Control of Heating and Cooling Systems

### Maintenance

Of the 3,556,000 ( $\pm 370,000$ ) buildings with heating or cooling systems, 81.9 ( $\pm 2.1$ ) percent had a regular maintenance program for those systems. The percentage of buildings with a regular maintenance program was the highest for the buildings constructed between 1980 and 1983, with 91.3 ( $\pm 3.8$ ) percent. Large buildings were also more likely to have a regular maintenance program than were small buildings. While, 99.3 ( $\pm 1.8$ ) percent of buildings larger than 200,000 square feet had such a program, only 77.1 ( $\pm 3.1$ ) percent of all buildings less than 5,000 square feet had a regular maintenance program.

### Computerized Control

Heating and/or cooling were controlled by computerized systems in 105,000 ( $\pm 17,000$ ) buildings, which comprised 2.9 ( $\pm 0.5$ ) percent of the buildings with heating or cooling systems. Buildings most likely to have computerized control of heating or cooling systems were buildings constructed between 1980 and 1983, with 9.2 ( $\pm 2.1$ ) percent, and buildings of more than 100,000 square feet with 21.5 ( $\pm 3.9$ ) percent.

### Employee Control

The employees or other people in the building were able to control the heating temperature in 72.4 ( $\pm 2.5$ ) percent of the buildings with heating and the cooling temperature in 44.3 ( $\pm 3.3$ ) percent of the buildings with air-conditioning. This control of indoor temperatures was more likely to occur in small buildings than in large buildings. In buildings under 5,000 square feet, employees could control the heating and cooling temperatures in 77.2 ( $\pm 3.7$ ) and 44.1 ( $\pm 4.2$ ) percent of the buildings, respectively. By contrast, employees could control the heating temperature in 28.8 ( $\pm 5.8$ ) percent and the cooling temperature in 22.9 ( $\pm 5.8$ ) percent of the buildings over 200,000 square feet.

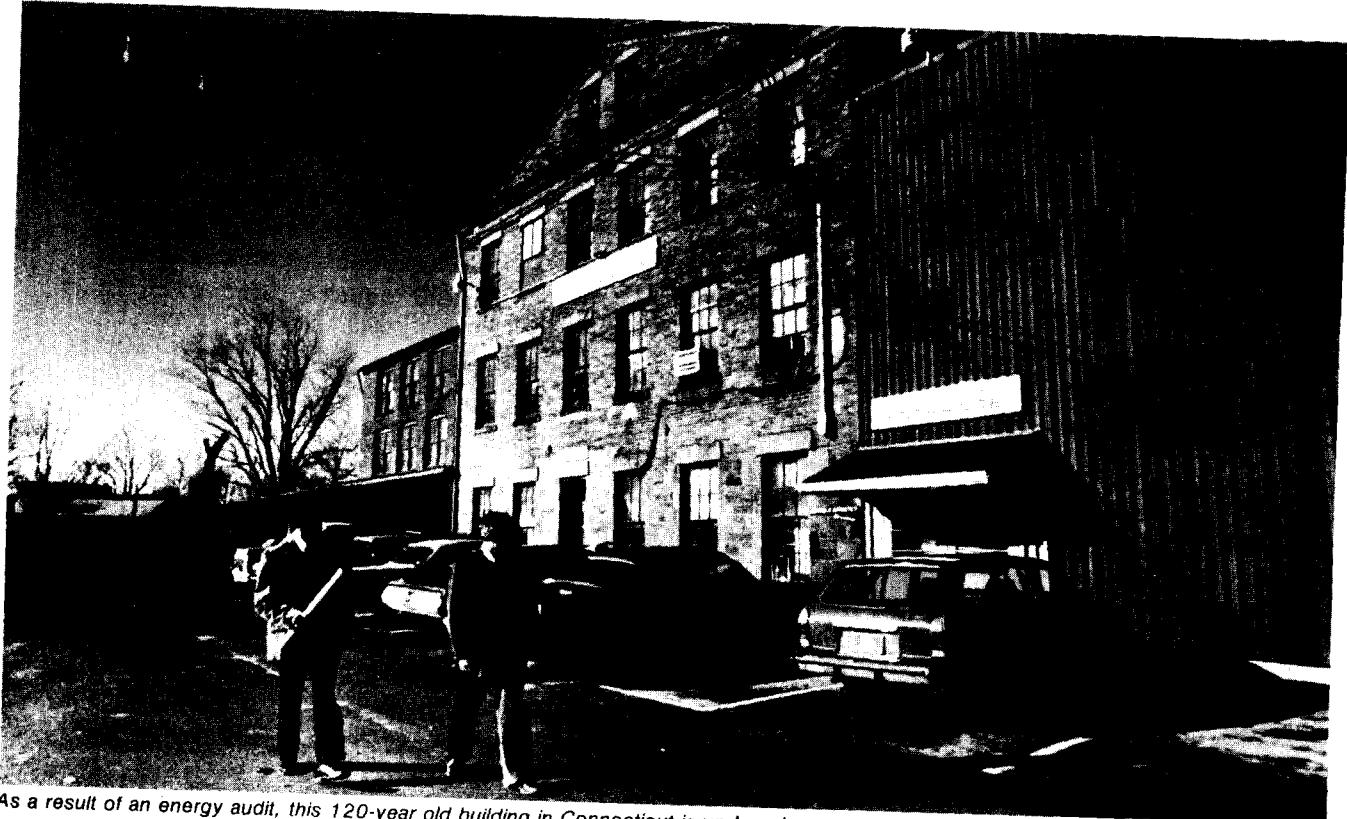
## **Reduction of Heating or Cooling**

Heating was reduced during off-hours in 85.8 ( $\pm 1.4$ ) percent of the buildings that were heated, and cooling was reduced during off-hours in 87.1 ( $\pm 1.4$ ) percent of the buildings that were air-conditioned.

There were 642,000 ( $\pm 107,000$ ) commercial buildings that had some space vacant for at least 3 months from mid-1982 to mid-1983. Of these buildings, 82.9 ( $\pm 3.3$ ) percent reduced the heating and/or cooling in the vacant areas.

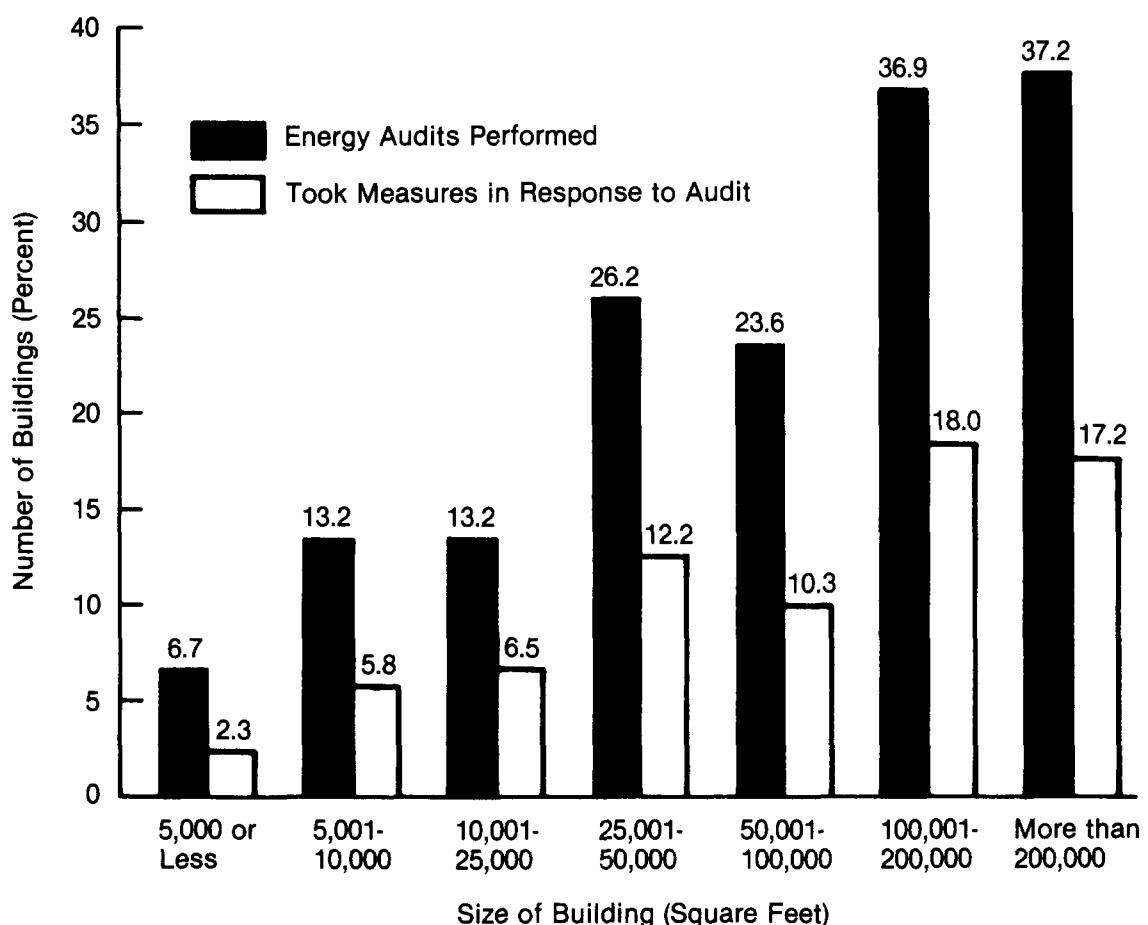
## **Professional Energy Audits**

Professional energy audits were performed in 11.0 ( $\pm 1.8$ ) percent of all commercial buildings between mid-1982 and mid-1983. Large buildings were more likely to have had audits than small buildings. As shown in Figure 15, professional energy audits were performed in 6.7 ( $\pm 2.3$ ) percent of the buildings under 5,000 square feet, while 37.2 ( $\pm 9.5$ ) percent of the buildings over 200,000 square feet were audited. Buildings constructed after 1960 were more likely to have been audited (13.7 ( $\pm 2.6$ ) percent audited) than were buildings constructed before 1960 (9.2 ( $\pm 1.4$ ) percent audited). Buildings used for educational, health-care, and lodging purposes were the types most likely to have had audits. In addition, buildings occupied by government agencies were more likely to be audited than buildings not occupied by government agencies.



*As a result of an energy audit, this 120-year old building in Connecticut is undergoing major conservation improvements.*

**Figure 15. Professional Energy Audits in Commercial Buildings During the Year Prior to the Survey**



Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

Of all commercial buildings that had energy audits, 33.9 ( $\pm 6.8$ ) percent were audited by utility company representatives, while 47.2 ( $\pm 6.1$ ) percent were audited by private contractors. The remaining 18.9 ( $\pm 4.5$ ) percent of the audits were conducted by someone other than a utility company representative or private contractor (e.g., an employee of the company). Buildings larger than 200,000 square feet were more likely to use the services of private contractors (62.5 ( $\pm 18.5$ ) percent) rather than utility company representatives (16.7 ( $\pm 13.7$ ) percent). Overall, 43.1 ( $\pm 7.0$ ) percent of the buildings audited reported that conservation measures had been taken as a result of the energy audit.

# **Related Energy Consumption Publications**

## **Commercial Sector**

### **Building Characteristics**

Nonresidential Buildings Energy Consumption Survey: Fuel Characteristics and Conservation Practices; June 1981, DOE/EIA-0278, GPO Stock No. 061-003-00200-5, \$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: 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. 061-003-00366-4, \$6.00.

## **Residential Sector**

### **Housing Characteristics**

Residential Energy Consumption Survey: Housing Characteristics, 1982, August 1984, DOE/EIA-0314(82), GPO Stock No. 061-003-00393-9, \$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.

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.).

## **Consumption and Expenditures**

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. 061-003-00319-2, \$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. 061-003-00191-2, \$6.50.

Residential Energy Consumption Survey: 1978-1980 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, \$6.50.

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 Residential Sector Publications**

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.061-003-00347-8, \$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.).

Residential Energy Consumption Survey: Conservation; February 1980, DOE/EIA-0207/3, GPO Stock No. 061-003-00087-8, \$6.00.

Preliminary Conservation Tables from the National Interim Energy Consumption Survey; August 1979, DOE/EIA-0193/P, (No GPO Stock No.).

## **Residential Transportation Sector**

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 Energy Consumption Survey: Consumption Patterns of Household Vehicles, June to August 1979; June 1980, DOE/EIA-0207/4, GPO Stock No.061-003-156-4, \$5.00.

## **Industrial Sector**

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 on the 1980 Manufacturing Industries Survey of Large Combustors (EIA-463); March 1982, DOE/EIA-0306, (No GPO Stock No.).

## **Cross Sector**

Natural Gas: Use and Expenditures; April 1983, DOE/EIA-0382, GPO Stock No. 061-003-00307-9, \$5.50.

See inside front cover for information concerning copies of these publications.

**Table 1. Square Footage Category, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Having Square Footage of:							
		5,000 or Less Square Feet	5,001 to 10,000 Square Feet	10,001 to 25,000 Square Feet	25,001 to 50,000 Square Feet	50,001 to 100,000 Square Feet	100,001 to 200,000 Square Feet	Over 200,000 Square Feet	
All Buildings.....	3,948	2,248	725	567	222	107	50	29	
Year Constructed									
1900 or Before.....	288	153	61	51	16	4	Q	1	
1901 to 1920.....	388	187	85	65	29	14	5	2	
1921 to 1945.....	726	413	131	106	48	14	9	4	
1946 to 1960.....	946	601	174	110	28	19	8	6	
1961 to 1970.....	721	429	126	87	39	23	12	6	
1971 to 1973.....	209	103	43	32	18	8	4	1	
1974 to 1979.....	530	313	83	82	30	13	6	3	
1980 to 1983.....	140	49	22	33	14	12	4	6	
Principal Activity Within Building									
Assembly.....	457	209	122	86	27	9	3	1	
Educational.....	177	45	24	33	37	24	11	3	
Food Sales/Service.....	380	287	49	35	6	3	Q	Q	
Health Care.....	61	31	Q	Q	Q	Q	3	4	
Lodging.....	106	42	23	19	14	5	2	1	
Mercantile/Services.....	1,071	666	217	131	30	17	6	4	
Office.....	575	328	109	81	27	14	8	7	
Residential.....	236	131	37	48	13	Q	Q	Q	
Warehouse.....	425	221	64	75	36	18	7	4	
Other.....	179	111	24	25	10	3	3	2	
Vacant.....	281	177	43	29	17	9	3	2	
Census Region									
Northeast.....	670	306	131	130	58	27	12	6	
North Central.....	1,211	688	234	163	68	31	16	11	
South.....	1,493	955	236	185	60	32	15	9	
West.....	574	299	124	89	37	17	6	3	
Metropolitan Status									
Metropolitan.....	2,255	1,168	424	352	164	82	38	26	
Nonmetropolitan.....	1,693	1,080	301	215	58	25	11	3	
Annual Heating (HDD) and Cooling Degree-Days (CDD)									
<2,000 CDD and >7,000 HDD.....	421	215	95	61	28	13	6	3	
<2,000 CDD and 5,500-7,000 HDD....	1,153	613	232	173	73	32	18	12	
<2,000 CDD and 4,000-5,499 HDD...	1,016	580	171	163	56	28	13	7	
<2,000 CDD and <4,000 HDD.....	678	423	114	81	34	16	8	3	
>2,000 CDD and <4,000 HDD.....	679	417	Q	89	32	18	6	4	
Number of Establishments in Building									
None.....	142	96	Q	11	6	5	Q	1	
Single Establishment.....	3,160	1,925	537	408	166	76	32	16	
Multi-Establishment.....	645	227	165	148	50	26	17	12	
Government Occupancy									
Government Occupied.....	346	153	51	61	39	23	11	8	
Non-Government Occupied.....	3,602	2,095	674	507	183	84	38	21	
Fuels Used Alone or in Combination									
Electricity.....	3,783	2,120	704	561	216	104	49	29	
Natural Gas.....	2,314	1,155	481	387	158	73	39	22	
Fuel Oil.....	633	306	124	112	40	22	15	13	
Propane.....	260	168	42	32	9	3	4	2	
Purchased Steam.....	60	Q	Q	13	13	9	5	6	
Other.....	245	154	36	32	9	8	3	4	
Fuel Combinations Used									
No Fuels Used.....	161	126	Q	Q	Q	Q	Q	Q	
Electricity.....	800	555	105	88	30	16	5	2	
Electricity and Natural Gas.....	1,939	1,009	411	313	122	52	23	9	
Electricity and Fuel Oil.....	319	186	66	46	12	6	Q	Q	
Electricity, Natural Gas, and Fuel Oil.....	207	70	40	45	23	12	10	7	
Electricity and Propane.....	138	101	23	Q	Q	Q	Q	Q	
Other.....	383	200	60	58	28	17	10	10	

See footnotes at end of table.

**Table 1. Square Footage Category, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Having Square Footage of:						
		5,000 or Less Square Feet	5,001 to 10,000 Square Feet	10,001 to 25,000 Square Feet	25,001 to 50,000 Square Feet	50,001 to 100,000 Square Feet	100,001 to 200,000 Square Feet	Over 200,000 Square Feet
<b>Percent Heated</b>								
Not Heated.....	440	345	45	26	15	6	2	1
1 to 50.....	517	254	125	66	31	14	5	2
51 to 99.....	564	271	135	104	31	12	7	5
100.....	2,427	1,378	420	351	146	76	36	21
<b>Percent Cooled</b>								
Not Cooled.....	1,304	903	204	124	44	18	8	2
1 to 50.....	1,004	424	236	199	82	36	16	9
51 to 99.....	510	235	115	89	33	18	11	8
100.....	1,129	686	169	155	63	33	14	9

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 2. Average, Median, and Total Square Footage of Buildings, 1983**

Building Characteristics	Number of Buildings (thousands)	Average Square Feet per Building (thousand square feet)	Median Square Feet per Building (thousand square feet)	Total Floorspace (million square feet)	Total Floorspace (million square feet) Within All Buildings Having Square Footage of:						
					5,000 or Less	5,001 to 10,000	10,001 to 25,000	25,001 to 50,000	50,001 to 100,000	100,001 to 200,000	Over 200,000
					square feet	square feet	square feet	square feet	square feet	square feet	square feet
All Buildings.....	3,948	13.3	4.0	52,325	4,908	5,246	8,912	7,692	7,168	6,642	11,757
Year Constructed											
1900 or Before.....	288	10.2	4.8	2,940	406	440	767	530	281	Q	409
1901 to 1920.....	388	14.1	5.1	5,453	514	600	1,049	1,010	942	636	701
1921 to 1945.....	726	11.9	3.8	8,639	855	950	1,663	1,656	949	1,251	1,315
1946 to 1960.....	946	10.2	3.1	9,612	1,187	1,279	1,699	964	1,265	1,062	2,157
1961 to 1970.....	721	13.8	3.4	9,947	881	860	1,417	1,371	1,533	1,664	2,221
1971 to 1973.....	209	16.4	5.1	3,492	249	320	496	654	556	559	609
1974 to 1979.....	530	12.5	4.1	6,616	688	635	1,298	1,029	848	773	1,345
1980 to 1983.....	140	40.5	9.9	5,675	127	163	523	479	794	590	3,000
Principal Activity Within Building											
Assembly.....	457	12.0	5.9	5,483	485	901	1,390	912	621	412	Q
Educational.....	177	34.2	18.1	6,044	113	182	560	1,322	1,619	1,449	799
Food Sales/Service.....	380	5.4	2.8	2,051	636	343	568	209	179	Q	Q
Health Care.....	61	37.6	4.7	2,277	80	Q	Q	Q	Q	433	1,328
Lodging.....	106	21.1	6.8	2,241	95	166	310	495	318	303	553
Mercantile/Services.....	1,071	9.7	3.5	10,427	1,433	1,562	2,013	1,065	1,089	800	Q
Office.....	575	14.7	4.1	8,454	749	803	1,236	976	933	1,086	2,671
Residential.....	236	10.4	4.4	2,454	325	265	748	432	Q	Q	Q
Warehouse.....	425	16.0	4.8	6,791	448	446	1,202	1,203	1,198	937	1,356
Other.....	179	15.4	3.4	2,760	176	186	405	350	214	441	988
Vacant.....	281	11.9	3.3	3,342	368	314	410	582	614	467	587
Census Region											
Northeast.....	670	17.3	5.7	11,615	784	939	1,960	1,915	1,754	1,598	2,666
North Central.....	1,211	13.3	4.0	16,059	1,526	1,685	2,616	2,334	2,146	2,132	3,618
South.....	1,493	11.4	3.3	17,049	1,971	1,685	2,923	2,176	2,199	2,069	4,025
West.....	574	13.2	4.7	7,602	627	937	1,412	1,267	1,068	843	Q
Metropolitan Status											
Metropolitan.....	2,255	16.7	4.9	37,587	2,620	3,085	5,543	5,677	5,576	5,130	9,956
Nonmetropolitan.....	1,693	8.7	3.3	14,738	2,288	2,162	3,369	2,015	1,592	1,512	Q
Annual Heating (HDD) and Cooling Degree-Days (CDD)											
<2,000 HDD and >7,000 CDD.....	421	13.6	4.8	5,725	501	717	904	967	848	801	987
<2,000 CDD and 5,500-7,000 HDD....	1,153	14.7	4.7	16,965	1,446	1,658	2,732	2,444	2,231	2,379	4,075
<2,000 CDD and 4,000-5,499 HDD....	1,016	13.6	3.9	13,793	1,216	1,250	2,631	1,973	1,793	1,703	3,227
<2,000 CDD and <4,000 HDD.....	678	11.1	3.5	7,496	863	811	1,241	1,162	1,035	976	1,409
>2,000 CDD and <4,000 HDD.....	679	12.3	3.5	8,346	882	Q	1,403	1,146	1,260	784	2,060
Number of Establishments in Building											
None.....	142	10.4	3.1	1,475	218	Q	137	187	342	Q	300
Single Establishment.....	3,160	11.1	3.6	35,227	4,077	3,870	6,563	5,710	5,031	4,222	5,753
Multi-Establishment.....	645	24.2	7.5	15,623	613	1,202	2,212	1,795	1,794	2,303	5,704
Government Occupancy											
Government Occupied.....	346	29.2	7.2	10,099	327	378	959	1,356	1,551	1,636	3,893
Not Government Occupied.....	3,602	11.7	3.9	42,225	4,580	4,868	7,953	6,336	5,616	5,006	7,865
Fuels Used Alone or in Combination											
Electricity.....	3,783	13.6	4.1	51,359	4,701	5,079	8,810	7,491	6,973	6,632	11,673
Natural Gas.....	2,314	16.0	5.0	37,090	2,732	3,522	6,081	5,484	4,930	5,219	9,123
Fuel Oil.....	633	21.0	5.1	13,313	743	866	1,656	1,425	1,509	2,057	5,036
Propane.....	260	11.6	3.5	3,007	380	285	515	328	209	540	750
Purchased Steam.....	60	76.2	29.2	4,594	Q	Q	235	448	645	688	2,485
Other.....	245	16.3	3.6	3,997	345	260	497	337	535	357	1,667

See footnotes at end of table.

**Table 2. Average, Median, and Total Square Footage of Buildings, 1983  
(Continued)**

Building Characteristics	Number of Buildings (thousands)	Average Square Feet per Building (thousand square feet)	Median Square Feet per Building (thousand square feet)	Total Floorspace (million square feet)	Total Floorspace (million square feet) Within All Buildings Having Square Footage of:							
					5,000 or Less square feet	5,001 to 10,000 square feet	10,001 to 25,000 square feet	25,001 to 50,000 square feet	50,001 to 100,000 square feet	100,001 to 200,000 square feet	Over 200,000 square feet	
<b>Fuel Combinations Used</b>												
No Fuels Used.....	161	5.8	2.0	935	205	Q	Q	Q	Q	Q	Q	Q
Electricity.....	800	8.1	2.8	6,518	1,053	733	1,414	1,044	1,036	617	621	
<b>Electricity and Natural Gas</b>												
Electricity and Fuel Oil.....	319	9.1	4.0	2,911	420	470	666	402	385	Q	423	
Electricity, Natural Gas, and Fuel Oil.....	207	33.6	9.5	6,953	197	298	654	814	798	1,426	2,766	
Electricity and Propane.....	138	5.3	3.0	736	198	154	Q	Q	Q	Q	Q	
Other.....	383	24.6	3.6	9,409	470	438	946	987	1,209	1,372	3,987	
<b>Percent Heated</b>												
Not Heated.....	440	6.8	2.1	2,971	621	325	391	512	412	282	427	
1 to 50.....	517	11.4	5.1	5,913	551	880	1,325	1,024	870	598	665	
51 to 99.....	564	14.7	5.1	8,266	691	963	1,598	1,084	806	890	2,234	
100.....	2,427	14.5	4.1	35,175	3,044	3,077	5,599	5,072	5,080	4,873	8,431	
<b>Percent Cooled</b>												
Not Cooled.....	1,304	7.5	3.0	9,802	1,631	1,503	1,856	1,511	1,251	1,099	752	
1 to 50.....	1,004	16.3	6.0	16,335	1,056	1,660	3,149	2,828	2,525	2,117	2,998	
51 to 99.....	510	20.3	5.5	10,333	559	819	1,399	1,167	1,232	1,502	3,655	
100.....	1,129	14.0	3.5	15,855	1,461	1,264	2,508	2,187	2,159	1,924	4,352	

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50% or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings, 50 square feet per building, or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 3. Building Type, 1983**  
(Thousands Buildings)

Building Characteristics	Number of Buildings (thousands) in Which the Principal Activity Is:											
	All Buildings	Assembly	Educational	Food Sales /Service	Health Care	Lodging	Mercantile Services	Office	Residential	Warehouse	Other	None (Vacant)
All Buildings.....	3,948	457	177	380	61	106	1,071	575	236	425	179	281
Year Constructed												
1900 or Before.....	288	51	Q	24	Q	Q	71	35	54	20	Q	22
1901 to 1920.....	388	66	11	43	Q	Q	95	41	45	41	Q	31
1921 to 1945.....	726	69	24	55	8	15	194	107	69	80	28	76
1946 to 1960.....	946	102	58	78	19	35	311	97	38	98	40	70
1961 to 1970.....	721	87	45	76	10	27	187	121	Q	81	34	38
1971 to 1973.....	209	19	6	23	Q	12	52	45	Q	22	Q	Q
1974 to 1979.....	530	50	20	70	12	7	139	100	Q	65	35	22
1980 to 1983.....	140	14	10	12	3	3	21	28	Q	18	16	14
Square Footage Category												
5,000 or Less.....	2,248	209	45	287	31	42	666	328	131	221	111	177
5,001 to 10,000.....	725	122	24	49	Q	23	217	109	37	64	24	43
10,001 to 25,000.....	567	86	33	35	Q	19	131	81	48	75	25	29
25,001 to 50,000.....	222	27	37	6	Q	14	30	27	13	36	10	17
50,001 to 100,000.....	107	9	24	3	Q	5	17	14	Q	18	3	9
100,001 to 200,000.....	50	3	11	Q	3	2	6	8	Q	7	3	3
Over 200,000.....	29	1	3	Q	4	1	4	7	Q	4	2	2
Census Region												
Northeast.....	670	61	28	58	11	13	183	97	97	57	20	46
North Central.....	1,211	149	39	120	21	12	353	176	78	131	50	80
South.....	1,493	202	79	145	20	57	383	191	44	170	67	114
West.....	574	45	31	57	Q	24	151	112	16	68	22	41
Metropolitan Status												
Metropolitan.....	2,255	213	117	221	40	49	618	360	148	230	99	161
Nonmetropolitan.....	1,693	244	60	160	20	57	453	215	88	196	80	120
Annual Heating (HDD) and Cooling Degree-Days (CDD)												
<2,000 CDD and >7,000 HDD	421	40	18	51	5	7	124	54	38	44	Q	Q
<2,000 CDD and 5,500-7,000 HDD.....	1,153	141	47	99	25	26	303	191	86	103	48	83
<2,000 CDD and 4,000-5,499 HDD.....	1,016	150	42	88	12	20	274	125	90	101	47	65
<2,000 CDD and <4,000 HDD	678	60	28	72	Q	25	184	92	Q	98	38	62
>2,000 CDD and <4,000 HDD	679	65	Q	71	10	Q	186	113	Q	Q	Q	Q
Number of Establishments in Building												
None.....	142	--	--	--	--	--	--	--	--	--	--	142
Single Establishment.....	3,160	406	164	339	56	94	925	363	172	367	157	118
Multi-Establishment.....	645	51	Q	42	5	13	145	212	63	59	21	22
Government Occupancy												
Government Occupied.....	346	46	57	Q	13	Q	32	79	Q	20	57	26
Non-Government Occupied..	3,602	411	120	372	47	101	1,039	496	233	405	121	255
Fuels Used Alone or in Combination												
Electricity.....	3,783	452	177	380	59	106	1,059	575	235	387	169	183
Natural Gas.....	2,314	271	115	235	37	67	674	352	187	198	73	103
Fuel Oil.....	633	97	37	43	14	17	194	76	60	50	26	Q
Propane.....	260	51	7	41	Q	12	75	16	Q	20	Q	Q
Purchased Steam.....	60	8	8	Q	Q	10	3	9	Q	Q	6	5
Other.....	245	25	8	38	2	7	77	22	Q	14	25	10
Fuel Combinations Used												
No Fuels Used.....	161	Q	NC	Q	NC	NC	Q	NC	Q	37	Q	97
Electricity.....	800	70	33	78	Q	15	175	156	Q	138	51	54
Electricity and Natural Gas.....	1,939	226	90	205	26	52	574	303	144	173	51	93
Electricity and Fuel Oil.....	319	55	15	Q	Q	115	42	Q	27	13	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	207	24	16	Q	7	7	53	30	38	13	Q	6
Electricity and Propane..	138	27	Q	Q	NC	Q	41	Q	Q	14	Q	Q
Other.....	383	50	19	57	9	18	100	32	22	22	38	15

See footnotes at end of table.

**Table 3. Building Type, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Assembly	Educational	Number of Buildings (thousands) in Which the Principal Activity Is:								
				Food Sales/ Service	Health Care	Lodging/ Services	Mercantile	Office	Residential	Warehouse	Other	None (Vacant)
<b>Percent Heated</b>												
Not Heated.....	440	Q	Q	Q	NC	Q	89	Q	Q	126	39	144
1 to 50.....	517	23	Q	39	Q	Q	165	44	Q	148	34	45
51 to 99.....	564	49	22	76	Q	11	190	105	43	24	16	20
100.....	2,427	370	149	251	49	88	627	417	186	127	90	72
<b>Percent Cooled</b>												
Not Cooled.....	1,304	161	47	66	Q	28	412	50	72	195	81	187
1 to 50.....	1,004	81	45	74	20	7	311	106	84	185	38	52
51 to 99.....	510	52	27	92	10	21	115	123	24	14	21	12
100.....	1,129	163	58	148	25	51	232	297	55	31	39	30

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 4. Total Square Footage by Building Type, 1983**  
 (Million Square Feet)

Building Characteristics	Total Floorspace of Buildings (million square feet) in Which the Principal Activity Is:											
	All Buildings	Assembly	Educational	Food Sales /Service	Health Care	Lodging/Services	Mercantile	Office	Residential	Warehouse	Other	None (Vacant)
All Buildings.....	52,325	5,483	6,044	2,051	2,277	2,241	10,427	8,454	2,454	6,791	2,760	3,342
Year Constructed												
1900 or Before.....	2,940	373	Q	129	Q	Q	488	429	609	315	Q	263
1901 to 1920.....	5,453	791	435	249	Q	Q	882	715	517	915	Q	394
1921 to 1945.....	8,639	799	1,084	206	215	523	1,345	1,388	721	1,096	388	875
1946 to 1960.....	9,612	1,142	1,623	368	751	301	2,120	966	278	1,348	258	458
1961 to 1970.....	9,947	896	1,494	390	346	647	1,979	1,773	Q	1,406	472	360
1971 to 1973.....	3,442	318	357	163	Q	255	736	625	Q	363	Q	Q
1974 to 1979.....	6,616	654	674	376	505	213	1,485	1,370	Q	797	228	281
1980 to 1983.....	5,675	Q	274	171	130	154	Q	1,189	Q	552	689	566
Square Footage Category												
5,000 or Less.....	4,908	485	113	636	80	95	1,433	749	325	448	176	368
5,001 to 10,000.....	5,246	901	182	343	Q	166	1,562	803	265	446	186	314
10,001 to 25,000.....	8,912	1,390	560	568	Q	310	2,013	1,236	748	1,202	405	410
25,001 to 50,000.....	7,692	912	1,322	209	Q	495	1,065	976	432	1,203	350	582
50,001 to 100,000.....	7,168	621	1,619	179	Q	318	1,089	933	Q	1,198	214	614
100,001 to 200,000.....	6,642	412	1,449	Q	433	303	800	1,086	Q	937	441	467
Over 200,000.....	11,757	Q	799	Q	1,328	553	Q	2,671	Q	1,356	988	587
Census Region												
Northeast.....	11,615	1,053	1,374	392	502	422	2,040	1,774	1,336	1,224	834	664
North Central.....	16,059	1,755	1,834	724	1,015	669	3,219	2,178	717	2,130	881	937
South.....	17,049	1,835	2,082	616	567	803	3,843	2,903	299	2,288	644	1,169
West.....	7,602	Q	754	320	193	346	1,325	1,599	103	1,149	402	571
Metropolitan Status												
Metropolitan.....	37,587	3,576	4,295	1,300	1,760	1,617	6,651	7,040	1,912	4,641	2,275	2,518
Nonmetropolitan.....	14,738	1,907	1,749	751	516	624	3,776	1,414	542	2,150	485	824
Annual Heating (HDD) and Cooling Degree-Days (CDD)												
<2,000 CDD and >7,000 HDD.....	5,725	554	722	302	201	146	1,353	726	342	770	Q	326
<2,000 CDD and 5,500-7,000 HDD.....	16,965	1,760	2,055	741	1,213	728	2,463	2,611	973	2,080	1,180	1,160
<2,000 CDD and 4,000-5,499 HDD.....	13,793	1,638	1,597	368	272	537	3,485	2,031	970	1,547	616	731
<2,000 CDD and <4,000 HDD.....	7,496	460	697	311	400	292	1,489	1,348	Q	1,507	324	596
>2,000 CDD and <4,000 HDD.....	8,346	Q	973	329	Q	Q	Q	1,736	Q	888	361	528
Number of Establishments in Building												
None.....	1,475	--	--	--	--	--	--	--	--	--	--	1,471
Single Establishment.....	35,227	4,352	5,640	1,751	2,053	1,819	6,334	3,466	1,307	5,460	1,801	1,245
Multi-Establishment.....	15,623	1,131	404	300	224	422	4,093	4,988	1,148	1,331	955	626
Government Occupancy												
Government Occupied.....	10,099	651	2,625	Q	552	258	Q	2,197	Q	373	1,282	400
Not Government Occupied..	42,225	4,831	3,419	1,913	1,725	1,983	8,859	6,257	2,400	6,418	1,479	2,941
Fuels Used Alone or in Combination												
Electricity.....	51,359	5,475	6,038	2,050	2,275	2,241	10,359	8,447	2,439	6,706	2,743	2,585
Natural Gas.....	37,090	4,044	4,482	1,459	2,024	1,748	8,146	5,811	2,064	4,545	1,308	1,459
Fuel Oil.....	13,313	952	2,046	300	1,713	688	1,825	2,217	863	1,415	840	454
Propane.....	3,007	339	435	256	Q	118	660	76	Q	719	Q	Q
Purchased Steam.....	4,594	501	393	Q	403	511	Q	1,233	Q	Q	442	321
Other.....	3,997	282	504	178	333	295	475	724	Q	363	626	161
Fuel Combinations Used												
No Fuels Used.....	935	Q	NC	Q	NC	Q	NC	Q	Q	84	Q	753
Electricity.....	6,518	639	615	234	Q	157	1,039	1,169	Q	1,292	527	652
Electricity and Natural Gas.....	24,863	3,127	2,657	1,208	342	853	6,201	3,896	1,311	3,454	738	1,076
Electricity and Fuel Oil.....	2,911	314	319	Q	Q	Q	658	678	Q	394	150	171
Electricity, Natural Gas, and Fuel Oil.....	6,953	416	1,254	Q	1,198	448	929	1,021	673	491	241	204
Electricity and Propane.....	736	97	Q	Q	NC	Q	166	Q	Q	160	Q	Q
Other.....	9,409	881	1,153	378	648	673	1,376	1,660	191	916	1,057	475

See footnotes at end of table.

**Table 4. Total Square Footage by Building Type, 1983 (Continued)**  
 (Million Square Feet)

Building Characteristics	All Buildings	Total Floorspace of Buildings (million square feet) in Which the Principal Activity Is:										
		Assembly	Educational	Food Sales/Service	Health Care	Lodging/Services	Mercantile	Office	Residential	Warehouse	Other	
<b>Percent Heated</b>												
Not Heated.....	2,971	Q	Q	Q	NC	Q	380	Q	Q	811	293	1,339
1 to 50.....	5,913	258	Q	216	Q	Q	1,069	452	Q	2,648	642	441
51 to 99.....	8,266	695	690	420	284	259	2,043	1,972	436	719	357	393
100.....	35,175	4,477	5,256	1,393	1,966	1,929	6,936	5,997	1,970	2,614	1,469	1,169
<b>Percent Cooled</b>												
Not Cooled.....	9,802	1,184	1,437	352	Q	399	1,753	290	604	1,412	573	1,784
1 to 50.....	16,335	1,210	2,100	448	653	284	2,724	1,202	952	4,863	1,261	638
51 to 99.....	10,333	826	970	494	751	628	2,104	3,023	425	311	458	344
100.....	15,855	2,264	1,537	757	858	930	3,847	3,939	474	205	468	576

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 5. Number of Floors, 1983**

Building Characteristics	All Buildings		Buildings with:							
	Number of Buildings (thousands)	Square Feet (millions)	1 Floor		2 Floors		3 Floors		More than 3 Floors	
			Number of Buildings (thousands)	Square Feet (millions)						
All Buildings.....	3,948	52,325	2,320	17,433	891	11,848	467	8,209	269	14,834
Year Constructed										
1900 or Before.....	288	2,940	51	154	77	499	90	845	70	1,442
1901 to 1920.....	388	5,453	114	828	105	956	107	1,356	62	2,313
1921 to 1945.....	726	8,639	355	1,674	161	1,758	137	1,875	73	3,332
1946 to 1960.....	946	9,612	643	3,467	232	2,763	53	1,582	18	1,800
1961 to 1970.....	721	9,947	524	3,844	135	2,589	41	1,347	21	2,167
1971 to 1973.....	209	3,442	136	1,325	56	956	9	290	8	871
1974 to 1979.....	530	6,616	402	3,288	98	1,657	21	451	9	1,221
1980 to 1983.....	140	5,675	97	Q	27	669	8	464	8	1,688
Square Footage Category										
5,000 or Less.....	2,248	4,908	1,643	3,224	385	1,043	169	489	51	152
5,001 to 10,000.....	725	5,246	338	2,372	246	1,854	106	750	35	270
10,001 to 25,000.....	567	8,912	217	3,413	173	2,648	111	1,792	67	1,058
25,001 to 50,000.....	222	7,692	73	2,492	48	1,641	52	1,790	49	1,769
50,001 to 100,000.....	107	7,168	36	2,349	24	1,606	17	1,134	30	2,078
100,001 to 200,000.....	50	6,642	10	1,208	11	1,511	8	1,100	21	2,823
Over 200,000.....	29	11,757	4	Q	5	1,545	3	1,154	16	6,684
Principal Activity Within Building										
Assembly.....	457	5,483	214	1,836	161	1,658	67	1,287	15	701
Educational.....	177	6,044	90	1,849	47	1,654	27	1,445	13	1,097
Food Sales/Service.....	380	2,051	276	1,157	59	463	36	300	Q	Q
Health Care.....	61	2,277	24	277	19	Q	11	254	7	1,370
Lodging.....	106	2,241	48	265	28	430	16	373	15	1,173
Mercantile/Services.....	1,071	10,427	766	5,781	190	2,260	84	1,069	32	1,317
Office.....	575	8,454	289	1,368	153	1,458	81	1,295	52	4,333
Residential.....	236	2,654	28	57	48	208	82	564	77	1,626
Warehouse.....	425	6,791	296	3,218	86	1,800	26	759	17	1,014
Other.....	179	2,760	124	809	26	438	19	469	10	1,044
Vacant.....	281	3,342	164	815	75	1,103	19	395	22	1,028
Census Region										
Northeast.....	670	11,615	225	2,259	159	1,985	145	2,280	141	5,091
North Central.....	1,211	16,059	623	4,335	318	3,972	196	2,999	74	4,753
South.....	1,493	17,049	1,101	7,797	278	3,993	79	1,897	35	3,361
West.....	574	7,602	372	3,042	136	1,899	47	1,032	20	1,629
Metropolitan Status										
Metropolitan.....	2,255	37,587	1,267	10,746	512	8,328	266	5,396	209	13,116
Nonmetropolitan.....	1,693	14,738	1,053	6,686	379	3,520	201	2,813	60	1,718
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	154	1,061	128	1,507	94	1,254	46	1,903
<2,000 CDD and 5,500-7,000 HDD...	1,153	16,965	557	4,346	282	3,446	194	3,612	119	5,561
<2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	538	4,526	269	3,231	131	1,892	78	4,145
<2,000 CDD and <4,000 HDD.....	678	7,496	528	3,330	117	1,793	19	688	14	1,684
>2,000 CDD and <4,000 HDD.....	679	8,346	543	4,170	Q	1,871	Q	763	12	1,541
Number of Establishments in Building										
None.....	142	1,475	89	457	37	469	9	215	6	334
Single Establishment.....	3,160	35,227	1,954	12,454	689	8,631	337	5,692	180	8,449
Multi-Establishment.....	645	15,623	277	4,522	165	2,748	121	2,301	83	6,051
Government Occupancy										
Government Occupied.....	346	10,099	193	2,965	78	2,019	48	1,621	27	3,494
Non-Government Occupied.....	3,602	42,225	2,128	14,468	813	9,829	419	6,588	242	11,340

See footnotes at end of table.

**Table 5. Number of Floors, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings with:							
			1 Floor		2 Floors		3 Floors		More than 3 Floors	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Feet (mil- lions)						
				Square Feet		Square Feet		Square Feet		Square Feet
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	51,359	2,200	17,095	861	11,511	459	8,116	262	14,638
Natural Gas.....	2,314	37,090	1,176	11,350	580	8,233	347	6,295	211	11,211
Fuel Oil.....	633	13,313	260	2,313	167	2,814	119	2,366	86	5,820
Propane.....	260	3,007	163	1,237	57	779	34	637	5	354
Purchased Steam.....	60	4,594	Q	Q	7	282	13	488	30	3,633
Other.....	245	3,997	153	1,102	53	612	29	768	11	1,515
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	119	338	Q	335	Q	Q	6	184
Electricity.....	800	6,518	644	3,338	116	1,585	28	621	12	974
Electricity and Natural Gas.....	1,939	24,863	1,028	9,632	503	6,222	276	4,367	132	4,642
Electricity and Fuel Oil.....	319	2,911	168	817	85	717	45	541	21	836
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	54	850	52	1,448	46	1,064	55	3,591
Electricity and Propane.....	138	736	109	524	20	116	Q	Q	Q	Q
Other.....	383	9,409	199	1,933	85	1,427	57	1,464	42	4,585
<b>Percent Heated</b>										
Not Heated.....	440	2,971	355	1,278	58	680	16	432	10	581
1 to 50.....	517	5,913	261	2,048	151	1,791	61	715	43	1,359
51 to 99.....	564	8,266	265	1,803	131	1,787	107	1,401	61	3,275
100.....	2,427	35,175	1,439	12,304	551	7,590	282	5,662	155	9,620
<b>Percent Cooled</b>										
Not Cooled.....	1,304	9,802	848	3,477	270	2,405	128	1,770	60	2,150
1 to 50.....	1,004	16,335	436	5,251	268	4,320	186	3,039	114	3,726
51 to 99.....	510	10,333	265	2,039	118	2,004	77	1,457	50	4,834
100.....	1,129	15,855	772	6,666	235	3,120	76	1,943	46	4,125

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 6. Percentage of Glass on the Exterior Surface, 1983**

Building Characteristics	All Buildings		Buildings in Which the Exterior Surface Contains:							
			Less than 25 Percent Glass		25-49 Percent Glass		50-74 Percent Glass		75 Percent or More Glass	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Feet (millions)	Number of Buildings (thousands)	Feet (millions)	Number of Buildings (thousands)	Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	2,649	28,673	986	15,442	251	5,883	61	2,327
Year Constructed										
1900 or Before.....	288	2,940	187	1,517	80	948	20	423	Q	Q
1901 to 1920.....	388	5,453	251	2,887	110	1,747	26	713	Q	Q
1921 to 1945.....	726	8,639	492	4,353	181	3,080	38	949	15	257
1946 to 1960.....	946	9,612	648	4,710	218	3,396	72	1,222	8	284
1961 to 1970.....	721	9,947	467	5,340	186	2,842	51	1,198	16	567
1971 to 1973.....	209	3,442	134	2,083	58	953	Q	282	Q	125
1974 to 1979.....	530	6,616	374	4,118	121	1,498	23	513	12	488
1980 to 1983.....	140	5,675	96	3,666	31	978	9	584	4	447
Square Footage Category										
5,000 or Less.....	2,248	4,908	1,581	3,457	536	1,175	112	239	Q	Q
5,001 to 10,000.....	725	5,246	481	3,448	182	1,319	47	350	Q	Q
10,001 to 25,000.....	567	8,912	380	5,954	135	2,118	39	623	13	217
25,001 to 50,000.....	222	7,692	119	4,057	73	2,495	27	1,004	4	137
50,001 to 100,000.....	107	7,168	56	3,689	33	2,275	14	954	4	249
100,001 to 200,000.....	50	6,642	22	2,876	16	2,178	8	1,176	3	412
Over 200,000.....	29	11,757	12	5,193	10	3,881	4	1,537	3	1,147
Principal Activity Within Building										
Assembly.....	457	5,483	297	3,573	121	1,303	29	467	Q	Q
Educational.....	177	6,044	87	2,303	56	2,248	29	1,258	5	236
Food Sales/Service.....	380	2,051	237	1,194	106	639	35	152	Q	Q
Health Care.....	61	2,277	38	630	16	1,191	5	324	Q	Q
Lodging.....	106	2,241	55	794	36	850	12	506	Q	Q
Mercantile/Services.....	1,071	10,427	749	6,979	256	2,857	50	445	16	145
Office.....	575	8,454	355	2,885	166	2,885	39	1,567	15	1,117
Residential.....	236	2,454	140	1,034	77	1,045	16	243	Q	Q
Warehouse.....	425	6,791	356	5,362	52	1,110	13	245	Q	Q
Other.....	179	2,760	134	1,939	35	473	10	264	Q	Q
Vacant.....	281	3,342	202	1,981	64	840	14	412	1	110
Census Region										
Northeast.....	670	11,615	419	5,618	181	3,980	62	1,525	8	492
North Central.....	1,211	16,059	833	8,518	302	5,172	64	1,811	11	558
South.....	1,493	17,049	1,027	10,165	347	4,183	90	1,762	28	938
West.....	574	7,602	370	4,372	156	2,106	35	784	14	339
Metropolitan Status										
Metropolitan.....	2,255	37,587	1,452	19,357	590	11,771	169	4,536	44	1,924
Nonmetropolitan.....	1,693	14,738	1,197	9,317	396	3,671	82	1,347	17	403
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	258	2,903	128	1,973	28	659	7	189
<2,000 CDD and 5,500-7,000 HDD....	1,153	16,965	764	8,623	313	5,737	67	1,989	8	616
<2,000 CDD and 4,000-5,499 HDD....	1,016	13,793	670	7,786	261	3,852	69	1,597	16	558
<2,000 CDD and <4,000 HDD.....	678	7,496	492	4,402	140	2,031	30	718	16	345
>2,000 CDD and <4,000 HDD.....	679	8,346	464	4,959	Q	Q	56	918	14	619
Number of Establishments in Building										
None.....	142	1,475	99	873	36	453	Q	115	Q	Q
Single Establishment.....	3,160	35,227	2,140	20,491	777	9,920	195	3,703	48	1,111
Multi-Establishment.....	645	15,623	410	7,308	172	5,068	50	2,065	13	1,181
Government Occupancy										
Government Occupied.....	346	10,099	210	4,734	102	3,393	29	1,534	5	439
Non-Government Occupied.....	3,602	42,225	2,439	23,939	884	12,049	222	4,349	57	1,888

See footnotes at end of table.

**Table 6. Percentage of Glass on the Exterior Surface, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings in Which the Exterior Surface Contains:							
	Number of Buildings (thousands)	Square Feet (millions)	Less than 25 Percent Glass		25-49 Percent Glass		50-74 Percent Glass		75 Percent or More Glass	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	51,359	2,527	28,052	947	15,178	248	5,809	61	2,320
Natural Gas.....	2,314	37,090	1,494	19,547	617	11,691	164	4,118	38	1,733
Fuel Oil.....	633	13,313	362	5,265	200	4,994	58	2,195	14	859
Propane.....	260	3,007	200	1,673	43	902	13	292	Q	Q
Purchased Steam.....	60	4,594	27	1,734	18	1,637	13	919	Q	305
Other.....	245	3,997	157	1,693	73	1,561	10	515	Q	229
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	120	613	37	247	Q	Q	NC	NC
Electricity.....	800	6,518	582	4,405	163	1,422	39	467	16	244
Electricity and Natural Gas.....	1,939	24,863	1,287	15,074	500	6,647	123	2,212	29	930
Electricity and Fuel Oil.....	319	2,911	199	1,598	95	738	22	496	2	80
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	105	2,259	67	3,021	27	1,129	8	544
Electricity and Propane.....	138	736	121	611	12	92	Q	Q	NC	NC
Other.....	383	9,409	235	4,113	111	3,275	31	1,492	6	529
<b>Percent Heated</b>										
Not Heated.....	440	2,971	351	2,168	65	583	16	180	Q	Q
1 to 50.....	517	5,913	391	4,590	97	1,004	24	262	Q	Q
51 to 99.....	564	8,266	372	3,980	147	2,711	37	1,041	8	534
100.....	2,427	35,175	1,536	17,935	677	11,144	174	4,399	40	1,696
<b>Percent Cooled</b>										
Not Cooled.....	1,304	9,802	909	5,749	313	2,831	66	1,083	16	139
1 to 50.....	1,004	16,335	664	9,703	256	4,816	73	1,444	10	373
51 to 99.....	510	10,333	335	4,458	133	3,749	36	1,421	6	705
100.....	1,129	15,855	741	8,764	284	4,046	76	1,934	28	1,110

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 7. Buildings With Alterations Between 1979 and 1983**

Building Characteristics	All Buildings		All Buildings with Alterations		Buildings in Which the Square Footage Was:			
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Decreased/Not Changed		Increased	
					Buildings	Square Feet (millions)	Buildings	Square Feet (millions)
All Buildings.....	3,790	46,373	309	5,954	179	2,947	127	3,000
Year Constructed								
1900 or Before.....	287	2,962	25	285	17	219	Q	Q
1901 to 1920.....	383	5,432	50	733	28	343	Q	Q
1921 to 1945.....	742	8,757	47	876	31	682	13	190
1946 to 1960.....	961	9,714	72	1,702	43	844	29	858
1961 to 1970.....	713	9,910	72	1,209	45	509	27	700
1971 to 1973.....	203	3,402	9	373	Q	Q	Q	Q
1974 to 1979.....	502	6,196	34	776	Q	185	22	591
Square Footage Category								
5,000 or Less.....	2,195	4,756	176	403	114	241	60	157
5,001 to 10,000.....	699	5,049	42	311	27	200	Q	Q
10,001 to 25,000.....	529	8,376	57	992	17	260	40	731
25,001 to 50,000.....	205	7,154	14	486	12	396	Q	Q
50,001 to 100,000.....	94	6,282	6	468	3	249	3	219
100,001 to 200,000.....	45	6,010	7	966	4	531	3	435
Over 200,000.....	23	8,745	6	2,328	3	1,070	4	1,256
Principal Activity Within Building								
Assembly.....	447	5,070	45	820	19	271	Q	Q
Educational.....	167	5,925	9	548	Q	351	2	197
Food Sales/Service.....	367	1,844	52	289	29	106	Q	Q
Health Care.....	57	2,184	9	994	Q	Q	4	819
Lodging.....	102	2,053	Q	Q	Q	Q	Q	Q
Mercantile/Services.....	1,043	8,846	76	1,101	50	633	26	468
Office.....	543	7,215	46	768	27	486	20	282
Residential.....	235	2,412	20	256	Q	Q	Q	Q
Warehouse.....	403	6,166	28	600	14	306	Q	Q
Other.....	158	1,982	Q	Q	Q	Q	Q	Q
Vacant.....	267	2,677	8	225	Q	Q	Q	Q
Census Region								
Northeast.....	654	10,885	45	1,308	29	1,024	17	284
North Central.....	1,171	14,967	99	2,161	60	927	36	1,229
South.....	1,424	14,165	133	1,893	74	729	60	1,164
West.....	541	6,355	31	592	17	267	14	324
Metropolitan Status								
Metropolitan.....	2,147	33,235	161	4,177	101	2,337	57	1,833
Nonmetropolitan.....	1,644	13,137	148	1,778	78	610	69	1,168
Annual Heating (HDD) and Cooling Degree-Days (CDD)								
<2,000 CDD and >7,000 HDD.....	403	5,112	37	604	23	303	14	302
<2,000 CDD and 5,500-7,000 HDD....	1,121	15,903	82	2,087	52	1,026	27	1,054
<2,000 CDD and 4,000-5,499 HDD...	994	12,255	77	1,721	39	916	Q	805
<2,000 CDD and <4,000 HDD.....	648	6,821	51	613	26	261	25	352
>2,000 CDD and <4,000 HDD.....	625	6,281	62	929	39	441	Q	487
Number of Establishments in Building								
None.....	126	1,154	Q	Q	Q	Q	Q	Q
Single Establishment.....	3,050	32,815	259	4,062	144	1,657	112	2,398
Multi-Establishment.....	615	12,404	46	1,834	32	1,245	14	588
Government Occupancy								
Government Occupied.....	334	8,684	23	1,047	15	608	8	439
Not Government Occupied.....	3,457	37,689	285	4,908	165	2,339	118	2,561

See footnotes at end of table.

**Table 7. Buildings With Alterations Between 1979 and 1983 (Continued)**

Building Characteristics	All Buildings		All Buildings with Alterations		Buildings in Which the Square Footage Was:			
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Decreased/Not Changed		Increased	
					Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)
<b>Fuels Used Alone or in Combination</b>								
Electricity.....	3,632	45,424	305	5,948	175	2,940	127	3,000
Natural Gas.....	2,241	33,249	178	4,722	108	2,399	68	2,316
Fuel Oil.....	624	12,105	40	2,229	18	930	21	1,299
Propane.....	241	2,585	19	297	Q	Q	Q	Q
Purchased Steam.....	58	4,297	6	744	6	577	Q	Q
Other.....	240	3,418	20	414	Q	Q	12	229
<b>Fuel Combinations Used</b>								
No Fuels Used.....	154	916	Q	Q	Q	Q	NC	NC
Electricity.....	740	5,422	84	645	47	234	Q	Q
Electricity and Natural Gas.....	1,885	22,047	153	2,428	94	1,263	57	1,160
Electricity and Fuel Oil.....	317	2,579	Q	Q	Q	Q	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	199	6,531	17	1,509	6	604	10	906
Electricity and Propane.....	123	533	Q	Q	Q	Q	Q	Q
Other.....	372	8,343	33	1,194	17	714	16	477
<b>Percent Heated</b>								
Not Heated.....	410	2,567	Q	Q	Q	Q	Q	Q
1 to 50.....	507	5,510	38	549	22	275	Q	Q
51 to 99.....	550	7,663	65	1,212	34	721	30	491
100.....	2,323	30,633	198	4,153	116	1,921	79	2,225
<b>Percent Cooled</b>								
Not Cooled.....	1,265	9,155	53	451	32	319	Q	Q
1 to 50.....	980	15,211	77	1,693	46	890	31	803
51 to 99.....	479	9,343	63	1,853	34	978	29	873
100.....	1,067	12,664	116	1,957	67	760	49	1,197

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 8. Location of Buildings by Census Region, 1983**

Building Characteristics	All Buildings		Buildings Located in the Following Census Regions:							
	Number of Buildings (thousands)	Square Feet (millions)	Northeast		North Central		South		West	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	670	11,615	1,211	16,059	1,493	17,049	574	7,602
Year Constructed										
1900 or Before.....	288	2,940	102	1,289	110	1,123	49	355	27	Q
1901 to 1920.....	388	5,453	93	1,850	158	1,879	100	1,173	37	550
1921 to 1945.....	726	8,639	160	2,398	225	2,795	227	2,221	114	1,225
1946 to 1960.....	946	9,612	131	2,083	275	3,128	396	3,258	144	1,143
1961 to 1970.....	721	9,947	94	1,798	189	3,043	345	3,594	94	1,512
1971 to 1973.....	209	3,442	26	651	59	953	90	1,296	35	542
1974 to 1979.....	530	6,616	50	720	162	2,166	224	2,487	95	1,244
1980 to 1983.....	140	5,675	14	826	33	972	64	2,665	29	Q
Square Footage Category										
5,000 or Less.....	2,248	4,908	306	784	688	1,526	955	1,971	299	627
5,001 to 10,000.....	725	5,246	131	939	234	1,685	236	1,685	124	937
10,001 to 25,000.....	567	8,912	130	1,960	163	2,614	185	2,923	89	1,412
25,001 to 50,000.....	222	7,692	58	1,915	68	2,334	60	2,176	37	1,267
50,001 to 100,000.....	107	7,168	27	1,754	31	2,146	32	2,199	17	1,068
100,001 to 200,000.....	50	6,642	12	1,598	16	2,132	15	2,069	6	843
Over 200,000.....	29	11,757	6	2,666	11	3,618	9	4,025	3	Q
Principal Activity Within Building										
Assembly.....	457	5,483	61	1,053	149	1,755	202	1,835	45	Q
Educational.....	177	6,044	28	1,374	39	1,834	79	2,082	31	754
Food Sales/Service.....	380	2,051	58	392	120	724	145	616	57	320
Health Care.....	61	2,277	11	502	21	1,015	20	567	Q	193
Lodging.....	106	2,241	13	422	12	669	57	803	24	346
Mercantile/Services.....	1,071	10,427	183	2,040	353	3,219	383	3,843	151	1,325
Office.....	575	8,454	97	1,774	176	2,178	191	2,903	112	1,599
Residential.....	236	2,454	97	1,336	78	717	44	299	16	103
Warehouse.....	425	6,791	57	1,224	131	2,130	170	2,288	68	1,149
Other.....	179	2,760	20	834	50	881	87	644	22	402
Vacant.....	281	3,342	46	664	80	937	114	1,169	41	571
Metropolitan Status										
Metropolitan.....	2,255	37,587	532	9,993	683	11,651	644	9,753	395	6,190
Nonmetropolitan.....	1,693	14,738	138	1,622	527	4,408	848	7,295	179	Q
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	Q	1,160	246	3,697	--	--	Q	Q
<2,000 CDD and 5,500-7,000 HDD.....	1,153	16,965	346	6,098	644	9,092	NC	NC	162	1,775
<2,000 CDD and 4,000-5,499 HDD....	1,016	13,793	224	4,357	Q	Q	401	5,209	Q	Q
<2,000 CDD and <4,000 HDD.....	678	7,496	--	--	NC	NC	452	4,581	227	2,915
>2,000 CDD and <4,000 HDD.....	679	8,346	--	--	--	--	639	7,258	Q	Q
Number of Establishments in Building										
None.....	142	1,475	19	313	38	374	63	518	Q	Q
Single Establishment.....	3,160	35,227	507	7,137	986	12,203	1,237	11,258	431	4,629
Multi-Establishment.....	645	15,623	144	4,165	186	3,483	193	5,273	122	2,703
Government Occupancy										
Government Occupied.....	346	10,099	61	2,245	99	2,917	127	3,555	59	1,382
Not Government Occupied.....	3,602	42,225	609	9,371	1,111	13,142	1,366	13,494	515	6,219
Fuels Used Alone or in Combination										
Electricity.....	3,783	51,359	651	11,405	1,161	15,736	1,420	16,734	551	7,484
Natural Gas.....	2,314	37,090	444	8,321	912	13,547	620	9,913	339	5,309
Fuel Oil.....	633	13,313	257	5,619	123	3,070	206	3,605	46	1,019
Propane.....	260	3,007	Q	561	70	549	144	1,781	18	116
Purchased Steam.....	60	4,594	17	1,373	22	1,930	11	779	11	512
Other.....	245	3,997	42	1,101	64	1,138	91	1,284	48	475

See footnotes at end of table.

**Table 8. Location of Buildings by Census Region, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings Located in the Following Census Regions:							
			Northeast		North Central		South		West	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	18	202	49	308	72	307	Q	Q
Electricity.....	800	6,518	55	644	102	803	504	3,660	139	1,411
Electricity and Natural Gas.....	1,939	24,863	294	3,701	810	9,205	532	7,603	303	4,354
Electricity and Fuel Oil.....	319	2,911	104	1,064	66	441	119	1,173	30	234
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	118	3,262	41	2,161	37	1,030	Q	499
Electricity and Propane.....	138	736	Q	Q	37	181	85	481	Q	Q
Other.....	383	9,409	74	2,697	105	2,960	144	2,795	60	958
<b>Percent Heated</b>										
Not Heated.....	440	2,971	43	398	97	641	214	1,311	85	621
1 to 50.....	517	5,913	77	686	148	1,642	199	2,062	93	1,323
51 to 99.....	564	8,266	115	2,111	160	2,163	195	2,817	95	1,176
100.....	2,427	35,175	435	8,221	806	11,612	886	10,859	301	4,482
<b>Percent Cooled</b>										
Not Cooled.....	1,304	9,802	226	2,445	407	2,912	381	1,934	290	2,511
1 to 50.....	1,004	16,335	234	4,514	344	5,846	308	4,222	118	1,753
51 to 99.....	510	10,333	91	2,553	155	3,206	205	3,377	59	1,197
100.....	1,129	15,855	118	2,103	305	4,096	599	7,516	107	Q

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 9. Location of Buildings by Metropolitan Status, 1983**

Building Characteristics	All Buildings		Buildings in:			
	Number of Buildings (thousands)	Square Feet (millions)	Metropolitan Locations		Nonmetropolitan Locations	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	2,255	37,587	1,693	14,738
Year Constructed						
1900 or Before.....	288	2,940	143	1,856	145	1,084
1901 to 1920.....	388	5,453	214	3,914	174	1,540
1921 to 1945.....	726	8,639	411	6,030	315	2,609
1946 to 1960.....	946	9,612	522	6,830	423	2,781
1961 to 1970.....	721	9,947	444	7,371	277	2,576
1971 to 1973.....	209	3,442	127	2,577	82	865
1974 to 1979.....	530	6,616	295	4,780	235	1,836
1980 to 1983.....	140	5,675	100	4,229	40	Q
Square Footage Category						
5,000 or Less.....	2,248	4,908	1,168	2,620	1,080	2,288
5,001 to 10,000.....	725	5,246	424	3,085	301	2,162
10,001 to 25,000.....	567	8,912	352	5,563	215	3,369
25,001 to 50,000.....	222	7,692	164	5,677	58	2,015
50,001 to 100,000.....	107	7,168	82	5,576	25	1,592
100,001 to 200,000.....	50	6,642	38	5,130	11	1,512
Over 200,000.....	29	11,757	26	9,956	3	Q
Principal Activity Within Building						
Assembly.....	457	5,483	213	3,576	244	1,907
Educational.....	177	6,044	117	4,295	60	1,749
Food Sales/Service.....	380	2,051	221	1,300	160	751
Health Care.....	61	2,277	40	1,760	20	516
Lodging.....	106	2,241	49	1,617	57	624
Mercantile/Services.....	1,071	10,427	618	6,651	453	3,776
Office.....	575	8,454	360	7,040	215	1,414
Residential.....	236	2,454	148	1,912	88	542
Warehouse.....	425	6,791	230	4,641	196	2,150
Other.....	179	2,760	99	2,275	80	485
Vacant.....	261	3,342	161	2,518	120	824
Census Region						
Northeast.....	670	11,615	532	9,993	138	1,622
North Central.....	1,211	16,059	683	11,651	527	4,408
South.....	1,493	17,049	644	9,753	848	7,295
West.....	574	7,602	395	6,190	179	Q
Annual Heating (HDD) and Cooling Degree-Days (CDD)						
<2,000 CDD and >7,000 HDD.....	421	5,725	Q	3,430	213	2,295
<2,000 CDD and 5,500-7,000 HDD....	1,153	16,965	831	14,414	Q	Q
>2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	333	7,289	684	6,504
<2,000 CDD and <4,000 HDD.....	678	7,496	476	6,120	Q	1,376
>2,000 CDD and <4,000 HDD.....	679	8,346	407	6,335	Q	Q
Number of Establishments in Building						
None.....	142	1,475	76	1,045	66	431
Single Establishment.....	3,160	35,227	1,758	24,373	1,402	10,853
Multi-Establishment.....	645	15,623	420	12,169	225	3,454
Government Occupancy						
Government Occupied.....	346	10,099	191	6,957	155	3,142
Non-Government Occupied.....	3,602	42,225	2,064	30,630	1,537	11,595
Fuels Used Alone or in Combination						
Electricity.....	3,783	51,359	2,175	36,942	1,608	14,417
Natural Gas.....	2,314	37,090	1,535	28,553	779	8,537
Fuel Oil.....	633	13,313	324	9,648	309	3,664
Propane.....	260	3,007	70	1,175	189	1,832
Purchased Steam.....	60	4,594	51	4,210	9	383
Other.....	245	3,997	73	2,620	172	1,377

See footnotes at end of table.

**Table 9. Location of Buildings by Metropolitan Status, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings in:			
	Number of Buildings (thousands)	Square Feet (millions)	Metropolitan Locations		Nonmetropolitan Locations	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
<b>Fuel Combinations Used</b>						
No Fuels Used.....	161	935	77	613	85	321
Electricity.....	800	6,518	399	3,865	401	2,653
Electricity and Natural Gas.....	1,939	24,863	1,300	18,671	639	6,192
Electricity and Fuel Oil.....	319	2,911	143	1,634	176	1,277
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	151	5,842	57	1,111
Electricity and Propane.....	138	736	45	292	93	445
Other.....	383	9,409	141	6,669	242	2,740
<b>Percent Heated</b>						
Not Heated.....	440	2,971	218	1,884	221	1,086
1 to 50.....	517	5,913	288	4,110	229	1,802
51 to 99.....	564	8,266	323	6,168	241	2,098
100.....	2,427	35,175	1,426	25,424	1,001	9,751
<b>Percent Cooled</b>						
Not Cooled.....	1,304	9,802	662	6,313	642	3,489
1 to 50.....	1,004	16,335	626	11,684	378	4,651
51 to 99.....	510	10,333	311	8,334	199	1,999
100.....	1,129	15,855	656	11,256	473	4,599

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 10. Location of Buildings by Climate Zone, 1983**

Building Characteristics	All Buildings		Buildings Located on Sites Having the Following Long-Term Average Annual Heating (HDD) and Cooling Degree-Days (CDD):									
			<2,000 CDD and >7,000 HDD		<2,000 CDD and 5,500-7,000 HDD		<2,000 CDD and 4,000-5,499 HDD		<2,000 CDD and <4,000 HDD		>2,000 CDD and <4,000 HDD	
	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
All Buildings.....	3,948	52,325	421	5,725	1,153	16,965	1,016	13,793	678	7,496	679	8,346
Year Constructed												
1900 or Before.....	288	2,940	68	539	135	1,442	54	744	Q	Q	Q	Q
1901 to 1920.....	388	5,453	51	704	149	2,050	116	1,809	41	594	31	Q
1921 to 1945.....	726	8,639	71	898	210	3,013	246	2,852	119	1,229	Q	647
1946 to 1960.....	946	9,612	78	877	264	3,439	233	2,257	199	1,639	172	1,400
1961 to 1970.....	721	9,947	64	989	191	3,249	156	2,281	142	1,566	169	1,863
1971 to 1973.....	209	3,442	Q	Q	49	851	50	859	38	639	50	Q
1974 to 1979.....	530	6,616	Q	Q	120	1,773	142	1,562	97	1,099	119	1,513
1980 to 1983.....	140	5,675	16	623	34	1,147	19	Q	28	632	44	Q
Square Footage Category												
5,000 or Less.....	2,248	4,908	215	501	613	1,446	580	1,216	423	863	417	882
5,001 to 10,000.....	725	5,246	95	717	232	1,658	171	1,250	114	811	Q	Q
10,001 to 25,000.....	567	8,912	61	904	173	2,732	163	2,631	81	1,241	89	1,403
25,001 to 50,000.....	222	7,692	28	967	73	2,444	56	1,973	34	1,162	32	1,146
50,001 to 100,000.....	107	7,168	13	848	32	2,231	28	1,793	16	1,035	18	1,260
100,001 to 200,000.....	50	6,642	6	801	18	2,379	13	1,703	8	976	6	784
Over 200,000.....	29	11,757	3	987	12	4,075	7	3,227	3	1,409	4	2,060
Principal Activity Within Building												
Assembly.....	457	5,483	40	554	141	1,760	150	1,638	60	460	65	Q
Educational.....	177	6,044	18	722	47	2,055	42	1,597	28	697	Q	973
Food Sales/Service.....	380	2,051	51	302	99	741	88	368	72	311	71	329
Health Care.....	61	2,277	5	201	25	1,213	12	272	Q	400	10	Q
Lodging.....	106	2,241	7	146	26	728	20	537	25	292	Q	Q
Mercantile/Services.....	1,071	10,427	124	1,353	303	2,463	274	3,485	184	1,489	186	Q
Office.....	575	8,454	54	728	191	2,611	125	2,031	92	1,348	113	1,736
Residential.....	236	2,454	38	342	86	973	90	970	Q	Q	Q	Q
Warehouse.....	425	6,791	44	770	103	2,080	101	1,547	98	1,507	Q	888
Other.....	179	2,760	Q	Q	48	1,180	47	616	38	324	Q	361
Vacant.....	281	3,342	Q	326	83	1,160	65	731	62	596	Q	526
Census Region												
Northeast.....	670	11,615	Q	1,160	346	6,098	224	4,357	--	--	--	--
North Central.....	1,211	16,059	246	3,897	644	9,092	Q	Q	NC	NC	--	--
South.....	1,493	17,049	--	--	NC	NC	401	5,209	452	4,581	639	7,258
West.....	574	7,602	Q	Q	162	1,775	Q	Q	227	2,915	Q	Q
Metropolitan Status												
Metropolitan.....	2,255	37,587	Q	3,430	831	14,414	333	7,289	476	6,120	407	6,335
Nonmetropolitan.....	1,693	14,736	213	2,295	Q	Q	684	6,504	Q	1,376	Q	Q
Number of Establishments in Building												
None.....	142	1,475	Q	Q	33	446	34	273	37	393	Q	165
Single Establishment.....	3,160	35,227	319	4,207	921	11,807	833	8,847	553	5,262	535	5,103
Multi-Establishment.....	645	15,623	84	1,320	199	4,712	150	4,672	88	1,841	Q	3,078
Government Occupancy												
Government Occupied.....	346	10,099	39	1,310	113	3,218	89	3,420	58	1,106	Q	1,046
Not Government Occupied..	3,602	42,225	382	4,415	1,039	13,747	928	10,373	620	6,391	633	7,300
Fuels Used Alone or in Combination												
Electricity.....	3,783	51,359	401	5,532	1,114	16,724	974	13,560	638	7,298	655	8,245
Natural Gas.....	2,314	37,090	250	3,962	829	13,448	606	9,464	390	5,268	239	4,948
Fuel Oil.....	633	13,313	106	1,564	191	4,732	234	4,359	Q	1,436	Q	1,222
Propane.....	260	3,007	Q	Q	Q	653	54	674	Q	490	77	Q
Purchased Steam.....	60	4,594	13	1,056	29	1,848	10	1,351	Q	206	Q	Q
Other.....	245	3,997	47	620	72	1,437	74	1,052	Q	498	Q	390

See footnotes at end of table.

**Table 10. Location of Buildings by Climate Zone, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings Located on Sites Having the Following Long-Term Average Annual Heating (HDD) and Cooling Degree-Days (CDD):									
			<2,000 CDD and >7,000 HDD		<2,000 CDD and 5,500-7,000 HDD		<2,000 CDD and 4,000-5,499 HDD		<2,000 CDD and <4,000 HDD		>2,000 CDD and <4,000 HDD	
	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Feet (mil-lions)	Number of Buildings (thousands)	Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
Fuel Combinations Used												
No Fuels Used.....	161	935	Q	Q	36	231	42	230	39	Q	Q	Q
Electricity.....	800	6,518	43	278	105	1,068	170	1,790	170	1,249	Q	Q
Electricity and Natural Gas.....	1,939	24,863	201	2,402	697	8,630	471	5,628	364	4,159	205	4,044
Electricity and Fuel Oil.....	319	2,911	53	450	94	801	114	891	Q	Q	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	24	673	73	2,772	88	2,566	10	608	12	333
Electricity and Propane..	138	736	Q	Q	Q	102	22	238	Q	98	52	Q
Other.....	383	9,409	71	1,708	117	3,362	109	2,450	Q	868	Q	Q
Percent Heated												
Not Heated.....	440	2,971	Q	307	70	560	105	643	125	861	Q	600
1 to 50.....	517	5,913	51	580	152	1,753	97	1,222	111	1,237	106	1,122
51 to 99.....	564	8,266	78	1,024	173	2,241	145	2,463	93	1,288	Q	1,250
100.....	2,427	35,175	253	3,815	756	12,411	669	9,465	349	4,111	398	5,373
Percent Cooled												
Not Cooled.....	1,304	9,802	188	1,483	438	3,823	332	2,443	235	1,509	Q	Q
1 to 50.....	1,004	16,335	135	2,058	316	6,474	272	4,054	137	2,115	145	1,634
51 to 99.....	510	10,333	43	1,041	146	3,130	128	3,055	97	1,539	95	1,568
100.....	1,129	15,855	Q	Q	253	3,539	285	4,241	209	2,334	327	4,600

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 11. Number of People Working in Building, 1983**

Building Characteristics	All Buildings		Buildings in Which the Number of People Working is:									
			Fewer than 10		10 to 19		20 to 49		50 to 99		100 or More	
	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
All Buildings.....	3,948	52,325	2,646	15,247	538	6,180	502	10,082	141	5,251	121	15,564
Year Constructed												
1900 or Before.....	288	2,940	217	1,599	32	278	29	468	Q	Q	6	515
1901 to 1920.....	388	5,453	253	2,155	77	1,055	35	859	11	391	11	993
1921 to 1945.....	726	8,639	549	3,194	74	1,146	69	1,742	16	783	17	1,775
1946 to 1960.....	946	9,612	699	3,046	105	1,056	102	2,309	23	860	17	2,341
1961 to 1970.....	721	9,947	473	2,068	90	896	102	2,079	31	1,351	25	3,552
1971 to 1973.....	209	3,442	104	710	36	425	43	769	16	449	9	1,089
1974 to 1979.....	530	6,616	293	1,541	98	716	92	1,267	26	865	21	2,227
1980 to 1983.....	140	5,675	58	935	25	609	28	589	14	472	15	Q
Square Footage Category												
5,000 or Less.....	2,248	4,908	1,899	3,914	210	558	120	384	Q	Q	Q	Q
5,001 to 10,000.....	725	5,246	423	3,022	164	1,199	110	820	26	190	Q	Q
10,001 to 25,000.....	567	8,912	237	3,512	122	1,923	152	2,518	40	704	16	255
25,001 to 50,000.....	222	7,692	59	2,019	29	1,030	79	2,670	29	1,011	26	961
50,001 to 100,000.....	107	7,168	20	1,296	9	599	30	1,973	23	1,552	25	1,746
100,001 to 200,000.....	50	6,642	5	680	3	383	8	1,077	8	1,059	25	3,444
Over 200,000.....	29	11,757	2	803	Q	Q	640	2	696	21	9,129	
Principal Activity Within Building												
Assembly.....	457	5,483	295	2,167	68	982	75	1,175	12	383	7	4
Educational.....	177	6,044	49	377	31	440	58	2,308	24	1,453	14	1,466
Food Sales/Service.....	300	2,051	229	693	61	257	68	564	17	296	5	242
Health Care.....	61	2,277	35	166	Q	Q	Q	Q	Q	Q	9	1,656
Lodging.....	106	2,241	73	701	7	139	15	422	7	283	4	695
Mercantile/Services.....	1,071	10,427	819	3,552	142	1,356	72	1,226	18	764	19	3,529
Office.....	575	8,454	268	789	113	640	108	1,263	41	873	45	4,890
Residential.....	236	2,454	208	1,558	14	364	Q	Q	Q	Q	Q	Q
Warehouse.....	425	6,791	292	2,045	66	1,139	49	1,712	11	704	7	1,192
Other.....	179	2,760	115	787	25	677	26	459	6	233	7	604
Vacant.....	281	3,342	263	2,413	5	130	9	268	2	137	3	393
Census Region												
Northeast.....	670	11,615	435	3,696	100	1,562	83	1,797	23	1,070	29	3,491
North Central.....	1,211	16,059	819	4,664	160	1,711	146	3,359	48	1,771	36	4,553
South.....	1,493	17,049	1,049	4,934	193	2,115	170	3,086	44	1,522	38	5,392
West.....	574	7,602	343	1,953	85	792	103	1,840	27	889	17	2,128
Metropolitan Status												
Metropolitan.....	2,255	37,587	1,390	9,336	313	3,941	356	7,512	102	4,063	94	12,735
Nonmetropolitan.....	1,693	14,738	1,256	5,911	225	2,239	146	2,570	40	1,188	27	2,830
Annual Heating (HDD) and Cooling Degree-Days (CDD)												
<2,000 CDD and >7,000 HDD	421	5,725	282	1,814	60	710	47	1,157	20	618	13	1,427
<2,000 CDD and 5,500-7,000 HDD.....	1,153	16,965	741	4,787	177	2,180	151	3,289	40	1,848	42	4,861
<2,000 CDD and 4,000-5,999 HDD.....	1,016	13,793	712	4,374	128	1,600	114	2,260	31	1,187	31	4,372
<2,000 CDD and <4,000 HDD.....	678	7,496	473	2,168	67	811	98	1,825	24	736	16	1,956
>2,000 CDD and <4,000 HDD.....	679	8,346	438	2,104	Q	Q	91	1,551	26	862	19	2,948
Number of Establishments in Building												
None.....	142	1,475	142	1,452	Q	Q	Q	Q	Q	NC	NC	
Single Establishment.....	3,160	35,227	2,214	11,533	391	4,201	379	7,688	104	3,979	72	7,825
Multi-Establishment.....	645	15,623	290	2,262	147	1,962	123	2,391	37	1,269	49	7,739
Government Occupancy												
Government Occupied.....	346	10,099	161	1,176	51	927	71	1,711	32	1,307	30	4,979
Not Government Occupied..	3,602	42,225	2,485	14,072	487	5,253	431	8,371	109	3,944	91	10,586

See footnotes at end of table.

**Table 11. Number of People Working in Building, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings in Which the Number of People Working is:									
	Number of Buildings (thousands)	Square Feet (mil-lions)	Fewer than 10		10 to 19		20 to 49		50 to 99		100 or More	
			Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
Fuels Used Alone or in Combination												
Electricity.....	3,783	51,359	2,483	14,299	535	6,177	502	10,082	141	5,249	121	15,551
Natural Gas.....	2,314	37,090	1,425	9,036	333	3,987	361	7,625	104	3,906	91	12,536
Fuel Oil.....	633	13,313	423	2,973	88	1,395	66	2,055	21	1,170	35	5,720
Propane.....	260	3,007	187	806	27	309	31	642	6	394	9	856
Purchased Steam.....	60	4,594	20	458	7	186	14	630	7	437	12	2,882
Other.....	245	3,997	177	814	30	593	19	679	8	307	11	1,605
Fuel Combinations Used												
No Fuels Used.....	161	935	159	930	Q	Q	NC	NC	Q	Q	NC	NC
Electricity.....	800	6,518	567	2,681	124	1,177	76	1,132	21	593	13	936
Electricity and Natural Gas.....	1,939	24,863	1,207	7,232	274	3,023	316	5,751	85	2,820	57	6,038
Electricity and Fuel Oil.	319	2,911	233	1,273	44	339	29	464	8	296	5	539
Electricity, Natural Gas and Fuel Oil.....	207	6,953	121	1,142	33	609	25	1,080	9	534	19	3,587
Electricity and Propane..	138	736	112	379	Q	Q	12	147	Q	Q	Q	Q
Other.....	383	9,409	246	1,611	48	925	45	1,508	17	985	27	4,380
Percent Heated												
Not Heated.....	440	2,971	408	2,427	23	283	Q	Q	Q	Q	Q	Q
1 to 50.....	517	5,913	377	2,636	75	1,000	51	1,325	8	285	5	666
51 to 99.....	564	8,266	340	2,028	99	1,065	87	1,417	19	609	18	3,147
100.....	2,427	35,175	1,520	8,156	341	3,831	356	7,202	114	4,331	96	11,655
Percent Cooled												
Not Cooled.....	1,304	9,802	1,134	6,430	91	958	59	1,428	17	650	4	336
1 to 50.....	1,004	16,335	613	4,487	181	2,892	142	4,089	38	1,836	29	3,031
51 to 99.....	510	10,333	248	1,347	99	964	104	1,743	25	683	35	5,396
100.....	1,129	15,855	651	2,983	167	1,367	197	2,823	61	1,881	53	6,801

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 12. Area per Worker and Number of Workers per Building, 1983**

Building Characteristics	Number of Buildings (thousands)	Average Square Feet per Worker	Median Square Feet per Worker	Total Workers (thousands)	Total Number of People (thousands) Working in Buildings with:				
		Less than 10 Employees	10 to 19 Employees		20 to 49 Employees	50 to 99 Employees	100 or More Employees		
All Buildings.....	3,948	674	714	77,673	9,315	6,876	14,807	8,865	37,811
Year Constructed									
1900 or Before.....	288	785	980	3,745	779	403	784	Q	1,628
1901 to 1920.....	388	958	1,122	5,691	759	949	935	670	2,378
1921 to 1945.....	726	785	873	11,012	1,751	966	2,076	1,092	5,127
1946 to 1960.....	946	680	686	14,130	2,461	1,321	2,947	1,388	6,013
1961 to 1970.....	721	629	615	15,811	1,803	1,182	3,038	1,959	7,829
1971 to 1973.....	209	555	492	6,203	427	454	1,344	1,113	2,865
1974 to 1979.....	530	513	565	12,900	1,117	1,291	2,875	1,570	6,047
1980 to 1983.....	140	694	653	8,181	218	310	808	923	5,922
Square Footage Category									
5,000 or Less.....	2,248	352	501	13,954	6,238	2,596	3,412	Q	Q
5,001 to 10,000.....	725	598	954	8,768	1,776	2,117	3,093	1,563	Q
10,001 to 25,000.....	567	742	1,271	12,006	984	1,587	4,533	2,469	2,412
25,001 to 50,000.....	222	824	1,307	9,340	224	394	2,440	1,937	4,345
50,001 to 100,000.....	107	960	1,695	7,470	70	119	981	1,427	4,872
100,001 to 200,000.....	50	829	1,550	8,008	16	45	280	538	7,128
Over 200,000.....	29	649	1,437	18,128	7	Q	67	171	17,865
Principal Activity Within Building									
Assembly.....	457	914	1,087	5,998	969	835	2,051	677	1,466
Educational.....	177	986	971	6,131	211	391	1,905	1,474	2,150
Food Sales/Service.....	380	362	380	5,670	979	801	2,147	1,086	657
Health Care.....	61	413	397	5,512	184	Q	Q	Q	4,900
Lodging.....	106	944	1,176	2,373	256	92	456	489	1,080
Mercantile/Services.....	1,071	749	735	13,914	3,161	1,748	1,986	1,239	5,779
Office.....	575	323	364	26,174	1,307	1,487	3,182	2,493	17,706
Residential.....	236	1,790	1,295	1,371	669	186	Q	Q	Q
Warehouse.....	425	1,261	1,253	5,386	827	882	1,483	675	1,519
Other.....	179	762	604	3,624	335	327	789	391	1,782
Vacant.....	281	2,199	ZD	1,520	416	66	253	105	679
Census Region									
Northeast.....	670	698	849	16,633	1,624	1,302	2,458	1,518	9,731
North Central.....	1,211	709	731	22,659	2,902	2,023	4,373	2,969	10,392
South.....	1,493	667	677	26,347	3,525	2,472	5,036	2,712	12,603
West.....	574	632	604	12,034	1,264	1,080	2,939	1,666	5,086
Metropolitan Status									
Metropolitan.....	2,255	643	678	58,435	5,113	4,020	10,532	6,316	32,454
Nonmetropolitan.....	1,693	766	761	19,238	4,201	2,857	4,275	2,549	5,356
Annual Heating (HDD) and Cooling Degree-Days (CDD)									
<2,000 CDD and >7,000 HDD.....	421	743	889	7,701	1,023	738	1,307	1,305	3,329
<2,000 CDD and 5,500-7,000 HDD...	1,153	687	715	24,695	2,687	2,322	4,581	2,465	12,640
<2,000 CDD and 4,000-5,499 HDD...	1,016	719	801	19,184	2,352	1,600	3,397	1,904	9,931
<2,000 CDD and <4,000 HDD....	678	641	634	11,697	1,596	865	2,817	1,530	4,889
>2,000 CDD and <4,000 HDD.....	679	580	568	14,396	1,657	Q	2,705	1,661	7,021
Number of Establishments in Building									
None.....	142	Q	ZD	44	39	Q	Q	Q	NC
Single Establishment.....	3,160	695	633	50,709	7,966	4,946	11,294	6,515	19,987
Multi-Establishment.....	645	580	612	26,920	1,309	1,927	3,511	2,349	17,824
Government Occupancy									
Government Occupied.....	346	589	544	17,149	616	703	2,172	2,067	11,591
Not Government Occupied.....	3,602	698	731	60,524	8,699	6,174	12,635	6,797	26,219
Fuels Used Alone or in Combination									
Electricity.....	3,783	662	680	77,540	9,232	6,851	14,807	8,864	37,786
Natural Gas.....	2,314	679	695	54,659	5,598	4,319	10,650	6,412	27,680
Fuel Oil.....	633	611	900	21,794	1,567	1,154	1,993	1,398	15,682
Propane.....	260	683	693	4,405	622	332	1,000	427	2,025
Purchased Steam.....	60	557	937	8,249	78	93	407	442	7,229
Other.....	245	602	847	6,639	535	371	621	512	4,600

See footnotes at end of table.

**Table 12. Area per Worker and Number of Workers per Building, 1983  
(Continued)**

Building Characteristics	Number of Buildings (thousands)	Average Square Feet per Worker	Median Square Feet per Worker	Total Workers (thousands)	Total Number of People (thousands) Working in Buildings with:				
					Less than 10 Employees	10 to 19 Employees	20 to 49 Employees	50 to 99 Employees	100 or More Employees
<b>Fuel Combinations Used</b>									
No Fuels Used.....	161	Q	ZD	92	66	Q	NC	Q	NC
Electricity.....	800	648	544	10,052	1,957	1,548	2,118	1,321	3,108
Electricity and Natural Gas.....	1,939	700	672	35,498	4,780	3,528	9,309	5,254	12,626
Electricity and Fuel Oil.....	319	553	752	5,264	847	567	864	557	Q
Electricity, Natural Gas, and Fuel Oil.....	207	660	991	10,542	493	459	711	554	8,326
Electricity and Propane.....	138	644	595	1,143	389	Q	Q	Q	Q
Other.....	383	624	1,473	15,082	783	592	1,417	1,127	11,163
<b>Percent Heated</b>									
Not Heated.....	440	2,290	Q	1,297	632	297	Q	Q	Q
1 to 50.....	517	1,075	860	5,498	1,412	939	1,485	480	1,182
51 to 99.....	564	583	730	14,179	1,415	1,300	2,504	1,204	7,756
100.....	2,427	620	612	56,699	5,855	4,340	10,635	7,150	28,719
<b>Percent Cooled</b>									
Not Cooled.....	1,304	1,331	1,182	7,367	2,938	1,131	1,601	1,107	589
1 to 50.....	1,004	919	867	17,783	2,592	2,312	4,194	2,314	6,370
51 to 99.....	510	498	510	20,753	1,098	1,313	3,058	1,604	13,680
100.....	1,129	499	462	31,770	2,686	2,121	5,954	3,839	17,171

NC=No cases in sample.

ZD=Estimation procedure resulted in division by zero number of workers.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 workers or 0.5 square feet per worker are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 13. Hours of Operation During a Typical Week, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Operating Weekly for:				
		39 or Fewer Hours	40 to 48 Hours	49 to 60 Hours	61 to 84 Hours	Over 84 Hours
All Buildings.....	3,948	740	876	893	656	782
Year Constructed						
1900 or Before.....	288	68	65	72	42	40
1901 to 1920.....	388	103	70	99	67	49
1921 to 1945.....	726	160	191	175	86	114
1946 to 1960.....	946	179	215	213	161	178
1961 to 1970.....	721	110	153	138	150	170
1971 to 1973.....	209	23	53	49	38	46
1974 to 1979.....	530	79	99	111	93	148
1980 to 1983.....	140	18	29	36	20	37
Square Footage Category						
5,000 or Less.....	2,248	510	502	445	338	452
5,001 to 10,000.....	725	119	164	195	126	121
10,001 to 25,000.....	567	71	127	154	112	104
25,001 to 50,000.....	222	28	49	55	42	49
50,001 to 100,000.....	107	9	24	28	21	25
100,001 to 200,000.....	50	2	6	11	12	18
Over 200,000.....	29	2	3	5	7	13
Principal Activity Within Building						
Assembly.....	457	255	57	52	49	44
Educational.....	177	42	51	41	33	10
Food Sales/Service.....	380	Q	Q	47	100	195
Health Care.....	61	Q	Q	17	Q	15
Lodging.....	106	Q	Q	Q	Q	86
Mercantile/Services.....	1,071	69	257	342	238	165
Office.....	575	34	218	189	101	33
Residential.....	236	41	61	36	42	56
Warehouse.....	425	83	119	116	41	66
Other.....	179	32	30	25	17	75
Vacant.....	281	162	41	24	17	37
Census Region						
Northeast.....	670	97	152	161	131	129
North Central.....	1,211	232	221	299	221	237
South.....	1,493	339	346	311	214	283
West.....	574	72	157	123	90	133
Metropolitan Status						
Metropolitan.....	2,255	336	493	539	422	465
Nonmetropolitan.....	1,693	404	383	355	234	317
Annual Heating (HDD) and Cooling Degree-Days (CDD)						
<2,000 CDD and >7,000 HDD.....	421	68	69	110	82	92
<2,000 CDD and 5,500-7,000 HDD	1,153	186	251	253	216	246
<2,000 CDD and 4,000-5,499 HDD	1,016	248	221	233	136	178
<2,000 CDD and <4,000 HDD.....	678	136	177	136	106	123
>2,000 CDD and <4,000 HDD.....	679	Q	Q	162	116	143
Number of Establishments in Building						
None.....	142	118	Q	Q	Q	Q
Single Establishment.....	3,160	571	700	701	534	654
Multi-Establishment.....	645	51	173	188	122	112
Government Occupancy						
Government Occupied.....	346	57	102	66	48	72
Not Government Occupied.....	3,602	683	774	827	608	710
Fuels Used Alone or in Combination						
Electricity.....	3,783	622	863	891	654	753
Natural Gas.....	2,314	306	544	574	440	451
Fuel Oil.....	633	108	146	139	111	128
Propane.....	260	54	48	46	43	68
Purchased Steam.....	60	4	10	14	8	24
Other.....	245	40	62	56	38	49

See footnotes at end of table.

**Table 13. Hours of Operation During a Typical Week, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Operating Weekly for:				
		39 or Fewer Hours	40 to 48 Hours	49 to 60 Hours	61 to 84 Hours	Over 84 Hours
<b>Fuel Combinations Used</b>						
No Fuels Used.....	161	116	Q	Q	Q	Q
Electricity.....	800	178	164	191	108	159
Electricity and Natural Gas...	1,939	258	460	481	367	372
Electricity and Fuel Oil.....	319	63	82	57	56	60
Electricity, Natural Gas, and Fuel Oil.....	207	32	43	58	39	35
Electricity and Propane.....	138	38	30	16	22	32
Other.....	383	55	84	88	61	95
<b>Percent Heated</b>						
Not Heated.....	440	206	59	54	40	80
1 to 50.....	517	55	143	176	65	78
51 to 99.....	564	71	136	141	104	113
100.....	2,427	408	539	523	446	511
<b>Percent Cooled</b>						
Not Cooled.....	1,304	425	271	218	168	222
1 to 50.....	1,004	102	267	309	163	163
51 to 99.....	510	54	121	114	94	126
100.....	1,129	159	217	252	231	270

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 14. Number of Establishments in Building, 1983**

Building Characteristics	All Buildings		Buildings Containing the Following Number of Establishments:					
			One		More than One		None(Vacant)	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	3,160	35,227	645	15,623	142	1,475
Year Constructed								
1900 or Before.....	288	2,940	209	1,812	69	1,034	Q	Q
1901 to 1920.....	388	5,453	306	3,833	63	1,405	20	215
1921 to 1945.....	726	8,639	577	6,197	111	2,096	38	346
1946 to 1960.....	946	9,612	782	7,273	127	2,131	37	Q
1961 to 1970.....	721	9,947	604	6,827	101	2,971	16	150
1971 to 1973.....	209	3,442	170	2,452	38	912	Q	Q
1974 to 1979.....	530	6,616	413	4,490	105	2,012	Q	Q
1980 to 1983.....	140	5,675	100	2,342	33	3,063	8	270
Square Footage Category								
5,000 or Less.....	2,248	4,908	1,925	4,077	227	613	96	218
5,001 to 10,000.....	725	5,246	537	3,870	165	1,202	Q	Q
10,001 to 25,000.....	567	8,912	408	6,563	148	2,212	11	137
25,001 to 50,000.....	222	7,692	166	5,710	50	1,795	6	187
50,001 to 100,000.....	107	7,168	76	5,031	26	1,794	5	342
100,001 to 200,000.....	50	6,642	32	4,222	17	2,303	Q	Q
Over 200,000.....	29	11,757	16	5,753	12	5,704	1	300
Principal Activity Within Building								
Assembly.....	457	5,483	406	4,352	51	1,131	--	--
Educational.....	177	6,044	164	5,640	Q	404	--	--
Food Sales/Service.....	380	2,051	339	1,751	42	300	--	--
Health Care.....	61	2,277	56	2,053	5	224	--	--
Lodging.....	106	2,241	94	1,819	13	422	--	--
Mercantile/Services.....	1,071	10,427	925	6,334	145	4,093	--	--
Office.....	575	8,454	363	3,466	212	4,988	--	--
Residential.....	236	2,454	172	1,307	63	1,148	--	--
Warehouse.....	425	6,791	367	5,460	59	1,331	--	--
Other.....	179	2,760	157	1,801	21	955	--	--
Vacant.....	281	3,342	118	1,245	22	626	142	1,471
Census Region								
Northeast.....	670	11,615	507	7,137	144	4,165	19	313
North Central.....	1,211	16,059	986	12,203	186	3,483	38	374
South.....	1,493	17,049	1,237	11,258	193	5,273	63	518
West.....	574	7,602	431	4,629	122	2,703	Q	Q
Metropolitan Status								
Metropolitan.....	2,255	37,587	1,758	24,373	420	12,169	76	1,045
Nonmetropolitan.....	1,693	14,738	1,402	10,853	225	3,454	66	431
Annual Heating (HDD) and Cooling								
Degree-Days (CDD)								
<2,000 CDD and >7,000 HDD.....	421	5,725	319	4,207	84	1,320	Q	Q
<2,000 CDD and 5,500-7,000 HDD....	1,153	16,965	921	11,807	199	4,712	33	446
<2,000 CDD and 4,000-5,499 HDD....	1,016	13,793	833	8,847	150	4,672	34	273
<2,000 CDD and <4,000 HDD.....	678	7,496	553	5,262	88	1,841	37	393
>2,000 CDD and <4,000 HDD.....	679	8,346	535	5,103	Q	3,078	Q	165
Government Occupancy								
Government Occupied.....	346	10,099	264	5,703	74	4,289	Q	Q
Not Government Occupied.....	3,602	42,225	2,896	29,524	571	11,333	134	1,368
Fuels Used Alone or in Combination								
Electricity.....	3,783	51,359	3,081	34,926	639	15,540	62	893
Natural Gas.....	2,314	37,090	1,835	24,588	450	12,047	28	455
Fuel Oil.....	633	13,313	529	9,258	97	3,873	Q	182
Propane.....	260	3,007	228	2,443	29	541	Q	Q
Purchased Steam.....	60	4,594	50	3,237	10	1,299	Q	Q
Other.....	245	3,997	213	2,828	27	1,083	Q	Q

See footnotes at end of table.

**Table 14. Number of Establishments in Building, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings Containing the Following Number of Establishments:					
			One		More than One		None(Vacant)	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
<b>Fuel Combinations Used</b>								
No Fuels Used.....	161	935	76	293	Q	Q	79	580
Electricity.....	800	6,518	659	4,459	118	1,773	23	285
Electricity and Natural Gas.....	1,939	24,863	1,545	16,373	369	8,193	25	297
Electricity and Fuel Oil.....	319	2,911	277	2,243	37	615	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	151	4,502	55	2,356	Q	Q
Electricity and Propane.....	138	736	118	631	18	99	Q	Q
Other.....	383	9,409	333	6,726	43	2,524	Q	158
<b>Percent Heated</b>								
Not Heated.....	440	2,971	298	1,621	34	416	107	934
1 to 50.....	517	5,913	441	4,457	70	1,356	Q	Q
51 to 99.....	564	8,266	445	5,173	112	2,999	Q	95
100.....	2,427	35,175	1,976	23,975	429	10,852	22	347
<b>Percent Cooled</b>								
Not Cooled.....	1,304	9,802	1,054	7,241	131	1,440	119	1,120
1 to 50.....	1,004	16,335	815	12,420	177	3,772	Q	143
51 to 99.....	510	10,333	390	5,954	116	4,250	Q	129
100.....	1,129	15,855	901	9,611	221	6,161	7	83

NC=No cases in sample.

Q Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 15. Government Owned and Occupied Buildings, 1983**

Building Characteristics	All Buildings		Buildings Occupied by an Agency of:								Buildings Owned by Government	
			Government (Total)		Federal Government		State Government		Local Government			
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
All Buildings.....	3,948	52,325	346	10,099	60	3,117	104	3,355	217	4,929	360	9,920
Year Constructed												
1900 or Before.....	288	2,940	17	385	Q	Q	Q	Q	9	284	14	350
1901 to 1920.....	388	5,453	25	693	Q	Q	9	265	17	380	31	680
1921 to 1945.....	726	6,639	64	1,651	10	354	17	544	41	908	71	1,888
1946 to 1960.....	946	9,612	78	1,810	13	624	30	645	42	818	79	1,737
1961 to 1970.....	721	9,947	65	2,077	7	438	19	694	44	1,236	70	2,164
1971 to 1973.....	209	3,442	19	713	1	155	Q	247	14	384	18	728
1974 to 1979.....	530	6,616	58	1,195	12	326	18	433	36	637	56	1,223
1980 to 1983.....	140	5,675	20	Q	4	Q	5	Q	12	281	22	1,150
Square Footage Category												
5,000 or Less.....	2,248	4,908	153	327	24	53	33	58	104	228	155	310
5,001 to 10,000.....	725	5,246	51	378	Q	14	102	33	248	50	374	
10,001 to 25,000.....	567	8,912	61	959	12	179	26	442	32	483	59	914
25,001 to 50,000.....	222	7,692	39	1,356	5	176	15	549	22	765	46	1,586
50,001 to 100,000.....	107	7,168	23	1,551	3	215	9	633	15	997	30	2,026
100,001 to 200,000.....	50	6,642	11	1,636	2	215	3	459	8	1,123	13	1,872
Over 200,000.....	29	11,757	8	3,893	4	Q	3	1,113	3	1,085	7	2,839
Principal Activity Within Building												
Assembly.....	457	5,483	46	651	Q	Q	Q	Q	35	417	50	1,150
Educational.....	177	6,044	57	2,625	Q	Q	18	728	43	2,031	85	4,007
Food Sales/Service.....	380	2,051	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Health Care.....	61	2,277	13	552	Q	158	Q	287	10	262	9	500
Lodging.....	106	2,241	Q	258	Q	Q	Q	Q	Q	Q	9	296
Mercantile/Services.....	1,071	10,427	32	Q	21	Q	Q	Q	9	212	16	220
Office.....	575	8,454	79	2,197	14	1,054	30	861	46	722	59	1,308
Residential.....	236	2,454	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Warehouse.....	425	6,791	20	373	Q	Q	Q	Q	13	149	20	225
Other.....	179	2,760	57	1,282	Q	Q	20	566	39	742	61	1,361
Vacant.....	281	3,342	26	400	Q	Q	Q	Q	16	Q	35	632
Census Region												
Northeast.....	670	11,615	61	2,245	15	609	15	882	39	1,009	62	2,133
North Central.....	1,211	16,059	99	2,917	9	442	27	951	70	1,734	102	3,070
South.....	1,493	17,049	127	3,555	26	Q	40	1,037	74	1,397	132	3,171
West.....	574	7,602	59	1,382	10	268	22	486	34	789	63	1,547
Metropolitan Status												
Metropolitan.....	2,255	37,587	191	6,957	30	2,053	58	2,470	123	3,405	201	7,181
Nonmetropolitan.....	1,693	14,738	155	3,142	29	Q	46	886	94	1,524	159	2,739
Annual Heating (HDD) and Cooling Degree-Days (CDD)												
<2,000 CDD and >7,000 HDD	421	5,725	39	1,310	Q	117	13	Q	22	743	41	1,249
<2,000 CDD and 5,500-7,000 HDD.....	1,153	16,965	113	3,218	22	546	27	1,239	77	1,702	113	3,292
<2,000 CDD and 4,000-5,499 HDD.....	1,016	13,793	89	3,420	Q	Q	28	623	54	1,384	95	2,711
<2,000 CDD and <4,000 HDD	678	7,496	58	1,106	9	351	18	540	37	663	57	1,175
>2,000 CDD and <4,000 HDD	679	8,346	Q	1,046	Q	Q	Q	Q	Q	436	Q	Q
Number of Establishments in Building												
None.....	142	1,475	Q	Q	Q	Q	Q	Q	Q	Q	16	231
Single Establishment.....	3,160	35,227	264	5,703	32	822	73	1,855	176	3,477	298	7,277
Multi-Establishment.....	645	15,623	74	4,289	23	Q	31	1,483	37	1,428	46	2,412

See footnotes at end of table.

**Table 15. Government Owned and Occupied Buildings, 1983 (Continued)**

Building Characteristics	All Buildings		Buildings Occupied by an Agency of:								Buildings Owned by Government	
			Government (Total)		Federal Government		State Government		Local Government			
	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)	Number of Buildings (thousands)	Square Feet (mil-lions)
<b>Government Occupancy</b>												
Government Occupied.....	346	10,099	346	10,099	60	3,117	104	3,355	217	4,929	260	7,009
Not Government Occupied..	3,602	42,225	--	--	--	--	--	--	--	--	99	2,911
<b>Fuels Used Alone or in Combination</b>												
Electricity.....	3,783	51,359	336	9,996	60	3,110	100	3,353	212	4,833	341	9,693
Natural Gas.....	2,314	37,090	186	6,957	27	Q	61	2,044	121	3,321	182	6,334
Fuel Oil.....	633	13,313	67	3,245	9	845	16	1,331	48	1,556	73	3,232
Propane.....	260	3,007	20	366	Q	Q	Q	Q	6	273	15	484
Purchased Steam.....	60	4,594	18	1,576	2	525	12	698	Q	492	22	1,686
Other.....	245	3,997	32	1,424	9	347	11	757	14	409	33	1,520
<b>Fuel Combinations Used</b>												
No Fuels Used.....	161	935	Q	Q	Q	Q	Q	Q	Q	Q	19	223
Electricity.....	800	6,518	77	1,059	13	196	18	283	52	738	83	1,094
Electricity and Natural Gas.....	1,939	24,863	142	4,014	24	Q	45	1,093	94	1,781	136	3,516
Electricity and Fuel Oil.	319	2,911	33	366	Q	Q	6	194	27	253	37	466
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	20	1,704	1	496	5	552	15	957	22	1,468
Electricity and Propane..	138	736	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other.....	383	9,409	53	2,797	13	707	21	1,203	21	1,082	57	3,095
<b>Percent Heated</b>												
Not Heated.....	440	2,971	37	327	Q	Q	Q	Q	23	Q	50	479
1 to 50.....	517	5,913	34	569	Q	171	Q	Q	22	341	35	502
51 to 99.....	564	8,266	41	1,648	11	824	14	391	24	616	31	1,383
100.....	2,427	35,175	234	7,556	35	Q	75	2,801	148	3,724	244	7,556
<b>Percent Cooled</b>												
Not Cooled.....	1,304	9,802	135	1,647	20	288	33	441	87	1,054	167	2,219
1 to 50.....	1,004	16,335	68	2,580	9	316	22	1,068	45	1,445	71	3,105
51 to 99.....	510	10,333	51	2,497	10	949	17	746	33	1,187	40	2,002
100.....	1,129	15,855	92	3,376	20	Q	33	1,100	52	1,243	82	2,595

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Columns do not sum to totals because buildings may have multiple government occupancy. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 16. Energy Sources Supplied to Building, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Using:							
		Electricity	Natural Gas	Fuel Oil	Propane	Steam	Wood	Coal	Other
All Buildings.....	3,948	3,783	2,314	633	260	60	134	55	105
Year Constructed									
1900 or Before.....	288	280	198	80	Q	Q	Q	Q	Q
1901 to 1920.....	388	370	266	79	24	7	Q	Q	Q
1921 to 1945.....	726	689	481	140	35	17	Q	15	18
1946 to 1960.....	946	882	545	161	72	20	38	Q	18
1961 to 1970.....	721	702	410	88	33	9	Q	Q	17
1971 to 1973.....	209	207	106	30	24	Q	Q	Q	Q
1974 to 1979.....	530	517	233	44	43	1	Q	Q	21
1980 to 1983.....	140	135	75	9	7	2	Q	Q	7
Square Footage Category									
5,000 or Less.....	2,248	2,120	1,155	306	168	Q	101	Q	49
5,001 to 10,000.....	725	704	481	124	42	Q	Q	Q	22
10,001 to 25,000.....	567	561	387	112	32	13	Q	Q	16
25,001 to 50,000.....	222	216	158	40	9	13	Q	Q	7
50,001 to 100,000.....	107	104	73	22	3	9	Q	Q	5
100,001 to 200,000.....	50	49	39	15	4	5	Q	Q	2
Over 200,000.....	29	29	22	13	2	6	Q	*	3
Principal Activity Within Building									
Assembly.....	457	452	271	97	51	8	Q	Q	3
Educational.....	177	177	115	37	7	8	NC	4	4
Food Sales/Service.....	360	360	235	43	41	Q	Q	Q	Q
Health Care.....	61	59	37	14	Q	Q	NC	Q	2
Lodging.....	106	106	67	17	12	10	Q	Q	Q
Mercantile/Services.....	1,071	1,059	674	194	75	3	51	Q	30
Office.....	575	575	352	76	16	9	Q	Q	17
Residential.....	236	235	187	60	Q	Q	Q	NC	Q
Warehouse.....	425	387	198	50	20	Q	Q	Q	Q
Other.....	179	169	73	26	Q	6	Q	Q	15
Vacant.....	281	183	103	Q	Q	5	Q	Q	8
Census Region									
Northeast.....	670	651	444	257	Q	17	Q	Q	29
North Central.....	1,211	1,161	912	123	70	22	Q	23	32
South.....	1,493	1,420	620	206	144	11	55	24	28
West.....	574	551	339	46	18	11	31	Q	16
Metropolitan Status									
Metropolitan.....	2,255	2,175	1,535	324	70	51	27	4	46
Nonmetropolitan.....	1,693	1,608	779	309	189	9	107	51	59
Annual Heating (HDD) and Cooling Degree-Days (CDD)									
<2,000 CDD and >7,000 HDD.....	421	401	250	106	Q	13	Q	Q	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	1,114	829	191	Q	29	34	Q	34
<2,000 CDD and 4,000-5,499 HDD...	1,016	974	606	234	54	10	42	Q	24
<2,000 CDD and <4,000 HDD.....	678	638	390	Q	Q	Q	Q	Q	6
>2,000 CDD and <4,000 HDD.....	679	655	239	Q	77	Q	Q	Q	Q
Number of Establishments in Building									
None.....	142	62	28	Q	Q	Q	NC	Q	Q
Single Establishment.....	3,160	3,081	1,835	529	228	50	125	50	82
Multi-Establishment.....	645	639	450	97	29	10	Q	Q	18
Government Occupancy									
Government Occupied.....	346	336	186	67	20	18	Q	10	22
Not Government Occupied.....	3,602	3,446	2,128	566	240	42	129	45	83
Fuels Used Alone or in Combination									
Electricity.....	3,783	3,783	2,311	631	260	60	134	55	105
Natural Gas.....	2,314	2,311	2,314	230	40	28	37	17	57
Fuel Oil.....	633	631	230	633	61	5	42	Q	Q
Propane.....	260	260	40	61	260	Q	Q	Q	15
Purchased Steam.....	60	60	28	5	Q	60	NC	Q	6
Other.....	245	245	100	56	41	6	134	55	105

See footnotes at end of table.

**Table 16. Energy Sources Supplied to Building, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) Using:							
		Electricity	Natural Gas	Fuel Oil	Propane	Steam	Wood	Coal	Other
<b>Percent Heated</b>									
Not Heated.....	440	278	53	Q	Q	Q	Q	NC	Q
1 to 50.....	517	516	309	87	39	Q	Q	Q	17
51 to 99.....	564	563	367	100	43	9	35	Q	13
100.....	2,427	2,426	1,585	441	168	48	74	27	73
<b>Percent Cooled</b>									
Not Cooled.....	1,304	1,140	594	248	92	18	86	36	38
1 to 50.....	1,004	1,004	732	180	64	19	Q	12	30
51 to 99.....	510	510	324	77	37	10	Q	Q	14
100.....	1,129	1,129	663	128	67	14	Q	Q	23

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals because of multiple energy sources in use. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 17. Fuel Oil Tanks and Total Tank Capacity, 1983**

Building Characteristics	All Buildings (thousands)	Buildings with Fuel Oil as Energy Source:		
		Number of Buildings (thousands)	Number of Tanks (thousands)	Total Tank Capacity (million gallons)
All Buildings.....	3,948	633	733	1,610
Year Constructed				
1900 or Before.....	288	80	98	104
1901 to 1920.....	388	79	96	215
1921 to 1945.....	726	140	169	255
1946 to 1960.....	946	161	171	495
1961 to 1970.....	721	88	91	222
1971 to 1973.....	209	30	46	63
1974 to 1979.....	530	44	51	149
1980 to 1983.....	140	9	12	107
Square Footage Category				
5,000 or Less.....	2,248	306	300	214
5,001 to 10,000.....	725	124	165	248
10,001 to 25,000.....	567	112	156	329
25,001 to 50,000.....	222	40	51	170
50,001 to 100,000.....	107	22	26	246
100,001 to 200,000.....	50	15	18	169
Over 200,000.....	29	13	18	235
Principal Activity Within Building				
Assembly.....	457	97	118	138
Educational.....	177	37	49	298
Food Sales/Service.....	380	43	56	26
Health Care.....	61	14	14	105
Lodging.....	106	17	21	Q
Mercantile/Services.....	1,071	194	224	208
Office.....	575	76	85	282
Residential.....	236	60	70	97
Warehouse.....	425	50	48	130
Other.....	179	26	31	156
Vacant.....	281	Q	17	47
Census Region				
Northeast.....	670	257	318	794
North Central.....	1,211	123	129	291
South.....	1,493	206	236	376
West.....	574	46	50	150
Metropolitan Status				
Metropolitan.....	2,255	324	384	994
Nonmetropolitan.....	1,693	309	349	617
Annual Heating (HDD) and Cooling Degree-Days (CDD)				
<2,000 CDD and >7,000 HDD.....	421	106	133	334
<2,000 CDD and 5,000-7,000 HDD....	1,153	191	197	508
<2,000 CDD and 4,000-5,499 HDD...	1,016	234	289	558
<2,000 CDD and <4,000 HDD.....	678	Q	Q	115
>2,000 CDD and <4,000 HDD.....	679	Q	Q	Q
Number of Establishments in Building				
None.....	142	Q	Q	23
Single Establishment.....	3,160	529	602	1,217
Multi-Establishment.....	645	97	124	370
Government Occupancy				
Government Occupied.....	346	67	76	420
Not Government Occupied.....	3,602	566	658	1,190
Fuels Used Alone or in Combination				
Electricity.....	3,783	631	733	1,606
Natural Gas.....	2,314	230	251	899
Fuel Oil.....	633	633	733	1,610
Propane.....	260	61	91	140
Purchased Steam.....	60	5	3	Q
Other.....	245	56	68	154

See footnotes at end of table.

**Table 17. Fuel Oil Tanks and Total Tank Capacity, 1983 (Continued)**

Building Characteristics	All Buildings (thousands)	Buildings with Fuel Oil as Energy Source:		
		Number of Buildings (thousands)	Number of Tanks (thousands)	Total Tank Capacity (million gallons)
<b>Fuel Combinations Used</b>				
No Fuels Used.....	161	--	--	--
Electricity.....	800	--	--	--
Electricity and Natural Gas.....	1,939	--	--	--
Electricity and Fuel Oil.....	319	319	367	459
Electricity, Natural Gas, and Fuel Oil.....	207	207	231	791
Electricity and Propane.....	138	--	--	--
Other.....	383	107	136	360
<b>Percent Heated</b>				
Not Heated.....	440	Q	Q	Q
1 to 50.....	517	87	89	111
51 to 99.....	564	100	137	251
100.....	2,427	441	501	1,211
<b>Percent Cooled</b>				
Not Cooled.....	1,304	248	282	488
1 to 50.....	1,004	180	203	496
51 to 99.....	510	77	91	302
100.....	1,129	128	157	324

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

--Numbers of fewer than 500 buildings or tanks, or fewer than 500,000 gallons are rounded to zero.

Note: See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 18. Changes in Usage of Natural Gas Between 1979 and 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings Constructed No Later Than 1979	Number of Buildings (thousands) in Which Natural Gas Was:			
		Used in 1979	Added Since 1979	Dropped Since 1979	Used in 1983
All Buildings.....	3,790	2,184	220	163	2,241
Year Constructed					
1900 or Before.....	287	200	Q	Q	202
1901 to 1920.....	383	285	18	38	265
1921 to 1945.....	742	498	47	44	500
1946 to 1960.....	961	515	62	33	545
1961 to 1970.....	713	395	33	20	408
1971 to 1973.....	203	108	7	Q	105
1974 to 1979.....	502	183	41	Q	216
Square Footage Category					
5,000 or Less.....	2,195	1,100	127	86	1,141
5,001 to 10,000.....	699	447	42	Q	469
10,001 to 25,000.....	529	369	29	34	364
25,001 to 50,000.....	205	148	13	14	148
50,001 to 100,000.....	94	67	5	8	65
100,001 to 200,000.....	45	34	2	Q	36
Over 200,000.....	23	18	1	1	18
Principal Activity Within Building					
Assembly.....	447	260	25	Q	268
Educational.....	167	107	Q	Q	114
Food Sales/Service.....	367	212	Q	Q	227
Health Care.....	57	34	Q	Q	36
Lodging.....	102	56	Q	Q	64
Mercantile/Services.....	1,043	641	49	29	661
Office.....	543	321	26	15	333
Residential.....	235	179	Q	Q	188
Warehouse.....	403	159	49	Q	187
Other.....	158	65	Q	Q	63
Vacant.....	267	149	Q	59	99
Census Region					
Northeast.....	654	426	39	29	436
North Central.....	1,171	876	60	43	892
South.....	1,424	567	90	66	592
West.....	541	315	31	25	322
Metropolitan Status					
Metropolitan.....	2,147	1,476	109	106	1,480
Nonmetropolitan.....	1,644	708	111	57	761
Annual Heating (HDD) and Cooling Degree-Days (CDD)					
<2,000 CDD and >7,000 HDD.....	403	238	13	Q	240
<2,000 CDD and 5,500-7,000 HDD... ..	1,121	807	50	40	817
<2,000 CDD and 4,000-5,499 HDD... ..	994	579	65	52	592
<2,000 CDD and <4,000 HDD.....	648	366	46	39	373
>2,000 CDD and <4,000 HDD.....	625	194	Q	Q	220
Number of Establishments in Building					
None.....	126	68	Q	43	26
Single Establishment.....	3,050	1,712	179	107	1,785
Multi-Establishment.....	615	404	40	Q	431
Government Occupancy					
Government Occupied.....	334	183	15	12	186
Not Government Occupied.....	3,457	2,001	206	151	2,056
Fuels Used Alone or in Combination					
Electricity.....	3,632	2,130	220	112	2,238
Natural Gas.....	2,241	2,021	220	--	2,241
Fuel Oil.....	624	202	40	19	223
Propane.....	241	30	Q	Q	35
Purchased Steam.....	58	31	6	9	27
Other.....	240	90	10	Q	95

See footnotes at end of table.

**Table 18. Changes in Usage of Natural Gas Between 1979 and 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings Constructed No Later Than 1979	Number of Buildings (thousands) in Which Natural Gas Was:			
		Used in 1979	Added Since 1979	Dropped Since 1979	Used in 1983
<b>Fuel Combinations Used</b>					
No Fuels Used.....	154	51	--	51	--
Electricity.....	740	71	--	71	--
Electricity and Natural Gas.....	1,885	1,726	159	--	1,885
Electricity and Fuel Oil.....	317	19	--	19	--
Electricity, Natural Gas, and Fuel Oil.....	199	167	32	--	199
Electricity and Propane.....	123	Q	--	Q	--
Other.....	372	141	29	13	157
<b>Percent Heated</b>					
Not Heated.....	410	101	Q	74	46
1 to 50.....	507	294	35	Q	311
51 to 99.....	550	345	28	Q	357
100.....	2,323	1,444	138	55	1,527
<b>Percent Cooled</b>					
Not Cooled.....	1,265	618	61	97	582
1 to 50.....	980	684	52	20	715
51 to 99.....	479	290	33	18	305
100.....	1,067	592	75	Q	639

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to non-exclusive categories. Numbers in this table may show slight inconsistencies with other tables due to the use of longitudinally adjusted weights (see Appendix B). See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 19. Changes in Usage of Fuel Oil Between 1979 and 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings Constructed No later than 1979	Number of Buildings (thousands) in Which Fuel Oil Was:			
		Used in 1979	Added Since 1979	Dropped Since 1979	Used in 1983
All Buildings.....	3,790	783	56	215	624
Year Constructed					
1900 or Before.....	287	95	Q	23	77
1901 to 1920.....	383	87	Q	15	82
1921 to 1945.....	742	190	Q	55	142
1946 to 1960.....	961	213	17	66	164
1961 to 1970.....	713	111	14	36	89
1971 to 1973.....	203	34	Q	Q	28
1974 to 1979.....	502	53	2	Q	44
Square Footage Category					
5,000 or Less.....	2,195	387	31	114	304
5,001 to 10,000.....	699	165	Q	49	124
10,001 to 25,000.....	529	133	Q	29	110
25,001 to 50,000.....	205	51	Q	15	41
50,001 to 100,000.....	94	23	Q	5	21
100,001 to 200,000.....	45	13	Q	2	14
Over 200,000.....	23	9	Q	1	10
Principal Activity Within Building					
Assembly.....	447	131	Q	37	95
Educational.....	167	50	Q	15	38
Food Sales/Service.....	367	49	Q	Q	43
Health Care.....	57	12	Q	Q	14
Lodging.....	102	18	Q	Q	16
Mercantile/Services.....	1,043	233	22	60	195
Office.....	543	78	8	18	69
Residential.....	235	75	Q	Q	62
Warehouse.....	403	58	Q	15	49
Other.....	158	30	Q	Q	24
Vacant.....	267	47	Q	Q	Q
Census Region					
Northeast.....	654	296	15	52	258
North Central.....	1,171	181	17	78	120
South.....	1,424	240	21	62	200
West.....	541	66	Q	23	46
Metropolitan Status					
Metropolitan.....	2,147	394	29	107	315
Nonmetropolitan.....	1,644	389	27	107	309
Annual Heating (HDD) and Cooling Degree-Days (CDD)					
<2,000 CDD and >7,000 HDD.....	403	132	Q	Q	103
<2,000 CDD and 5,500-7,000 HDD...	1,121	243	23	70	195
<2,000 CDD and 4,000-5,499 HDD...	994	287	10	69	228
<2,000 CDD and <4,000 HDD.....	648	Q	8	Q	Q
>2,000 CDD and <4,000 HDD.....	625	Q	9	Q	Q
Number of Establishments in Building					
None.....	126	Q	Q	Q	Q
Single Establishment.....	3,050	626	50	152	524
Multi-Establishment.....	615	128	6	40	94
Government Occupancy					
Government Occupied.....	334	82	Q	26	64
Not Government Occupied.....	3,457	701	48	189	561
Fuels Used Alone or in Combination					
Electricity.....	3,632	760	55	192	623
Natural Gas.....	2,241	302	36	115	223
Fuel Oil.....	624	568	56	--	624
Propane.....	241	74	Q	Q	61
Purchased Steam.....	58	14	3	12	5
Other.....	240	71	12	26	57

See footnotes at end of table.

**Table 19. Changes in Usage of Fuel Oil Between 1979 and 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings Constructed No later than 1979	Number of Buildings (thousands) in Which Fuel Oil Was:			
		Used in 1979	Added Since 1979	Dropped Since 1979	Used in 1983
<b>Fuel Combinations Used</b>					
No Fuels Used.....	154	Q	--	Q	--
Electricity.....	740	39	--	39	--
Electricity and Natural Gas.....	1,885	103	--	103	--
Electricity and Fuel Oil.....	317	305	12	--	317
Electricity, Natural Gas, and Fuel Oil.....	199	172	28	--	199
Electricity and Propane.....	123	Q	--	Q	--
Other.....	372	130	16	38	108
<b>Percent Heated</b>					
Not Heated.....	410	37	Q	34	Q
1 to 50.....	507	99	Q	24	88
51 to 99.....	550	120	Q	23	100
100.....	2,323	527	40	134	433
<b>Percent Cooled</b>					
Not Cooled.....	1,265	332	21	106	246
1 to 50.....	980	206	19	45	180
51 to 99.....	479	86	8	18	75
100.....	1,067	160	8	45	123

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to non-exclusive categories. Numbers in this table may show slight inconsistencies with other tables due to the use of longitudinally adjusted weights (see Appendix B). See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 20. End Uses of Energy Sources, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) that Use Energy for:					
		Space Heating	Water Heating	Cooling	Cooking	Manufacturing	Electricity Generation
All Buildings.....	3,948	3,507	2,931	2,636	1,468	388	108
Year Constructed							
1900 or Before.....	288	268	232	175	152	24	Q
1901 to 1920.....	388	355	292	247	168	40	10
1921 to 1945.....	726	633	500	433	246	74	8
1946 to 1960.....	946	813	642	596	307	97	17
1961 to 1970.....	721	649	554	530	249	74	29
1971 to 1973.....	209	199	176	150	80	17	14
1974 to 1979.....	530	466	414	391	207	53	21
1980 to 1983.....	140	125	121	113	58	8	8
Square Footage Category							
5,000 or Less.....	2,248	1,903	1,489	1,340	719	201	40
5,001 to 10,000.....	725	680	577	519	286	66	Q
10,001 to 25,000.....	567	541	499	444	235	71	20
25,001 to 50,000.....	222	207	196	178	118	25	12
50,001 to 100,000.....	107	101	96	88	58	16	6
100,001 to 200,000.....	50	47	48	41	33	7	7
Over 200,000.....	29	28	27	27	16	3	8
Principal Activity Within Building							
Assembly.....	457	443	375	293	288	Q	3
Educational.....	177	177	158	130	108	7	6
Food Sales/Service.....	380	367	343	314	285	30	Q
Health Care.....	61	61	57	55	27	Q	8
Lodging.....	106	102	102	79	61	Q	3
Mercantile/Services.....	1,071	982	701	659	160	169	19
Office.....	575	566	509	524	170	35	20
Residential.....	236	235	229	164	195	Q	Q
Warehouse.....	425	299	238	226	56	86	Q
Other.....	179	140	108	98	57	17	27
Vacant.....	281	136	109	94	41	10	7
Census Region							
Northeast.....	670	627	583	444	328	74	24
North Central.....	1,211	1,113	942	801	463	132	35
South.....	1,493	1,279	969	1,106	470	112	40
West.....	574	489	437	285	206	69	9
Metropolitan Status							
Within SMSA's.....	2,255	2,036	1,784	1,589	874	255	61
Outside SMSA's.....	1,693	1,471	1,148	1,047	594	133	47
Annual Heating (HDD) and Cooling Degree-Days (CDD)							
<2,000 CDD and >7,000 HDD.....	421	382	338	233	200	Q	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	1,082	945	713	458	113	34
<2,000 CDD and 4,000-5,499 HDD...	1,016	912	763	685	381	97	36
<2,000 CDD and <4,000 HDD.....	678	553	422	441	203	61	8
>2,000 CDD and <4,000 HDD.....	679	579	463	564	225	Q	Q
Number of Establishments in Building							
Vacant.....	142	35	30	23	Q	NC	Q
Single Establishment.....	3,160	2,862	2,356	2,099	1,194	325	89
Multi-Establishment.....	645	611	545	514	271	63	15
Government Occupancy							
Government Occupied.....	346	308	269	210	134	18	24
Not Government Occupied.....	3,602	3,199	2,662	2,426	1,334	369	84
Fuels Used Alone or in Combination							
Electricity.....	3,783	3,504	2,929	2,636	1,466	387	108
Natural Gas.....	2,314	2,260	2,000	1,717	1,029	268	63
Fuel Oil.....	633	627	520	384	280	57	49
Propane.....	260	251	179	166	127	29	20
Purchased Steam.....	60	60	56	43	28	3	6
Other.....	245	241	175	122	106	34	42

See footnotes at end of table.

**Table 20. End Uses of Energy Sources, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Number of Buildings (thousands) that Use Energy for:					
		Space Heating	Water Heating	Cooling	Cooking	Manufacturing	Electricity Generation
<b>Fuel Combinations Used</b>							
No Fuels Used.....	161	--	--	--	--	--	--
Electricity.....	800	587	459	554	187	Q	--
Electricity and Natural Gas.....	1,939	1,891	1,661	1,456	822	227	19
Electricity and Fuel Oil.....	319	315	235	171	100	25	13
Electricity, Natural Gas, and Fuel Oil.....	287	205	195	149	121	20	17
Electricity and Propane.....	138	132	81	91	54	Q	Q
Other.....	383	377	302	216	184	46	56
<b>Percent Heated</b>							
Not Heated.....	440	--	68	55	26	31	Q
1 to 50.....	517	517	351	358	128	92	13
51 to 99.....	564	564	473	435	261	48	7
100.....	2,427	2,426	2,039	1,788	1,052	217	88
<b>Percent Cooled</b>							
Not Cooled.....	1,304	921	692	--	340	123	35
1 to 50.....	1,004	973	819	1,004	387	159	26
51 to 99.....	510	504	448	510	264	36	16
100.....	1,129	1,109	972	1,122	476	70	31

NCP-No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals because of multiple end uses. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 21. Energy Sources Used for Space Heating, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings that Provide Heat	Number of Buildings (thousands) in Which Energy for Space Heating Was Obtained from:							
			Electricity	Natural Gas	Fuel Oil	Propane	Steam	Wood	Coal	Other
All Buildings.....	3,948	3,507	1,105	2,011	566	161	55	115	48	38
Year Constructed										
1900 or Before.....	288	268	41	177	76	Q	Q	Q	Q	NC
1901 to 1920.....	388	355	71	236	76	Q	5	Q	Q	Q
1921 to 1945.....	726	633	146	414	128	Q	16	Q	Q	Q
1946 to 1960.....	946	813	214	467	147	45	18	Q	Q	Q
1961 to 1970.....	721	649	248	361	73	20	8	Q	Q	Q
1971 to 1973.....	209	199	81	94	26	Q	Q	Q	Q	Q
1974 to 1979.....	530	466	242	197	36	28	1	Q	Q	Q
1980 to 1983.....	140	125	62	64	3	Q	Q	Q	Q	3
Square Footage Category										
5,000 or Less.....	2,248	1,903	589	1,020	287	125	Q	91	Q	Q
5,001 to 10,000.....	725	680	217	433	114	Q	Q	Q	Q	Q
10,001 to 25,000.....	567	541	187	322	99	Q	13	Q	Q	Q
25,001 to 50,000.....	222	207	60	131	33	Q	11	Q	Q	Q
50,001 to 100,000.....	107	101	29	59	17	Q	8	Q	Q	Q
100,001 to 200,000.....	50	47	15	30	10	Q	5	NC	Q	Q
Over 200,000.....	29	28	8	15	6	Q	6	Q	Q	*
Principal Activity Within Building										
Assembly.....	457	443	138	245	89	30	8	Q	Q	Q
Educational.....	177	177	52	102	34	Q	6	NC	4	Q
Food Sales/Service.....	380	367	121	204	42	Q	Q	Q	Q	Q
Health Care.....	61	61	18	33	7	Q	Q	NC	Q	Q
Lodging.....	106	102	54	43	13	Q	8	Q	Q	Q
Mercantile/Services.....	1,071	982	244	603	182	59	Q	49	Q	Q
Office.....	575	566	231	309	65	Q	8	Q	Q	3
Residential.....	236	235	49	152	53	Q	Q	NC	NC	NC
Warehouse.....	425	299	104	173	45	13	Q	Q	Q	Q
Other.....	179	140	50	60	18	Q	6	Q	Q	Q
Vacant.....	281	136	44	87	Q	Q	4	Q	Q	Q
Census Region										
Northeast.....	670	627	116	348	241	Q	16	Q	Q	12
North Central.....	1,211	1,113	203	854	105	56	21	Q	22	10
South.....	1,493	1,279	604	527	179	84	9	46	Q	8
West.....	574	489	183	281	41	Q	9	Q	Q	Q
Metropolitan Status										
Metropolitan.....	2,255	2,036	590	1,313	283	42	47	Q	3	17
Nonmetropolitan.....	1,693	1,471	515	697	282	119	7	96	45	20
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	382	88	231	99	Q	12	Q	Q	9
<2,000 CDD and 5,000-7,000 HDD....	1,153	1,082	209	762	172	Q	27	Q	Q	15
<2,000 CDD and 4,000-5,499 HDD...	1,016	912	244	501	214	28	10	40	Q	Q
<2,000 CDD and <4,000 HDD.....	678	553	207	325	Q	Q	Q	Q	Q	Q
>2,000 CDD and <4,000 HDD.....	679	579	Q	191	Q	46	Q	Q	Q	Q
Number of Establishments in Building										
None.....	142	35	10	20	Q	Q	Q	NC	Q	Q
Single Establishment.....	3,160	2,862	882	1,613	474	143	45	109	47	30
Multi-Establishment.....	645	611	213	378	86	Q	9	Q	Q	Q
Government Occupancy										
Government Occupied.....	346	308	102	163	58	Q	17	Q	7	5
Not Government Occupied.....	3,602	3,199	1,003	1,848	508	147	38	113	42	33
Fuels Used Alone or in Combination										
Electricity.....	3,783	3,504	1,105	2,008	564	161	55	115	48	38
Natural Gas.....	2,314	2,260	361	2,011	189	15	24	34	14	22
Fuel Oil.....	633	627	100	119	566	13	3	36	Q	Q
Propane.....	260	251	75	28	55	161	Q	Q	Q	Q
Purchased Steam.....	60	60	5	5	Q	Q	55	NC	Q	3
Other.....	245	241	60	79	48	Q	5	115	48	34

See footnotes at end of table.

**Table 21. Energy Sources Used for Space Heating, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings that Provide Heat	Number of Buildings (thousands) in Which Energy for Space Heating Was Obtained from:							
			Electricity	Natural Gas	Fuel Oil	Propane	Steam	Wood	Coal	Other
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	--	--	--	--	--	--	--	--	--
Electricity.....	800	587	585	--	--	--	--	--	--	--
Electricity and Natural Gas.....	1,939	1,891	315	1,788	--	--	--	--	--	--
Electricity and Fuel Oil.....	319	315	59	--	300	--	--	--	--	--
Electricity, Natural Gas, and Fuel Oil.....	207	205	22	108	172	--	--	--	--	--
Electricity and Propane.....	138	132	45	--	--	110	--	--	--	--
Other.....	383	377	79	114	93	50	55	115	48	36
<b>Percent Heated</b>										
Not Heated.....	440	--	--	--	--	--	--	--	--	--
1 to 50.....	517	517	174	285	80	27	Q	Q	Q	Q
51 to 99.....	564	564	189	328	93	Q	9	Q	Q	8
100.....	2,427	2,426	742	1,398	393	112	44	60	24	29
<b>Percent Cooled</b>										
Not Cooled.....	1,304	921	181	505	233	61	16	77	32	Q
1 to 50.....	1,004	973	243	648	161	41	18	Q	Q	11
51 to 99.....	510	504	216	284	64	Q	8	Q	Q	6
100.....	1,129	1,109	466	574	108	44	13	Q	Q	3

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for space heating. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 22. Energy Sources Used for Water Heating, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings that Heat Water	Number of Buildings (thousands) in Which Energy for Water Heating Was Obtained from:					
			Electricity	Natural Gas	Fuel Oil	Propane	Steam	Other
All Buildings.....	3,948	2,931	1,382	1,403	148	54	32	22
Year Constructed								
1900 or Before.....	288	232	84	132	15	Q	Q	Q
1901 to 1920.....	388	292	124	157	20	Q	3	Q
1921 to 1945.....	726	500	183	282	38	Q	7	Q
1946 to 1960.....	946	642	260	334	33	Q	10	Q
1961 to 1970.....	721	554	293	244	20	Q	7	Q
1971 to 1973.....	209	176	97	62	Q	Q	Q	Q
1974 to 1979.....	530	414	263	146	9	Q	1	Q
1980 to 1983.....	140	121	77	46	1	Q	1	Q
Square Footage Category								
5,000 or Less.....	2,248	1,439	750	659	59	36	NC	Q
5,001 to 10,000.....	725	577	262	292	25	Q	Q	Q
10,001 to 25,000.....	567	499	225	251	34	Q	8	Q
25,001 to 50,000.....	222	196	80	112	13	Q	6	Q
50,001 to 100,000.....	107	96	38	48	8	Q	6	Q
100,001 to 200,000.....	50	48	17	28	5	Q	3	Q
Over 200,000.....	29	27	10	13	3	Q	4	Q
Principal Activity Within Building								
Assembly.....	457	375	206	160	10	Q	2	Q
Educational.....	177	158	60	87	17	Q	6	3
Food Sales/Service.....	380	343	155	174	Q	Q	Q	Q
Health Care.....	61	57	23	32	4	Q	1	Q
Lodging.....	106	102	36	51	11	Q	7	Q
Mercantile/Services.....	1,071	701	346	328	29	Q	Q	Q
Office.....	575	509	256	232	22	Q	5	Q
Residential.....	236	229	53	154	20	Q	Q	Q
Warehouse.....	425	238	139	96	Q	Q	Q	Q
Other.....	179	108	52	41	Q	Q	Q	Q
Vacant.....	281	109	56	50	Q	NC	Q	Q
Census Region								
Northeast.....	670	583	197	303	103	Q	7	5
North Central.....	1,211	942	356	574	9	Q	10	Q
South.....	1,493	969	611	313	29	29	8	8
West.....	574	437	218	213	Q	Q	6	Q
Metropolitan Status								
Metropolitan.....	2,255	1,784	720	988	100	Q	26	4
Nonmetropolitan.....	1,693	1,148	662	414	48	46	Q	18
Annual Heating (HDD) and Cooling Degree-Days (CDD)								
<2,000 CDD and >7,000 HDD.....	421	338	156	156	22	Q	Q	Q
<2,000 CDD and 5,500-7,000 HDD... ..	1,153	945	366	543	47	Q	10	Q
<2,000 CDD and 4,000-5,499 HDD... ..	1,016	763	346	349	65	Q	8	8
<2,000 CDD and <4,000 HDD.....	678	422	203	220	Q	Q	Q	Q
>2,000 CDD and <4,000 HDD.....	679	463	Q	136	Q	Q	Q	Q
Number of Establishments in Building								
None.....	142	30	19	10	Q	NC	Q	Q
Single Establishment.....	3,160	2,356	1,115	1,107	117	49	26	21
Multi-Establishment.....	645	545	248	285	30	Q	5	Q
Government Occupancy								
Government Occupied.....	346	269	120	127	20	Q	13	6
Not Government Occupied.....	3,602	2,662	1,262	1,276	128	50	19	16
Fuels Used Alone or in Combination								
Electricity.....	3,783	2,929	1,382	1,400	147	54	32	22
Natural Gas.....	2,314	2,000	598	1,403	55	Q	12	6
Fuel Oil.....	633	520	268	128	148	Q	2	8
Propane.....	260	179	106	24	Q	54	Q	Q
Purchased Steam.....	60	56	10	14	Q	NC	32	2
Other.....	245	175	88	58	14	Q	4	21

See footnotes at end of table.

**Table 22. Energy Sources Used for Water Heating, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings that Heat Water	Number of Buildings (thousands) in Which Energy for Water Heating Was Obtained from:					
			Electricity	Natural Gas	Fuel Oil	Propane	Steam	Other
<b>Fuel Combinations Used</b>								
No Fuels Used.....	161	--	--	--	--	--	--	--
Electricity.....	800	459	458	--	--	--	--	--
Electricity and Natural Gas.....	1,939	1,661	522	1,187	--	--	--	--
Electricity and Fuel Oil.....	319	235	168	--	74	--	--	--
Electricity, Natural Gas, and Fuel Oil.....	207	195	48	119	50	--	--	--
Electricity and Propane.....	138	81	55	--	--	27	--	--
Other.....	363	302	132	97	23	27	32	22
<b>Percent Heated</b>								
Not Heated.....	440	68	33	28	Q	Q	Q	NC
1 to 50.....	517	351	185	152	13	Q	Q	Q
51 to 99.....	564	473	243	219	25	Q	2	Q
100.....	2,427	2,039	921	1,003	104	39	29	17
<b>Percent Cooled</b>								
Not Cooled.....	1,304	692	309	328	43	Q	8	Q
1 to 50.....	1,004	819	325	453	52	Q	8	4
51 to 99.....	510	448	221	201	29	Q	5	Q
100.....	1,129	972	527	420	24	20	11	Q

NC:No cases in sample.

Q:Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for water heating. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division.

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 23. Energy Sources Used for Cooling, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings That Cool	Number of Buildings (thousands) in Which Energy for Cooling Was Obtained from:		
			Electricity	Natural Gas	Other
All Buildings.....	3,948	2,636	2,515	141	21
Year Constructed					
1900 or Before.....	288	175	166	Q	Q
1901 to 1920.....	388	247	241	Q	Q
1921 to 1945.....	726	433	413	26	Q
1946 to 1960.....	946	596	564	37	2
1961 to 1970.....	721	530	506	29	5
1971 to 1973.....	209	150	143	7	1
1974 to 1979.....	530	391	377	18	5
1980 to 1983.....	140	113	104	8	Q
Square Footage Category					
5,000 or Less.....	2,248	1,340	1,282	74	Q
5,001 to 10,000.....	725	519	499	27	Q
10,001 to 25,000.....	567	444	424	18	Q
25,001 to 50,000.....	222	178	166	12	Q
50,001 to 100,000.....	107	88	81	7	3
100,001 to 200,000.....	50	41	39	2	1
Over 200,000.....	29	27	24	2	2
Principal Activity Within Building					
Assembly.....	457	293	282	Q	Q
Educational.....	177	130	123	7	2
Food Sales/Service.....	380	314	303	20	Q
Health Care.....	61	55	53	1	1
Lodging.....	106	79	77	Q	Q
Mercantile/Services.....	1,071	659	640	26	Q
Office.....	575	524	488	42	4
Residential.....	236	164	154	Q	Q
Warehouse.....	425	226	208	19	Q
Other.....	179	98	97	Q	Q
Vacant.....	281	94	89	Q	Q
Census Region					
Northeast.....	670	444	417	26	5
North Central.....	1,211	801	755	51	6
South.....	1,493	1,106	1,079	32	7
West.....	574	285	264	31	3
Metropolitan Status					
Metropolitan.....	2,255	1,589	1,502	106	14
Nonmetropolitan.....	1,693	1,047	1,012	34	7
Annual Heating (HDD) and Cooling Degree-Days (CDD)					
<2,000 CDD and >7,000 HDD.....	421	233	222	Q	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	713	665	52	6
<2,000 CDD and 4,000-5,499 HDD...	1,016	685	651	32	3
<2,000 CDD and <4,000 HDD.....	678	441	420	35	7
>2,000 CDD and <4,000 HDD.....	679	564	556	Q	Q
Number of Establishments in Building					
None.....	142	23	20	Q	Q
Single Establishment.....	3,160	2,099	2,008	108	15
Multi-Establishment.....	645	514	486	33	3
Government Occupancy					
Government Occupied.....	346	210	201	10	7
Not Government Occupied.....	3,602	2,426	2,313	130	14
Fuels Used Alone or in Combination					
Electricity.....	3,783	2,636	2,515	140	21
Natural Gas.....	2,314	1,717	1,602	141	13
Fuel Oil.....	633	384	374	5	6
Propane.....	260	166	163	Q	Q
Purchased Steam.....	60	43	38	Q	5
Other.....	245	122	115	2	11

See footnotes at end of table.

**Table 23. Energy Sources Used for Cooling, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings That Cool	Number of Buildings (thousands) in Which Energy for Cooling Was Obtained from:		
			Electricity	Natural Gas	Other
<b>Fuel Combinations Used</b>					
No Fuels Used.....	161	--	--	--	--
Electricity.....	800	554	553	--	--
Electricity and Natural Gas.....	1,939	1,456	1,353	133	--
Electricity and Fuel Oil.....	319	171	169	--	Q
Electricity, Natural Gas, and Fuel Oil.....	207	149	142	4	2
Electricity and Propane.....	138	91	90	--	Q
Other.....	383	216	207	3	13
<b>Percent Heated</b>					
Not Heated.....	440	55	55	Q	Q
1 to 50.....	517	358	343	18	Q
51 to 99.....	564	435	413	27	5
100.....	2,427	1,788	1,703	95	15
<b>Percent Cooled</b>					
Not Cooled.....	1,304	--	--	--	--
1 to 50.....	1,004	1,004	968	40	2
51 to 99.....	510	510	479	31	9
100.....	1,129	1,122	1,066	70	10

NC=No cases in sample.

Q Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\* Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for cooling. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 24. Energy Sources Used for Cooking, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Provision for Cooking	Number of Buildings (thousands) in Which Energy for Cooking Was Obtained from:			
			Electricity	Natural Gas	Propane	Other
All Buildings.....	3,948	1,468	887	658	80	13
Year Constructed						
1900 or Before.....	288	152	76	77	Q	Q
1901 to 1920.....	388	168	87	90	Q	Q
1921 to 1945.....	726	246	110	148	Q	1
1946 to 1960.....	946	307	180	136	23	4
1961 to 1970.....	721	249	172	98	Q	3
1971 to 1973.....	209	80	59	19	Q	Q
1974 to 1979.....	530	207	157	73	Q	Q
1980 to 1983.....	140	58	47	17	Q	Q
Square Footage Category						
5,000 or Less.....	2,248	719	449	296	43	Q
5,001 to 10,000.....	725	286	172	130	Q	Q
10,001 to 25,000.....	567	235	134	110	Q	Q
25,001 to 50,000.....	222	118	66	61	Q	Q
50,001 to 100,000.....	107	58	36	29	Q	Q
100,001 to 200,000.....	50	33	20	19	2	Q
Over 200,000.....	29	18	11	13	Q	2
Principal Activity Within Building						
Assembly.....	457	288	169	105	29	Q
Educational.....	177	108	62	62	Q	Q
Food Sales/Service.....	380	285	149	168	Q	Q
Health Care.....	61	27	19	12	Q	3
Lodging.....	106	81	49	38	Q	1
Mercantile/Services.....	1,071	160	97	71	Q	Q
Office.....	575	170	140	40	Q	1
Residential.....	236	195	91	114	Q	Q
Warehouse.....	425	56	46	18	Q	Q
Other.....	179	57	40	13	Q	Q
Vacant.....	281	41	24	17	Q	Q
Census Region						
Northeast.....	670	328	145	202	Q	Q
North Central.....	1,211	463	279	231	Q	3
South.....	1,493	470	321	147	50	4
West.....	574	206	143	78	Q	Q
Metropolitan Status						
Metropolitan.....	2,255	874	488	468	19	7
Nonmetropolitan.....	1,693	594	399	190	61	Q
Annual Heating (HDD) and Cooling Degree-Days (CDD)						
<2,000 CDD and >7,000 HDD.....	421	200	122	85	Q	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	458	281	210	12	5
<2,000 CDD and 4,000-5,499 HDD...	1,016	381	203	203	Q	2
<2,000 CDD and <4,000 HDD.....	678	203	120	93	Q	Q
>2,000 CDD and <4,000 HDD.....	679	225	162	66	Q	Q
Number of Establishments in Building						
None.....	142	Q	Q	Q	NC	Q
Single Establishment.....	3,160	1,194	726	523	67	11
Multi-Establishment.....	645	271	158	135	13	1
Government Occupancy						
Government Occupied.....	346	134	87	57	6	7
Not Government Occupied.....	3,602	1,334	801	601	74	6
Fuels Used Alone or in Combination						
Electricity.....	3,783	1,466	887	656	80	13
Natural Gas.....	2,314	1,029	508	658	Q	6
Fuel Oil.....	633	280	171	105	34	4
Propane.....	260	127	61	10	80	Q
Purchased Steam.....	60	28	15	15	Q	6
Other.....	245	106	69	30	Q	5

See footnotes at end of table.

**Table 24. Energy Sources Used for Cooking, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Provision for Cooking	Number of Buildings (thousands) in Which Energy for Cooking Was Obtained from:			
			Electricity	Natural Gas	Propane	Other
<b>Fuel Combinations Used</b>						
No Fuels Used.....	161	--	--	--	--	--
Electricity.....	800	187	186	--	--	--
Electricity and Natural Gas.....	1,939	822	426	504	--	--
Electricity and Fuel Oil.....	319	100	98	--	--	Q
Electricity, Natural Gas, and Fuel Oil.....	207	121	43	98	--	1
Electricity and Propane.....	138	54	28	--	37	--
Other.....	383	184	105	56	43	10
<b>Percent Heated</b>						
Not Heated.....	440	26	20	Q	Q	Q
1 to 50.....	517	128	89	48	Q	Q
51 to 99.....	564	261	158	107	20	*
100.....	2,427	1,052	620	496	53	10
<b>Percent Cooled</b>						
Not Cooled.....	1,304	340	200	134	21	Q
1 to 50.....	1,004	367	206	213	14	Q
51 to 99.....	510	264	180	107	16	3
100.....	1,129	476	301	203	29	5

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for cooking. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 25. Energy Sources Used for Manufacturing, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Manufacturing	Number of Buildings (thousands) in Which Energy for Manufacturing Was Obtained from:		
			Electricity	Natural Gas	Other
All Buildings.....	3,948	388	317	82	26
Year Constructed					
1900 or Before.....	288	24	18	Q	Q
1901 to 1920.....	388	40	34	Q	Q
1921 to 1945.....	726	74	58	16	Q
1946 to 1960.....	946	97	79	21	Q
1961 to 1970.....	721	74	61	12	7
1971 to 1973.....	209	17	16	Q	Q
1974 to 1979.....	530	53	43	Q	Q
1980 to 1983.....	140	8	8	Q	Q
Square Footage Category					
5,000 or Less.....	2,248	201	164	44	Q
5,001 to 10,000.....	725	66	53	Q	Q
10,001 to 25,000.....	567	71	56	Q	Q
25,001 to 50,000.....	222	25	21	5	Q
50,001 to 100,000.....	107	16	13	4	Q
100,001 to 200,000.....	50	7	6	2	Q
Over 200,000.....	29	3	2	1	Q
Principal Activity Within Building					
Assembly.....	457	Q	Q	Q	NC
Educational.....	177	7	Q	Q	Q
Food Sales/Service.....	380	30	Q	Q	Q
Health Care.....	61	Q	Q	Q	Q
Lodging.....	106	Q	Q	Q	Q
Mercantile/Services.....	1,071	169	148	24	Q
Office.....	575	35	32	4	Q
Residential.....	236	Q	Q	Q	NC
Warehouse.....	425	86	71	15	7
Other.....	179	17	13	Q	Q
Vacant.....	281	10	8	Q	Q
Census Region					
North East.....	670	74	49	26	5
North Central.....	1,211	132	116	28	Q
South.....	1,493	112	94	10	16
West.....	574	69	57	17	Q
Metropolitan Status					
Metropolitan.....	2,255	255	198	66	16
Nonmetropolitan.....	1,693	133	119	16	Q
Annual Heating (HDD) and Cooling Degree-Days (CDD)					
<2,000 CDD and >7,000 HDD.....	421	Q	Q	7	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	113	88	35	Q
<2,000 CDD and 4,000-5,499 HDD...	1,016	97	82	18	5
<2,000 CDD and <4,000 HDD.....	678	61	46	15	Q
>2,000 CDD and <4,000 HDD.....	679	Q	Q	Q	Q
Number of Establishments in Building					
None.....	142	NC	NC	NC	NC
Single Establishment.....	3,160	325	269	68	25
Multi-Establishment.....	645	63	47	22	Q
Government Occupancy					
Government Occupied.....	346	18	15	2	Q
Not Government Occupied.....	3,602	369	302	80	24
Fuels Used Alone or in Combination					
Electricity.....	3,783	387	317	82	24
Natural Gas.....	2,314	268	209	82	8
Fuel Oil.....	633	57	38	9	16
Propane.....	260	29	21	Q	8
Purchased Steam.....	60	3	2	Q	Q
Other.....	245	34	30	Q	Q

See footnotes at end of table.

**Table 25. Energy Sources Used for Manufacturing, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Manufacturing	Number of Buildings (thousands) in Which Energy for Manufacturing Was Obtained from:		
			Electricity	Natural Gas	Other
<b>Fuel Combinations Used</b>					
No Fuels Used.....	161	--	--	--	--
Electricity.....	800	Q	Q	--	--
Electricity and Natural Gas.....	1,939	227	183	69	--
Electricity and Fuel Oil.....	319	25	21	--	Q
Electricity, Natural Gas, and Fuel Oil.....	207	20	9	8	Q
Electricity and Propane.....	138	Q	Q	--	Q
Other.....	383	46	39	5	9
<b>Percent Heated</b>					
Not Heated.....	440	31	Q	Q	NC
1 to 50.....	517	92	76	12	11
51 to 99.....	564	48	41	9	Q
100.....	2,427	217	174	52	14
<b>Percent Cooled</b>					
Not Cooled.....	1,304	123	102	24	Q
1 to 50.....	1,004	159	133	29	11
51 to 99.....	510	36	25	12	Q
100.....	1,129	70	57	17	Q

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for manufacturing. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 26. Energy Sources Used for Electricity Generation, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Capacity to Generate Electricity	Number of Buildings (thousands) in Which Energy for Electricity Generation Was Obtained from:		
			Natural Gas	Fuel Oil	Other
All Buildings.....	3,948	108	33	31	45
Year Constructed					
1900 or Before.....	288	Q	Q	Q	Q
1901 to 1920.....	388	10	Q	Q	Q
1921 to 1945.....	726	8	Q	Q	Q
1946 to 1960.....	946	17	Q	4	7
1961 to 1970.....	721	29	14	9	Q
1971 to 1973.....	209	14	Q	Q	Q
1974 to 1979.....	530	21	Q	3	16
1980 to 1983.....	140	8	3	5	Q
Square Footage Category					
5,000 or Less.....	2,248	40	Q	Q	Q
5,001 to 10,000.....	725	Q	Q	Q	Q
10,001 to 25,000.....	567	20	Q	Q	Q
25,001 to 50,000.....	222	12	5	6	Q
50,001 to 100,000.....	107	6	Q	3	Q
100,001 to 200,000.....	50	7	2	3	2
Over 200,000.....	29	8	2	6	1
Principal Activity Within Building					
Assembly.....	457	3	Q	Q	Q
Educational.....	177	6	2	Q	Q
Food Sales/Service.....	380	Q	Q	Q	Q
Health Care.....	61	8	Q	7	1
Lodging.....	106	3	Q	Q	Q
Mercantile/Services.....	1,071	19	Q	Q	Q
Office.....	575	20	3	9	7
Residential.....	236	Q	Q	Q	Q
Warehouse.....	425	Q	Q	Q	Q
Other.....	179	27	Q	6	Q
Vacant.....	281	7	Q	*	Q
Census Region					
Northeast.....	670	24	Q	11	Q
North Central.....	1,211	35	11	7	15
South.....	1,493	40	Q	10	21
West.....	574	9	Q	2	Q
Metropolitan Status					
Metropolitan.....	2,255	61	24	24	14
Nonmetropolitan.....	1,693	47	8	7	31
Annual Heating (HDD) and Cooling Degree-Days (CDD)					
<2,000 CDD and >7,000 HDD.....	421	Q	Q	Q	Q
<2,000 CDD and 5,500-7,000 HDD....	1,153	34	11	11	11
<2,000 CDD and 4,000-5,499 HDD...	1,016	36	6	8	21
<2,000 CDD and <4,000 HDD.....	678	8	Q	3	Q
>2,000 CDD and <4,000 HDD.....	679	Q	Q	Q	Q
Number of Establishments in Building					
None.....	142	Q	Q	*	Q
Single Establishment.....	3,160	89	30	25	35
Multi-Establishment.....	645	15	2	Q	7
Government Occupancy					
Government Occupied.....	346	24	5	10	10
Not Government Occupied.....	3,602	84	27	20	36
Fuels Used Alone or in Combination					
Electricity.....	3,783	108	33	31	45
Natural Gas.....	2,314	63	33	17	16
Fuel Oil.....	633	49	Q	31	11
Propane.....	260	20	Q	Q	17
Purchased Steam.....	60	6	Q	2	1
Other.....	245	42	Q	4	33

See footnotes at end of table.

**Table 26. Energy Sources Used for Electricity Generation, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Capacity to Generate Electricity	Number of Buildings (thousands) in Which Energy for Electricity Generation Was Obtained from:		
			Natural Gas	Fuel Oil	Other
<b>Fuel Combinations Used</b>					
No Fuels Used.....	161	--	--	--	--
Electricity.....	800	Q	--	--	--
Electricity and Natural Gas.....	1,939	19	19	--	--
Electricity and Fuel Oil.....	319	13	--	11	--
Electricity, Natural Gas, and Fuel Oil.....	207	17	4	14	--
Electricity and Propane.....	138	Q	--	--	Q
Other.....	383	56	Q	6	40
<b>Percent Heated</b>					
Not Heated.....	440	Q	Q	Q	Q
1 to 50.....	517	13	Q	Q	Q
51 to 99.....	564	7	1	2	Q
100.....	2,427	88	29	28	31
<b>Percent Cooled</b>					
Not Cooled.....	1,304	35	Q	Q	Q
1 to 50.....	1,004	26	6	7	14
51 to 99.....	510	16	3	9	Q
100.....	1,129	31	6	11	13

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings are rounded to zero.

Note: See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 27. Percent of Building Heated, 1983**

Building Characteristics	All Buildings		Number and Square Footage of Buildings in Which the Following Percent of the Building is Heated:							
	Number of Buildings (thousands)	Square Feet (millions)	Not Heated		1 to 50 Percent		51 to 99 Percent		100 Percent	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	440	2,971	517	5,913	564	8,266	2,427	35,175
Year Constructed										
1900 or Before.....	288	2,940	19	159	57	509	57	646	154	1,626
1901 to 1920.....	368	5,453	33	337	65	954	75	1,015	216	3,147
1921 to 1945.....	726	8,639	93	989	113	1,040	125	1,337	395	5,273
1946 to 1960.....	946	9,612	133	463	135	1,062	101	1,373	576	6,713
1961 to 1970.....	721	9,947	72	319	68	977	85	1,553	495	7,098
1971 to 1973.....	209	3,442	Q	Q	23	401	26	527	150	2,436
1974 to 1979.....	530	6,616	64	337	44	567	79	1,117	342	4,596
1980 to 1983.....	140	5,675	15	289	12	402	15	699	98	4,285
Square Footage Category										
5,000 or Less.....	2,248	4,908	345	621	254	551	271	691	1,378	3,044
5,001 to 10,000.....	725	5,246	45	325	125	880	135	963	420	3,077
10,001 to 25,000.....	567	8,912	26	391	86	1,325	104	1,598	351	5,599
25,001 to 50,000.....	222	7,692	15	512	31	1,024	31	1,084	146	5,072
50,001 to 100,000.....	107	7,168	6	412	14	870	12	806	76	5,080
100,001 to 200,000.....	50	6,642	2	282	5	598	7	890	36	4,873
Over 200,000.....	29	11,757	1	427	2	665	5	2,234	21	8,431
Principal Activity Within Building										
Assembly.....	457	5,483	Q	Q	23	258	49	695	370	4,477
Educational.....	177	6,044	Q	Q	Q	Q	22	690	149	5,256
Food Sales/Service.....	380	2,051	Q	Q	39	216	76	420	251	1,393
Health Care.....	61	2,277	NC	NC	Q	Q	Q	284	49	1,966
Lodging.....	106	2,241	Q	Q	Q	Q	11	259	88	1,929
Mercantile/Services.....	1,071	10,427	89	380	165	1,069	190	2,043	627	6,936
Office.....	575	8,454	Q	Q	44	452	105	1,972	417	5,997
Residential.....	236	2,454	Q	Q	Q	Q	43	436	186	1,970
Warehouse.....	425	6,791	126	811	148	2,648	24	719	127	2,614
Other.....	179	2,760	39	293	34	642	16	357	90	1,469
Vacant.....	281	3,342	144	1,339	45	441	20	393	72	1,169
Census Region										
Northeast.....	670	11,615	43	398	77	886	115	2,111	435	8,221
North Central.....	1,211	16,059	97	641	148	1,642	160	2,163	806	11,612
South.....	1,493	17,049	214	1,311	199	2,062	195	2,817	886	10,859
West.....	574	7,602	85	621	93	1,323	95	1,176	301	4,482
Metropolitan Status										
Metropolitan.....	2,255	37,587	218	1,884	288	4,110	323	6,168	1,426	25,424
Nonmetropolitan.....	1,693	14,738	221	1,086	229	1,802	241	2,098	1,001	9,751
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	Q	307	51	580	78	1,024	253	3,815
<2,000 CDD and 5,500-7,000 HDD...	1,153	16,965	70	560	152	1,753	173	2,241	758	12,411
<2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	105	643	97	1,222	145	2,463	669	9,465
<2,000 CDD and <4,000 HDD.....	678	7,496	125	861	111	1,237	93	1,288	349	4,111
>2,000 CDD and <4,000 HDD.....	679	8,346	Q	600	106	1,122	Q	1,250	398	5,373
Number of Establishments in Building										
None.....	142	1,475	107	934	Q	Q	Q	95	22	347
Single Establishment.....	3,160	35,227	298	1,621	441	4,457	445	5,173	1,976	23,975
Multi-Establishment.....	645	15,623	34	416	70	1,356	112	2,999	429	10,852
Government Occupancy										
Government Occupied.....	346	10,099	37	327	34	569	41	1,648	234	7,556
Not Government Occupied.....	3,602	42,225	402	2,644	483	5,344	523	6,618	2,193	27,619

See footnotes at end of table.

**Table 27. Percent of Building Heated, 1983 (Continued)**

Building Characteristics	All Buildings		Number and Square Footage of Buildings in Which the Following Percent of the Building is Heated:							
			Not Heated		1 to 50 Percent		51 to 99 Percent		100 Percent	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	51,359	278	2,036	516	5,899	563	8,258	2,426	35,165
Natural Gas.....	2,314	37,090	53	502	309	3,849	367	6,117	1,585	26,622
Fuel Oil.....	633	13,313	Q	Q	87	1,100	100	2,385	441	9,767
Propane.....	260	3,007	Q	Q	39	387	43	489	168	2,089
Purchased Steam.....	60	4,594	Q	Q	Q	Q	9	773	48	3,581
Other.....	245	3,997	Q	Q	40	356	48	778	154	2,848
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	161	935	--	--	--	--	--	--
Electricity.....	800	6,518	213	1,425	101	1,133	92	888	394	3,073
Electricity and Natural Gas.....	1,939	24,863	47	480	266	3,010	308	3,918	1,318	17,455
Electricity and Fuel Oil.....	319	2,911	Q	Q	46	432	50	491	219	1,950
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	Q	Q	23	373	30	1,261	151	5,303
Electricity and Propane.....	138	736	Q	Q	25	134	16	Q	91	458
Other.....	383	9,409	Q	Q	56	830	67	1,600	254	6,936
<b>Percent Cooled</b>										
Not Cooled.....	1,304	9,802	383	2,431	159	1,352	129	990	633	5,029
1 to 50.....	1,004	16,335	Q	354	337	4,210	139	2,056	497	9,715
51 to 99.....	510	10,333	Q	Q	9	155	277	4,933	218	5,179
100.....	1,129	15,855	20	120	Q	Q	19	288	1,079	15,252

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 28. Percent of Building Cooled, 1983**

Building Characteristics	All Buildings		Number and Square Footage of Buildings in Which the Following Percent of the Building is Cooled:							
	Number of Buildings (thousands)	Square Feet (millions)	Not Cooled		1 to 50 Percent		51 to 99 Percent		100 Percent	
			Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (millions)
All Buildings.....	3,948	52,325	1,304	9,802	1,004	16,335	510	10,333	1,129	15,855
Year Constructed										
1900 or Before.....	288	2,940	112	934	100	1,042	32	566	44	398
1901 to 1920.....	388	5,453	141	1,608	128	2,086	54	992	66	768
1921 to 1945.....	726	8,639	293	2,419	225	3,377	83	1,405	125	1,439
1946 to 1960.....	946	9,612	347	1,827	242	3,662	101	1,795	256	2,328
1961 to 1970.....	721	9,947	190	1,278	155	2,798	111	2,225	265	3,645
1971 to 1973.....	209	3,442	59	452	43	901	26	801	81	1,288
1974 to 1979.....	530	6,616	136	818	84	1,346	62	1,565	228	2,889
1980 to 1983.....	140	5,675	27	466	27	1,123	21	985	65	Q
Square Footage Category										
5,000 or Less.....	2,248	4,908	903	1,831	424	1,056	235	559	686	1,461
5,001 to 10,000.....	725	5,246	204	1,503	236	1,660	115	819	169	1,264
10,001 to 25,000.....	567	8,912	124	1,856	199	3,149	89	1,399	155	2,508
25,001 to 50,000.....	222	7,692	44	1,511	82	2,828	33	1,167	63	2,187
50,001 to 100,000.....	107	7,168	18	1,251	38	2,525	18	1,232	33	2,159
100,001 to 200,000.....	50	6,642	8	1,099	16	2,117	11	1,502	14	1,924
Over 200,000.....	29	11,757	2	752	9	2,998	8	3,655	9	4,352
Principal Activity Within Building										
Assembly.....	457	5,483	161	1,184	81	1,210	52	826	163	2,264
Educational.....	177	6,044	47	1,437	45	2,100	27	970	58	1,537
Food Sales/Service.....	380	2,051	66	352	74	448	92	499	148	757
Health Care.....	61	2,277	Q	Q	20	653	10	751	25	858
Lodging.....	106	2,241	28	399	7	284	21	628	51	930
Mercantile/Services.....	1,071	10,427	412	1,753	311	2,724	115	2,104	232	3,847
Office.....	575	8,454	50	290	106	1,202	123	3,023	297	3,939
Residential.....	236	2,454	72	604	84	952	24	425	55	474
Warehouse.....	425	6,791	195	1,412	185	4,863	14	311	31	205
Other.....	179	2,760	81	573	38	1,261	21	458	39	468
Vacant.....	281	3,342	187	1,784	52	638	12	344	30	576
Census Region										
Northeast.....	670	11,615	226	2,445	234	4,514	91	2,553	118	2,103
North Central.....	1,211	16,059	407	2,912	344	5,846	155	3,206	305	4,096
South.....	1,493	17,049	381	1,934	308	4,222	205	3,377	599	7,516
West.....	574	7,602	290	2,511	118	1,753	59	1,197	107	Q
Metropolitan Status										
Metropolitan.....	2,255	37,587	662	6,313	626	11,684	311	8,334	656	11,256
Nonmetropolitan.....	1,693	14,738	642	3,469	378	4,651	199	1,999	473	4,599
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	188	1,483	135	2,058	43	1,041	Q	Q
<2,000 CDD and 5,500-7,000 HDD....	1,153	16,965	438	3,623	316	6,474	146	3,130	253	3,539
<2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	332	2,443	272	4,054	128	3,055	285	4,241
<2,000 CDD and <4,000 HDD.....	678	7,496	235	1,509	137	2,115	97	1,539	209	2,334
>2,000 CDD and <4,000 HDD.....	679	8,346	Q	Q	145	1,634	95	1,568	327	4,600
Number of Establishments in Building										
None.....	142	1,475	119	1,120	Q	143	Q	129	7	83
Single Establishment.....	3,160	35,227	1,054	7,241	815	12,420	390	5,954	901	9,611
Multi-Establishment.....	645	15,623	131	1,440	177	3,772	116	4,250	221	6,161
Government Occupancy										
Government Occupied.....	346	10,099	135	1,647	68	2,580	51	2,497	92	3,376
Not Government Occupied.....	3,602	42,225	1,169	8,155	937	13,755	458	7,836	1,037	12,478

See footnotes at end of table.

**Table 28. Percent of Building Cooled, 1983 (Continued)**

Building Characteristics	All Buildings		Number and Square Footage of Buildings in Which the Following Percent of the Building is Cooled:							
			Not Cooled		1 to 50 Percent		51 to 99 Percent		100 Percent	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	51,359	1,140	8,859	1,004	16,323	510	10,326	1,129	15,851
Natural Gas.....	2,314	37,090	594	5,285	732	12,577	324	7,781	663	11,447
Fuel Oil.....	633	13,313	248	2,111	180	4,742	77	3,462	128	2,997
Propane.....	260	3,007	92	537	64	1,174	37	468	67	Q
Purchased Steam.....	60	4,594	18	707	19	847	10	1,443	14	1,596
Other.....	245	3,997	123	693	54	1,352	27	903	41	1,049
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	161	935	--	--	--	--	--	--
Electricity.....	800	6,518	245	1,671	132	1,291	111	1,173	313	2,382
Electricity and Natural Gas.....	1,939	24,863	480	3,595	596	8,633	266	4,163	597	8,472
Electricity and Fuel Oil.....	319	2,911	148	866	65	892	33	450	73	704
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	58	914	82	2,429	32	2,139	36	1,471
Electricity and Propane.....	138	736	45	192	32	200	22	162	38	183
Other.....	383	9,409	167	1,629	98	2,890	46	2,246	72	2,643
<b>Percent Heated</b>										
Not Heated.....	460	2,971	383	2,431	Q	354	Q	Q	20	120
1 to 50.....	517	5,913	159	1,352	337	4,210	9	155	Q	Q
51 to 99.....	564	8,266	129	990	139	2,056	277	4,933	19	288
100.....	2,427	35,175	633	5,029	497	9,715	218	5,179	1,079	15,252

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 29. Changes in Percent of Building Heated and Cooled Between 1979 and 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings Constructed No Later Than 1979	Number of Buildings in Which the Percent of the Building Heated Has:			Number of Buildings in Which the Percent of the Building Cooled Has:		
		Increased Since 1979	Decreased Since 1979	Not Changed Since 1979	Increased Since 1979	Decreased Since 1979	Not Changed Since 1979
All Buildings.....	3,790	241	304	3,245	370	284	3,136
Year Constructed							
1900 or Before.....	287	18	23	245	28	21	237
1901 to 1920.....	383	32	39	312	49	31	302
1921 to 1945.....	742	54	81	607	86	69	587
1946 to 1960.....	961	46	72	843	89	83	790
1961 to 1970.....	713	44	51	619	52	44	618
1971 to 1973.....	203	16	Q	179	21	Q	172
1974 to 1979.....	502	32	31	439	46	26	430
Square Footage Category							
5,000 or Less.....	2,195	144	172	1,879	203	175	1,817
5,001 to 10,000.....	699	30	72	598	68	42	590
10,001 to 25,000.....	529	49	31	449	68	41	420
25,001 to 50,000.....	205	14	19	172	14	12	179
50,001 to 100,000.....	94	3	8	83	12	8	74
100,001 to 200,000.....	45	2	Q	42	4	4	37
Over 200,000.....	23	1	1	21	2	1	19
Principal Activity Within Building							
Assembly.....	447	25	Q	404	49	27	371
Educational.....	167	Q	Q	162	Q	12	137
Food Sales/Service.....	367	26	Q	322	44	28	295
Health Care.....	57	Q	Q	50	Q	Q	49
Lodging.....	102	Q	Q	98	9	Q	90
Mercantile/Services.....	1,043	57	87	899	86	83	874
Office.....	543	37	22	485	53	31	460
Residential.....	235	Q	Q	222	20	Q	201
Warehouse.....	403	56	32	316	58	14	331
Other.....	158	Q	Q	139	7	Q	145
Vacant.....	267	25	94	148	20	62	185
Census Region							
Northeast.....	654	41	54	559	69	46	539
North Central.....	1,171	64	100	1,007	109	98	964
South.....	1,424	93	103	1,228	147	102	1,175
West.....	541	44	47	450	45	38	458
Metropolitan Status							
Metropolitan.....	2,147	132	178	1,837	205	176	1,766
Nonmetropolitan.....	1,644	109	127	1,408	166	108	1,370
Annual Heating (HDD) and Cooling Degree-Days (CDD)							
<2,000 CDD and >7,000 HDD.....	403	Q	Q	335	36	24	344
<2,000 CDD and 5,500-7,000 HDD.....	1,121	69	74	977	107	76	938
<2,000 CDD and 4,000-5,499 HDD.....	994	45	79	870	98	82	814
<2,000 CDD and <4,000 HDD.....	648	58	55	535	52	46	550
>2,000 CDD and <4,000 HDD.....	625	Q	Q	528	77	Q	491
Number of Establishments in Building							
None.....	126	Q	76	48	2	51	73
Single Establishment.....	3,050	191	190	2,668	296	191	2,563
Multi-Establishment.....	615	47	38	529	73	42	500
Government Occupancy							
Government Occupied.....	334	16	21	296	27	23	284
Not Government Occupied.....	3,457	225	283	2,949	344	261	2,852
Fuels Used Alone or in Combination							
Electricity.....	3,632	241	227	3,164	370	243	3,020
Natural Gas.....	2,241	138	126	1,978	241	156	1,844
Fuel Oil.....	624	32	31	561	55	31	539
Propane.....	241	22	Q	208	36	Q	196
Purchased Steam.....	58	4	Q	54	7	8	44
Other.....	240	22	16	202	24	17	200

See footnotes at end of table.

**Table 29. Changes in Percent of Building Heated and Cooled Between 1979 and 1983 (Continued)**  
**(Thousand Buildings)**

Building Characteristics	All Buildings Constructed No Later Than 1979	Number of Buildings in Which the Percent of the Building Heated Has:			Number of Buildings in Which the Percent of the Building Cooled Has:		
		Increased Since 1979	Decreased Since 1979	Not Changed Since 1979	Increased Since 1979	Decreased Since 1979	Not Changed Since 1979
<b>Fuel Combinations Used</b>							
No Fuels Used.....	154	NC	77	77	NC	40	114
Electricity.....	740	Q	73	609	70	54	616
Electricity and Natural Gas....	1,885	119	105	1,661	208	129	1,549
Electricity and Fuel Oil.....	317	16	Q	293	16	Q	290
Electricity, Natural Gas, and Fuel Oil.....	199	12	15	172	19	15	165
Electricity and Propane.....	123	Q	Q	113	17	Q	100
Other.....	372	27	24	321	41	29	302
<b>Percent Heated</b>							
Not Heated.....	410	--	136	274	8	70	332
1 to 50.....	507	40	97	371	54	48	405
51 to 99.....	550	74	72	404	60	63	426
100.....	2,323	127	--	2,196	248	102	1,972
<b>Percent Cooled</b>							
Not Cooled.....	1,265	74	179	1,012	--	150	1,115
1 to 50.....	980	59	85	836	136	88	756
51 to 99.....	479	52	36	391	85	46	348
100.....	1,067	57	Q	1,006	150	--	917

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding. Numbers in this table may show slight inconsistencies with other tables due to the use of longitudinally adjusted weights (see Appendix B). See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 30. Heating Systems, 1983**  
(Thousand Buildings)

Building Characteristics			Number of Buildings (thousands) that have:					
					Central System Only or in Combination with Self-Contained Units			
			All Buildings	With Heating		Total	With Furnace or Boiler	
All Buildings.....	3,948	3,508	583		2,904	2,190	169	34
Year Constructed								
1900 or Before.....	288	268	22		245	222	Q	Q
1901 to 1920.....	388	355	49		306	275	Q	Q
1921 to 1945.....	726	633	116		512	416	Q	Q
1946 to 1960.....	946	813	159		648	499	26	Q
1961 to 1970.....	721	649	101		543	381	53	Q
1971 to 1973.....	209	199	24		176	118	Q	Q
1974 to 1979.....	530	466	98		366	223	41	Q
1980 to 1983.....	160	125	15		109	56	19	8
Square Footage Category								
5,000 or Less.....	2,248	1,903	385		1,504	1,108	100	Q
5,001 to 10,000.....	725	680	94		581	449	35	Q
10,001 to 25,000.....	567	541	65		476	368	18	Q
25,001 to 50,000.....	222	207	24		183	142	9	3
50,001 to 100,000.....	107	101	9		91	69	3	Q
100,001 to 200,000.....	50	47	6		42	33	2	1
Over 200,000.....	29	28	1		27	19	Q	1
Principal Activity Within Building								
Assembly.....	457	443	37		405	334	24	Q
Educational.....	177	177	22		153	131	7	Q
Food Sales/Service.....	380	367	61		303	214	Q	Q
Health Care.....	61	61	Q		54	39	Q	Q
Lodging.....	106	102	29		73	51	Q	Q
Mercantile/Services.....	1,071	982	232		739	546	26	Q
Office.....	575	566	50		512	358	45	12
Residential.....	236	235	23		213	187	Q	NC
Warehouse.....	425	299	66		233	161	Q	Q
Other.....	179	140	30		110	79	Q	Q
Vacant.....	281	136	28		109	89	Q	Q
Census Region								
Northeast.....	670	627	66		560	485	6	10
North Central.....	1,211	1,113	107		1,002	893	15	10
South.....	1,493	1,279	312		955	547	119	6
West.....	574	489	98		388	265	29	8
Metropolitan Status								
Metropolitan.....	2,255	2,037	310		1,715	1,296	80	18
Nonmetropolitan.....	1,693	1,471	273		1,189	894	89	16
Annual Heating (HDD) and Cooling Degree-Days (CDD)								
<2,000 CDD and >7,000 HDD.....	421	382	22		358	301	Q	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	1,083	126		951	836	17	13
<2,000 CDD and 4,000-5,499 HDD...	1,016	912	146		762	639	31	7
<2,000 CDD and <4,000 HDD.....	678	553	164		382	222	Q	Q
>2,000 CDD and <4,000 HDD.....	679	579	125		451	192	Q	Q
Number of Establishments in Building								
None.....	142	35	Q		27	23	Q	Q
Single Establishment.....	3,160	2,862	505		2,344	1,781	128	19
Multi-Establishment.....	645	611	70		533	386	41	13
Government Occupancy								
Government Occupied.....	346	309	39		268	221	14	5
Not Government Occupied.....	3,602	3,199	545		2,636	1,969	155	29

See footnotes at end of table.

**Table 30. Heating Systems, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Heating	Self Contained Units Only	Number of Buildings (thousands) that have:			
				Central System Only or in Combination With Self-Contained Units			
				Total	With Furnace or Boiler	Heat Pumps	Passive Solar Heating
<b>Fuels Used Alone or in Combination</b>							
Electricity.....	3,783	3,504	583	2,900	2,186	169	34
Natural Gas.....	2,314	2,261	312	1,938	1,642	35	20
Fuel Oil.....	633	627	29	598	558	13	2
Propane.....	260	251	54	195	141	Q	Q
Purchased Steam.....	60	60	Q	59	39	Q	Q
Other.....	245	241	38	203	142	Q	9
<b>Fuel Combinations Used</b>							
No Fuels Used.....	161	--	--	--	--	--	--
Electricity.....	800	587	185	394	86	110	9
Electricity and Natural Gas.....	1,939	1,892	284	1,597	1,344	30	14
Electricity and Fuel Oil.....	319	315	14	302	282	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	207	205	Q	196	185	Q	*
Electricity and Propane.....	138	132	44	66	51	Q	Q
Other.....	383	377	48	329	241	14	9
<b>Fuel Used For Heating</b>							
Electricity.....	1,105	1,105	276	820	368	159	19
Natural Gas.....	2,011	2,011	282	1,719	1,488	18	18
Fuel Oil.....	566	566	Q	544	518	Q	1
Propane.....	161	161	40	118	83	Q	Q
Purchased Steam.....	55	55	Q	54	34	Q	Q
Other.....	170	170	Q	142	98	Q	7
<b>Percent Heated</b>							
Not Heated.....	440	--	--	--	--	--	--
1 to 50.....	517	517	148	364	273	22	Q
51 to 99.....	564	564	76	484	365	31	4
100.....	2,427	2,427	360	2,056	1,552	116	23
<b>Percent Cooled</b>							
Not Cooled.....	1,304	922	198	719	603	Q	Q
1 to 50.....	1,004	973	152	814	676	27	7
51 to 99.....	510	504	71	433	304	39	3
100.....	1,129	1,109	162	939	607	94	13

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

#=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns may not sum to totals due to nonexhaustive and overlapping categories of heating system.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,

The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 31. Heat Distribution Systems, 1983**  
(Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Heating	Air Forced Through Ducts	Number of Buildings (thousands) that have:						
				Baseboards			Radiators, Convectors, or Heating Panels		Other Heat Distribution Systems	
				All Buildings	Electric	Hot Water	Steam			
All Buildings.....	3,948	3,508	1,858	538	290	226	39	59	401	
Year Constructed										
1900 or Before.....	288	268	120	52	20	33	Q	Q	29	
1901 to 1920.....	388	355	165	47	23	19	6	9	22	
1921 to 1945.....	726	633	239	88	45	38	9	10	78	
1946 to 1960.....	946	813	414	110	52	52	12	18	94	
1961 to 1970.....	721	649	406	118	59	52	10	10	85	
1971 to 1973.....	209	199	131	34	25	Q	Q	Q	32	
1974 to 1979.....	530	466	287	72	57	17	Q	4	45	
1980 to 1983.....	140	125	96	17	9	8	Q	2	15	
Square Footage Category										
5,000 or Less.....	2,248	1,903	928	231	140	86	Q	29	244	
5,001 to 10,000.....	725	680	384	124	68	51	Q	Q	69	
10,001 to 25,000.....	567	541	319	95	52	39	6	13	53	
25,001 to 50,000.....	222	207	120	47	16	28	Q	5	17	
50,001 to 100,000.....	107	101	59	23	8	12	4	3	8	
100,001 to 200,000.....	50	47	27	12	4	6	2	3	7	
Over 200,000.....	29	28	21	8	3	4	3	2	3	
Principal Activity Within Building										
Assembly.....	457	443	287	89	51	31	Q	Q	49	
Educational.....	177	177	87	39	10	23	9	9	13	
Food Sales/Service.....	380	367	199	37	30	Q	Q	Q	55	
Health Care.....	61	61	37	15	Q	13	1	1	Q	
Lodging.....	106	102	30	25	14	12	Q	Q	15	
Mercantile/Services.....	1,071	982	464	81	44	31	Q	Q	128	
Office.....	575	566	389	112	66	46	5	10	55	
Residential.....	236	235	86	45	19	25	Q	Q	Q	
Warehouse.....	425	299	150	56	32	23	Q	Q	47	
Other.....	179	140	59	23	15	Q	Q	Q	13	
Vacant.....	281	136	71	15	6	7	Q	Q	13	
Census Region										
Northeast.....	670	627	251	167	69	97	11	13	53	
North Central.....	1,211	1,113	677	211	68	102	25	26	84	
South.....	1,493	1,279	670	86	72	13	3	15	215	
West.....	574	489	260	74	60	Q	Q	Q	50	
Metropolitan Status										
Metropolitan.....	2,255	2,037	1,128	288	126	135	32	39	204	
Nonmetropolitan.....	1,693	1,471	730	250	164	91	7	20	197	
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	382	193	132	56	66	15	13	35	
<2,000 CDD and 5,500-7,000 HDD....	1,153	1,083	592	211	98	103	16	24	71	
<2,000 CDD and 4,000-5,499 HDD...	1,016	912	467	151	97	52	8	10	106	
<2,000 CDD and <4,000 HDD.....	678	553	264	30	28	Q	Q	Q	86	
>2,000 CDD and <4,000 HDD.....	679	579	341	14	10	Q	Q	Q	Q	
Number of Establishments in Building										
None.....	142	35	17	1	Q	Q	Q	Q	Q	
Single Establishment.....	3,160	2,862	1,469	440	237	187	31	51	338	
Multi-Establishment.....	645	611	371	98	52	39	8	6	60	
Government Occupancy										
Government Occupied.....	346	309	153	71	33	28	12	14	27	
Not Government Occupied.....	3,602	3,199	1,704	467	257	198	27	44	374	
Fuels Used Alone or in Combination										
Electricity.....	3,783	3,504	1,857	538	290	226	39	59	401	
Natural Gas.....	2,314	2,261	1,256	317	130	168	28	42	213	
Fuel Oil.....	633	627	322	137	52	79	13	18	58	
Propane.....	260	251	108	21	15	Q	Q	Q	51	
Purchased Steam.....	60	60	28	22	Q	13	10	5	4	
Other.....	245	241	92	39	25	Q	Q	3	49	

See footnotes at end of table.

**Table 31. Heat Distribution Systems, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Heating	Air Forced Through Ducts	Number of Buildings (thousands) that have:						
				Baseboards			Radiators, Convector, or Heating Panels		Other Heat Distribution Systems	
				All Buildings	Electric	Hot Water Steam				
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	--	--	--	--	--	--	--	--	--
Electricity.....	800	587	289	96	95	Q	Q	Q	Q	89
Electricity and Natural Gas.....	1,939	1,892	1,089	253	118	123	17	31	174	
Electricity and Fuel Oil.....	319	315	184	78	35	38	Q	Q	26	
Electricity, Natural Gas, and Fuel Oil.....	207	205	86	40	8	29	4	8	16	
Electricity and Propane.....	138	132	49	Q	Q	Q	NC	Q	36	
Other.....	383	377	161	67	30	32	11	7	60	
<b>Fuel Used For Heating</b>										
Electricity.....	1,105	1,105	590	253	222	44	Q	16	161	
Natural Gas.....	2,011	2,011	1,140	279	115	149	21	36	190	
Fuel Oil.....	566	566	290	122	45	71	11	16	44	
Propane.....	161	161	59	Q	Q	Q	Q	Q	39	
Purchased Steam.....	55	55	26	22	Q	12	9	5	3	
Other.....	170	170	49	25	21	Q	Q	Q	43	
<b>Percent Heated</b>										
Not Heated.....	440	--	--	--	--	--	--	--	--	--
1 to 50.....	517	517	229	64	36	25	Q	Q	73	
51 to 99.....	564	564	298	80	50	29	5	8	55	
100.....	2,427	2,427	1,331	394	204	173	32	41	273	
<b>Percent Cooled</b>										
Not Cooled.....	1,304	922	323	138	83	46	Q	14	113	
1 to 50.....	1,004	973	479	178	77	97	13	24	106	
51 to 99.....	510	504	298	92	51	37	9	6	65	
100.....	1,129	1,109	758	131	79	45	8	14	117	

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals because buildings may contain more than one type of system. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 32. Boilers and Fuels Used to Fire Boilers, 1983**

Building Characteristics	All Buildings (thousands)	Number of Boilers (thousands)	Number of Buildings with Boilers (thousands)	Number of Buildings (thousands) that Fire Boilers With:		
				Natural Gas	Fuel Oil	Other Fuel
All Buildings .....	3,948	1,015	733	497	216	48
Year Constructed						
1900 or Before.....	288	124	97	61	34	Q
1901 to 1920.....	388	116	94	62	34	Q
1921 to 1945.....	726	243	183	116	62	15
1946 to 1960.....	946	221	150	103	42	Q
1961 to 1970.....	721	171	121	94	22	4
1971 to 1973.....	209	34	23	11	10	Q
1974 to 1979.....	530	80	51	36	10	7
1980 to 1983.....	140	26	16	13	2	2
Square Footage Category						
5,000 or Less.....	2,248	267	227	159	50	Q
5,001 to 10,000.....	725	183	158	105	56	Q
10,001 to 25,000.....	567	242	169	109	56	15
25,001 to 50,000.....	222	133	90	62	22	7
50,001 to 100,000.....	107	86	49	32	17	5
100,001 to 200,000.....	50	58	27	19	10	3
Over 200,000.....	29	45	14	11	5	1
Principal Activity Within Building						
Assembly.....	457	146	116	85	34	Q
Educational.....	177	157	83	60	26	8
Food Sales/Service.....	380	54	42	27	Q	Q
Health Care.....	61	29	15	10	6	Q
Lodging.....	106	50	31	23	8	Q
Mercantile/Services.....	1,071	175	133	83	49	Q
Office.....	575	161	128	88	32	8
Residential.....	236	102	87	59	26	Q
Warehouse.....	425	74	53	33	15	Q
Other.....	179	40	25	16	7	Q
Vacant.....	281	26	19	13	4	Q
Census Region						
Northeast.....	670	374	263	132	132	Q
North Central.....	1,211	325	251	222	23	8
South.....	1,493	213	138	79	46	17
West.....	574	103	82	64	Q	Q
Metropolitan Status						
Metropolitan.....	2,255	655	473	343	119	19
Nonmetropolitan.....	1,693	360	260	154	97	30
Annual Heating (HDD) and Cooling Degree-Days (CDD)						
<2,000 CDD and >7,000 HDD.....	421	162	128	84	44	Q
<2,000 CDD and 5,500-7,000 HDD...	1,153	402	302	228	67	15
<2,000 CDD and 4,000-5,499 HDD...	1,016	294	200	109	84	15
<2,000 CDD and <4,000 HDD.....	678	74	50	42	Q	2
>2,000 CDD and <4,000 HDD.....	679	82	54	34	Q	Q
Number of Establishments in Building						
None.....	142	6	3	2	Q	Q
Single Establishment.....	3,160	780	570	386	168	43
Multi-Establishment.....	645	229	159	109	47	5
Government Occupancy						
Government Occupied.....	346	163	105	67	33	10
Not Government Occupied.....	3,602	852	628	430	183	38
Fuels Used Alone or in Combination						
Electricity.....	3,783	1,013	731	495	216	48
Natural Gas.....	2,314	818	593	497	103	18
Fuel Oil.....	633	368	238	49	215	15
Propane.....	260	53	29	3	23	Q
Purchased Steam.....	60	11	5	2	Q	Q
Other.....	245	66	50	15	21	21

See footnotes at end of table.

**Table 32. Boilers and Fuels Used to Fire Boilers, 1983 (Continued)**

Building Characteristics	All Buildings (thousands)	Number of Boilers (thousands)	Number of Buildings with Boilers (thousands)	Number of Buildings (thousands) that Fire Boilers with:		
				Natural Gas	Fuel Oil	Other Fuel
<b>Fuel Combinations Used</b>						
No Fuels Used.....	161	--	--	--	--	--
Electricity.....	800	18	13	--	--	7
Electricity and Natural Gas.....	1,939	579	447	430	--	8
Electricity and Fuel Oil.....	319	110	86	--	84	5
Electricity, Natural Gas, and Fuel Oil.....	207	189	111	46	94	Q
Electricity and Propane.....	138	2	9	--	--	Q
Other.....	383	116	77	21	38	26
<b>Percent Heated</b>						
Not Heated.....	440	--	--	--	--	--
1 to 50.....	517	103	83	47	34	Q
51 to 99.....	564	179	128	82	45	8
100.....	2,427	733	523	367	137	32
<b>Percent Cooled</b>						
Not Cooled.....	1,304	261	205	131	73	Q
1 to 50.....	1,004	353	255	170	78	14
51 to 99.....	510	173	116	78	34	Q
100.....	1,129	228	158	117	31	12

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings or boilers are rounded to zero.

Note: Columns do not sum to totals due to multiple fuels for boilers. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 33. Cooling Systems, 1983**  
(Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Cooling	Window Units	Wall Units	Number of Buildings (thousands) that have Air Conditioning Systems as Follows:				Number of Buildings (thousand) that have:	
					Central Systems				Well Water for Cooling	
					All Buildings	Factory Assembled	Built from Individual Components	Both Types	Heat Pumps	
All Buildings.....	3,948	2,643	812	406	1,748	1,184	546	18	169	45
Year Constructed										
1900 or Before.....	288	175	87	29	86	56	29	Q	Q	Q
1901 to 1920.....	388	247	77	39	155	108	44	Q	Q	Q
1921 to 1945.....	726	433	226	66	224	147	76	Q	Q	12
1946 to 1960.....	946	599	241	115	339	234	103	Q	26	9
1961 to 1970.....	721	530	100	83	392	273	114	5	53	9
1971 to 1973.....	209	150	22	19	121	85	35	Q	Q	Q
1974 to 1979.....	530	394	54	44	329	224	101	Q	41	Q
1980 to 1983.....	140	113	5	11	102	57	44	1	19	Q
Square Footage Category										
5,000 or Less.....	2,248	1,345	452	222	785	566	213	Q	100	Q
5,001 to 10,000.....	725	521	148	77	371	258	112	Q	35	Q
10,001 to 25,000.....	567	443	116	61	334	222	109	Q	18	Q
25,001 to 50,000.....	222	178	50	26	128	73	52	Q	9	5
50,001 to 100,000.....	107	88	28	9	70	36	31	Q	3	Q
100,001 to 200,000.....	50	41	12	7	35	19	15	Q	2	3
Over 200,000.....	29	27	6	4	25	9	14	1	Q	Q
Principal Activity Within Building										
Assembly.....	457	296	80	31	227	163	62	Q	24	Q
Educational.....	177	130	52	19	82	49	32	Q	7	Q
Food Sales/Service.....	380	314	69	48	221	165	55	Q	Q	Q
Health Care.....	61	55	9	13	42	25	16	Q	Q	Q
Lodging.....	106	79	30	30	37	14	21	Q	Q	Q
Mercantile/Services.....	1,071	659	227	104	377	258	117	Q	26	Q
Office.....	575	525	109	49	428	294	127	7	45	5
Presidential.....	236	163	96	46	62	42	19	Q	Q	Q
Warehouse.....	425	230	69	39	152	101	51	Q	Q	Q
Other.....	179	98	34	12	64	34	29	Q	Q	Q
Vacant.....	281	94	37	Q	57	39	18	Q	Q	Q
Census Region										
Northeast.....	670	444	206	98	227	142	81	3	6	Q
North Central.....	1,211	804	228	99	560	392	161	Q	15	23
South.....	1,493	1,111	327	180	755	509	239	7	119	Q
West.....	574	284	51	28	206	141	65	Q	29	Q
Metropolitan Status										
Metropolitan.....	2,255	1,593	477	224	1,094	756	327	12	80	20
Nonmetropolitan.....	1,693	1,050	334	183	654	428	219	Q	89	25
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	233	71	55	131	Q	39	Q	Q	5
<2,000 CDD and 5,500-7,000 HDD....	1,153	715	248	97	466	309	152	4	17	15
<2,000 CDD and 4,000-5,499 HDD...	1,016	685	231	115	426	296	128	2	31	15
<2,000 CDD and <4,000 HDD.....	678	443	120	59	311	218	90	Q	Q	Q
>2,000 CDD and <4,000 HDD.....	679	567	141	Q	414	273	Q	Q	Q	Q
Number of Establishments in Building										
None.....	142	23	Q	Q	16	11	5	Q	Q	Q
Single Establishment.....	3,160	2,106	650	329	1,361	916	430	14	128	39
Multi-Establishment.....	645	514	155	72	371	256	111	4	41	6
Government Occupancy										
Government Occupied.....	346	211	62	23	160	93	64	Q	14	6
Not Government Occupied.....	3,602	2,432	749	384	1,588	1,091	482	15	155	39

See footnotes at end of table.

**Table 33. Cooling Systems, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Cooling	Number of Buildings (thousands) that have Air Conditioning Systems as Follows:						Number of Buildings (thousand) that have:	
			Central Systems			Built from Components				
			Window Units	Wall Units	All Buildings	Factory Assembled	Individual Components	Both Types	Heat Pumps	Well Water for Cooling
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	2,643	812	406	1,748	1,184	546	18	169	45
Natural Gas.....	2,314	1,720	527	231	1,189	799	377	14	35	28
Fuel Oil.....	633	385	184	87	205	128	74	3	13	11
Propane.....	260	168	72	26	95	67	27	Q	Q	Q
Purchased Steam.....	60	42	15	6	32	13	17	2	Q	Q
Other.....	245	122	49	Q	71	47	23	Q	Q	Q
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	--	--	--	--	--	--	--	--	--
Electricity.....	800	556	114	103	373	260	111	Q	110	Q
Electricity and Natural Gas.....	1,939	1,459	414	185	1,026	698	317	11	30	22
Electricity and Fuel Oil.....	319	171	78	39	84	56	27	Q	Q	Q
Electricity, Natural Gas, and Fuel Oil.....	207	149	78	34	81	51	28	2	Q	3
Electricity and Propane.....	138	93	49	14	43	35	Q	Q	Q	Q
Other.....	383	216	79	31	142	83	56	2	14	7
<b>Percent Cooled</b>										
Not Cooled.....	1,304	--	--	--	--	--	--	--	--	--
1 to 50.....	1,004	1,004	454	172	488	333	154	2	27	10
51 to 99.....	510	510	143	84	362	263	92	6	39	11
100.....	1,129	1,129	214	149	898	588	300	10	94	20
<b>Fuel Used for Cooling</b>										
Electricity.....	2,515	2,514	797	396	1,629	1,104	507	18	159	40
Natural Gas.....	141	141	12	6	135	96	38	Q	Q	Q
Other.....	21	21	2	4	20	9	10	Q	Q	Q

\*NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*\*Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals because buildings may contain more than one type of system. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 34. Buildings With Insulation or Special Glass, 1983**

Building Characteristics	All Buildings		All Buildings with Insulation or Special Glass		Buildings that have:					
					Special Glass		Roof/Ceiling Insulation		Exterior Wall Insulation	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)
All Buildings.....	3,948	52,325	2,726	40,713	1,488	27,784	1,904	29,301	1,366	19,498
Year Constructed										
1900 or Before.....	288	2,940	196	2,146	104	1,351	127	1,333	87	843
1901 to 1920.....	388	5,453	216	3,553	124	2,123	135	2,276	100	1,377
1921 to 1945.....	726	8,639	441	5,253	196	2,869	294	3,327	176	1,620
1946 to 1960.....	946	9,612	573	6,989	264	4,318	423	5,294	272	2,815
1961 to 1970.....	721	9,947	548	8,470	292	5,497	388	6,404	262	3,561
1971 to 1973.....	209	3,442	171	2,863	92	1,820	120	2,107	96	1,348
1974 to 1979.....	530	6,616	450	5,975	311	4,813	312	4,558	267	3,408
1980 to 1983.....	140	5,675	130	5,464	104	4,994	106	4,001	106	4,528
Square Footage Category										
5,000 or Less.....	2,248	4,908	1,450	3,326	689	1,706	1,029	2,376	752	1,742
5,001 to 10,000.....	725	5,246	545	4,018	327	2,386	354	2,614	263	1,958
10,001 to 25,000.....	567	8,912	421	6,639	259	4,137	297	4,688	219	3,540
25,001 to 50,000.....	222	7,692	163	5,724	112	3,919	116	4,058	70	2,474
50,001 to 100,000.....	107	7,168	84	5,674	54	3,691	62	4,222	35	2,368
100,001 to 200,000.....	50	6,642	37	5,024	27	3,652	27	3,662	15	1,954
Over 200,000.....	29	11,757	25	10,308	20	8,344	19	7,680	12	5,462
Principal Activity Within Building										
Assembly.....	457	5,483	359	4,658	236	3,503	246	3,582	162	2,054
Educational.....	177	6,044	136	4,673	84	2,887	98	3,616	58	1,709
Food Sales/Service.....	380	2,051	280	1,711	168	1,093	186	1,184	153	602
Health Care.....	61	2,277	55	2,159	32	1,892	46	1,948	34	1,121
Lodging.....	106	2,241	77	1,865	36	1,075	61	1,426	43	961
Mercantile/Services.....	1,071	10,427	665	7,874	310	4,665	479	5,412	290	4,083
Office.....	575	8,454	488	7,478	299	5,939	333	5,320	274	3,851
Residential.....	236	2,454	171	1,880	108	1,316	111	1,151	89	804
Warehouse.....	425	6,791	223	4,346	90	2,600	153	2,702	112	1,800
Other.....	179	2,760	110	1,787	51	1,282	73	1,327	63	1,054
Vacant.....	281	3,342	162	2,281	74	1,533	118	1,633	89	1,259
Census Region										
Northeast.....	670	11,615	464	9,130	253	6,218	310	6,339	233	4,272
North Central.....	1,211	16,059	867	12,703	511	8,847	601	9,306	452	6,167
South.....	1,493	17,049	1,001	13,158	480	8,631	712	9,631	478	6,270
West.....	574	7,602	395	5,722	243	4,089	282	4,025	203	2,789
Metropolitan Status										
Metropolitan.....	2,255	37,587	1,552	29,248	911	20,616	1,039	21,129	719	12,962
Nonmetropolitan.....	1,693	14,738	1,174	11,465	577	7,169	866	8,172	647	6,536
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	5,725	327	4,817	207	3,306	221	3,535	204	2,763
<2,000 CDD and 5,500-7,000 HDD...	1,153	16,965	833	13,497	479	9,588	602	9,702	417	6,212
<2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	661	10,165	342	6,236	458	7,130	347	5,305
<2,000 CDD and <4,000 HDD.....	678	7,496	411	5,008	195	3,567	272	3,185	181	1,794
>2,000 CDD and <4,000 HDD.....	679	8,346	493	7,226	Q	5,087	351	5,749	218	3,425
Number of Establishments in Building										
None.....	142	1,475	74	1,003	40	732	53	737	33	556
Single Establishment.....	3,160	35,227	2,173	26,749	1,155	17,186	1,519	19,489	1,089	11,844
Multi-Establishment.....	645	15,623	479	12,960	292	9,866	332	9,074	244	7,098

See footnotes at end of table.

**Table 34. Buildings With Insulation or Special Glass, 1983 (Continued)**

Building Characteristics	All Buildings		All Buildings with Insulation or Special Glass		Buildings that have:					
					Special Glass		Roof/Ceiling Insulation		Exterior Wall Insulation	
	Number of Buildings (thousands)	Square Feet (millions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)	Number of Buildings (thousands)	Square Feet (mil- lions)
<b>Government Occupancy</b>										
Government Occupied.....	346	10,099	248	8,297	126	5,773	178	5,994	118	3,939
Not Government Occupied.....	3,602	42,225	2,478	32,415	1,362	22,011	1,726	23,306	1,248	15,559
<b>Fuels Used Alone or in Combination</b>										
Electricity.....	3,783	51,359	2,663	40,300	1,466	27,560	1,863	29,029	1,336	19,278
Natural Gas.....	2,314	37,090	1,666	29,346	970	20,599	1,130	20,847	798	13,521
Fuel Oil.....	633	13,313	438	10,739	223	7,442	319	8,235	190	5,156
Propane.....	260	3,007	192	2,375	87	1,501	138	1,723	104	1,148
Purchased Steam.....	60	4,594	44	3,540	21	2,345	38	2,871	13	1,288
Other.....	245	3,997	165	3,084	85	2,042	127	2,606	102	1,795
<b>Fuel Combinations Used</b>										
No Fuels Used.....	161	935	60	398	Q	Q	40	Q	30	Q
Electricity.....	800	6,518	553	4,888	310	3,323	399	3,593	307	2,792
Electricity and Natural Gas.....	1,939	24,863	1,393	19,605	807	13,735	938	13,228	683	8,997
Electricity and Fuel Oil.....	319	2,911	206	2,170	89	1,278	151	1,472	96	1,264
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	143	5,733	89	4,051	98	4,464	52	2,496
Electricity and Propane.....	138	736	96	606	33	264	71	483	54	353
Other.....	383	9,409	275	7,313	140	4,922	208	5,802	145	3,382
<b>Fuel Used For Heating</b>										
Electricity.....	1,105	15,905	873	13,469	522	10,027	642	9,848	517	8,404
Natural Gas.....	2,011	29,057	1,463	23,066	850	15,907	987	16,832	718	10,553
Fuel Oil.....	566	8,990	388	6,803	191	4,207	278	4,932	166	2,849
Propane.....	161	1,035	112	681	42	320	79	440	69	444
Purchased Steam.....	55	4,339	41	3,331	18	2,191	35	2,708	12	1,206
Other.....	170	1,675	102	1,123	48	731	85	946	67	647
<b>Percent Heated</b>										
Not Heated.....	440	2,971	168	1,323	58	696	114	855	67	498
1 to 50.....	517	5,913	321	3,512	153	1,981	220	2,445	152	1,554
51 to 99.....	564	8,266	410	6,680	225	4,674	283	4,848	217	3,371
100.....	2,427	35,175	1,827	29,198	1,051	20,434	1,287	21,152	930	14,075
<b>Percent Cooled</b>										
Not Cooled.....	1,304	9,802	678	5,520	272	2,717	495	3,941	315	2,269
1 to 50.....	1,004	16,335	716	12,039	414	7,831	472	8,057	313	4,791
51 to 99.....	510	10,333	404	8,925	237	6,445	282	7,046	221	4,684
100.....	1,129	15,855	928	14,229	564	10,791	656	10,256	518	7,753

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Columns do not sum to totals because buildings may contain more than one feature. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 35. Combinations of Conservation Features, 1983**  
 (Thousand Buildings)

Building Characteristics	Number of Buildings (thousands) having:									
	Buildings with No Insulation or Special Glass		Roof/Ceiling Insulation Only		Special Glass Only		Wall Insulation Only		Both Roof/Ceiling and Wall Insulation	
	All Buildings	Buildings with No Insulation or Special Glass	Roof/Ceiling Insulation Only	Special Glass Only	Wall Insulation Only	Both Roof/Ceiling and Wall Insulation	Both Roof/Ceiling and Special Glass	Both Wall Insulation and Special Glass	Both Wall Insulation	All Three Conservation Features
All Buildings.....	3,948	1,221	571	410	223	444	379	189	510	
Year Constructed										
1900 or Before.....	288	91	44	41	Q	31	24	Q	27	
1901 to 1920.....	388	172	40	44	27	24	32	Q	39	
1921 to 1945.....	726	284	133	72	43	69	61	34	30	
1946 to 1960.....	946	373	153	77	53	104	71	20	96	
1961 to 1970.....	721	173	108	86	41	107	92	34	81	
1971 to 1973.....	209	38	28	22	16	35	25	14	31	
1974 to 1979.....	530	80	58	64	23	58	61	51	136	
1980 to 1983.....	140	10	6	5	Q	17	13	16	71	
Square Footage Category										
5,000 or Less.....	2,248	798	335	186	146	280	177	90	237	
5,001 to 10,000.....	725	180	105	104	43	71	73	45	105	
10,001 to 25,000.....	567	146	77	64	23	62	60	37	97	
25,001 to 50,000.....	222	59	26	30	8	18	37	10	35	
50,001 to 100,000.....	107	22	18	15	3	9	17	4	18	
100,001 to 200,000.....	50	12	7	8	Q	3	8	2	9	
Over 200,000.....	29	4	4	3	Q	2	7	Q	8	
Principal Activity Within Building										
Assembly.....	457	98	58	68	Q	45	70	25	72	
Educational.....	177	41	29	21	8	16	28	9	25	
Food Sales/Service.....	380	100	45	39	26	42	44	29	56	
Health Care.....	61	Q	9	4	Q	12	Q	Q	17	
Lodging.....	106	29	19	5	Q	15	11	Q	16	
Mercantile/Services.....	1,071	406	185	110	51	119	81	25	95	
Office.....	575	87	81	63	42	67	70	51	115	
Residential.....	236	65	25	30	Q	21	28	Q	38	
Warehouse.....	425	202	62	34	21	49	14	14	27	
Other.....	179	69	19	17	Q	28	10	Q	16	
Vacant.....	281	119	40	19	Q	30	Q	8	33	
Census Region										
Northeast.....	670	207	97	73	41	73	60	39	80	
North Central.....	1,211	344	158	134	60	137	122	71	183	
South.....	1,493	492	257	131	98	165	134	59	155	
West.....	574	179	60	71	23	69	62	Q	91	
Metropolitan Status										
Metropolitan.....	2,255	703	304	286	110	227	242	117	265	
Nonmetropolitan.....	1,693	519	267	124	113	218	136	72	245	
Annual Heating (HDD) and Cooling Degree-Days (CDD)										
<2,000 CDD and >7,000 HDD.....	421	94	39	54	20	62	30	31	90	
<2,000 CDD and 5,500-7,000 HDD...	1,153	319	168	121	54	133	127	57	173	
<2,000 CDD and 4,000-5,499 HDD...	1,016	355	144	76	73	102	95	54	118	
<2,000 CDD and <4,000 HDD.....	678	267	107	82	38	71	41	18	53	
>2,000 CDD and <4,000 HDD.....	679	186	114	Q	38	77	Q	Q	75	
Number of Establishments in Building										
None.....	142	68	22	Q	Q	Q	Q	Q	Q	
Single Establishment.....	3,160	987	458	324	188	372	302	143	386	
Multi-Establishment.....	645	166	91	73	30	66	70	43	105	
Government Occupancy										
Government Occupied.....	346	97	60	30	24	38	40	16	40	
Not Government Occupied.....	3,602	1,124	511	380	198	406	338	173	470	

See footnotes at end of table.

**Table 35. Combinations of Conservation Features, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Buildings with No Insulation or Special Glass	Number of Buildings (thousands) having:								
			Roof/Ceiling Insulation Only	Special Glass Only	Wall Insulation Only	Both Roof/Ceiling and Wall Insulation	Both Roof/Ceiling Insulation and Special Glass	Both Wall Insulation and Special Glass	All Three Conservation Features		
<b>Fuels Used Alone or in Combination</b>											
Electricity.....	3,783	1,120	549	399	213	434	379	188	501		
Natural Gas.....	2,314	648	325	295	122	250	248	120	307		
Fuel Oil.....	633	195	120	52	39	56	76	28	67		
Propane.....	260	68	48	18	22	35	22	15	33		
Purchased Steam.....	60	16	16	5	Q	7	10	1	5		
Other.....	245	60	26	14	Q	42	22	12	37		
<b>Fuel Combinations Used</b>											
No Fuels Used.....	161	101	Q	Q	Q	Q	Q	Q	Q		
Electricity.....	800	247	97	70	45	101	Q	39	121		
Electricity and Natural Gas.....	1,939	546	267	246	104	215	198	105	258		
Electricity and Fuel Oil.....	319	113	66	19	22	29	25	14	31		
Electricity, Natural Gas, and Fuel Oil.....	207	64	32	30	9	13	29	6	23		
Electricity and Propane.....	138	43	29	Q	Q	20	Q	Q	17		
Other.....	383	108	59	28	19	56	43	20	50		
<b>Fuel Used For Heating</b>											
Electricity.....	1,105	232	133	99	61	157	125	71	227		
Natural Gas.....	2,011	548	278	256	113	221	211	107	277		
Fuel Oil.....	566	178	109	49	37	51	65	25	53		
Propane.....	161	48	27	Q	Q	29	Q	Q	18		
Purchased Steam.....	55	14	16	5	Q	6	9	1	4		
Other.....	170	67	17	Q	Q	31	12	Q	25		
<b>Percent Heated</b>											
Not Heated.....	440	272	64	33	Q	27	Q	Q	Q		
1 to 50.....	517	196	85	46	34	50	38	21	48		
51 to 99.....	564	154	78	59	38	69	55	30	80		
100.....	2,427	600	345	272	132	298	281	136	363		
<b>Percent Cooled</b>											
Not Cooled.....	1,304	627	198	92	58	151	73	34	73		
1 to 50.....	1,004	288	149	144	66	67	110	34	126		
51 to 99.....	510	105	73	56	32	62	55	34	93		
100.....	1,129	201	152	118	67	145	141	87	218		

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding error. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 36. Selected Conservation Features Installed in Buildings Between 1979 and 1983**

Building Characteristics	All Buildings		All Buildings Taking Conservation Actions		Buildings Taking the Following Conservation Actions Between 1979 and 1983:							
					Weather Stripping or Caulking		Roof Insulation		Wall Insulation		Special Glass	
	Number of Buildings	Square Feet	Number of Buildings	Square Feet	Number of Buildings	Square Feet	Number of Buildings	Square Feet	Number of Buildings	Square Feet	Number of Buildings	Square Feet
	(thousands)	(millions)	(thousands)	(mil-lions)	(thousands)	(mil-lions)	(thousands)	(mil-lions)	(thousands)	(mil-lions)	(thousands)	(mil-lions)
All Buildings.....	3,948	52,325	1,541	23,248	1,237	18,989	401	5,597	251	3,179	401	6,765
Year Constructed												
1900 or Before.....	288	2,940	138	1,749	112	1,497	40	413	36	420	34	480
1901 to 1920.....	388	5,453	179	2,728	156	2,379	37	598	33	480	60	1,141
1921 to 1945.....	726	8,639	299	3,745	253	3,231	80	879	50	465	70	1,090
1946 to 1960.....	946	9,612	363	4,908	298	4,024	97	1,586	53	666	87	1,637
1961 to 1970.....	721	9,947	293	4,902	224	3,681	84	1,316	47	667	86	1,369
1971 to 1973.....	209	3,442	68	1,403	51	1,114	14	319	15	201	22	298
1974 to 1979.....	530	6,616	172	2,784	122	2,163	43	421	12	172	37	649
1980 to 1983.....	140	5,675	28	Q	21	Q	6	65	4	108	5	101
Square Footage Category												
5,000 or Less.....	2,248	4,908	814	1,902	646	1,491	213	514	148	356	194	461
5,001 to 10,000.....	725	5,246	302	2,211	237	1,708	77	588	46	332	82	599
10,001 to 25,000.....	567	8,912	235	3,763	196	3,101	64	1,047	32	541	72	1,204
25,001 to 50,000.....	222	7,692	103	3,571	87	2,967	27	890	15	547	29	1,033
50,001 to 100,000.....	107	7,168	50	3,303	40	2,670	12	751	5	358	13	858
100,001 to 200,000.....	50	6,642	24	3,218	19	2,628	6	792	3	354	7	950
Over 200,000.....	29	11,757	13	5,280	11	4,424	2	1,014	2	692	4	1,660
Principal Activity Within Building												
Assembly.....	457	5,483	194	2,880	156	2,271	45	656	24	217	66	1,053
Educational.....	177	6,044	91	3,132	73	2,613	26	974	10	292	27	888
Food Sales/Service.....	380	2,051	153	889	129	705	42	290	31	144	57	250
Health Care.....	61	2,277	25	1,485	22	1,288	Q	334	Q	Q	7	513
Lodging.....	106	2,241	54	1,099	49	975	14	209	Q	Q	12	241
Mercantile/Services.....	1,071	10,427	436	4,001	339	3,189	106	986	71	569	80	955
Office.....	575	8,454	236	4,055	174	3,188	63	822	45	726	83	1,308
Residential.....	236	2,454	123	1,476	112	1,360	33	311	27	314	19	430
Warehouse.....	425	6,791	116	2,468	89	1,878	28	493	20	397	27	636
Other.....	179	2,760	47	879	41	751	16	270	Q	Q	Q	234
Vacant.....	281	3,342	65	885	49	771	23	254	10	176	14	258
Census Region												
Northeast.....	670	11,615	316	6,170	252	5,143	77	1,670	61	985	85	2,093
North Central.....	1,211	16,059	550	8,198	476	6,891	140	2,020	96	1,274	108	1,812
South.....	1,493	17,049	500	6,207	393	5,040	128	1,328	69	660	136	2,080
West.....	574	7,602	175	2,673	115	1,916	56	580	25	260	72	781
Metropolitan Status												
Metropolitan.....	2,255	37,587	904	17,055	725	14,070	210	3,800	119	2,124	246	5,007
Nonmetropolitan.....	1,693	14,738	638	6,193	512	4,920	191	1,797	132	1,055	156	1,758

See footnotes at end of table.

**Table 36. Selected Conservation Features Installed in Buildings Between 1979 and 1983 (Continued)**

Building Characteristics	All Buildings		All Buildings Taking Conservation Actions		Buildings Taking the Following Conservation Actions Between 1979 and 1983:							
					Weather Stripping or Caulking		Roof Insulation		Wall Insulation		Special Glass	
	Number of Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)	Buildings (thousands)	Square Feet (millions)
<b>Annual Heating (HDD) and Cooling Degree-Days (CDD)</b>												
<2,000 CDD and >7,000 HDD.....	421	5,725	175	2,619	143	2,033	Q	701	Q	462	47	602
<2,000 CDD and 5,500-7,000 HDD...	1,153	16,965	527	8,583	435	7,235	146	2,164	92	1,441	125	2,313
<2,000 CDD and 4,000-5,499 HDD...	1,016	13,793	421	6,297	351	5,264	96	1,527	68	759	91	1,868
<2,000 CDD and <4,000 HDD.....	678	7,496	184	2,427	137	1,703	50	495	31	236	61	1,051
>2,000 CDD and <4,000 HDD.....	679	8,346	233	3,321	170	2,753	63	710	24	Q	Q	931
<b>Number of Establishments in Building</b>												
None.....	142	1,475	29	287	27	278	Q	Q	Q	Q	Q	Q
Single Establishment.....	3,160	35,227	1,241	15,660	1,006	12,940	322	3,885	207	2,036	312	4,386
Multi-Establishment.....	645	15,623	271	7,301	204	5,771	69	1,605	43	1,091	89	2,323
<b>Government Occupancy</b>												
Government Occupied.....	346	10,099	128	4,541	99	3,653	40	1,421	12	490	32	1,348
Not Government Occupied.....	3,602	42,225	1,413	18,707	1,137	15,336	361	4,177	239	2,689	370	5,417
<b>Fuels Used Alone or in Combination</b>												
Electricity.....	3,783	51,359	1,525	23,194	1,222	18,938	396	5,589	251	3,179	400	6,763
Natural Gas.....	2,314	37,090	1,011	17,863	829	14,590	259	4,384	150	2,401	266	5,169
Fuel Oil.....	633	13,313	298	7,334	252	6,296	63	2,084	41	959	60	2,223
Propane.....	260	3,007	118	1,409	94	1,242	37	451	31	264	27	308
Purchased Steam.....	60	4,594	19	1,917	15	1,517	7	377	1	210	7	695
Other.....	245	3,997	111	1,597	84	1,341	35	410	31	292	28	392
<b>Fuel Combinations Used</b>												
No Fuels Used.....	161	935	Q	Q	Q	Q	Q	Q	NC	NC	Q	Q
Electricity.....	800	6,518	233	1,997	157	1,507	73	374	49	268	89	788
Electricity and Natural Gas.....	1,939	24,863	826	11,096	675	8,832	212	2,556	125	1,512	215	3,032
Electricity and Fuel Oil.....	319	2,911	131	1,212	112	1,051	18	251	Q	Q	17	287
Electricity, Natural Gas, and Fuel Oil.....	207	6,953	116	4,629	100	4,000	22	1,351	14	553	28	1,484
Electricity and Propane.....	138	736	51	293	46	258	Q	Q	Q	Q	Q	Q
Other.....	383	9,409	169	3,982	132	3,305	60	979	42	587	46	1,136
<b>Percent Heated</b>												
Not Heated.....	440	2,971	48	322	35	272	Q	Q	Q	Q	Q	Q
1 to 50.....	517	5,913	173	1,955	126	1,478	31	417	28	343	48	433
51 to 99.....	564	8,266	265	4,441	208	3,530	78	1,307	59	651	65	1,381
100.....	2,427	35,175	1,055	16,530	867	13,708	280	3,811	161	2,154	275	4,869
<b>Percent Cooled</b>												
Not Cooled.....	1,304	9,802	377	2,848	298	2,337	87	612	60	411	65	586
1 to 50.....	1,004	16,335	434	7,741	350	6,213	110	2,015	74	1,074	125	2,174
51 to 99.....	510	10,333	247	5,635	209	4,654	77	1,780	45	915	70	1,999
100.....	1,129	15,855	483	7,024	379	5,786	127	1,191	72	779	141	2,006

NC=No cases in sample.

Q=Data withheld either because the PSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings or 500,000 square feet are rounded to zero.

Note: Columns do not sum to totals because buildings may contain more than one feature. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 37. Maintenance and Control of Heating and Cooling Systems, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	Buildings with Heating or Cooling Systems	Buildings with Computerized Control of Heating/Cooling System	Buildings with Regular Maintenance of Heating/Cooling System	Number of Buildings (thousands) that have:			
					Heating Systems	Occupant Control of Heating	Cooling Systems	Occupant Control of Cooling
All Buildings.....	3,948	3,556	105	2,914	3,508	2,541	2,643	1,170
Year Constructed								
1900 or Before.....	288	268	9	224	268	190	175	60
1901 to 1920.....	388	360	9	292	355	252	247	112
1921 to 1945.....	726	639	10	513	633	454	433	147
1946 to 1960.....	946	833	23	664	813	610	599	243
1961 to 1970.....	721	654	19	558	649	472	530	249
1971 to 1973.....	209	201	9	172	199	143	150	77
1974 to 1979.....	530	473	22	374	466	339	394	217
1980 to 1983.....	140	128	12	116	125	82	113	66
Square Footage Category								
5,000 or Less.....	2,248	1,940	29	1,497	1,903	1,470	1,345	593
5,001 to 10,000.....	725	684	9	582	680	516	521	257
10,001 to 25,000.....	567	544	20	472	541	362	443	206
25,001 to 50,000.....	222	211	15	194	207	112	178	61
50,001 to 100,000.....	107	101	13	94	101	51	88	31
100,001 to 200,000.....	50	47	10	47	47	22	41	15
Over 200,000.....	29	28	7	28	28	8	27	6
Principal Activity Within Building								
Assembly.....	457	444	12	389	443	324	296	149
Educational.....	177	177	17	160	177	99	130	47
Food Sales/Service.....	380	375	13	318	367	237	314	124
Health Care.....	61	61	3	54	61	42	55	28
Lodging.....	106	104	6	85	102	71	79	19
Mercantile/Services.....	1,071	1,010	15	774	982	771	659	272
Office.....	575	567	25	481	566	434	525	305
Residential.....	236	235	9	187	235	146	163	42
Warehouse.....	425	310	2	250	299	217	230	98
Other.....	179	158	4	108	140	100	98	44
Vacant.....	281	137	3	106	136	100	94	41
Census Region								
Northeast.....	670	628	24	534	627	405	444	136
North Central.....	1,211	1,115	36	931	1,113	816	804	373
South.....	1,493	1,317	27	1,054	1,279	967	1,111	532
West.....	574	496	18	394	489	353	284	128
Metropolitan Status								
Metropolitan.....	2,255	2,061	79	1,700	2,037	1,427	1,593	712
Nonmetropolitan.....	1,693	1,495	26	1,214	1,471	1,114	1,050	459
Annual Heating (HDD) and Cooling Degree-Days (CDD)								
<2,000 CDD and >7,000 HDD.....	421	382	14	314	382	271	233	76
<2,000 CDD and 5,500-7,000 HDD...	1,153	1,085	28	904	1,083	783	715	312
<2,000 CDD and 4,000-5,499 HDD...	1,016	917	30	760	912	637	685	269
<2,000 CDD and <4,000 HDD.....	678	561	20	454	553	407	443	221
>2,000 CDD and <4,000 HDD.....	679	611	9	482	579	443	567	291
Number of Establishments in Building								
None.....	142	35	*	27	35	23	23	13
Single Establishment.....	3,160	2,901	81	2,389	2,862	2,053	2,106	891
Multi-Establishment.....	645	620	23	498	611	465	514	266
Government Occupancy								
Government Occupied.....	346	309	21	266	309	200	211	89
Not Government Occupied.....	3,602	3,247	84	2,648	3,199	2,341	2,432	1,081
Fuels Used Alone or in Combination								
Electricity.....	3,783	3,552	105	2,911	3,504	2,539	2,643	1,170
Natural Gas.....	2,314	2,277	71	1,899	2,261	1,611	1,720	791
Fuel Oil.....	633	627	17	551	627	426	385	119
Propane.....	260	253	6	207	251	177	168	57
Purchased Steam.....	60	60	9	56	60	27	42	11
Other.....	245	239	6	176	241	160	122	38

See footnotes at end of table.

**Table 37. Maintenance and Control of Heating and Cooling Systems, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings				Number of Buildings (thousands) that have:			
		Buildings with Heating or Cooling Systems	Buildings with Computerized Control of Heating/Cooling System	Buildings with Regular Maintenance of Heating/Cooling System	Heating Systems	Occupant Control of Heating	Cooling Systems	Occupant Control of Cooling
<b>Fuel Combinations Used</b>								
No Fuels Used.....	161	--	--	--	--	--	--	--
Electricity.....	800	619	17	463	587	470	556	268
Electricity and Natural Gas.....	1,939	1,907	57	1,578	1,892	1,373	1,459	700
Electricity and Fuel Oil.....	319	316	6	281	315	232	171	53
Electricity, Natural Gas, and Fuel Oil.....	207	205	6	186	205	126	149	48
Electricity and Propane.....	138	132	Q	104	132	98	93	28
Other.....	383	377	16	300	377	242	216	72
<b>Fuels Used For Heating</b>								
Electricity.....	1,105	1,099	39	858	1,105	861	924	458
Natural Gas.....	2,011	2,010	58	1,673	2,011	1,455	1,506	699
Fuel Oil.....	566	566	12	494	566	392	333	103
Propane.....	161	160	Q	127	161	113	100	33
Purchased Steam.....	55	55	9	51	55	25	39	10
Other.....	170	168	2	118	170	117	68	18
<b>Fuels Used for Cooling</b>								
Electricity.....	2,515	2,515	87	2,101	2,460	1,781	2,514	1,090
Natural Gas.....	141	141	9	129	141	101	141	95
Other.....	21	21	3	20	21	12	21	11
<b>Percent Heated</b>								
Not Heated.....	440	57	Q	Q	--	--	57	Q
1 to 50.....	517	508	Q	396	517	406	357	145
51 to 99.....	564	564	19	471	564	390	435	186
100.....	2,427	2,427	83	2,007	2,427	1,745	1,793	830
<b>Percent Cooled</b>								
Not Cooled.....	1,304	913	11	697	922	674	--	--
1 to 50.....	1,004	1,004	17	817	973	695	1,004	326
51 to 99.....	510	510	27	434	504	364	510	232
100.....	1,129	1,129	50	967	1,109	808	1,129	612

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Columns do not sum to totals due to nonexhaustive and nonexclusive categories. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 38. Reduced Heating and Cooling When Building Not in Use, 1983**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Heating Systems	Buildings with Reduced Heating in Off Hours	All Buildings with Cooling Systems	Buildings with Reduced Cooling in Off Hours	All Buildings with Vacant at Least 3 Months	Buildings with Reduced Heating/Cooling in Vacant Portion (At least 3 Months)
All Buildings.....	3,948	3,508	3,010	2,643	2,302	642	532
Year Constructed							
1900 or Before.....	288	268	232	175	160	62	53
1901 to 1920.....	388	355	297	247	216	92	67
1921 to 1945.....	726	633	537	433	387	127	103
1946 to 1960.....	946	813	718	599	538	113	103
1961 to 1970.....	721	649	568	530	455	100	85
1971 to 1973.....	209	199	181	150	135	32	28
1974 to 1979.....	530	466	374	394	315	77	66
1980 to 1983.....	140	125	103	113	95	39	27
Square Footage Category							
5,000 or Less.....	2,248	1,903	1,630	1,345	1,151	337	291
5,001 to 10,000.....	725	680	598	521	466	107	83
10,001 to 25,000.....	567	541	459	443	393	95	72
25,001 to 50,000.....	222	207	176	178	154	55	48
50,001 to 100,000.....	107	101	84	88	78	26	21
100,001 to 200,000.....	50	47	40	41	35	12	9
Over 200,000.....	29	28	24	27	24	10	8
Principal Activity Within Building							
Assembly.....	457	443	418	296	277	37	29
Educational.....	177	177	171	130	125	28	25
Food Sales/Service.....	380	367	295	314	254	54	41
Health Care.....	61	61	51	55	50	9	Q
Lodging.....	106	102	79	79	68	26	23
Mercantile/Services.....	1,071	982	864	659	576	111	93
Office.....	575	566	505	525	474	143	113
Residential.....	236	235	164	163	130	58	45
Warehouse.....	425	299	248	230	195	46	42
Other.....	179	140	103	98	72	19	12
Vacant.....	281	136	111	94	82	111	101
Census Region							
Northeast.....	670	627	528	444	407	129	104
North Central.....	1,211	1,113	952	804	677	181	151
South.....	1,493	1,279	1,114	1,111	985	239	203
West.....	574	489	416	284	233	93	75
Metropolitan Status							
Metropolitan.....	2,255	2,037	1,712	1,593	1,361	364	302
Nonmetropolitan.....	1,693	1,471	1,298	1,050	941	278	231
Annual Heating (HDD) and Cooling Degree-Days (CDD)							
<2,000 CDD and >7,000 HDD.....	421	382	329	233	203	73	60
<2,000 CDD and 5,500-7,000 HDD...	1,153	1,083	915	715	611	185	152
<2,000 CDD and 4,000-5,499 HDD...	1,016	912	800	685	607	167	140
<2,000 CDD and <4,000 HDD.....	678	553	477	443	387	108	91
>2,000 CDD and <4,000 HDD.....	679	579	490	567	495	Q	Q
Number of Establishments in Building							
None.....	142	35	31	23	20	54	49
Single Establishment.....	3,160	2,862	2,480	2,106	1,833	407	344
Multi-Establishment.....	645	611	500	514	449	182	139
Government Occupancy							
Government Occupied.....	346	309	252	211	180	58	44
Not Government Occupied.....	3,602	3,199	2,759	2,432	2,123	584	468
Fuels Used Alone or in Combination							
Electricity.....	3,783	3,504	3,008	2,643	2,302	622	517
Natural Gas.....	2,314	2,261	1,931	1,720	1,504	390	318
Fuel Oil.....	633	627	551	385	344	119	89
Propane.....	260	251	221	168	150	41	32
Purchased Steam.....	60	60	45	42	36	16	14
Other.....	245	241	228	122	104	44	37

See footnotes at end of table.

**Table 38. Reduced Heating and Cooling When Building Not in Use, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	All Buildings	All Buildings with Heating Systems	Buildings with Reduced Heating in Off Hours	All Buildings with Cooling Systems	Buildings with Reduced Cooling in Off Hours	All Buildings with Portion Vacant at Least 3 Months	Buildings with Reduced Heating/Cooling in Vacant Portion (At least 3 Months)
<b>Fuel Combinations Used</b>							
No Fuels Used.....	161	--	--	--	--	17	--
Electricity.....	800	587	489	556	463	134	119
Electricity and Natural Gas.....	1,939	1,692	1,608	1,459	1,285	306	252
Electricity and Fuel Oil.....	319	315	288	171	160	38	32
Electricity, Natural Gas, and Fuel Oil.....	207	205	172	149	125	58	44
Electricity and Propane.....	138	132	115	93	82	Q	Q
Other.....	383	377	338	216	187	74	62
<b>Percent Heated</b>							
Not Heated.....	440	--	--	57	Q	58	44
1 to 50.....	517	517	453	357	326	121	102
51 to 99.....	564	564	474	435	381	114	100
100.....	2,427	2,427	2,083	1,793	1,552	350	286
<b>Percent Cooled</b>							
Not Cooled.....	1,304	922	794	--	--	192	156
1 to 50.....	1,004	973	842	1,004	893	196	164
51 to 99.....	510	504	421	510	445	93	81
100.....	1,129	1,109	954	1,129	963	161	132

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division,  
 The 1983 Nonresidential Buildings Energy Consumption Survey.

**Table 39. Energy Audits, 1983**  
(Thousand Buildings)

Building Characteristics	Buildings Professionally Audited by:						Buildings Not Professionally Audited and:		
	All Buildings		All Buildings Professionally Audited	Private Contractor	Electric/Gas Company Representative	Other Auditor	Measures Taken in Response to Audit	All Buildings Not Professionally Audited	Audit Available From Energy Supplier
	All Buildings	Professionally Audited							
All Buildings.....	3,948	434	205	147	82	187	3,514	1,761	1,753
Year Constructed									
1900 or Before.....	288	23	11	Q	Q	12	265	151	114
1901 to 1920.....	388	37	15	18	Q	18	352	167	185
1921 to 1945.....	726	73	32	21	19	35	653	288	365
1946 to 1960.....	946	83	44	26	14	45	862	423	439
1961 to 1970.....	721	94	49	25	20	35	627	325	302
1971 to 1973.....	209	38	17	15	6	15	172	99	72
1974 to 1979.....	530	65	26	27	Q	19	465	232	233
1980 to 1983.....	140	22	10	6	5	8	119	76	43
Square Footage Category									
5,000 or Less.....	2,248	151	68	53	Q	52	2,097	999	1,099
5,001 to 10,000.....	725	96	42	36	Q	43	629	335	294
10,001 to 25,000.....	567	75	39	23	12	38	492	260	233
25,001 to 50,000.....	222	58	26	22	11	27	164	89	75
50,001 to 100,000.....	107	25	13	7	5	12	82	48	34
100,001 to 200,000.....	50	18	10	4	4	9	31	19	12
Over 200,000.....	29	11	7	2	2	5	18	11	7
Principal Activity Within Building									
Assembly.....	457	52	25	23	Q	24	405	198	207
Educational.....	177	49	31	11	7	24	128	78	50
Food Sales/Service.....	380	44	19	Q	Q	15	336	151	185
Health Care.....	61	18	10	Q	Q	Q	43	31	12
Lodging.....	106	24	8	9	7	11	83	42	41
Mercantile/Services.....	1,071	85	29	32	24	36	986	475	511
Office.....	575	88	45	29	14	39	488	278	210
Residential.....	236	20	Q	Q	Q	Q	215	107	109
Warehouse.....	425	30	15	10	Q	14	395	189	206
Other.....	179	19	7	Q	Q	Q	160	85	75
Vacant.....	281	6	4	Q	Q	3	275	128	148
Census Region									
Northeast.....	670	81	37	26	18	45	589	321	267
North Central.....	1,211	120	70	34	17	54	1,091	513	577
South.....	1,493	154	67	53	34	58	1,338	655	683
West.....	574	78	30	34	13	30	496	271	225
Metropolitan Status									
Metropolitan.....	2,255	285	132	100	53	125	1,970	1,080	890
Nonmetropolitan.....	1,693	149	73	47	29	61	1,544	681	863
Annual Heating (HDD) and Cooling Degree-Days (CDD)									
<2,000 CDD and >7,000 HDD.....	421	55	27	19	Q	22	366	227	140
<2,000 CDD and 5,500-7,000 HDD.....	1,153	128	66	34	26	62	1,025	521	504
<2,000 CDD and 4,000-5,499 HDD.....	1,016	83	53	23	7	42	933	340	593
<2,000 CDD and <4,000 HDD.....	678	81	19	40	22	31	597	307	290
>2,000 CDD and <4,000 HDD.....	679	Q	39	Q	Q	593	366	Q	
Number of Establishments in Building									
None.....	142	Q	Q	Q	Q	Q	140	70	70
Single Establishment.....	3,160	342	166	110	66	147	2,818	1,386	1,432
Multi-Establishment.....	645	89	38	37	14	39	556	305	251
Government Occupancy									
Government Occupied.....	346	87	44	16	27	41	259	141	118
Not Government Occupied.....	3,602	347	161	131	55	146	3,255	1,620	1,635

See footnotes at end of table.

**Table 39. Energy Audits, 1983 (Continued)**  
 (Thousand Buildings)

Building Characteristics	Buildings Professionally Audited by:						Buildings Not Professionally Audited and:		
	All Buildings		All Profes- sionally Audited	Private Contractor	Electric/Gas Company Representative	Other Auditor	Measures Taken in Response to Audit	All Buildings Not Professionally Audited	Audit Available From Energy Supplier
	All Buildings	Profes- sionally Audited							
<b>Fuels Used Alone or in Combination</b>									
Electricity.....	3,783	433	205	147	82	187	3,349	1,705	1,644
Natural Gas.....	2,314	288	147	96	45	132	2,025	1,074	952
Fuel Oil.....	633	77	38	19	20	40	556	225	331
Propane.....	260	24	13	Q	2	11	236	106	128
Purchased Steam.....	60	14	8	Q	4	7	46	28	18
Other.....	245	34	14	14	6	16	211	98	113
<b>Fuel Combinations Used</b>									
No Fuels Used.....	161	--	--	--	--	--	161	54	107
Electricity.....	800	77	29	28	19	24	724	393	331
Electricity and Natural Gas...	1,939	225	111	80	34	98	1,714	917	797
Electricity and Fuel Oil.....	319	31	11	Q	11	16	288	96	192
Electricity, Natural Gas, and Fuel Oil.....	207	34	20	8	Q	17	174	83	91
Electricity and Propane.....	138	9	Q	Q	Q	Q	129	59	70
Other.....	383	59	27	21	10	30	324	159	166
<b>Percent Heated</b>									
Not Heated.....	440	19	Q	Q	Q	Q	421	183	238
1 to 50.....	517	40	18	18	Q	23	477	241	235
51 to 99.....	564	74	36	16	22	32	490	262	228
100.....	2,427	300	145	107	49	130	2,127	1,075	1,052
<b>Percent Cooled</b>									
Not Cooled.....	1,304	83	31	33	19	37	1,221	554	668
1 to 50.....	1,004	118	56	41	21	54	887	465	422
51 to 99.....	510	84	46	16	22	33	426	227	198
100.....	1,129	149	72	56	20	63	980	514	466

NC=No cases in sample.

Q=Data withheld either because the RSE was greater than 50%, or fewer than 20 buildings were sampled.

\*=Numbers of fewer than 500 buildings are rounded to zero.

Note: Data may not sum to totals due to rounding. See Glossary for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

## Appendix A

### How the Survey Was Conducted



*Primarily residential buildings, as shown here, are the oldest type of commercial building; over 70 percent were constructed before 1946.*

# Appendix A

## How the Survey Was Conducted

### Introduction

The Nonresidential Buildings Energy Consumption Surveys (NBECS) have been designed by the Energy Information Administration (EIA) to provide information concerning building characteristics, conservation practices, and energy consumption within the nonresidential/commercial building stock. Information concerning the building unit was collected through personal interviews in NBECS I (1979) and through telephone interviews in NBECS II (1983), by use of a national probability sample of nonresidential buildings. The NBECS II sample was designed to recontact all buildings in the NBECS I sample, complemented by a sample of new buildings constructed since NBECS I. Data concerning actual energy consumption were obtained from fuel records maintained by the buildings' energy suppliers using the mandatory Form EIA-788C, Nonresidential Building Energy Consumption Survey - Energy Supplier Forms. Westat Inc., a survey research firm, developed the sample design and conducted the interviews under the direction of the EIA, Office of Energy Markets and End Use, Energy End Use Division.

### Sample Design

The NBECS II design consisted of two complementary samples: the multi-stage area probability sample selected in 1979 for the NBECS I building survey and a sample of new buildings drawn from the 1979-to-1982 lists of new construction compiled by the F.W. Dodge Division, McGraw-Hill Information Systems Company.

#### Original Sample

A majority of the sample buildings were selected by use of multi-stage area probability methods. The first-stage sample for NBECS I involved the selection of primary sampling units (PSU's). The approximately 3,100 counties and independent cities of the contiguous United States and the District of Columbia were grouped into about 1,900 PSU's by a procedure similar to the one used by the Census Bureau for its 1970 Current Population Survey. These PSU's consisted of individual counties or groups of counties, including those designated as Standard Metropolitan Statistical Areas (SMSA). The 25 PSU's that had a 1970 population of more than 1.85 million were designated as self-representing; that is, they were chosen with certainty. The remaining nonself-representing PSU's were placed in strata on the basis of metropolitan status, Census region, rate of growth from 1960 to 1970, percentage of black population, and a measure of socioeconomic status. There were 54 PSU's selected from these strata. These nonself-representing PSU's, together with the 25 self-representing PSU's, comprised the first stage sample of 79 PSU's.

Within their respective strata, the nonself-representing PSU's were not given equal probabilities of selection into the sample. Rather, they were selected with probabilities proportionate to sizes of their 1970 populations. Probability proportionate to size (PPS) sampling is commonly used to take advantage of knowledge about the sample units (i.e., their measures of size) in order to improve the reliability of estimates. For quantities which are positively correlated with these measures of size, estimates based on PPS sampling have lower variances than estimates based on equal-probability sampling. The 1970 population of a PSU was considered to be a useful measure of size because of its relationship with commercial activity and energy consumption.

For the second stage of sampling, each PSU was divided into second-stage sampling units corresponding to ZIP Codes or groups of adjacent ZIP Codes. Procedures were designed to handle ZIP Codes that overlapped county boundaries and/or special ZIP Codes that were assigned to large commercial establishments or Government agencies. (In what follows, we use "ZIP group" to refer to a ZIP Code or group of ZIP Codes.) ZIP groups were selected with probabilities proportionate to a measure of size reflecting their commercial activity. Each ZIP group was assigned a measure of size based jointly on summary data from the 1975 County Business Patterns (CBP) and on proprietary commercial data related to office machines. Within each ZIP group, the CBP data were used to derive counts of establishments by 2-digit Standard Industrial Classification (SIC) group, weighted according to employment size. The final measure of size assigned to a ZIP group was an integer equal to the number of segments into which the ZIP group would be divided if drawn into the sample. These segment sizes were assigned in such a way that segments would contain an average of 120 establishments based on the CBP tabulations. After the measures of size were assigned, a sample of about five ZIP groups was selected in each PSU, with probabilities proportionate to the number of segments in each ZIP group, giving a total second-stage sample of 405 ZIP groups.

The sample of third-stage units consisted of approximately 400 segments, usually with one segment selected from each of the sampled ZIP groups. The selection of the segments was made in such a way that 1 percent of all segments in the contiguous United States and the District of Columbia was included in the sample, each having an equal chance of being selected. In ZIP groups with measures of size six or more, the segments were geographically compact areas. It was feasible to define and sample area segments within these selected ZIP groups on the basis of previous completed field work. For ZIP groups with smaller measures of size (i.e., segments), it was less costly to bypass defining segments and directly list all buildings across the entire ZIP group. A count of potential segments would then still be available as a measure of size for these ZIP groups.

The fourth stage of sampling consisted of the selection of nonresidential buildings (excluding farm buildings). Buildings were selected from the sampled segment within ZIP groups of six or more segments. For smaller ZIP groups, buildings were selected from the list representing the entire ZIP group, but at a lower rate since these ZIP groups represented more than one potential segment. With a few exceptions, a nonresidential building was defined as a structure that was totally enclosed by walls, that extended from the foundation to the roof, and housed some type of nonresidential activity (see the "Glossary" for a complete definition of Nonresidential Building). The initial step in the fourth stage selection process was to conduct a field canvass to identify and list the addresses of all eligible nonresidential buildings within each sampled segment or ZIP group. As part of the listing procedure, the lister recorded very general preliminary descriptive information related to energy usage in a building, based on observation rather than inquiry. The information included the estimated square footage and apparent principal use. This information was used to categorize buildings for subsampling. About 75,000 buildings were listed from which approximately 5,800 buildings were selected for a personal interview. Subsampling fractions from the 1-percent sample of segments ranged from 1 in 1 for buildings of 50,000 or more square feet as assigned by the lister, to 1 in 20 for certain types of small buildings (less than 10,000 square feet). Thus, the

fourth stage consisted of placing buildings into different strata according to their square footage and general usage, then using equal probability sampling within these strata. Strata containing large buildings were sampled more intensely than strata of small buildings. Although not technically PPS sampling, this stratified sampling used a measure of size (square footage) in a different way to increase reliability of estimates.

Because of the measures of size used at various stages in the sample design, probabilities of selection were higher for larger commercial activities and building sizes. Thus, the sample design was more efficient for estimates of square footage and energy consumption (which is correlated with square footage) and relatively less efficient for estimates of counts of buildings in different categories.

To ensure adequate coverage of buildings which were significant energy users, the area probability sample of buildings within each PSU was supplemented by a sample from a list of "large" buildings. "Large" buildings were defined as: (1) those buildings with 250,000 or more square feet of enclosed floorspace in PSU's that are SMSA's and (2) buildings of 100,000 square feet or more in the remaining PSU's. The list of large buildings was compiled from existing lists of schools, hospitals, and Government-owned buildings, and also through inquiries with chambers of commerce and other local sources. Some of the large buildings listed were clusters of buildings, such as a university campus. About 3,200 buildings (or building clusters) were included on the Large Buildings List, and approximately 1,200 of them were included in the sample with probabilities of selection dependent on their sizes. In those cases in which the selected unit consisted of a cluster of buildings, the individual buildings were listed and subsampled. Large buildings sampled from the area sample list were checked against the Large Buildings List to identify duplicates and assign them appropriate selection probabilities.

A total of 549 sampled buildings were out-of-scope and, therefore, ineligible for interview. There were several reasons why buildings were designated as being ineligible for interview. Duplication occurred when a building was selected into both the area and large building samples. In these cases, adjustments were made to represent the building once.

Incorrect and multiple building listings were either deleted from the sample or subsampled.<sup>1</sup> Structures which were demolished or which failed to meet the definition of a nonresidential building were deleted from the sample. Also deleted were buildings sampled from the Large Buildings List, but whose size did not meet the definition of "large." Finally, any buildings which had had additions made to them since NBECS I were deleted from the original sample and

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<sup>1</sup>Buildings covered by the area-sampling were listed by observation. Therefore, it was not possible to determine the exact scope of a building until the interviewing phase, when contact was made with a building owner/manager. The list of large buildings was obtained through telephone contacts and what was reported over the telephone to be one building frequently turned out to be a group of buildings.

were considered eligible for coverage under the complementary sample of new buildings if (1) the addition was at least 10,000 square feet, and (2) the addition at least doubled the size of the building.

## New Buildings Sample

The sample drawn by NBECS I in 1979 is referred to as the "original sample." For NBECS II, the original sample within each selected PSU was updated by selecting a stratified random sample of new construction records from the 1979-to-1982 data files of the F.W. Dodge Division, McGraw-Hill Information Systems Company. This sample of new construction is referred to the "new buildings sample." Thus, the NBECS II sample involved recontacted buildings from the original sample, complemented by a new buildings sample.

Each Dodge file contained construction-project-specific information (see "Glossary" for the definition of project) on total square footage of the project, value of the project, month and year of construction start-up, type of structure, and whether the project was new construction, or an alteration or addition to an existing structure. Sampling from Dodge lists was performed within the PSU's selected for the original sample. The samples were drawn separately by the year of the Dodge file and at varying rates, depending on the project square footage and type of structure. The overall sampling fractions employed for the selection of the new buildings sample were approximately twice as large as the rates used to select the original 1979 building sample and ranged from 1 in 600 for buildings with less than 5,000 square feet to 1 in 1 for buildings exceeding 1 million square feet. This resulted in a sample of new construction that was approximately twice as large as would have been obtained had the 1979 sampling rates been used. New construction was oversampled to allow separate analysis of this building cohort.

Apartment buildings with five or more dwelling units comprised a special class of buildings, which were sampled separately from other building types. Apartment buildings were considered in-scope if part of the building was used for nonresidential purposes, but information on such use was not available in the Dodge file. With minor exceptions, these buildings were expected to be used solely for residential purposes and, therefore, were sampled at one-eighth the rates used for the other Dodge construction. If those selected for the sample were later found through telephone screening to have some commercial activity in the building (e.g., retail or service establishments), they were considered within the scope of the study and were administered the indepth interview. This treatment of residential buildings in NBECS II was consistent with the definition of in-scope residential buildings used in the 1979 NBECS I survey.

Prior to conducting the indepth telephone surveys, a subsample of project listings, coded by Dodge as being (1) nonbuildings, (2) alterations, or (3) additions, was reviewed to determine whether the project from these categories could be omitted from the sample process without further screening to verify eligibility. Out of this review, records coded as nonbuildings were found to be structures such as bridges, highways, sewer treatment facilities, and similar

out-of-scope structures. Thus, all records coded as nonbuildings were deleted from the sample without further screening. Alterations were also deleted from the sample since in none of the cases examined did the alterations involve a conversion of residential space to nonresidential space, although this possibility might still exist in the complete F.W. Dodge lists. The effect of omitting such conversions from the survey was trivial. Finally, additions were screened to determine whether an addition was more than 10,000 square feet and, if so, whether the addition had more than doubled the original size of the building. The purpose of this determination was to assign a probability of selection more closely reflecting the current size of the building, rather than the original size. Since additions of less than 10,000 square feet would have little effect on the probability of selection, these were deleted from the new buildings sample, and the buildings receiving these additions were considered to have had their chance for selection under the original sample. On the other hand, buildings with additions exceeding 10,000 square feet and which had more than doubled their original size were retained in the new buildings sample. These buildings were assigned probabilities of selection reflecting the size of the additions.

Application of the sampling rates yielded a total sample of 2,429 project records: 688 project records for 1979; 617 for 1980; 683 for 1981; and 441 for 1982. The sample for 1982 excluded new construction that was started after November 1982, since the listings were not available at the time of sampling. These rates exclude nonbuildings and alterations.

During the initial screening, it was determined that of the 2,429 sample project records, 1,461 contained at least one building that might be eligible, 850 did not contain an eligible building, and 118 were records for which eligibility could not be determined. Of these 118 records, 104 were records for which it was not possible to contact the building because F.W. Dodge could not supply any information about the project (Table A1). Because a project could contain more than one building, the 1,461 eligible projects represented 1,706 eligible buildings.

**Table A1. Number and Percent Distribution of Dodge Project Records by Eligibility Status as Determined During Initial Screening**

<u>Eligibility</u>	<u>Number</u>	<u>Percent of All Records</u>
Total Records .....	2,429	100.0
Not Eligible for Interview .....	850	35.0
Possibly Eligible for Interview .....	1,461	60.1
Eligibility Not Determined .....	118	4.9

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

A special screening operation was used to deal with the possible overlap between the original sample buildings constructed in 1979 and that portion of the new buildings sample drawn from the 1979 Dodge list. The goal was to identify those buildings for which construction began in 1979, but was not completed in time to have been covered by the original sample. A building was likely to have been field-listed for NBECS I if construction was at least 25 to 50 percent complete. The larger the building, the more time that was required for completion. Using this information and data from the Bureau of the Census's Construction Reports, a rule was developed for assigning buildings to either the original sample frame or the new building sample frame. This approximate "bounding" rule took into account the square footage of the building and the approximate construction start-up date. For example, buildings of less than 10,000 square feet selected from the 1979 Dodge file were retained in the new building sample only if the start-up date was July 1979 or later. On the other hand, all buildings with more than 1 million square feet were retained in the new building sample if the building had been started any time during 1979, because there was little chance that these buildings could have been sufficiently completed for inclusion in the original sample.

## Data Collection

The total NBECS II sample consisted of 8,479 buildings--6,773 from the original sample, complemented by 1,706 from the new buildings sample. Of these, 8,018 buildings were eligible to be interviewed--6,561 from the original sample and 1,457 from the new buildings sample (Table A2).

**Table A2. Number and Percent Distribution of NBECS II Sample Buildings by Building Disposition**

<u>Building Disposition</u>	<u>Number of Buildings</u>	<u>Percent of all Buildings</u>	<u>Percent of Eligible Buildings</u>	<u>Percent of Interviewed Buildings</u>
<u>Total Sample</u>				
Total .....	8,479	100.0	--	--
Not Eligible for Interview ...	461	5.4	--	--
Eligible for Interview .....	8,018	94.6	100.0	--
Interviewed .....	7,140	--	89.1	100.0
With Waiver .....	6,420	--	--	89.9
Waiver Not Required <sup>a</sup> .....	130	--	--	1.8
Without Waiver .....	590	--	--	8.3
Not Interviewed .....	878	--	10.9	--
<u>Original Sample</u>				
Total .....	6,773	100.0	--	--
Not Eligible for Interview ....	212	3.1	--	--
Eligible for Interview .....	6,561	96.9	100.0	--
Interviewed .....	5,845	--	89.2	100.0
With Waiver .....	5,278	--	--	90.3
Waiver Not Required <sup>a</sup> .....	117	--	--	2.0
Without Waiver .....	450	--	--	7.7
Not Interviewed .....	716	--	10.8	--
<u>New Buildings Sample</u>				
Total .....	1,706	100.0	--	--
Not Eligible for Interview ....	249	14.6	--	--
Eligible for Interview .....	1,457	85.4	100.0	--

See footnotes at end of table.

**Table A2. Number and Percent Distribution of NBECS II Sample Buildings by Building Disposition (Continued)**

Building Disposition	Number of Buildings	Percent of all Buildings	Percent of Eligible Buildings	Percent of Interviewed Buildings
Interviewed .....	1,295	--	88.9	100.0
With Waiver .....	1,142	--	--	88.2
Waiver Not Required <sup>a</sup> .....	13	--	--	1.0
Without Waiver .....	140	--	--	10.8
Not Interviewed .....	162	--	11.1	--

<sup>a</sup>Buildings without energy.

"--" = Data not applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## The Interview

The building interviews were conducted between March and August 1983. Initial contacts with the building owners and managers were made through a letter signed by the EIA Administrator. The letter introduced the survey contractor, stressed the importance of cooperation, and assured the confidentiality of responses. The interviews were conducted by means of the survey contractor's Computer Assisted Telephone Interviewing (CATI) system. With the respondent on the phone, the CATI system led the interviewer through the questionnaire, automatically following the correct skip patterns and recording the responses on computer files. For the buildings that had been in the original sample, certain information from the previous survey was coded into the program so that changes in the building could be verified. For instance, if the building respondent provided a square footage response that was significantly different from the 1979 response, the computer program provided a prompting which queried the respondent as to whether any alterations or renovations had occurred that led to this change. If not, a series of questions was asked to determine if the correct building had in fact been contacted. Although the CATI procedure reduced initial coding and editing time by reducing interviewer skip errors, it was still necessary to call back respondents. Some call backs were necessary when a respondent did not know the answer to certain crucial items, such as square footage. Other call backs were necessitated by problems with the CATI system itself: it was a new system and there were programming problems that became apparent only during the review of the final tape. Some of these errors resulted in buildings being recontacted and reinterviewed.

Respondents were asked about the building as a whole rather than individual establishments located within the building. The interviews covered structural and operational building features; types of heating, cooling, and ventilation systems; fuels used for various purposes; conservation practices; and a description of the activities found in the building. Respondents in buildings from the original sample were asked about changes that had occurred to these features since the 1979 interview. At the conclusion of the interview, respondents in both samples were asked to whom a waiver should be sent to authorize the survey contractor to obtain fuel consumption records from the building's fuel suppliers.

The average CATI interview lasted 27 minutes for the original sample and 34 minutes for the new buildings sample. By comparison, the in-person interviews for the 1979 NBECS I averaged 45 minutes. A machine edit check of CATI data files was made for reasonableness of responses, proper skip patterns, and logical inconsistencies in response patterns. Certain items in the building questionnaire, such as size, building activity, and the names and addresses of fuel suppliers were designated as being crucial. If any of the key items were missing or in need of verification, a call back was made to obtain this information and, at the same time, any other missing data.

## **The Interviewers**

Interviews were conducted by telephone with building owners/managers. Approximately 25 interviewers worked regularly throughout the data collection period. They were trained at one of four, three-day training sessions. Interviewers were provided instruction in the operation of the CATI system and interviewing techniques. A variety of training techniques were used. Training materials included: an annotated manual; interactive lectures; role-playing exercises; audio-visual presentations of the interview techniques; and slides relating specific building types to the questionnaire.

## **Minimizing Nonresponse**

Extensive efforts were made to minimize nonresponse in both the building survey and the collection of fuel supply waivers. This section describes the procedures used to ensure adequate levels of response.

Prior to conducting the telephone interview, it was necessary to have available correct telephone numbers for all eligible buildings. Telephone numbers were available for most building respondents interviewed in the original sample. However, telephone numbers were unavailable for 1,265 original sample buildings as a result of demolition, vacancy, relocation of establishment, incorrect or nonexistent listing, etc. In addition, telephone numbers had not yet been compiled for nonrespondents from the original sample or for the entire new buildings sample.

To obtain telephone numbers, the survey contractor used directory assistance, criss-cross directories (listings by address), 1979 listing sheets for telephone numbers of neighboring buildings, calls to regulatory agencies, post offices,

fire departments, and tax assessor offices. Field agents made site visits to the addresses of the unlocatable buildings. Telephone numbers for the new buildings sample were obtained by contacting the contractors, architects, or building owners recorded on the Dodge project records. Overall, only 2 percent of the total eligible buildings were not interviewed because of inability to locate them.

Potential respondents for approximately 900 buildings initially refused to be interviewed or were not available during the initial interviewing phase. In July and August 1983, a nonresponse conversion effort was undertaken to minimize the nonresponse. The nonresponse conversion effort resulted in a 33 percent conversion rate. Characteristics of nonrespondent buildings appear in Appendix B, "Data Quality."

The waiver survey was designed to obtain legal authorization from building respondents to collect energy consumption and expenditures data from their energy suppliers. A two-phase effort was used to minimize nonresponse to the waiver survey. Within at least 1 week (but usually 1 day) of the conclusion of the building survey, a waiver request package was mailed to the person identified during the CATI interview. The waiver request package included: an unsigned waiver authorization form; a pamphlet entitled "Highlights from the (1979) Nonresidential Buildings Energy Consumption Survey"; an introductory letter from the EIA Administrator; and a cover letter from the survey contractor. If the signed waiver was not received within 2 weeks, a followup telephone call was made to determine if the waiver request package had been received.

If necessary, a second waiver request was mailed within 1 week (but usually 1 day) of the followup telephone call. This package was identical to the first and, in addition, for the original sample, a "special table" was promised if the signed waiver authorization form was returned. The table compared the building's 1979 energy consumption with other buildings in the same Census region. A total of 4,947 signed waivers were received as a result of using these methods, and there was a mail response rate of 71 percent.

In October 1983, field agents were sent to buildings from which a signed waiver had not been received in an attempt to obtain a signed waiver. This effort resulted in obtaining 1,473 additional signed waivers and boosted the overall NBECS II waiver response rate to 92 percent. Percentages of waivers returned are given in Table A2 for the original and new buildings samples. Table A3 illustrates the relative effectiveness of the mail and field visit efforts to obtain waivers. When signed waivers were received, a letter was mailed thanking participants for their cooperation.

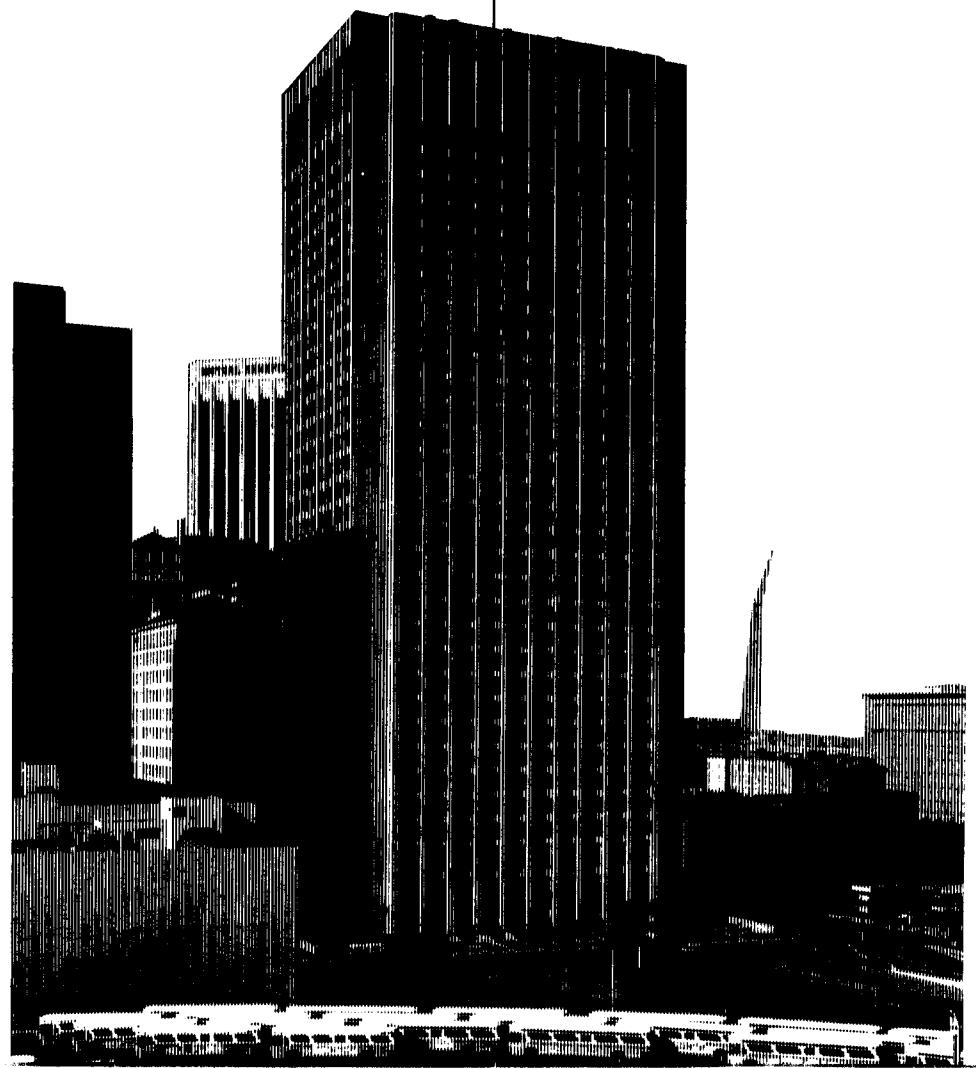
**Table A3. Response to Request for Waivers Authorizing Collection of Energy Consumption and Expenditure Data from Building Energy Suppliers**

<u>Request for Waivers</u>	<u>Number of Sample Buildings</u>	<u>Percent of Total Eligible</u>
Total Eligible for Waiver Survey .....	7,010	100
Total Signed Waivers .....	6,420	92
Obtained by Mail .....	4,947	71
Obtained by Field .....	1,473	21
Total Waivers Not Signed ....	590	8
Refused by Mail .....	235	3
Refused by Field .....	159	2
Returned from Field Without Signature .....	196	3

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

## **Appendix B**

### Data Quality



*Three percent of all commercial buildings were demolished between late-1979 and mid-1983.*



## **Appendix B**

# **Data Quality**

### **Introduction**

Survey estimates derived from the 1983 Nonresidential Buildings Energy Consumption Survey (NBECS II) are subject to sampling error and nonsampling biases.

Sampling Error is random variability resulting from surveying a sample of buildings rather than the entire building stock. That is, if the survey were to be conducted repeatedly in a given year, different statistics would result from each survey since different buildings would be sampled in each survey. Because probability sampling was used for NBECS II, estimates of sampling error could be computed for survey statistics, given the single sample of buildings. These estimates were computed by use of a balanced half-sample replication procedure described later in this appendix.

Nonsampling Errors are measures of variability in survey data resulting from the conduct of the survey. The major types of nonsampling error include respondent and/or interviewer errors, coding/keypunching errors, noncoverage, nonresponse bias and systematic respondent errors. A bias is a nonrandom type of error; that is, if a survey were to be conducted repeatedly, a biased survey statistic would, on the average, be either too low or too high. Appendix A, "How the Survey Was Conducted," details how the survey was designed and conducted to minimize all forms of nonsampling error. Interviewer and coding/keypunching errors were minimized through careful wording and format of the questionnaire, careful selection and training of interviewers, and quality control built into the data collection and data processing operations.

### **Nonresponse Bias**

There are two major types of nonresponse bias: unit nonresponse, and item nonresponse. A unit nonresponse is defined as any eligible sample building for which no information was obtained. This was due mostly to a refusal to cooperate or to the unavailability of a building representative. Item nonresponse refers to a building representative's inability to answer specific questionnaire items, usually due to a lack of knowledge. The next two sections describe these types of nonresponse and how they were handled.

### **Unit Nonresponse**

In both the original and new buildings samples, approximately 11 percent of eligible buildings were unit nonrespondents (Table B1). This rate was slightly higher than the 8 percent nonresponse rate experienced in the 1979 NBECS I. This increase may have been the result of the collection of data by telephone in NBECS II rather than by personal interview as in 1979. However, the NBECS II nonresponse rate is still low relative to many surveys of this nature. Buildings which were nonrespondents in NBECS I were 5 times more likely to be nonrespondents (as opposed to respondents) in NBECS II.

Table B1 contains nonresponse rates associated with various categories of buildings from each of the original and new buildings samples, although it should be kept in mind that new buildings nonresponse rates are based on small numbers of buildings. Nonresponse was highest in the Northeast Census region of the original sample and in the Northeast and South Census regions of the new buildings sample. Large metropolitan areas tended to have higher nonresponse rates than other areas for the original sample, but not for the new buildings sample. Among original sample buildings, nonresponse was highest for mercantile/personal service type buildings and open space types, such as warehouse, assembly, and vacant buildings. A similar, but less pronounced, pattern of nonresponse rates occurred in the new buildings sample. Nonresponse was highest in the smallest square footage category for the original buildings sample, although no distinct relationship between nonresponse and size was evident for larger size categories.

The highest nonresponse rate occurred in the largest size category of the new buildings sample.

Unit nonresponse bias in the survey statistics was reduced by the method of weight adjustment. The NBECS II sample was designed so that survey responses could be used to estimate characteristics of the entire nonresidential buildings stock in the contiguous United States and the District of Columbia. This was accomplished by calculating basic sampling weights (base weights) that relate the sampled buildings to the entire nonresidential buildings stock. Statistically, a base weight is the reciprocal of the probability of a building being selected into the sample. This is equivalent to saying that a base weight is the number of actual buildings represented by a sampled building. Thus, a building with a base weight of 1,000 means that the sampled building represents itself and 999 similar, but unsampled, buildings in the total building stock. To reduce unit nonresponse bias in the survey statistics, an upward adjustment of respondent building base weights was performed so that the respondent buildings also represented nonrespondent buildings in addition to unsampled buildings. Respondent building base weights were multiplied by the adjustment factor "A," defined as follows:

$$A = \frac{W}{R}$$

where W is the sum of the base weights over all eligible buildings and R is the corresponding sum over all respondent buildings.

As illustrated in Table B1, nonrespondents tended to fall into certain categories. Thus, to reduce nonresponse bias to the extent possible, adjustment factors were computed independently within subgroups created by sorting according to the building characteristics in Table B1. Additional, but less important, sorting characteristics were heating fuels used, heating and cooling degree-day categories, age of building, number of workers, and percentage of floorspace heated and cooled. The more characteristics used when sorting, the more detailed the subgroups and the lower the nonresponse bias. However, this sorting also resulted in higher weight adjustment factors, which tended to increase survey statistic standard errors. The weight adjustment factors were calculated by using as many sorting characteristics as possible while still resulting in an

**Table B1. Building Survey Response and Nonresponse Rates of the Original and New Buildings Samples by Region, Building Location, Building Type, and Building Size (Percent of Eligible Buildings)**

Characteristic	Response Rates		Nonresponse Rate							
	Original Sample	New Buildings Sample	Original Sample			New Buildings Sample				
			Refuse	Unable to Contact/ Locate	Other	Total Non-response	Refuse	Unable to Contact/ Locate		
Total .....	89.1	88.9	7.1	2.2	1.6	10.9	10.1	—	1.0	11.1
<b>Census Region</b>										
Northeast .....	86.9	87.7	7.9	2.9	2.3	13.1	11.8	—	0.5	12.3
North Central .....	88.7	92.4	7.7	2.0	1.6	11.3	6.7	—	0.9	7.6
South .....	90.0	87.5	6.8	2.1	1.1	10.0	11.0	—	1.5	12.5
West .....	91.4	88.5	4.7	1.9	2.0	8.6	10.9	—	0.6	11.5
<b>Location Type</b>										
SMSA Certainty .....	84.7	87.3	9.3	3.3	2.8	15.3	11.9	—	0.8	12.7
SMSA Noncertainty .....	91.2	89.8	6.0	1.3	1.5	8.8	9.0	—	1.2	10.2
Non-SMSA .....	90.8	88.4	6.2	2.2	0.8	9.2	10.5	—	1.1	11.6
<b>Building Type<sup>a</sup></b>										
Retail/Personal										
Services .....	86.4	89.0	9.3	2.1	2.2	13.6	10.5	—	0.5	11.0
Open Space .....	86.8	87.7	8.0	3.5	1.8	13.2	11.0	—	1.3	12.3
Office .....	92.2	89.1	6.0	0.9	0.9	7.8	10.6	—	0.3	10.9
Other .....	91.9	91.6	5.1	1.4	1.6	8.1	6.3	—	2.1	8.4
<b>Building Size<sup>b</sup></b>										
Less than 10,000 .....	86.2	91.0	7.5	4.0	2.4	13.8	7.3	—	1.7	9.0
10,000 - 24,999 .....	90.2	93.4	6.3	1.9	1.6	9.8	6.0	—	0.7	6.7
25,000 - 49,999 .....	90.4	90.4	6.5	1.2	1.9	9.6	9.0	—	0.6	9.6
50,000 - 99,999 .....	89.1	85.1	7.7	1.5	1.7	10.9	13.5	—	1.4	14.9
100,000 - 249,999 .....	89.2	88.6	9.9	0.9	0.0	10.8	10.5	—	0.9	11.4
250,000 - 499,999 .....	94.2	87.6	5.2	0.2	0.2	5.8	11.2	—	1.2	12.4
500,000 - 999,999 .....	94.4	92.8	4.7	0.0	0.9	5.6	6.2	—	1.0	7.2
1,000,000 and over .....	88.2	82.6	9.9	0.7	1.3	11.8	17.4	—	0.0	17.4

<sup>a</sup>Based on lister observation for the original sample and Dodge records for the new buildings sample. (See Appendix C for definitions of the building types.)

<sup>b</sup>The first five categories represent lister estimates of total square footage for buildings selected in the area sample portion of the original sample; the remaining categories were used for the list sample portion of the original sample. For the new buildings, sample size was estimated from total project value using \$50 per square foot as the conversion factor.

"—" = Data not applicable. Data may not sum to totals due to independent rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1983 Nonresidential Buildings Energy Consumption Survey.

adjustment factor smaller than some arbitrarily chosen value. The preliminary analyses of different sets of adjusted weights indicate that the relative standard errors of estimates show no increase across a range of maximum allowable adjustment factors ranging from two to four. Therefore, adjustment factors as high as four were allowed to permit the use of more detailed weight adjustment subgroups. Even with such a high allowable adjustment factor, only 2 percent of the adjustment factors calculated in this manner were higher than two. Individual weight adjustment subgroups varied in the number of sorting characteristics that could be employed and depended upon the point at which the constraint came into play for those individual subgroups.

Respondent weights remained nonzero after weight adjustment, whereas nonrespondent weights were set to zero because they were accounted for by the upward adjustment of respondent weights. Because the original buildings sample and the new buildings sample represented nonoverlapping portions of the total nonresidential buildings stock, weight adjustments for unit nonresponse were performed on each sample separately, as described below.

## **Unit Nonresponse Adjustments for the Original Buildings Sample**

The weight adjustment procedure for the original buildings sample was designed to produce two final weights for each respondent building. The first set, called cross-sectional weights, was used to derive estimates of characteristics of the 1983 nonresidential buildings stock from the NBECS II original buildings sample.

The second set of weights, the longitudinal weights, allowed buildings that were respondents in both 1979 and 1983 to be used to estimate changes that occurred in that part of the 1983 building stock that was in scope in 1979. Only buildings that responded to the survey in both 1979 and 1983 had a longitudinal weight greater than zero. All other buildings from the original buildings sample had a longitudinal weight of zero.

Prior to the cross-sectional and longitudinal weight adjustments, unit nonrespondents in 1983 were adjusted for out-of-scope cases among the respondents. This adjustment corrected the base weights of unit nonrespondents for any out-of-scope buildings they might represent and allowed estimation of how much of the 1979 nonresidential buildings stock had been removed from that stock by mid-1983.

## **Unit Nonresponse Adjustments to the New Buildings Sample**

Weight adjustment for unit nonresponse for the new buildings sample required only cross-sectional weights, because the sample consisted of buildings constructed after the 1979 survey (i.e., longitudinal weights did not apply). Weight adjustment cells for these buildings were defined by Census region, building square footage category, and building use category. This weight adjustment procedure was performed by Westat Inc., the survey research firm that administered the survey.

The cross-sectional weights in the new buildings sample and the cross-sectional weights in the original buildings sample were used to estimate characteristics of the total 1983 nonresidential building stock as of mid-1983.

## **Item Nonresponse**

Nonresponses to several items in otherwise completed questionnaires were treated by a technique known as "hot-deck imputation." Hot-decking consisted of assigning to the item nonresponse the same value for the missing item that was recorded for an appropriate "donor" building. Only buildings which were similar to the nonrespondent in characteristics correlated with the missing item could serve as donors to that nonrespondent. The characteristics used to define "similar" buildings depended on the item to be imputed. The most frequently used characteristics included building type, square footage category, year built category, and Census region. Other characteristics, such as type of heating fuel and presence of furnace or boilers, were used for specific items. The procedures used for NBECS II were identical to, or modifications of, the item imputation procedures used for the 1979 NBECS.

Three sets of imputation procedures were required to adjust NBECS II building characteristics for item nonresponse: the first, for double respondent buildings in the original sample, the second, for original sample buildings that responded only in 1983, and the third, for buildings in the new buildings sample. Three separate imputation procedures were developed because different information was available for matching nonrespondents with appropriate donors in each of these three groups of buildings.

### **1. Item Imputation Procedures for Original Sample Buildings Responding in Both 1979 and 1983**

Hot-decking was used to impute for missing items among the double respondent buildings in 1983. These hot-decking procedures incorporated NBECS I information from 1979, using as donors those buildings that were similar to the nonrespondent buildings and for which both donor and nonrespondent had the same 1979 value for the missing item.

### **2. Item Imputation Procedures for Original Sample Buildings Responding Only in 1983**

Hot-deck item imputation procedures used for original sample buildings that responded only in 1983 identical to the procedures used for hot-decking in 1979 and are described in NBECS I reports. (See References 1 and 2.)

### **3. Item Imputation Procedures for the New Buildings Sample**

Hot-deck item imputation procedures used for these buildings are very similar to the procedures used for hot-decking in 1979. However, these procedures were modified to utilize the information from the Dodge construction project slips and for categorizing donor and recipient buildings. The changes involved using Dodge construction slip information to develop the imputation cells for the hot-deck imputation for the number of floors and square footage. Table B2 contains the item nonresponse percentages for building characteristics used in this report.

**Table B2. Item Nonresponse Frequencies for Interviewed Buildings by Selected Building Characteristics**

Building Characteristics	Overall		By Sample		
	Frequency	Percent	The Original Sample		The New Buildings Sample
			Interviewed in 1979 and in 1983	Interviewed Only in 1983	Interviewed Only in 1983
Total Number of Cases	7140		5563	282	1295
*Square footage .....	842	11.8	776	30	36
*Number of workers .....	765	10.7	566	32	267
Insulation in roof or ceiling .....	379	5.3	327	16	36
*Utility audit available .....	364	5.1	238	15	111
*Total fuel oil tank capacity <sup>a</sup> .....	239	3.4	118	11	110
*Year built category .....	231	3.2	160	65	6
*Energy audit by a professional auditor .....	209	2.9	128	13	68
Building heat decreased in off hours .....	182	2.6	107	4	71
Conservation glass .....	174	2.4	105	5	64
*Number of fuel oil tanks .....	145	2.0	37	7	101
Building cooling decreased in off hours .....	142	2.0	83	2	57
*Hours of building operation (overall) <sup>b</sup> .....	130	1.8	105	5	20
Conservation response to audit .....	106	1.5	81	4	21
Building heating and cooling decreased in the vacant portion .....	87	1.2	56	3	65
Added weatherstripping or caulking since 1/1/80 .....	85	1.2	62	8	15
*Number of workers category .....	84	1.2	56	3	25
*Type of professional auditor used .....	70	1.0	54	4	12
Added roof insulation since 1/1/80 .....	70	1.0	50	11	9
*Number of boilers .....	67	.9	48	6	13
Employee control of heating temperature .....	66	.9	43	1	22
Added wall insulation since 1/1/80 .....	50	.7	31	9	10
Added conservation glass since 1/1/80 .....	43	.6	36	1	6
*Number of occupants .....	41	.6	34	1	6
Employee control of air-conditioning temperature .....	38	.5	23	0	15
*Boilers present .....	36	.5	26	2	8
*Percent glass .....	35	.5	16	0	19
*Local Government occupied .....	32	.4	20	3	9
*State Government occupied .....	27	.4	17	2	8
*Federal Government occupied .....	25	.4	15	1	9
Part of the building vacant for more than 3 months last year .....	23	.3	13	2	8
*Government owned .....	22	.3	13	0	9

See footnotes at end of table.

**Table B2. Item Nonresponse Frequencies for Interviewed Buildings by Selected Building Characteristics (Continued)**

Building Characteristics	Overall		By Sample		
	Frequency	Percent	The Original Sample		The New Buildings
			Interviewed in 1979 and in 1983	Interviewed Only in 1983	Sample Interviewed Only in 1983
*Number of floors .....	16	.2	14	1	1
Fuel oil fires boilers .....	15	.2	13	1	1
Other fuel fires boilers .....	14	.2	12	1	1
Natural gas fires boilers .....	14	.2	12	1	1
*Percent heated .....	9	.1	3	1	5
*Percent cooled .....	9	.1	5	0	4
*Square footage category .....	8	.1	2	4	2
Fuel oil/kerosene brought into building .....	8	.1	8	0	0
*New boilers present since 1/1/80 .....	7	.1	7	—	—
*Number of boilers since 1/1/80 .....	7	.1	7	—	—
All other fuels brought into building <sup>c</sup> .....	—	.1	—	—	—
Natural Gas brought into building .....	3	0.0	3	0	0
Fuel oil fires new boilers .....	1	0.0	1	0	0
Natural gas fires new boilers .....	0	0.0	0	0	0
Other fuel fires new boilers .....	0	0.0	0	0	0
Electricity brought into building .....	0	0.0	0	0	0

\* Item imputations were performed for these variables.

<sup>a</sup> Item imputation rates for tank capacity are the frequencies of sampled buildings that did not respond to this question for at least one kerosene or fuel oil tank.

<sup>b</sup> Overall item imputation rates for building hours are the frequencies of sampled buildings that did not respond to this question for at least 1 day of the week.

<sup>c</sup> Percentages of item imputation are the same for purchased steam, purchased chilled water, coal, propane, purchased hot water, wood, solar, and other fuels; therefore, the rate has been listed only once.

-- = Not Applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, The 1983 Nonresidential Buildings Energy Consumption Survey.

## Noncoverage Bias

Sampling frame incompleteness or noncoverage is also a potential source of bias. The F. W. Dodge construction files did not compile records for construction of buildings costing less than \$25,000. This will affect estimates for very small buildings (i.e., 5,000 square feet or less). The low percentage of small buildings of 1980 to 1983 vintage apparent in Tables 1 through 39 may be, in part, the result of a true size trend in the construction of commercial buildings and/or an underestimate of buildings costing less than \$25,000 to construct. At this time, it is not clear what the reason is for the small building count.

## Computation of Sampling Errors

One component of total survey error that can be estimated is sampling error or variance. However, NBECS is a list-supplemented, multi-stage area sample design of such complexity that it is virtually impossible to construct an exact algebraic expression for estimating variance. The method used to estimate sampling variances for this survey was balanced half-sample replication (see References 3 and 4). This is a numerical method which involves the pairing of primary sampling units (PSU's),<sup>1</sup> together in strata so that differences between the members of each pair can be used to build an estimate of sampling variance. The 79 PSU's were grouped into 37 strata. Nineteen of these strata consisted of nonself-representing PSU's belonging to the same Census regions, with one or more PSU's comprising each member of a pair. The remaining 18 strata were each comprised of one or more self-representing PSU's; that is, they consisted of large metropolitan areas that came into the sample with certainty. In each of the latter strata, all of the PSU's were treated as a composite "PSU," while the segments within the composite "PSU" were segregated into two groups representing the two members of a pair.

Half-sample replication involved the repeated drawing of pair members from the 37 strata. Each replication is called a "half-sample" because only one member of the pair within each of the 37 strata is selected. The sampling weights of buildings in any selected member are adjusted upward so that they represent not only themselves but all buildings in the stratum. In this way, each half-sample can produce unbiased survey statistics based on roughly one-half of the data. Using different combinations of members from the 37 pairs, a total of over 137 billion unique half-samples are possible. Although desirable for good variance estimation, a large number of half-samples would be computationally infeasible. However, by the method of balanced half-sample replication (Reference 3), each half-sample is constructed by using an orthogonal matrix adapted from Plackett and Burman (Reference 5) to control the selection of pair members from strata. Balancing allows a small number of half-samples (approximately equal to the number of strata) to produce estimates of variance which are identical to estimates based on all possible unique half-samples for linear survey statistics. Thus, for NBECS, 40 balanced half-samples were used in variance estimation.

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<sup>1</sup>See Appendix A, "How the Survey was Conducted."

The variance estimate for the survey estimate  $X'$  of characteristic X is given by:

$$S_{X'}^2 = 1 / 40 \sum_{i=1}^{40} (X'_{i1} - X')^2$$

where  $X'_{i1}$  is the  $i^{th}$  half-sample estimate of X. The standard error of  $X'$  is given by:

$$S_{X'} = \sqrt{S_{X'}^2}$$

The relative standard error percent of  $X'$  is given by:

$$RSE(X') = \frac{S_{X'}}{X'} \times 100$$

The RSE's for Tables 1 through 39, percentages for Tables 1 through 39, and RSE's for the percentages can be found in Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983: A Supplemental Reference (DOE/EIA-M008), available from National Technical Information Service, 5285 Port Royal Road, Virginia 22161 (Telephone: 703-487-4650).

## Generalized Variance Equations

A general relationship exists between estimated number of buildings, total square footage, or total number of workers, and the RSE's of the estimates: RSE's tend to decrease as the size of the estimates increase. Given an estimate, this relationship provides an opportunity to approximate its corresponding RSE. Functional relationships between estimates in Tables 1 through 39 and their corresponding RSE's were derived by linear regression. The resulting equations can be used to compute the RSE's for various estimates from Tables 1 through 39.

The estimated relative standard errors of statistics that give the aggregate number of buildings, square footage, or number of workers can be computed using the equations shown on page 155. Equations 1, 3, 4, 5 and 6 were obtained using a least squares regression analysis. Equation 2 was obtained using a least absolute value regression. The RSE's used as dependent variables in the regression procedures were obtained using the half-sample variance estimating procedure discussed in the previous section on computations of sampling errors.

Confidence intervals given with the survey statistics in the text of this report were computed individually using Balanced Repeated Replication rather than generalized variance equations. Generalized variance equations provide a convenient approximation of RSE's and are presented here for use with estimates from Tables 1 through 39 and derived statistics.

## Equations

1. All tables except Table 8, Table 10, and row items for Census region or climate zone in other tables.

a. Building counts:

$$\log_{10}(RSE) = 1.679 - .261 \times \log_{10}(COUNT). \quad (1)$$

b. Aggregate square footage:

$$\log_{10}(RSE) = 1.765 - .116 \times \log_{10}(COUNT \times SQFT). \quad (2)$$

c. Aggregate number of workers:

$$\log_{10}(RSE) = 1.890 - .211 \times \log_{10}(WORKERS). \quad (3)$$

2. Table 8, Table 10, and row items for Census region or climate zone in all other tables.

a. Building counts:

$$\log_{10}(RSE) = 1.734 - .241 \times \log_{10}(COUNT). \quad (4)$$

b. Aggregate square footage:

$$\log_{10}(RSE) = 1.730 - .093 \times \log_{10}(COUNT \times SQFT). \quad (5)$$

c. Aggregate number of workers:

$$\log_{10}(RSE) = 1.890 - .211 \times \log_{10}(WORKERS). \quad (6)$$

Notes:

RSE = relative standard error (percent)

$\log_{10}$  = logarithm base 10

COUNT = aggregate number of buildings (thousands)

SQFT = aggregate square footage (million square feet)

WORKERS = aggregate number of workers (thousands)

## Confidence Interval Estimation

A 95-percent confidence interval is an interval around a population estimate, which, by its method of construction, "contains" the true, but unknown, value of interest for 95 percent of all possible samples. For purposes of this report, estimates are assumed to be approximately normally distributed. Thus, an

interval of two standard errors on each side of the estimate closely corresponds to a 95-percent confidence interval. For example, Table 1 indicates a total of 3.95 million commercial buildings in the contiguous United States and District of Columbia, with an RSE of 5.5 percent (generalized variance from Equation 1). The 95-percent confidence interval requires the computation of two times the standard error as  $3.95 \times 0.055 \times 2 = 0.43$ . According to the notation used throughout this report, the 95-percent confidence interval would then be expressed as 3.95 ( $\pm 0.43$ ) million buildings. The confidence interval, or the doubled standard error in parenthesis, serves as a measure of the level of variability in the survey estimate. The wider the confidence interval, the higher the sampling variability of the survey estimate.

Two types of estimates or statistics that can be constructed from Tables 1-39 are (1) percentages, and (2) ratios. Following is a discussion on how RSE's and confidence intervals are estimated for such derived survey statistics.

### **(1) Percentages**

A percentage statistic is  $P' = N'/D' \times 100$ , where  $N'$  = the numerator estimate and  $D'$  = the denominator estimate.  $N'$  is "contained" in  $D'$ , or is a subset of  $D'$  (that is,  $N'$  is  $D'$  restricted by some additional characteristics). The following approximate formula can be used to obtain an estimate of sampling error:

$$RSE(P') \doteq \sqrt{[RSE(N')]^2 - [RSE(D')]^2}$$

$RSE(N')$  and  $RSE(D')$  can be obtained from the regression equations on page 155. For example, Table 16 indicates that of an estimated 3.95 million commercial buildings in the contiguous United States and District of Columbia, 2.31 million of them use natural gas. The RSE's for these survey statistics are 5.5 and 6.3 percent, respectively.

The percentage of buildings using natural gas is  $2.31/3.95 \times 100 = 58.6$  percent, with the following RSE:

$$RSE(58.6) \doteq \sqrt{(6.3)^2 - (5.5)^2} = 3.1 \text{ percent}$$

Two times the standard error is  $58.6 \times 0.031 \times 2 = 3.6$ , and the 95-percent confidence interval is expressed as  $58.6(\pm 3.6)$ .

However, the RSE formula given above is only an approximation based on Taylor series expansion. The RSE of 3.1 percent, computed from the approximate formula, compares with the value of 5.3 percent computed directly by balanced half-sample replication. The approximate formula for RSE's of percentages assumes simple random sampling. The consequences of its use for complex multistage surveys, as opposed to simple random samples, have been investigated (Reference 6). For the statistics investigated, the approximate formula became inaccurate for small sample sizes, high percentage values, or low- resulting RSE values. Therefore, approximate RSE's derived from NBECS percentage statistics should be used with care. In certain cases, use of this formula may lead to taking the square root of a negative number. This can occur when the estimated RSE of the numerator is

smaller than the estimated RSE of the denominator. In this case, an alternative, yet conservative approach, is to use the estimated RSE of the denominator as the RSE of the percentage.

## (2) Ratios

As mentioned earlier, in a percentage statistic, the numerator constitutes a subset of the denominator. This is not necessarily the case for a ratio estimate. An example of a ratio estimate is the estimated number of square feet of building space in the West Census region divided by the estimated number of buildings in the West Census region. This division yields an estimated number of square feet per building for the West. Another example would be the ratio of buildings with electric heat to those using gas heat. If  $X'$  and  $Y'$  are two survey statistics from Tables 1 through 39, and  $R' = X'/Y'$  is their ratio, an approximate RSE can be computed as follows:

$$RSE (R') \doteq \sqrt{[RSE(X')]^2 + [RSE(Y')]^2}$$

For example, Table 8 shows a total of 574,000 commercial buildings in the West Census region with an RSE of 11.7 percent (generalized variance from Equation 4). In addition, Table 8 shows a total square footage of 7,602 million square feet in the West with an RSE of 13.0 percent (generalized variance from Equation 5). The ratio of number of square feet per building in the West is 13,244 square feet per building, with the following RSE:

$$RSE (13,244) \doteq \sqrt{(11.7)^2 + (13.0)^2} = 17.5 \text{ percent}$$

Two times the standard error is  $13,244 \times 0.175 \times 2 = 4,635$ , and the 95-percent confidence interval is 13,244 ( $\pm 4,635$ ) square feet per building. However, the RSE formula given above is only an approximation based on Taylor series expansion. The amount of error incurred by its use depends on the correlation between  $X'$  and  $Y'$ . This correlation is likely to be positive for many statistics, in which case the approximation produces an overestimate of the true variance. The approximate formula yielded an RSE of 17.5 percent for the number of square feet per commercial building in the West, compared with the more exact RSE of 18.1 percent for the same statistic, as computed directly from balanced half-sample replication.

## Statistical Tests of Hypotheses

The previous sections showed how RSE's and confidence intervals can be used as a measure of reliability of the individual survey statistics presented in or computed from Tables 1 through 39. This section examines how RSE's can be employed to statistically test the validity of statements or "null hypotheses" about commercial buildings. Examples of null hypotheses are:

1. "The number of heated buildings was not significantly different between metropolitan and non-metropolitan areas."
2. "There were no significant differences in demolition rates among Census regions."

These hypotheses can be expressed as differences between certain survey statistics. In order to statistically test the significance of the difference between the estimates  $X'$  and  $Y'$ , the following "test statistic" is computed which is assumed to be approximately normally distributed by appeal to the Central Limit Theorem:

$$Z_{X', Y'} \doteq \frac{(X' - Y')100}{\sqrt{[X'RSE(X')]^2 + [Y'RSE(Y')]^2}}$$

The null hypothesis that there is no difference between  $X'$  and  $Y'$  is rejected if the absolute value of  $Z_{X', Y'}$  is greater than some critical value  $G$ . In this report, as is commonly done,  $G$  is set at 1.96 so that the probability of incorrectly detecting a significant difference is 0.05. This means that out of 100 hypothesis tests performed, 5 of them (on average) will erroneously detect significant differences when such differences do not in fact exist. Thus, it is impossible to know for certain whether a particular difference is in fact significant. However, the method of testing provides that 95 percent of such detected differences will be in fact significant.

Using null hypothesis No. 1 as an illustration, estimates from Table 21 for the numbers of heated buildings was 2.04 million in metropolitan areas and 1.47 million in non-metropolitan areas. RSE's were 6.5 and 7.1 percent, respectively (generalized variances from Equation 1).

The test statistic is computed as follows:

$$Z_{(2.04, 1.47)} \doteq \frac{(2.04 - 1.47)100}{\sqrt{[(2.04)(6.5)]^2 + [(1.47)(7.1)]^2}} = 3.38$$

Since 3.38 is greater than 1.96, the hypothesis that there is no significant difference in the numbers of heated buildings between metropolitan and non-metropolitan areas is rejected. The conclusion is that there is, in fact, a significant difference between the two numbers.

Hypothesis No. 2 can be broken down into a "family" of all possible pairwise comparisons of Census regions. The number of possible pairwise comparisons among the 4 Census regions is the combinatorial  $\binom{4}{2} = 6$ . For each of the 6 hypothesis tests performed alone, the probability of erroneously detecting a difference when none exists is 0.05. On the other hand, when all tests are performed, the overall probability that one or more of the tests erroneously detect a difference is greater than 0.05 since the error probabilities accumulate.

However, a multiple comparisons technique based on the Bonferroni inequality (see References 7 and 8) allows for the simultaneous testing of two or more hypotheses, while still maintaining an overall error probability not greater than

0.05. The technique calls for dividing the desired overall error probability of 0.05 by the number of hypotheses to be simultaneously tested. In the above example,  $0.05/6 = 0.0083$ , which yields a critical test of  $G = 2.64$  from tables of cumulative standard normal distribution. If the absolute value of the test statistic  $Z_{x,y}$ , for any pairwise comparison exceeds  $G$ , then a significant difference has been detected for that pair.

The statistics for testing all possible pairwise comparisons for number of demolished buildings among Census regions were computed from Table S3. The resulting  $Z_{x,y}$  are presented below.

	<u>Northeast</u>	<u>North Central</u>	<u>South</u>	<u>West</u>
<u>Northeast</u>	--	--	--	--
<u>North Central</u>	1.08	--	--	--
<u>South</u>	-1.08	2.35	--	--
<u>West</u>	0.47	0.25	1.26	--

Since the absolute value of no test statistic exceeds the overall critical value of  $G = 2.64$ , then no significant differences in demolition rates were detected among the four Census regions.

Again, it should be stressed that the formula for computing  $Z_{x,y}$ , the test statistic for an hypothesis test is approximate, with an error determined by any correlation between the two groups being tested. The Bonferroni approach to simultaneous tests is conservative in that the overall probability of erroneously detecting significant differences when none exist will be at most 0.05 and will likely be less than 0.05.

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## Appendix C

### Building Types



*Health care buildings, such as this hospital in Maryland are the largest building type, averaging 37,600 square feet.*

# Building Types

The principal building activity classification system is based on the primary business, commerce, or function carried out by the occupants of a building. The building type categories were designed to group buildings having similar patterns of energy consumption. Often, more than one activity is carried on in a building. In this survey, a building type category was assigned on the basis of the predominant use of floor space. Each building type is described below.

1. Assembly refers to large buildings used for the gathering of 50 or more persons for social, recreational, or religious activities.

Included in this category are the following building types:

Social/Public/Civic Assembly (fixed seating): (meeting hall/lodge hall, convention hall/assembly hall, town hall, auditorium, lecture hall, student union, etc.)

Religious Assembly: (Church, chapel, synagogue, mosque, etc.)

Recreational Facility:

Gymnasium/YMCA or YWCA/indoor racket sports, recreation center/athletic facility

Poolroom

Amusement arcade

Skating rink

Bowling alley

Indoor pool

Other

Entertainment Building:

Archive/library/museum/art gallery/exhibit hall

Observatory/planetarium

Concert hall

Coliseum/arena (enclosed)

Theater/movie/cinema

Radio/TV studio or station

Nightclub

Other

Other Enclosed Assembly Building:

Passenger terminal

Armory

Other

Nonenclosed or Partial Structure:

Stadium

Grandstand

Other

2. Education buildings house academic or technical instruction.  
This category includes:

Preschool  
Elementary  
Junior High  
Senior High  
College or University  
Vocational School

Specific Building Types (on school campuses):

Administration (see Office)  
Auditorium (see Assembly)  
Dormitory (see Lodging)  
Gymnasium (see Assembly)  
Infirmary (see Health Care)  
Library (see Assembly)  
Museum (see Assembly)  
Student Union (see Assembly)  
School for mentally retarded (see Health Care)  
Stadium (see Assembly)

3. Food Sales and Service buildings include:

Cafeteria

Full-Service Restaurant: (Diner--limited menu, bar and grill--  
limited menu, coffee shop--limited menu, full menu service, bar,  
etc.)

Carry-Out Service: (Caterer, pizza parlor, sandwich shop, fast  
food, etc.)

Retail Food Sales:

Supermarket  
Specialty food store  
Meat/seafood store  
Retail bakery  
Farmer's market, fruit/vegetable market  
Other

4. Health Care buildings house diagnostic and treatment facilities for  
both in- and out-patient care. In-patient facilities treat the  
mentally or physically ill. Buildings for overnight care are also  
included. This type includes:

Medical Care Hospital: General medical and surgical;  
chronic disease; medical infirmary (connected with  
institution); tuberculosis/other respiratory disease;  
orthopedic; maternity; ear, eye, nose and throat, etc.  
Mental Facility: (Psychiatric, mental retardation)

Rehabilitation: (Narcotic/drug addiction, physical therapy, alcoholism, etc.)

Veterinary: (Hospital, kennel)

Out-patient care may be medical, dental, or psychiatric. A building housing out-patient veterinary practices also falls into this category. Buildings of this type include:

Medical Clinic: (Abortion; ear, eye, nose, and throat; general)

Mental Health Clinic

Dental Clinic

Veterinary Clinic

5. Lodging facilities refer to buildings offering multiple accommodations for long- or short-term residents. Included are:

Short-Term Residence:

Shelter home

Motel

Tourist home

Hotel

Convention hotel

Inn

Other

Long-Term Residence:

Boarding house

Orphanage

Home for the aged, nursing home

Convent/monastery

Dormitory/sorority/fraternity

Other

6. Mercantile Sales and Personal Services buildings are those housing sales and displays of goods or services (excluding food). Included are:

Shopping Mall

Strip Shopping Center

Retail Sales (Single establishment):

Building materials, hardware, garden supply stores

Department stores, apparel stores

Furniture, home furnishings, and equipment stores

Drugstores

Multi-retail establishments

Other retail stores

Wholesale Goods (except food)

Services (except food):

- Laundry/dry cleaner/car wash
- Post office
- Personal service
- Multi-service establishment
- Other service

Automotive Sales and Service Buildings include:

- Gas Stations
- Automobile Dealers
- Motor Vehicle Repair/Service

7. Office buildings are used for general office space, professional offices, and administrative offices. Included are:

Professional Office Building: (Management, consulting, engineering, medical, law, corporate, administration of an institution, mixed professional)

Financial Office Building: (Bank, insurance, securities, brokerage firm, real estate, etc.)

Data Processing:

- Computer center
- Other data processing

8. Residential buildings serve as living quarters and have individual kitchen facilities.

Multi-Family:

- High-rise apartments
- Low-rise apartments

Single-Family:

- Detached
- Duplex
- Triplex
- Quadriplex
- Townhouse/rowhouse

Mobile Homes

9. Warehouse and Storage buildings are used for the storage of goods, merchandise, raw materials, or manufactured products. Included are:

Agricultural

Warehouse--nonrefrigerated

Refrigerated storage

Other

10. Vacant buildings are those with a predominant proportion of floor space unused at the time of the survey. A vacant building may contain occupants who are using small portions of floor space.
11. Other buildings are those that do not fit into any of the previous categories. Included are:

Crematorium

Parking garage

Hangar

Telephone exchange

Also included in the "Other" category are the building types  
Laboratory and Public Order and Safety

Laboratory buildings house equipment for experimental testing or for analysis. Included are:

Mechanical/Electrical

Medical/Dental

Agricultural

Other

Public Order and Safety buildings house establishments engaged in the preservation of law and order or in public safety.

Fire station

Police station

Jail

Reformatory

Penitentiary

Courthouse

Sheriff's Office

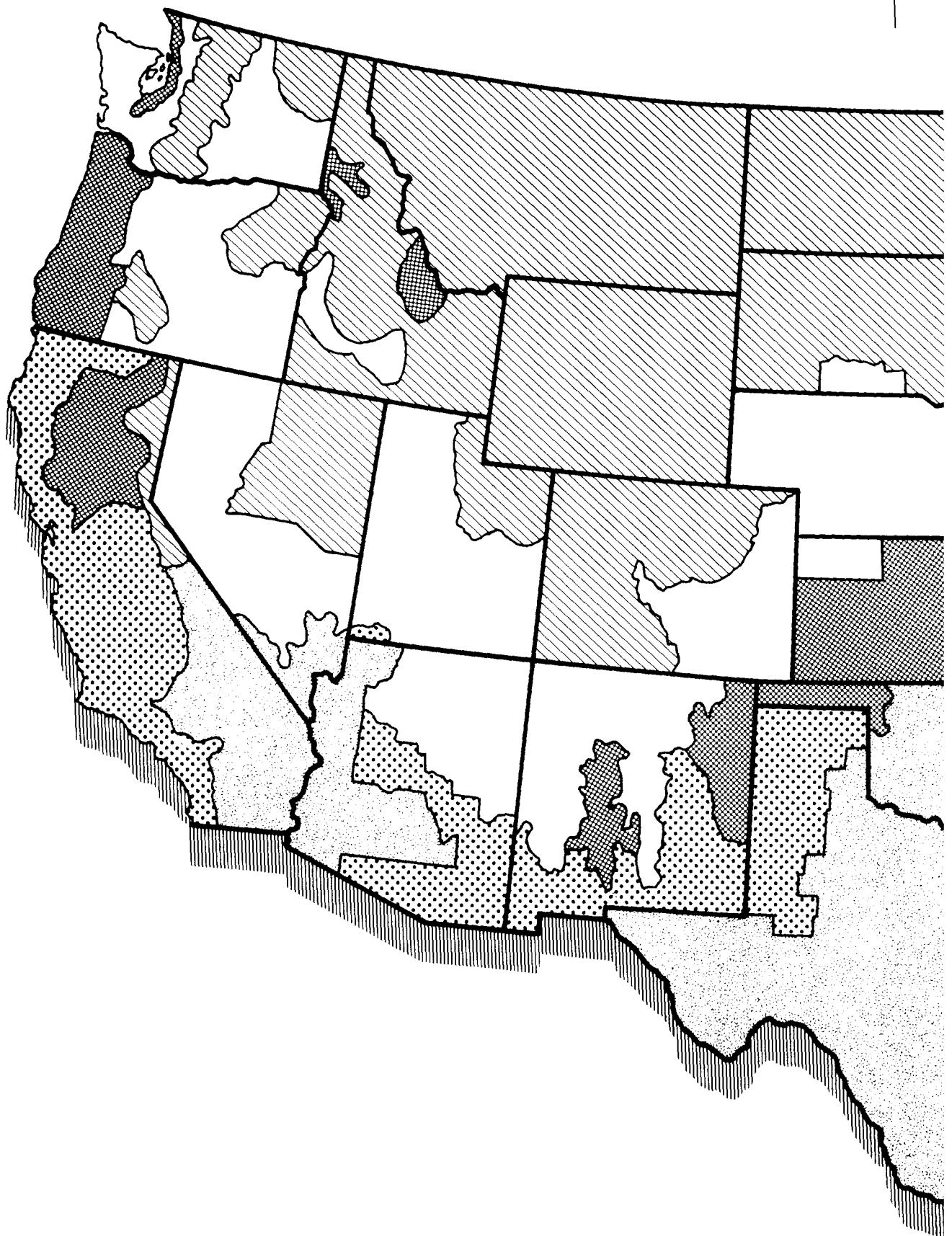
Other

## Appendix D

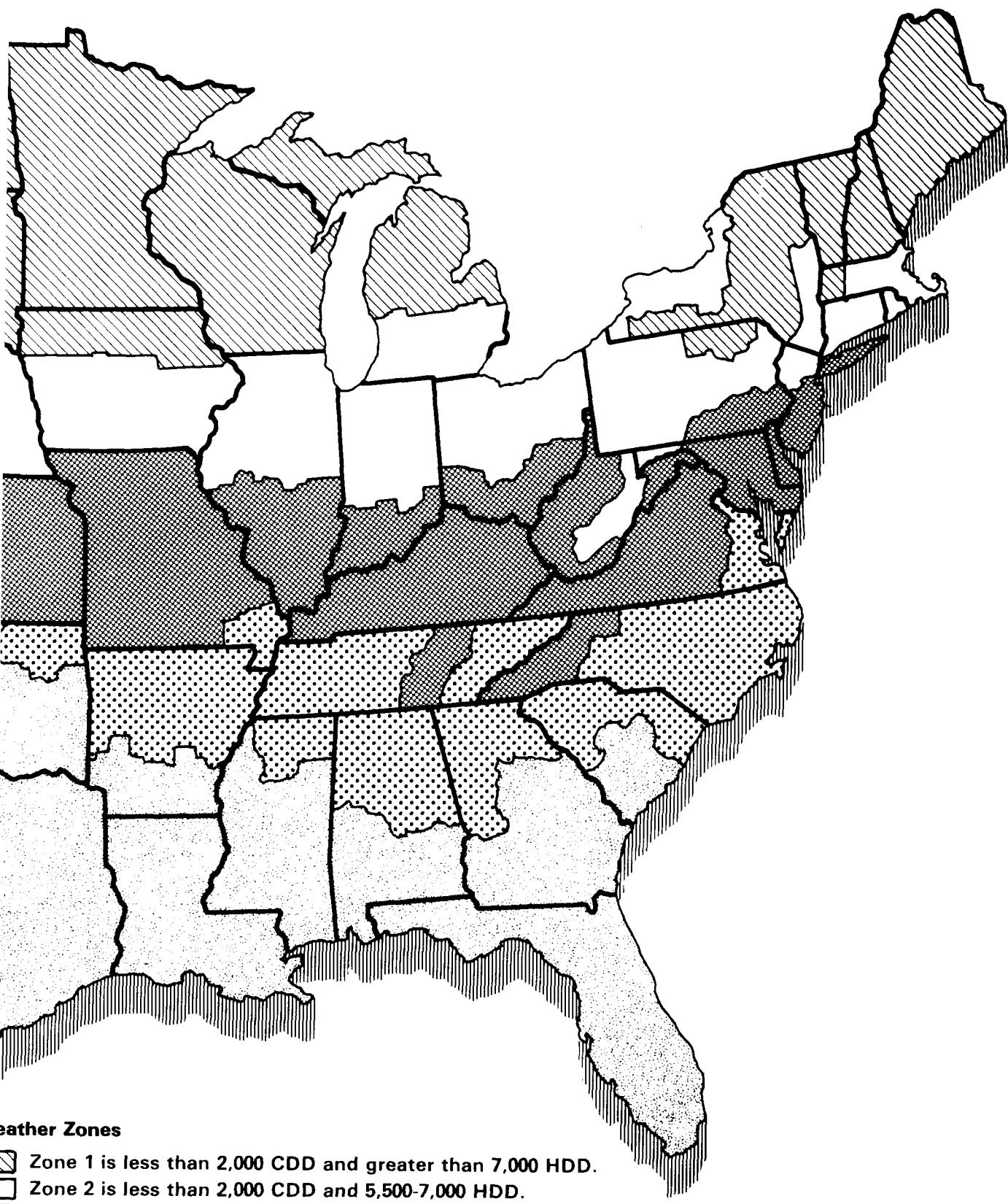
### U.S. Weather Zone Map



*Metropolitan areas such as New York City contain over half of all commercial buildings.*



**Appendix D**  
**U.S. Weather Zone Map**



**Weather 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 greater than 2,000 CDD and less than 4,000 HDD.

## Appendix E

### Census Region Map



*In 1983, the South had the highest concentration of small commercial buildings, while the Northeast had the highest concentration of large buildings.*

# Glossary

Active Solar Heating Systems - Use mechanical pumps/fans to circulate heat-laden fluids or air throughout the building and solar collectors. These systems contain three components:

- (1) Solar Collecting Panels -- one or more flat, sun-oriented boxes with transparent covers, and containing water tubes or air baffles under a blackened heat absorbant panel.
- (2) Insulated Heat Storage Tank -- containing water, or rocks where air is the heat-carrying medium, to serve as a source of heat on cloudy days.
- (3) Distribution System -- radiators or other convectors, or air ducts. Often adapted from existing conventional heating systems.

(See Passive Solar Heating Systems, Solar Water Heating Systems, Solar Air-Conditioning Systems, and Solar-Assisted Heat Pump.)

Additions -- see Large Additions

Air-Conditioning -- Cooling of air by a refrigeration unit. These units operate by allowing high pressure liquid refrigerant (e.g., Freon) to expand and vaporize inside a coiled tube unit called an "evaporator", with a subsequent adiabatic drop in temperature. The cool vapor takes up heat from the building space. This heat is released and vented outdoors as the vapor becomes liquefied in a "condenser" or in an "absorber vessel." Two major types of air-conditioners are "vapor-compression" and "absorption" types, which differ in the way the refrigerant vapor is liquefied. Not included under air-conditioning is cooling by fans, blowers, or evaporative cooling systems which are not connected to a refrigeration unit. Air-conditioning units that are not currently in working condition or are not used, but are in place in the building, are included in this survey. (See Solar Air-Conditioning Systems, Heat Pump, HVAC, and Well Water For Cooling.)

Air Forced Through Ducts -- Is heated, cooled, or ventilated air which is distributed throughout the building through ducts by the use of fans or blowers. (See Self-Contained Heating Units, Wall Unit, Window Unit, Central Air-Conditioning Systems, Central Heating System, HVAC, and Heat Pump.)

Boiler -- Boilers burn natural gas, fuel oil, or coal to produce hot water or low-pressure steam for space heating. High-pressure steam boilers are used for electric power generation or industrial processes. "Firetube" boilers pass hot combustion gases through tubes submerged in the boiler water to produce up to 25,000 pounds of steam per hour. "Watertube" boilers circulate boiler water inside of tubes surrounded by hot combustion gases to produce up to 500,000 pounds of steam per hour. Boiler efficiency depends in part on carefully controlled fuel/air mixture. (See Furnace, Central Heating Systems, and HVAC.)

Bounding Rule -- A procedure used to identify those buildings or large additions to buildings listed in F.W. Dodge Information Division's 1979 file of new construction but which had no probability of being selected into the 1979 Nonresidential Buildings Energy Consumption Survey. For example, Dodge may have listed a project in 1979, but the building was still under construction at that time and could not have been included in the 1979 survey. According to the bounding rule, the project would be considered part of the "New Buildings Sample" in the current survey. (See Dodge, Building, New Buildings Sample, Original Sample, Projects, and Nonresidential Building.)

Building -- A structure totally enclosed by walls that extend from the foundation to the roof. It is used for some purpose other than just as a residence. The nonresidential use is visible from the sidewalk in the form of a sign or other advertising medium which indicates the building is not used solely for residential purposes.

According to this definition, a private residence is included in the survey if it contains an office or business, such as a doctor's office. Other structures that are included as buildings are parking garages that may not be totally enclosed by walls and a roof and structures erected on pillars so that the first fully enclosed level is elevated with open sides at ground level.

Excluded are: structures not totally enclosed by walls and a roof, such as an oil refinery, steel mill, or water tower; buildings located on farms, such as silos, grain elevators, and barns; buildings on military bases or reservations; mobile homes and trailers, even if they house nonresidential activity; and oil storage tanks. For this report, industrial buildings have been excluded. Also excluded are nonbuildings which are consumers of energy, such as street lights, pumps, bridges, swimming pools, and construction sites.

Campus or Complex -- Refers to a well-defined geographic area containing a group of separate buildings that are operated as a unit, such as a college or university campus. (See Multibuilding Establishment.)

Census Region -- An area consisting of various States selected by the U.S. Bureau of Census according to population size and physical location. The States are grouped into four regions:

Northeast - Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania

North Central - Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, and South Dakota

South - Maryland, Delaware, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas

West - Montana, Wyoming, Washington, Oregon, Nevada, Colorado, California, Idaho, Utah, New Mexico, and Arizona

(Note: Alaska and Hawaii are normally considered parts of the western region but were not included in the sample for this survey.)

Central Air-Conditioning System -- Employs a central chiller or chillers which produce and deliver cooled air/fluid to all areas of the building that are air-conditioned. Such systems may be factory assembled or built up from individual components. Central air-conditioning systems are often built in conjunction with central heating systems and utilize common air ducts or mixing boxes (e.g., terminal reheat, multizone, or dual duct systems.) (See Air-Conditioning, HVAC, Heat Pump, and Well Water for Cooling.)

Central Heating Systems -- Refers to a centrally located heating plant, such as a furnace/boiler or electric resistance unit, which produces heated air or water. This heated air or water is then distributed to desired areas of the building through a system of ducts or pipes. The central heating plant may be located within or outside of the building. Central heating systems are often built in conjunction with central cooling systems and utilize common air ducts or mixing boxes (e.g., terminal reheat, multizone, or dual duct systems). (See HVAC, Boiler, Furnace, Heat Pump, and Solar Energy.)

Climate Zone -- Seven distinct areas designated by the American Institute of Architects (AIA) for the U.S. Departments of Energy and Housing and Urban Development; they are used to classify housing units or buildings based on long-term weather conditions. The zones were determined according to the annual sum of heating and cooling degree-days, averaged over 45 years as follows:

<u>Zone</u>	<u>Cooling Degree-Days</u>	<u>Heating Degree-Days</u>
1	Less than 2,000	More than 7,000
2	Less than 2,000	5,500 to 7,000
3	Less than 2,000	4,000 to 5,499
4	Less than 2,000	2,000 to 3,999
5	Less than 2,000	Less than 2,000
6	More than 2,000	Less than 2,000
7	More than 2,000	2,000 to 3,999

Zones 4 and 5 have been combined, and zones 6 and 7 have been combined for this report. A building was assigned to a climate zone on the basis of its geographic location. (See Heating Degree-Days, Cooling Degree-Days, and NOAA Division.)

Cogeneration -- A procedure for generating both electric power (or shaft horsepower) and useful heat from a single installation. Cogeneration is common in industrial operations. The heat can be used for industrial processes, space heating or cooling, or water heating. With steam-driven generators, exhaust steam is utilized. With gas-turbine or diesel-powered generators, exhaust gases are utilized by waste-heat boilers. Although in the demonstration stage of development at this time, cogeneration in commercial buildings will involve packaged units utilizing natural gas internal combustion engines. Cogeneration, when the primary purpose of the system is electric power generation, is often called Waste Heat Recovery. However, some respondents may also have considered other forms of waste heat recovery to be "cogeneration." (See Electricity Generation, Boiler, and Waste Heat Recovery System.)

Combination Air-Conditioning Systems -- Are air-cooling systems utilizing both self-contained units (e.g., window or wall-mounted air-conditioners) and a central cooling system. (See Air-Conditioning, Central Air-Conditioning Systems, and Heat Pump.)

Commercial Buildings -- Are those buildings whose principal building activity is nonresidential and nonindustrial. Commercial buildings include, but are not limited to, stores, offices, schools, churches, gymnasiums, libraries, museums, hospitals, clinics, warehouses, and jails. Government buildings are included except buildings on military bases or reservations. Industrial buildings have been excluded from this report. For a more complete list, see Appendix C, "Building Types." (See Building, Principal Building Activity.)

Computer Assisted Telephone Interviewing (CATI) -- A telephone interviewer reads the survey question as it appears on a screen and enters the response via a keyboard connected to a computer. The computer software controls the skip patterns of questions, so that only appropriate questions are displayed on the screen. The system also checks responses against allowable codes.

Computerized Building Automation System -- An Energy Monitoring and Control System (EMCS) which employs mini/microcomputers, instrumentation, control equipment, and software designed to manage a building's use of energy for heating, ventilation, air-conditioning, lighting, and processes. This survey is concerned only with the use of such systems for improving efficiency in heating and air-conditioning. Not included are clock timers or thermostats.

Conservation Practices -- Refer to actions that building owners or occupants may initiate, manually or automatically, to reduce the amount of energy consumed by a building's heating, ventilation, air-conditioning (i.e., HVAC) or lighting systems. The actions include reducing heating, cooling, or lighting during periods when the building is not in full use, and having a regular maintenance program for the HVAC. (See Reduced Cooling, Reduced Heating, and Computerized Building Automation System.)

Cooling -- See Air-Conditioning.

Cooling Degree-Days -- A quantity used to estimate demand on building cooling systems. Normally, cooling is not required in a building when the outdoor average daily temperature is below 65 degrees Fahrenheit. Cooling degree-days are determined by subtracting the base of 65 from the daily average temperature. For example, a day with an average temperature of 85 degrees has 20 cooling degree-days ( $85 - 65 = 20$ ), while one with an average temperature of 65 degrees or lower has no cooling degree-days. (The average daily temperature is the mean of the maximum and minimum temperatures for a 24-hour period). Cooling degree-days are thus computed for each day, then summed over any desired number of days in the season. (See NOAA Division, Climate Zone, and Heating Degree-Days.)

Demolition -- In this survey, demolition refers to the intentional destruction of buildings, as well as destruction by fire or other natural hazards. These structures are no longer present in the building stock, and were not included in the survey. (See Out-of-Scope.)

Dodge -- F.W. Dodge Information Division of McGraw-Hill Inc. compiles lists of new construction projects, including new buildings, building alterations, and large additions, among other things. The Dodge lists were used in the current survey to facilitate the sampling of buildings or large additions constructed since the 1979 Nonresidential Buildings Energy Consumption Survey. These "New Buildings," together with "Old Buildings," comprise all buildings in the current survey. (See New Buildings Sample, Original Sample, Projects, Bounding Rule, Large Additions, Nonresidential Building, and Building.)

Electricity -- In this survey, "electricity consumption" refers to the electric power supplied to a building by a central utility via underground or above-ground powerlines. It does not refer to electric power generated onsite for exclusive use within the building. In the latter case, the fuel used for the generation would be indicated as "fuel used to generate electricity." (See Electricity Generation.)

Electricity Generation -- In this survey, electricity generation refers to the onsite production of electricity from mechanically rotated electricity generators. Most generators are driven by steam turbines, where fossil-fuels are burned to produce boiler-steam. In some systems, hot combustion gases from light fuel oil drive the turbines. In others, diesel engines drive the turbines. Utility-owned electric generating plants, which produce electric power for sale to other buildings, were not included in this survey. NBECS included commercial buildings having the capacity to generate their own electric power on a regular basis or on an emergency basis. (See Electricity, Boiler, and Cogeneration.)

Energy Suppliers -- Are the companies that provide electricity, natural gas, fuel oil, coal, or other forms of energy to the buildings and to the individual customers within the buildings.

Establishment -- As defined by the Standard Industrial Classification Manual, is "an economic unit, generally, at a single physical location where business is conducted or where services or industrial operations are performed." Establishments are not synonymous with buildings. (See Multi-establishment Building, Single-establishment Building, Multibuilding Establishment, and Building.)

Fuel Oil -- Is a liquid petroleum product less volatile than gasoline that is burned to generate heat. In order of increasing viscosity and decreasing volatility, there are "distillate fuel oils" (No. 1, No. 2, No. 4) and "residual fuel oils" (No. 5 or No. 6). Kerosene falls into the category of No. 1 heating oil. No distinction is made between kerosene and fuel oil in this survey.

Furnace -- An enclosed chamber where fuel is burned or electrical resistance heat is generated to provide building heat, which is distributed as hot air, hot water, or steam. Furnaces which are used for industrial processes can produce very high temperatures, as in the melting of metal ores. (See Boiler, Central Heating System, and HVAC.)

Glass as a Percentage of Exterior Surface -- Refers to the proportion of the exterior wall surface which is composed of glass.

Government Occupancy -- Occupancy of a building by federal, state, or local government agencies. The buildings may be occupied by agencies of more than one government and may also be shared with nongovernment establishments.

Heat Pump -- A system which takes up environmental heat and delivers it into the building during the heating season, and transports building heat to the environment during the cooling season. 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. Outdoor coils exchange heat with ambient air or, more efficiently, with water (e.g., solar-heated water, heat distribution water, or cool well water). The former are called air-to-air heat pumps, while the latter are called hydronic heat pumps. Some heat pumps are used to transport heat from one part of a building (e.g., the computer room) to a cooler part (e.g., the lobby). The number of heat pumps reported in this survey represents a conservative estimate, since counts were obtained from open-ended questions about heating and heat distribution systems not mentioned in the questionnaire. (See Air-Conditioning, Central Air-Conditioning Systems, Central Heating System, HVAC, Solar-Assisted Heat Pump, Boiler, and Well Water for Cooling.)

Heating Degree-Days -- A quantity used to estimate demand on building heating systems. Normally, heating is not required in a building when the outdoor average daily temperature is above 65 degrees Fahrenheit. Heating degree-days are determined by subtracting the average daily temperature below 65 degrees from the base 65. For example, a day with an average temperature of 50 degrees has 15 heating degree-days ( $65 - 50 = 15$ ), while one with an average temperature of 65 or higher has none. (The average daily temperature is the mean of the maximum and minimum temperature for a 24-hour period.) Heating degree-days are thus computed for each day, then summed over any desired number of days in the season. (See NOAA Division, Climate Zone, and Cooling Degree-Days.)

Hours of Operation for a Typical Week -- Refers to the number of hours per week that a building is used for any nonresidential activity or activities and excludes hours when the building is occupied only by maintenance, security, or other support personnel. Many buildings do not maintain the same hours of operation during the year. For this survey, "hours of operation" refer to the schedule followed most often. Other buildings that do not have any regular schedule of hours are open intermittently or by appointment only, or are open without being staffed. (This last category includes automatic bank tellers and roadside rest stops.) These buildings were recorded as having zero operating hours, according to the definition given by the questionnaire, even though they were not vacant.

Hot-Deck Imputation -- Is a statistical procedure in which the building file is sorted by variables related to the missing item. A building which has the same value on the matching variables is then selected and this "donor" building supplies the value for the missing item. (See Imputation.)

HVAC -- Is an abbreviation for "Heating, Ventilation and Air-Conditioning" system, the system or systems which condition air in buildings. Sometimes heating, ventilation, and air-conditioning are accomplished by use of separate systems, although often a single system is designed to accomplish all of these functions. For example, "Terminal Reheat," "Single Zone," and "Multi-zone" systems each use a single set of ducts for delivering fan-forced air, which is heated or cooled as it passes through coiled-tube units. (See Central Heating Systems, Central Air-Conditioning Systems, Furnace, Boiler, and Heat Pump.)

Imputation -- Is a statistical method used to estimate the response to specific questions for which answers are missing. There are many techniques for accomplishing this, including "Hot-Decking," "Multiple Regression," etc. (See Hot-Deck Imputation.)

In-Scope -- Buildings which contain at least some nonresidential activity and are eligible to be in the survey. (See Out-of-Scope, Nonresidential Building, Dodge, Large Additions, and Building.)

Industrial Buildings -- Nonresidential buildings where industrial/manufacturing activities occupy more of the total square footage than any other type of activity. Examples include manufacture of automobiles, plastic and rubber goods, assembly of furniture and electronic equipment, etc. (See Nonresidential Building, Commercial Buildings, Building, and Projects.)

Insulation -- Refers to any material which, when placed between the interior of the building and the outdoor environment, reduces the rate of heat loss to the environment or heat gain from the environment. Examples include glass wool fill and foam board. (See Special Glass and Weatherstripping or Caulking.)

Kerosene -- Is a petroleum distillate having properties similar to No. 1 fuel oil and is used primarily in space heaters, cooking stoves, and water heaters. For this survey, no distinction is made between kerosene and fuel oil. (See Fuel Oil.)

Large Additions -- In this survey, additions larger than 10,000 square feet that at least doubled the total square footage of an existing building and made that building eligible for sampling as a "New Building." "New Buildings" and "Old Buildings" are the two mutually exclusive categories that comprise all buildings in the current survey. (See Building, Projects, and Dodge.)

Large Buildings List -- See Special Building List.

Liquefied Petroleum Gas or LPG -- Is any gas fuel supplied to a building in liquid form. It is usually delivered by tank truck and stored near the building in a tank or cylinder until used. LPG can contain propane, propylene, butane, butylene, ethane-propane mixtures, etc.

Master-Metering -- Is the method used by utility companies (i.e., electricity and natural gas) to collectively measure the total volume of energy used by several individual customers. (See Separate Metering.)

Median -- A measure of central tendency intended to express a "typical" value for an attribute. The median is different from the simple arithmetic average in that its value is not influenced much by extremes. For example, average square feet per building would be affected by the inclusion of a few very large buildings and would not express square footage for a "typical" building. However, the median square feet per building would not be so affected. Medians are computed by listing all values in ascending order. The value which divides the list in half is the median.

Metropolitan -- Refers to buildings located within Standard Metropolitan Statistical Areas (SMSA's) as defined in the 1970 Census. Except in New England, an SMSA 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 SMSA if they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, SMSA's consist of towns and cities rather than counties. "Nonmetropolitan" refers to buildings not located within SMSA's as defined in the 1970 Census. Beginning with the 1980 Census, the term "Metropolitan Statistical Area," or "MSA," is used. However, MSA definitions based on the 1980 Census were not available at the time of this survey. (See Primary Sample Unit or PSU.)

Multibuilding Establishment -- An establishment which operates in more than one building at a single location. Examples include college campuses, large manufacturing complexes, etc. In this survey, the building represents the interviewed sample unit which could have resulted in some parts of an establishment being sampled and others not. (See Establishment, Campus or Complex, Multi-establishment Building, Single-establishment Building, and Building.)

Multi-establishment Building -- A single building which houses more than one establishment. Examples include enclosed shopping malls and office suites. In this survey, the building represented the interviewed sample unit. (See Establishment, Single-establishment Building, Multibuilding Establishment, and Building.)

Multiple-building Unit -- Is a single building address that at the time of the interview was discovered to be two or more separate buildings.

Multi-stage Area Probability Sampling -- A sample design which minimizes survey expense while maintaining nationwide coverage. This is accomplished by sampling in stages and by selecting "clusters" of sample units at each stage. The cost of travel among sample units within a cluster is lower than among widely dispersed units. In this survey, a nationwide distribution of 79 Primary Sample Units, or PSU's, were selected at the first stage. Each PSU was composed of a cluster of ZIP code areas. At the second stage, an average of 5 ZIP Code units was selected from within each selected PSU. At the third stage, one segment (120 establishments) was selected from each ZIP Code area. At the final stage, buildings were selected from each segment. (See Appendix A, "How the Survey was Conducted.") (See also Primary Sample Unit or PSU, SMSA, Weight, and Establishment.)

Natural Gas -- Is hydrocarbon gas (mostly methane) supplied to individual buildings by pipelines from a central utility company. It does not refer to privately owned gas wells operated by a building owner.

New Buildings Sample -- Refers to buildings or large additions constructed since 1979 which were sampled from within the PSU's by use of Dodge lists of new construction. A New Buildings Sample was drawn to make inferences about all "New Buildings" at large. New Buildings together with Old Buildings comprise all buildings in the current survey. (See Original Sample, Dodge, Primary Sample Unit or PSU, and Multi-stage Area Probability Sample.)

NOAA Division -- One of the 344 weather divisions designated by the National Oceanic and Atmospheric Administration (NOAA) encompassing the 48 contiguous States and District of Columbia. These divisions usually follow county borders to encompass counties with similar weather conditions. The NOAA division does not follow county borders when weather conditions vary considerably within a county such as is likely to happen when the county borders the ocean or contains high mountains. A State contains an average of seven NOAA divisions; a NOAA division contains an average of nine counties. (See Climate Zone, Cooling Degree-Days, and Heating Degree-Days.)

Nonmaintenance Employee Control -- Indicates that employees who are not employed to maintain or operate the building are able to control the heating or cooling equipment where they work.

Nonresidential Building -- Is a roofed and walled structure that is used for some purpose other than just residential. Examples of nonresidential buildings include industrial plants, office, health care, retail sales/service, etc. The scope of this definition is quite broad and includes some buildings that are primarily residential (as well as commercial and industrial buildings). For example, a residential building, such as an apartment building, which also contained some obvious nonresidential activity, such as a store or an office, was considered a nonresidential building for the purposes of this survey. Nonresidential buildings comprise two groups: commercial and industrial. (See Commercial Buildings, Industrial Buildings, Building, Residential Building, Principal Building Activity, and Appendix C, "Building Types.")

Number of People Working in the Building -- Is the normal number of people working in the building during a typical workday or during most of the year.

Number of Floors -- Is the count of building levels in the tallest section of the building, including parking areas, basements, or other floors below ground level.

Original Sample -- Refers to buildings which were sampled during the 1979 Nonresidential Buildings Energy Consumption Survey and reinterviewed in the 1983 survey. The 1979 survey employed a Multi-stage Area Probability Sample design. Together with the buildings which were sampled from lists maintained by F. W. Dodge, they comprise all buildings covered by the current survey. (See New Buildings Sample, Multi-stage Area Probability Sampling, and Dodge.)

Out-of-Scope -- Buildings containing no nonresidential activity or that did not meet all of the conditions defining a "Building." Out-of-scope buildings were not included in the survey. (See In-Scope, Building, Projects, New Buildings Sample, Dodge, Large Additions, Bounding Rule.)

Package Units -- Refers to air-conditioning units which are built and assembled at a factory and installed as a unit to cool all, or portions of, a building. Package units are in contrast to unique units built up from individual components for use in a given building. (See Air-Conditioning, Window Unit, and Wall Unit.)

Passive Solar Heating Systems -- Operate without pumps, blowers, or other mechanical devices. The building is an integral part of the system design. Convection is relied on to circulate building air past a solar-heated surface, such as a thick masonry "thermal storage wall," which is situated behind large, sun-oriented, double glass panels. (See Active Solar Heating Systems, Solar Air-Conditioning Systems, and Solar Water Heating Systems.)

Primary Sample Unit or PSU -- In multi-stage area probability sampling, the sample units selected at the first stage are called PSU's. A PSU typically consists of one to several contiguous counties; for example, a metropolitan area with surrounding suburban counties. The approximately 3,100 counties and independent cities of the contiguous United States were grouped into about 1,900 PSU's by a procedure similar to the one used by the Census Bureau for its Current Population Survey. For the Nonresidential Buildings Energy Consumption Survey, 79 of these PSU's were selected with probabilities proportionate to their 1970 population. PSU's can be composed of one or more SMSAs or can be composed of rural counties. (See Multi-stage Area Probability Sampling, SMSA, Metropolitan, Weight, and Appendix A, "How the Survey Was Conducted.")

Principal Building Activity -- A building categorization based on the primary business, commerce, or function carried out by the occupants of a building. The building type categories were designed to group buildings having similar patterns of energy consumption. Often more than one activity is carried on in a building. In this survey, a building type category was assigned on the basis of the predominant use of floor space. Examples of various building types include Office, Health Care, Lodging, Mercantile Sales/Service, etc. (See Appendix C, "Building Types.")

Professional Energy Audit -- An inspection which determines where a building uses energy and identifies energy conservation opportunities. (See Conservation Practices.)

Projects -- All construction represented by a single record of the F.W. Dodge Information Division's file of new construction (e.g., new buildings, building alterations, and additions to buildings); a project is generally associated with a building or buildings, but not always. (See Dodge, Large Additions, Bounding Rule, and Building.)

Propane -- A gaseous petroleum product which liquefies under pressure, and is a major component in Liquefied Petroleum Gas or LPG.

Purchased Steam -- See Steam Energy Source.

Reduced Cooling -- Refers to the manual or automatic reduction in cooling produced by the air-conditioning system during the hours a building is not in full use. Buildings without air-conditioning systems or with only window air-conditioning units are reported as "Not Applicable." (See Air-Conditioning, Central Air-Conditioning Systems, Window Unit, Heat Pump, and Conservation Practices.)

Reduced Heating -- Refers to the manual or automatic reduction in the heat produced by the heating system during the hours a building is not in full use. Buildings that do not have heating systems are reported as "Not Applicable." (See Central Heating Systems, Self-contained Heating Units, Heat Pump, and Conservation Practices.)

Regular Maintenance -- Refers to a systematic program for checking the heating and/or air-conditioning equipment on a regular basis (at least once a year), even if there are no apparent problems. (See HVAC, Central Heating Systems, Central Air-Conditioning Systems, Air-Conditioning, Heat Pump, Self-Contained Heating Units, and Window Unit.)

Residential Buildings -- The term "residential" applies to structures where the primary activity is that of a dwelling for one or more households. Residential buildings were within the scope of the survey if they showed evidence of some kind of commercial or industrial activity. For example, a residential building, such as an apartment building, which also contained some obvious nonresidential activity, such as a store or an office, was considered a nonresidential building for the purposes of this survey. For a private residence to have been selected for this survey, it had to have a sign (large enough to be visible from the street) advertising the presence of some commercial or industrial activity. (See Nonresidential Building, Commercial Buildings, Industrial Buildings, Building, Principal Building Activity and In-Scope.)

Self-Contained Heating Units -- Are units installed either in the building or on the roof that generate and deliver heat only to a local zone within the building. (See Central Heating Systems.)

Separate Metering -- Refers to the method by which utility companies (i.e., electricity and natural gas) measure the quantity of energy consumed by individual customers in the building. (See Master-Metering.)

SIC -- Is an abbreviation for Standard Industrial Classification codes developed by the U.S. Bureau of the Census which categorizes businesses into groups with similar economic activities. (See Principal Building Activity and Appendix C, "Building Types.")

Single-establishment Building -- A building which houses only one establishment, for example, when a building is dedicated to the offices of a single corporation. (See Establishment, Multi-building Establishment, Multi-establishment Building, and Building.)

SMSA -- Standard Metropolitan Statistical Area. (See Metropolitan.)

Solar Air-Conditioning Systems -- Most commonly used are "evaporative coolers" whereby air is drawn through a moist, porous medium. A major drawback is that, although the air is cooled, its humidity is increased. A practical alternative uses an "absorption refrigeration unit" driven by solar-heated water. Absorption coolers use heat energy rather than mechanical compressors. (See Active Solar Heating Systems, Passive Solar Heating Systems, Solar Water Heating Systems, and Air-Conditioning.)

Solar-Assisted Heat Pump -- A heat pump which draws heat primarily from solar-heated water rather than from outdoor air during the heating season. (See Heat Pump, Active Solar Heating Systems, and Solar Water Heating Systems.)

Solar Energy -- Refers to the radiant energy of the sun, which can be converted into other forms of energy, such as heat or electricity. Solar radiation is most often used in buildings for space heating and water heating. (See Active Solar Heating Systems, Passive Solar Heating Systems, Solar Water Heating Systems, Solar Air-Conditioning Systems, and Solar-Assisted Heat Pump.)

Solar Water Heating Systems -- Use solar collecting panels to heat water which is then stored in a tank for use in personal hygiene or general cleaning, as opposed to space heating. "Thermosiphons" are passive systems using only convection to move heated water between the collecting panels and storage tank. Active systems use pumps to maintain flow. (See Active Solar Heating Systems, Passive Solar Heating Systems, Solar Air-Conditioning Systems, and Solar-Assisted Heat Pump.)

Special Building List -- Part of the sampling procedure entailed locating "large" buildings within the selected Primary Sample Units (PSU's). "Large" buildings were defined as those with 250,000 or more square feet of enclosed floorspace in PSU's that are in Standard Metropolitan Statistical Areas. In the remaining one-third of the PSU's, buildings of 100,000 square feet or more were listed. The special building list was used to select large buildings for the 1979 Nonresidential Buildings Energy Consumption Survey. These buildings make up part of the original sample in the 1983 survey. (See Primary Sample Units, Building, Nonresidential Building, New Buildings Sample, Original Sample, and Metropolitan.)

Special Glass -- Includes tinted, reflective, insulated, or thermal pane types of glass that, when installed in the exterior windows of a building, serve to reduce the rate of solar penetration into the building or the rate of heat or cold loss to the environment. Such forms of glass may have been installed at the time of construction or since construction (retrofitted). (See Insulation and Weatherstripping or Caulking.)

Special ZIP Codes -- Are allocated by the U.S. Postal Service to business establishments, government agencies, or buildings that have a high mail volume.

Square Feet -- Refers to all the space enclosed within the exterior walls of the building, including any indoor parking facilities, basements, hallways, lobbies, stairways, and elevator shafts. (See Total Square Footage.)

Steam Energy Source -- Applies to buildings that purchase steam from steam generation and distribution companies serving municipal areas, such as natural gas distributors. Many of these distributors are electric utilities which sell exhaust steam from their generator turbines. Steam energy source does not apply to buildings that use purchased fuels to generate their own steam for use in the building or other buildings in a campus/complex situation.

Structure Type -- Refers to whether the building is detached (stands alone), attached to other buildings on one or more sides, or is part of a shopping mall.

Tank Capacity -- Is the amount of fuel oil or kerosene a tank can hold. In this survey, "Tank Capacity" does not refer to storage of liquefied petroleum gas or propane. (See Fuel Oil and Kerosene.)

Total Square Footage -- Floor square footage summed or aggregated over all buildings in a category, such as all office buildings in the United States. In the survey, aggregate square footage was estimated by multiplying each building's square footage by an appropriate weight, then summing over all sample buildings of interest to represent nationwide totals. (See Square Feet and Weight.)

Waiver -- Is a signed authorization form instructing energy-supply companies serving the buildings to release the volumes and costs of energy the buildings consumed over a specified period.

Wall Unit -- Wall unit air-conditioners are self-contained units that are installed in a wall, with their heat-radiating condensers exposed on the outdoor surface of the wall. (See Air-Conditioning, Central Air-Conditioning Systems, and Window Unit.)

Waste Heat Recovery System -- An energy conservation system whereby space or water heating is achieved by use of by-product heat that would otherwise be rejected into the environment. In nonresidential buildings, sources of waste heat include refrigeration/air-conditioner compressors, manufacturing or other processes, data processing centers, ventilation exhaust air, lighting, and the building occupants themselves. For this survey, a waste heat recovery system was said to exist if there was equipment for the specific purpose of collecting and redistributing waste heat. For example, air ducts or heat pumps might be installed to redistribute waste heat within a building, or heat from chillers might produce hot water for heating coils in air handling units. Not considered was the passive use of radiant heat from lighting, workers, motors, ovens, etc., where no special heat collecting and redistributing systems existed. The number of waste heat recovery systems reported in this survey represents a conservative estimate, since counts were obtained from responses to open-ended questions concerning heating and heat distribution systems not mentioned in the questionnaire. (See Cogeneration, Air-Conditioning, Heat Pump, HVAC, and Water Heating.)

Waste Incineration -- The burning of otherwise discarded combustible materials to produce energy for space heating, electric power generation, etc. Waste undergoes size reduction in shredders, grinders, or hammermills. Noncombustible materials, if any, are removed. Waste is then dried and burned alone or in combination with fossil fuels.

Water Heating -- In this survey, hot water used mostly for personal hygiene and general cleaning. Not included is production of hot water or steam in boilers for use in space heating, electric power generation, or industrial processes. (See Solar Water Heating Systems and Boiler.)

Weatherstripping or Caulking -- Refers to any material that is placed between the door or window, and the door or window frame in order to reduce the rate of heat or cold loss. (See Insulation and Special Glass.)

Weight -- The weight associated with each sample building is an "inflation" factor by which a building attribute, such as square footage, is multiplied, when using sample values to estimate the values of the population at large. A weight is the number of actual buildings that a particular sample building is meant to represent. Summing over weighted sample values, thus, provides estimates of nationwide totals. Statistically, the weight of a building is the reciprocal of that building's probability of being selected into the sample and is known as a "basic weight". When an interview is unobtainable for a particular building, the basic weights of other similar sample buildings must be adjusted so that they collectively represent this nonrespondent. Basic weights then become "adjusted weights". Two adjusted weights are used in the tabulations for this report. The cross-sectional weight is used in tables that show 1983 building characteristics. The longitudinal weight is used in tables that show changes in buildings since 1979. Small differences may be noted between these weights. (See Primary Sample Unit or PSU, Multi-stage Area Probability Sampling, and Total Square Footage.)

Well Water for Cooling -- This system uses cool well water (typically 51 to 53 degrees Fahrenheit) for air-conditioning. For example, well water may be pumped directly through cooling coils inside of building air-handling units, or it may be employed to remove heat from a heat pump. Auxiliary cooling may be necessary during the warmest part of the season. (See Air-Conditioning, Solar Air-Conditioning Systems, and Heat Pump.)

Wind Energy -- Energy present as wind motion can be converted to mechanical energy for driving pumps, mills, electric power generators, etc. Wind pushes against sails, vanes, or blades radiating from a central rotating shaft.

Window Unit -- Window air-conditioners are self-contained units that are installed in a window. (See Air-Conditioning, Central Air-Conditioning Systems, and Wall Unit.)

Year Constructed -- Is the year in which the major or largest portion of a building was constructed. If a building was classified as a "New Building" due to large additions to its square footage, its year constructed was taken to be the completion date for those additions. (See Large Additions and Dodge.)

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