

Household Energy Consumption and Expenditures 1987

Part 1: National Data



EIA Energy
Information
Administration

Residential Energy Consumption Survey

Cover Caption: The single-family home, mobile home, townhouses and apartment buildings are examples of sampled housing units in the Residential Energy Consumption Survey.

Note: Title for this report, Household Energy Consumption and Expenditures 1987, Part I: National Data has been shortened. Previous editions included the survey and survey period in the title, for example: Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 Through March 1985.

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DOE/EIA-0321/1(87)
Distribution Category UC-98

Household Energy Consumption and Expenditures 1987

Part 1: National Data

Energy Information Administration
Office of Energy Markets and End Use
U.S. Department of Energy
Washington, DC 20585

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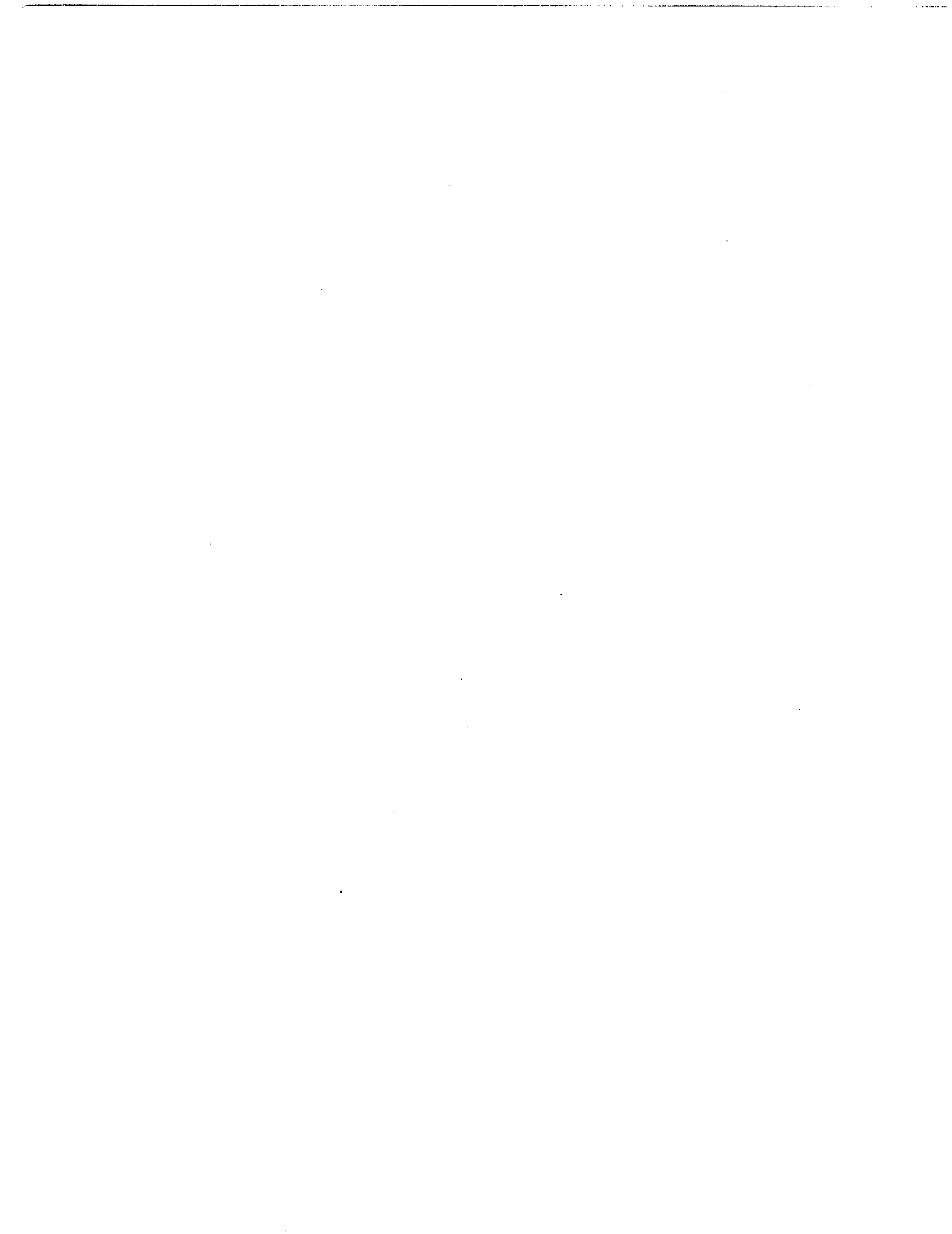
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Executive Summary

Residential energy consumption and expenditure patterns were different in 1987 than in previous years. In contrast to previous RECS findings, the 1987 RECS reported an increase in average household electricity consumption and a decrease in average household energy expenditures. These findings are from the 1987 Residential Energy Consumption Survey (RECS), conducted by the Energy Information Administration (EIA).

Other key findings include:

- Nationally, over one-half of all household energy is used for space heating.
- In 1987, households used more energy for air conditioning and less energy for space heating and water heating compared with 1984. This difference in consumption patterns was due partially to warmer weather in both the summer and winter months.
- The decrease in space-heating consumption was more pronounced among households that heated with natural gas or electricity.
- The per household amount of energy used for electrical appliances was greater in 1987 than 1984, while less energy was used for natural gas appliances in 1987 than in 1984.
- In housing units constructed in 1980 or after, the average heating intensities (Btu per square foot and per heating degree-day) of all main space-heating fuels was significantly lower than in homes constructed in the 1950's and 1960's.
- The elderly used more energy for space heating and less energy for water heating, air conditioning, and appliances than the nonelderly.

This is the second report based on 1987 RECS data. The 1987 RECS, the seventh in a series of national surveys of households and their energy suppliers, provides baseline information on how households in the United States use energy. A randomly selected set of housing units that includes single-family detached homes, townhouses, apartment buildings, condominiums, and mobile homes were selected for the survey. Data from the RECS and a companion survey, the Residential Transportation Energy Consumption Survey, are available to the public in published reports such as this one and on public use tapes.¹

Table ES1 summarizes energy consumption and expenditures for 1978, 1981, 1984, and 1987 and allows the reader to discern household trends. Between 1978 and 1987, total energy consumption decreased by 14 percent while the number of households increased by 18 percent. This decline in consumption shows the strong effect of past energy conservation efforts.² Figure ES1 shows the proportion of household energy that was used for space heating, water heating, air conditioning, and appliances in 1987.

¹See Appendix G, "Related EIA Publications on Energy Consumption" for a list of EIA publications available concerning the consumption of energy.

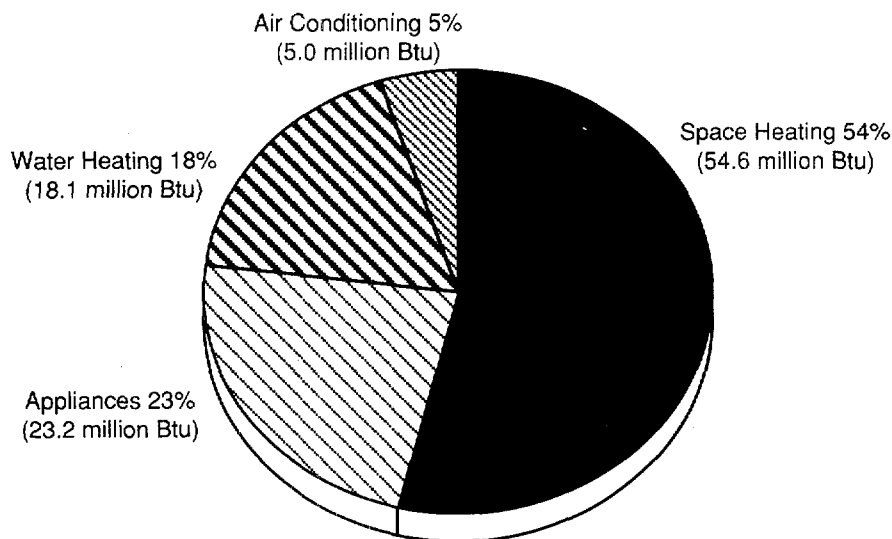
²The trend, not adjusted for weather effects, may be slowing since 1987 RECS data indicate increased usage of household air conditioning and heating systems since 1985.

Table ES1. U.S. Household Energy Consumption and Expenditures for 1978, 1981, 1984, and 1987

	1978	1981	1984	1987
Total Households (million)	76.6	83.1	86.3	90.5
Energy Consumption				
Total (quadrillion Btu)	10.6	9.5	9.0	9.1
Average (million Btu per household)	137.9	114.4	104.7	100.8
Energy Expenditures				
Total (billion dollars)	55.5	85.0	97.0	97.7
Average (dollars per household)	724	1,022	1,123	1,080
Price (dollars per million Btu)				
All Fuels	5.26	8.93	10.73	10.71
Natural Gas	2.69	4.55	5.97	5.41
Electricity	11.85	18.51	21.94	22.34
Fuel Oil/Kerosene	3.93	8.89	7.64	5.89
Liquefied Petroleum Gas	5.05	8.74	9.91	8.91

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1978, 1981, 1984 and 1987 Residential Energy Consumption Surveys.

Figure ES1. U.S. Energy Consumption per Household by End Use, 1987



Consumption per household = 100.8 million Btu

Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

Introduction

Household Energy Consumption and Expenditures 1987, Part 1: National Data is the second publication in a series from the 1987 Residential Energy Consumption Survey (RECS). It is prepared by the Energy End Use Division (EEUD) of the Office of Energy Markets and End Use (EMEUE), Energy Information Administration (EIA). The EIA collects and publishes comprehensive data on energy consumption in occupied housing units in the residential sector through the RECS.

Background

The data for this report are based both on the household interviews from the 1987 RECS, conducted in the fall of 1987, and on energy billing data collected from the households' energy suppliers in early 1988. The billing data cover the 12-month period from January 1987 through December 1987. The 1987 RECS represents 90.5 million households in the 50 States and the District of Columbia.

The RECS is a national multistage probability sample survey currently conducted on a triennial basis. The 1987 RECS is the seventh survey in the series. Previous RECS were conducted annually from 1978 to 1982 and then in 1984. The RECS data are collected in two stages. In the first stage, household characteristics data are collected via a personal interview with the household. At the end of that interview, the respondent is asked to sign an authorization form allowing the suppliers of energy to the household to release household billing information to the survey contractor. The second stage of RECS is a mail survey requesting household energy consumption and expenditure information from the energy suppliers. The RECS includes both a longitudinal component that measures energy changes over time and a subsample that provides information on residential vehicles. The longitudinal component collects data on the same housing units in two subsequent surveys. The transportation subsample is drawn from the RECS based on initial information on household vehicles. Additional vehicle-related data are then collected in the Residential Transportation Energy Consumption Survey (RTECS) and reported in the publication titled *Household Vehicles Energy Consumption 1988* to be published at the end of 1989. The EIA also conducts energy consumption surveys in the commercial and manufacturing sectors. See Appendix G,

"Related EIA Publications on Energy Consumption" for a listing of publications from the RECS and other EIA surveys in the residential transportation, commercial, and manufacturing sectors.

This report covers household energy consumption, expenditures, and prices for natural gas, electricity, fuel oil and kerosene, and liquefied petroleum gas (LPG) as well as household wood consumption. Data are presented in the form of aggregate totals and household averages. Also included are estimates of consumption and expenditures for the four end uses of residential energy: space heating, air conditioning, water heating and appliances. The values presented for the end-use estimates are based on the 1987 RECS and are disaggregations of actual bills using a nonlinear regression technique. (See Appendix B, "End-Use Estimation Methodology" for details on the procedures used to calculate the end-use estimates.)

Measures of energy use are also presented in the form of heating and air-conditioning intensities. These intensities are ratios of consumption to weather and floorspace. The values for space-heating intensities are presented as Btu or cents for space heating per heating degree-day (HDD) and per heated square foot. Values for air conditioning are presented as Btu or cents for air conditioning per cooling degree-day (CDD) and per cooled square foot. (See Appendix C, "Quality of the Data" for a comparison of the methods used to calculate the 1984 and 1987 Btu per HDD and per square foot.)

Housing Characteristics 1987, published in May 1989, was the first report based on the 1987 RECS. It focused on the energy-related characteristics of housing units and the change in household attitudes toward energy usage and conservation since 1984. Energy characteristics included type, size, and age of the housing structure; energy sources used for main and secondary heating; types of heating and air-conditioning equipment; types of appliances, insulation and retrofits; thermostat settings and uses of air-conditioning equipment. Household demographic data and climate data were also included.

A third report, titled *Household Energy Consumption and Expenditures 1987, Part 2: Regional Data*, is planned for release in late 1989. It will contain consumption, expenditure and price data by Census region and Census division.

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

The statistics published in this report are based on a sample from the population of all residential housing units in the United States as of November 1987. As a result, all the numbers are estimates rather than exact measures for the population. As described in Appendix C, "Quality of the Data," the accuracy of each estimate is indicated by the relative standard error (RSE). In general, no estimates were published that were based on fewer than 10 sample households or that had an RSE greater than 50 percent. Most of the tables of estimates in the section titled "Detailed Statistics" include corresponding RSE's that can be calculated using row/column RSE factors that are shaded on each table. Tables 13 and 21 do not have readily identified RSE's. These tables contain median values for which RSE's were unavailable. All comparisons reported in the text were made at the 0.05 level of statistical significance. No adjustments were made for simultaneous inference. Unless otherwise noted, consumption is reported for all fuels in terms of energy (Btu) delivered to the site of use. No adjustment was made for the primary fuels consumed to produce electricity.

The EIA gratefully acknowledges the cooperation of the respondents in supplying the information used to produce the estimates in this report.

Organization of the Report

A detailed discussion of the highlights presented in the Executive Summary follows this section. Tables and figures interspersed throughout the text highlight information of special interest or summarize a finer breakdown given in the "Detailed Statistics" section. Extensive cross-tabulations of housing characteristics, household characteristics, energy consumption and expenditures, and end use appear in the "Detailed Statistics" section, following the main text. The detailed tables in this section are divided into two types, the Consumption and Expenditure Data Tables and the Energy End-Use Tables. The first group of tables display energy consumption and expenditures data that are obtained directly from the RECS. The second group of tables display energy consumption and expenditures for four end uses--space heating, water heating, air conditioning, and appliance usage. These estimates are based on the 1987 RECS and were obtained using a nonlinear regression technique. Appendices A through C contain information on how the survey was conducted, how the end-use estimates were calculated, and on the quality of the data. Procedures for calculating RSE's are located in Appendix C, "Quality of the Data."

The data for the RECS are collected on Forms EIA-457A through G found in Appendix D, "Survey Forms." The Climate Zone and Census Regions and Divisions maps are located in Appendices E and F. A list of related EIA publications is found in Appendix G. Definition of the terms used in this report are located in the "Glossary."

Change in Annual Consumption Period

The annual period for the RECS consumption data has changed beginning with the 1987 RECS. Consumption data are now collected for the calendar year (January through December of the report year). Previous RECS collected consumption data for the 12-month period of April through March. For example, the 1984 RECS reports contained consumption data for April 1984 through March 1985. The change in the annual consumption period was made to make the RECS consumption estimates more consistent with other EIA data systems that are based on data for a calendar year.

The change to calendar year could increase the potential bias of the estimates of total energy consumption and total energy expenditures because of a change in the midpoint of the consumption period. The change should not affect the estimates of average consumption or average expenditures (See Appendix C, "Quality of the Data").

This change is not anticipated to have a major effect on the quality of the consumption and expenditures estimates. The length of the consumption period remains the same; data collection schedules have been adjusted to collect data for the January through December period. Consumption data stated in this report were collected for the 12-month period beginning in January 1987. (See Appendix C, "Energy Price and Expenditure Data Report 1970-1980 State and U.S. Total," July 1983, DOE/EIA-0376 for a comparison of the two data collection periods based on adjustment of the April through March collection period to the January through December collection period.)

Energy Consumption Patterns

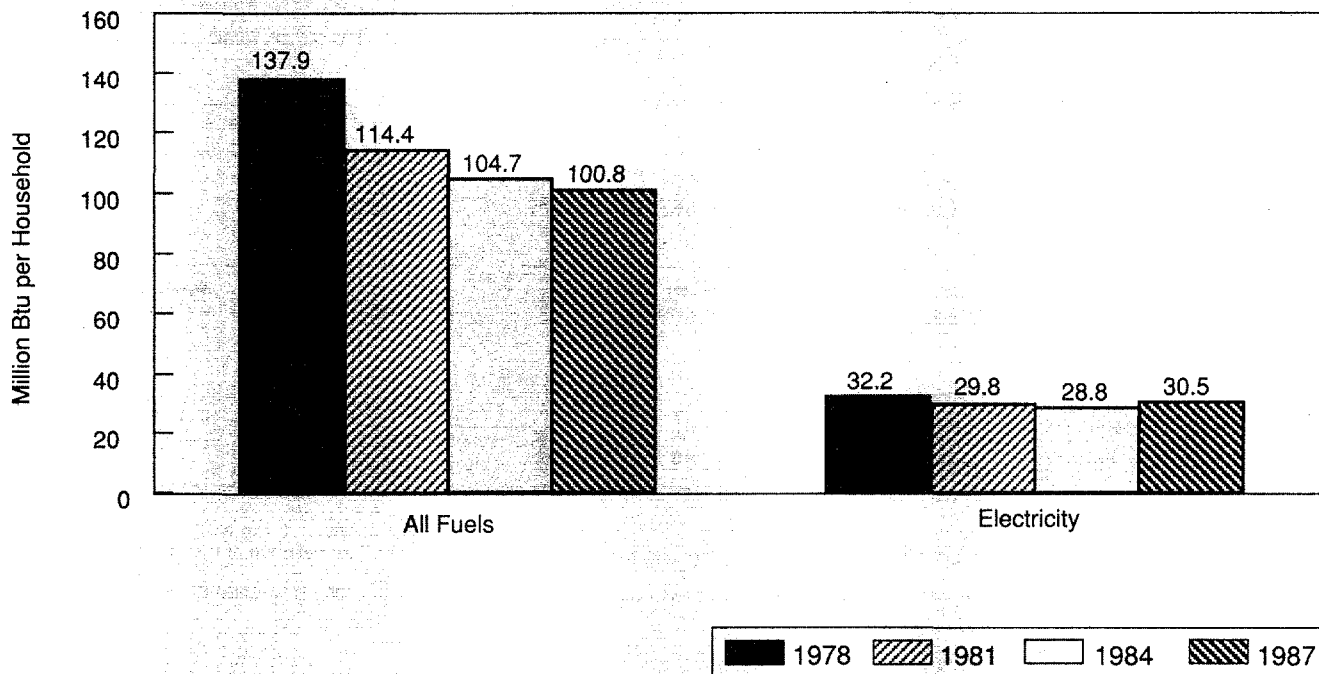
Electricity Consumption Increased

The average consumption of electricity was greater in 1987 than in 1984. Electricity consumption per household was 30.5 million Btu in 1987 compared to 28.8 million Btu in 1984. This 6 percent increase in average electricity consumption contrasts with the previous

RECS's that have shown a long-term drop in per household electricity consumption. The average overall energy consumption continued the downward trend that has been observed in previous RECS (Figure 1).

Between 1984 and 1987, the household's energy-related behavior changed. Several of the energy-related changes could depress electricity consumption in the household, while at the same time other changes could expand the electricity consumption.

Figure 1. Consumption per U.S. Household of Major Fuels and of Electricity for 1978, 1981, 1984, and 1987



Notes: • Electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. "See "Glossary" for definition of site energy.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1978, 1981, 1984, and 1987 Residential Energy Consumption Surveys.

Factors tending to increase electricity consumption are:

- In 1987, 64 percent of the households were air conditioned with electricity compared to 60 percent in 1984.
- The summer of 1987 was warmer than 1984. In 1987 the average CDD was 1,368, in 1984 the average CDD was 1,153.³
- Among the air-conditioned households, 53 percent had a central air-conditioning system in 1987 compared to 49 percent of the households in 1984.
- Among the air-conditioned households, the percent of households that were operating their air conditioners "all summer" increased from 23 percent in 1984 to 32 percent in 1987.
- More households in 1987 compared to 1984 were using energy-intensive electrical appliances.

Factors tending to decrease electricity consumption are:

- The number of households using microwave ovens increased from 34 percent in 1984 to 61 percent in 1987.
- In 1987, 5 percent of the households were using heat pumps as the main type of heating equipment. In 1984, 4 percent were using them.

Energy End-Use Patterns

A household uses energy for four major operational purposes (end-uses): space heating, water heating, air conditioning and appliance use. The consumption and expenditure patterns of these end uses help explain the overall per household consumption and expenditures. The end-use estimates in this report are based on the 1987 RECS consumption and expenditure data and were obtained using a nonlinear regression technique. Tables 23 through 32 in the "Detailed Statistics" section contain per household estimates for the four end uses by various energy-related characteristics. (See Appendix B, "End-Use Estimation Methodology" for a discussion of the procedures used to calculate the end-use estimates.)

Total Energy Consumption

Table 1 provides national estimates for the four end uses by fuel type. A total of 4.94 quadrillion Btu were used in the residential sector for space heating and another 2.10 quadrillion Btu were used for appliances.

Table 1. U.S. Household Consumption of Major Fuels by End Use, 1987
(Quadrillion Btu)

	Space Heating	Water Heating	Air Conditioning	Appliance Usage
Total	4.94	1.64	0.45	2.10
Electricity	.28	.31	.44	1.72
Fuel Oil/Kerosene	1.05	.17	NC	.00
Liquefied Petroleum Gas	.22	.06	NC	.04
Natural Gas	3.38	1.10	.01	.34

NC = No cases in sample.

Notes: • End-use estimates are based on the 1987 RECS and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

³See Appendix C, "Quality of the Data" for a discussion of the weather data.

Average Energy Consumption

The per household energy consumption was 100.8 million Btu in 1987. Of this amount, it is estimated that 54 percent of energy used was for space heating, 23 percent for appliances, 18 percent for water heating, and 5 percent for air conditioning.

In 1987 compared to 1984, the per household amount of energy used for space heating and water heating decreased by 8 percent and 4 percent, respectively, while the amount of energy used for air conditioning increased by 19 percent from 4.2 million Btu to 5.0 million Btu. The amount of energy used by electrical appliances increased while the amount of energy used by natural gas appliances decreased (Table 2). Part of the change in the amount of energy used for space heating and appliances can be explained by a change

in the regression procedure that is used to estimate the end-use consumption. The change in methodology accounted for less than 10 percent of the space-heating change and approximately 28 percent of the change in electric appliance consumption (See Appendix B, "End-Use Estimation Methodology" for a discussion of this change).

Main Heating Fuel

The percent of energy used for each of the four end uses varies by the type of fuel used in the household. Figure 2 shows the average consumption of natural gas, electricity, LPG, and fuel oil and kerosene for each of the four end uses for the households that use natural gas, electricity, LPG and fuel oil, and kerosene.

Table 2. Changes in U.S. Household Average Energy Consumption by End Use, 1984 and 1987
(Million Btu per Household)

	1984	1987	Change in Average Btu	Percent Change
Total	104.7	100.8	-3.9	-3.7
Space Heating	59.4	54.6	-4.8	-8.1
Water Heating	18.8	18.1	-0.7	-3.7
Air Conditioning	4.2	5.0	+0.8	+19.0
Appliance Usage	22.2	23.2	+1.0	+4.5
Electrical Appliance Usage ^a	17.7	19.0	+1.3	+7.3
Natural Gas Appliance Usage ^b	6.3	5.9	-0.4	-6.3

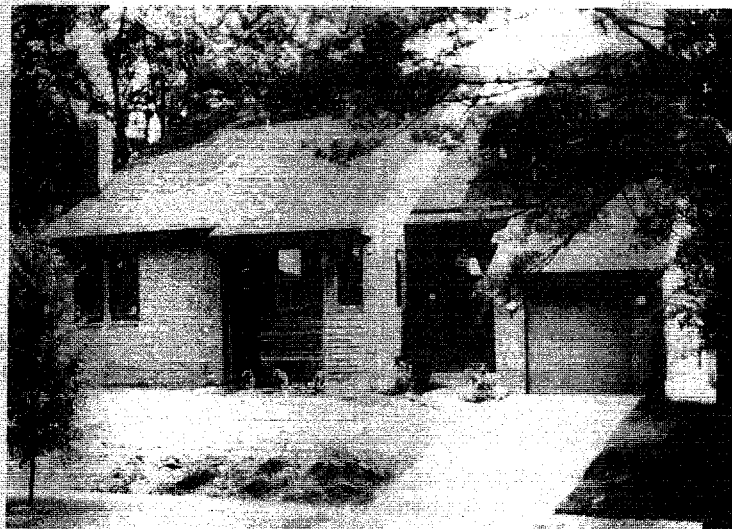
^a The average electricity consumption for appliances is the average over all households.

^b The average natural gas consumption for appliances is the average over the set of households that use natural gas.

Notes: • End-use estimates are based on the 1984 and 1987 RECS and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy.

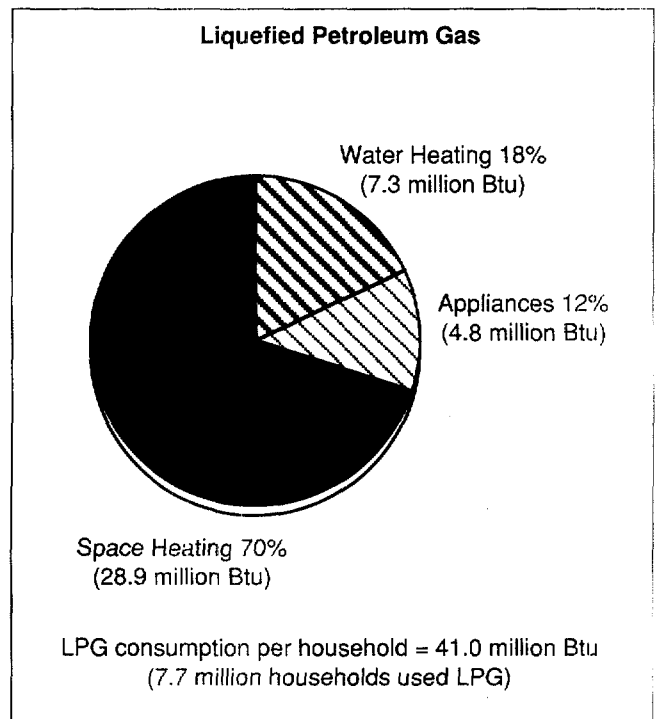
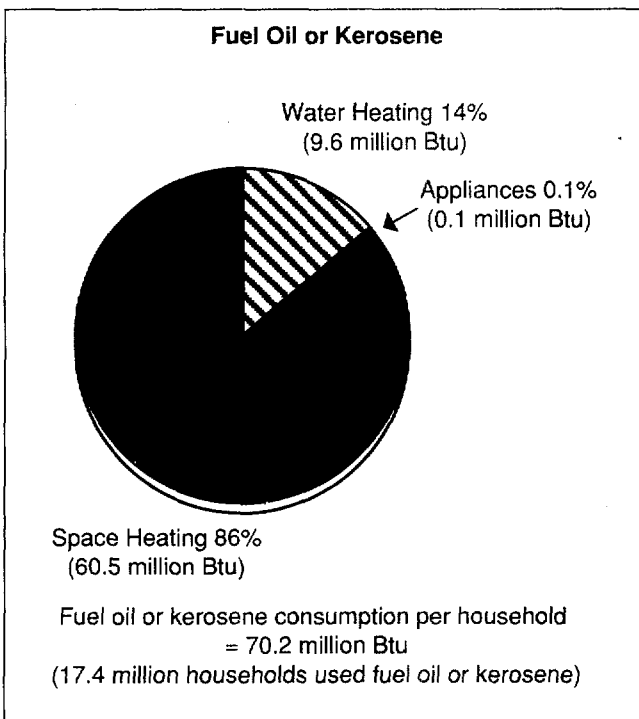
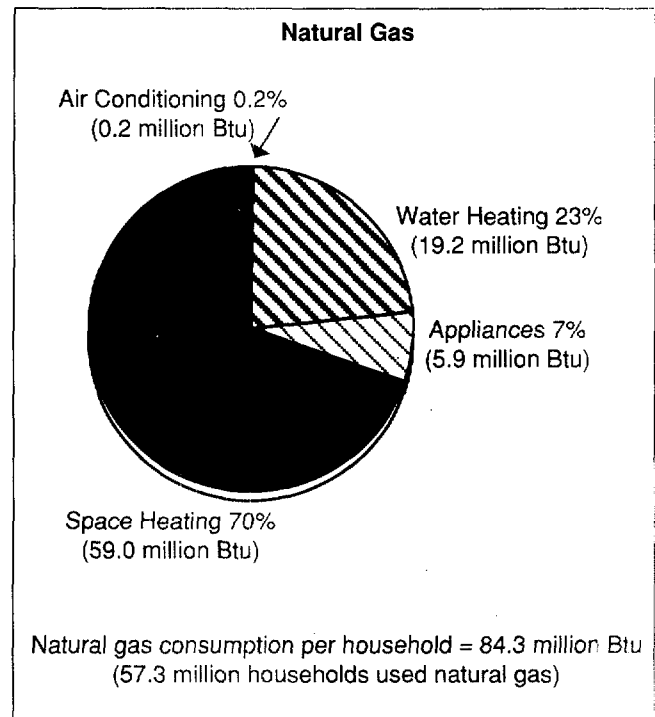
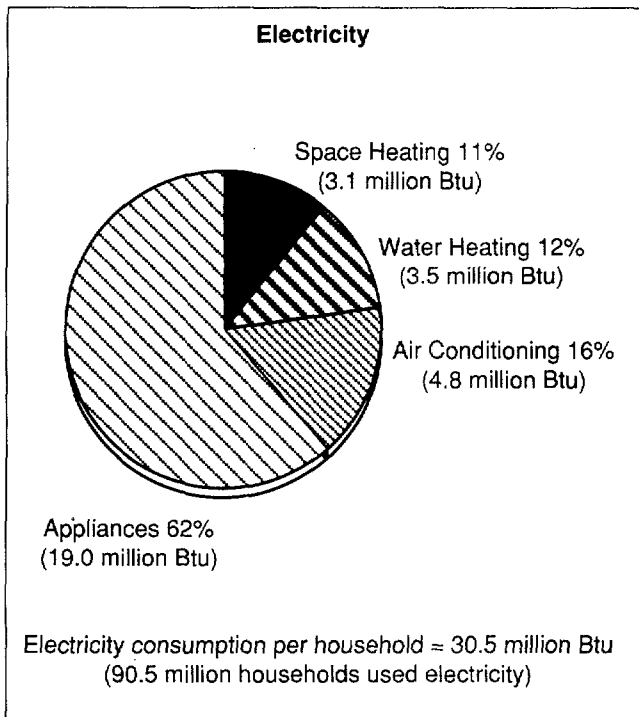
• The average energy consumption for air conditioning is the average over all households. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1984 and 1987 Residential Energy Consumption Surveys.



This single-family detached housing unit is an example of some of the housing structures included in the RECS.

Figure 2. Consumption of Electricity, Natural Gas, Fuel Oil or Kerosene, and LPG per U.S. Household by End Uses, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

1987 Household Electricity Consumption Greater than 1984

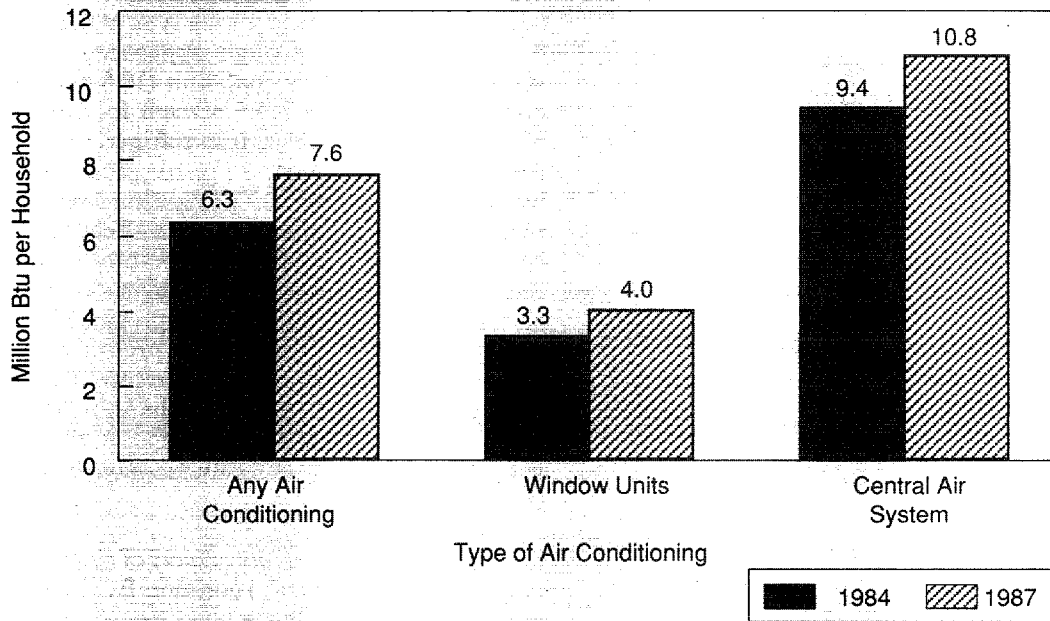
The increase in average electricity consumption per household between 1984 and 1987 was due primarily to an increase in the amount of electricity that was used by air conditioners and other appliances.

Air Conditioners

Among the 57.1 million households that used electric air conditioning in 1987, 21.7 percent of these households' total electricity consumption was used for air conditioning. The per household electricity consumption attributed to air conditioners was 7.6 million Btu, 20.6 percent more than was consumed in 1984. In 1987, households that cooled with central air used 6.8 million more Btu than households that cooled with window units (Figure 3).

Twice as much electricity was used during the summer for air conditioning among households operating their air conditioners (central air-conditioning systems or wall units) "all summer" compared to households operating their air conditioners "quite a bit".

Figure 3. Electricity Consumption per U.S. Household for Air Conditioning by Type of Air Conditioning, 1984 and 1987



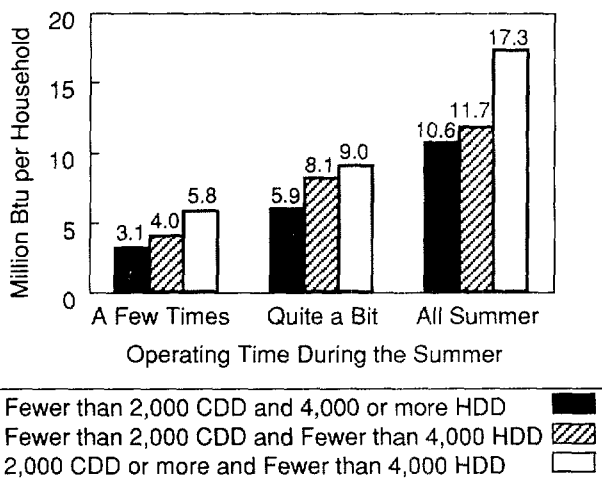
Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1984 and 1987 Residential Energy Consumption Surveys.

The RECS collects information about the length of time households operated their air conditioners during the summer months. In 1987, 32.4 percent of households reported operating their air conditioners "all summer" as opposed to "quite a bit" or "only a few times" during the summer.

The amount of electricity used by air conditioners is related to both the weather and how often the air conditioner is operated by the household. In the 1987 RECS, differences in both the number of CDDs and in household behavior relating to use of the air conditioner played a part in the amount of electricity used for air conditioning. Households living in the coldest three climate zones that operated their air conditioners only a few times consumed an average of 3.1 million Btu of electricity while households that operated their air conditioners all summer in the same climate zones consumed an average of 10.6 million Btu. Households that lived in the warmest two climate zones and operated their air conditioners only a few times consumed an average of 5.8 million Btu while all summer users consumed an average of 17.3 million Btu (Figure 4).

Figure 4. Electricity Consumption per U.S. Household for Air Conditioning by Operating Time and Climate Zones, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

Appliances

The RECS collects data on the presence of major household energy-using appliances. For some of these appliances, the number found in the home is included. In 1987, the per household amount of electricity used by appliances was 19.0 million Btu, 1.3 million Btu more than was used in 1984. Respondents living in single-family housing units used twice as much electricity for appliances than respondents living in buildings of two or more housing units (22.3 million Btu, 11.5 million Btu, respectively). Households with incomes of \$35,000 or more used 83.7 percent more electricity for appliances than households with incomes of less than \$10,000 (Figure 5).

Refrigerators Use One-Fifth of Household Electricity

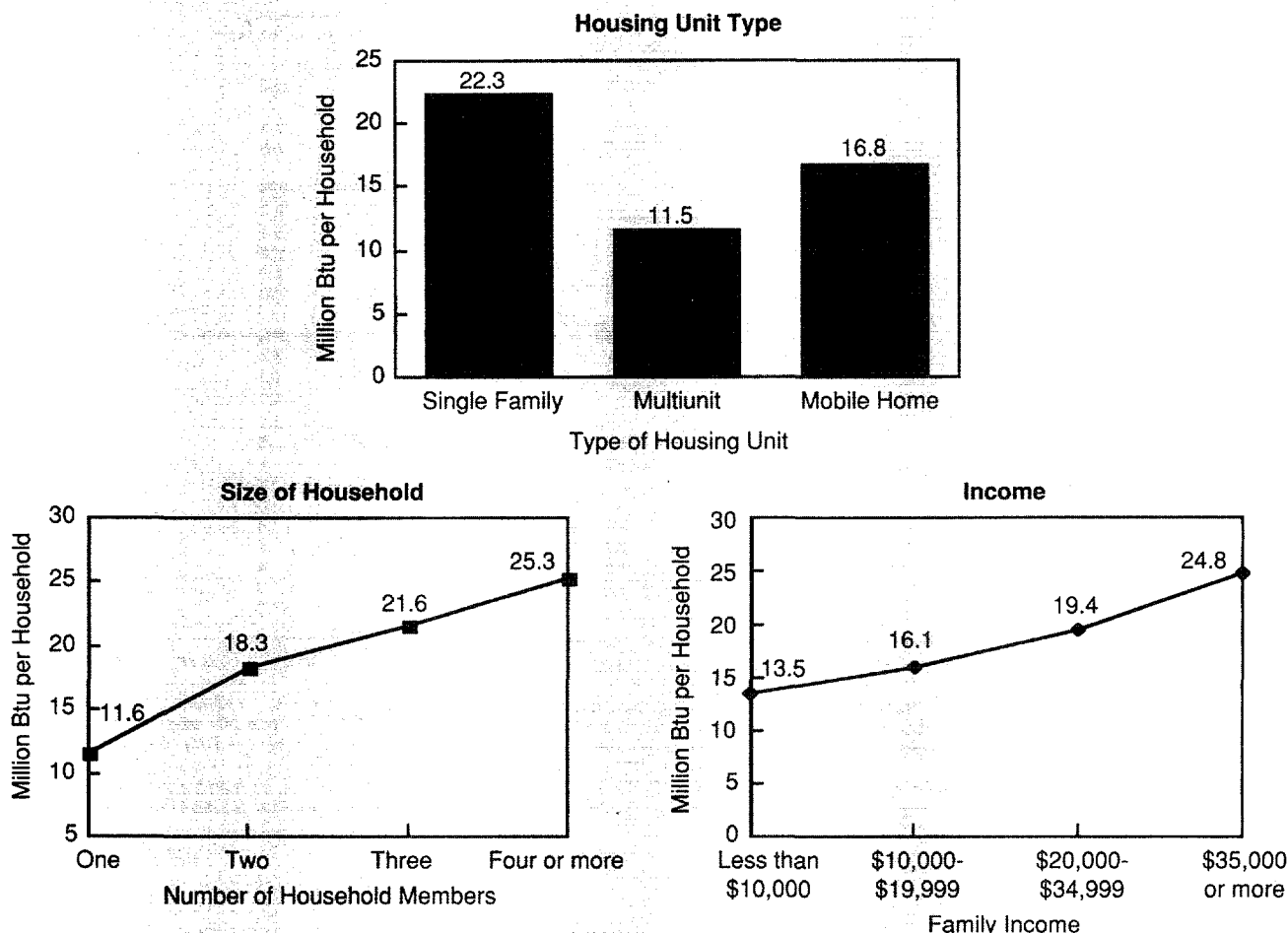
Household appliances that use electricity can be divided into two tiers depending on the amount of electricity that is consumed by each type of appliance. The first tier consists of a single appliance--refrigerators. Refrigerators use about one-fifth (19.8 percent) of all household electricity (14.5 percent for frost free and 5.3 percent for nonfrost free refrigerators). Of total electricity consumption, a greater proportion is used by refrigerators than the proportion used for either space heating (10.2 percent), water heating (11.5 percent), or air conditioning (15.7 percent) even though these end uses are more energy intensive than refrigerators. The greater use in the aggregate of electricity by refrigerators is a result of the prevalence of refrigerators. Almost every home uses electricity to operate a refrigerator (with 14 percent of the households having more than one refrigerator) while not all households use electricity for space heating, water heating or air conditioning.

Along with these major consumers of electricity, a second tier of appliances each consume from 1 to 6 percent of total electricity. This second tier of electric appliances includes clothes dryers (5.6 percent), color television sets (5.2 percent), freezers--manual or automatic (5.1 percent), range and oven (3.8 percent), and water-bed heaters (2.5 percent). Since the number of homes with water beds has been increasing rapidly (50 percent increase from 1984 to 1987⁴), the ranking for water-bed heaters may change in the near future.

Electrical appliances have been ranked by total energy consumption using data from several sources (Table 3). The number of appliances in the United States is

⁴See *Housing Characteristics 1987* DOE/EIA-0314(87), May 1989, p. 8 for a discussion of the increase in electrical appliance usage in the household.

Figure 5. Electricity Consumption per U.S. Household for Appliance Usage by Selected Household Characteristics, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

from the 1987 RECS and the annual consumption per appliance is from the Edison Electric Institute (EEI) and metered data published in *Energy Auditor & Retrofitter* (Nov/Dec 1987). The consumption data from the EEI are from a series of end-use submetering experiments conducted by various utilities scattered around the United States.⁵ (For RECS estimates of consumption for space heating, water heating or air

conditioning see the tables in "Detailed Statistics" in this report.)

Although the amount of error in both the estimates of appliance consumption and the percent of total electricity consumption are unknown in Table 3, the estimates still provide a broad ranking of the consumption of electric appliances based on both the prevalence of the appliance and on the average consumption of the appliance.

⁵The results of a comparison by the EEUD of some of these submetering estimates with the RECS estimates will be discussed in a report to be released in the future.

Table 3. U.S. End-Use Consumption of Electricity for Selected Appliances, 1987

Appliances	Million Units	Annual kWh	Total Electric Appliance Consumption		Percent of Total Electric Appliance Consumption	Percent of Total Electricity Consumption
			(billion kWh)	(trillion Btu)		
Total	NA	NA	504.0	1,719.6	100.0	62.4
Frost-free Refrigerator ^a	73.7	1,591	117.3	400.1	23.3	14.5
Clothes Dryer	45.9	993	45.6	155.6	9.0	5.6
Non Frost-Free Refrigerator ^a	28.5	1,500	42.8	145.9	8.5	5.3
Color TV ^a	131.5	320	42.1	143.6	8.4	5.2
Range/Oven	51.4	596	30.7	104.6	6.1	3.8
Furnace Fan	46.8	650	30.4	103.8	6.0	3.8
Manual Freezer	20.8	1,050	21.8	74.5	4.3	2.7
Water-bed Heater	12.5	1,600	20.0	68.2	4.0	2.5
Frost-free Freezer	10.6	1,820	19.3	65.8	3.8	2.4
Ceiling Fan	41.8	170	7.1	24.2	1.4	.9
Clothes Washer	66.4	103	6.8	23.3	1.4	.8
Dishwasher	39.0	165	6.4	22.0	1.3	.8
Microwave Oven ^a	55.0	100	5.5	18.8	1.1	.7
Blanket	27.2	147	4.0	13.6	.8	.5
Black/White TV ^a	39.4	100	3.9	13.4	.8	.5
Dehumidifier	9.0	377	3.4	11.6	.7	.4
Well Pump	4.7	500	2.4	8.0	.5	.3
Humidifier	13.2	163	2.2	7.3	.4	.3
Swimming Pool Pump	2.0	1,000	2.0	6.8	.4	.2
Swimming Pool Heater	.6	3,000	1.8	6.1	.4	.2
Whole-house Fan	8.6	200	1.7	1.9	.3	.2
Residual	NA	NA	86.8	296.2	17.2	10.7

^a Counts of individual appliances within the household. Other units are counts of households that may have one or more indicated appliances.
NA = Data not available.

Notes: • Electricity consumption for central and room air conditioning, space heating, water heating, and portable heaters is excluded. • Total electricity consumption in the 1987 RECS was 808 billion kWh. • Total electricity consumption for appliances in the 1987 RECS was 504 billion kWh. • "Residual" includes appliances not listed such as lighting, small cooking appliances, computers, and electric tools. It also includes the error term in estimating the energy consumption of the listed appliances. See "Glossary" for definition of Btu conversion.

Sources: • Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey. • Edison Electric Institute, Washington, DC. • Maier, Alan, "Saving the 'Other' Energy in Homes," *Energy Auditor & Retrofitter*, (Nov/Dec 1987).

Space Heating

The average amount of energy a household used for heating a home in 1987 was 54.6 million Btu. Among natural gas heated homes, 66.9 million Btu of natural gas was used for space heating and among electrical heated homes 14.5 million Btu of (site) electricity was used.

Electricity consumption is the measured electricity that is consumed at the site (the housing unit). This measurement does not account for the amount of energy that is required to generate the electricity. To account approximately for energy used for generation, the site value of electricity is multiplied by a factor of three.

The amount of both natural gas and electricity that was used for space heating decreased from 1984 to 1987. In natural gas-heated homes, the amount of natural gas that was used for space heating decreased by approximately 7.9 percent from 72.6 million Btu in

1984 to 66.9 million Btu in 1987. The amount of electricity used for heating decreased by 12.7 percent among households that used it as the main source of heat (16.6 million Btu in 1984 to 14.5 million Btu in 1987). Only about one-sixth of this decrease was due to a change in the methodology used to estimate electric space heating.

The weather and the household energy related behavior, reflected by the level of indoor thermostat settings, are two factors that influence the amount of energy that is consumed in the household. In the 1987 RECS weather played a large part in the decrease in space heating consumption. In 1987, the weather was 8 percent warmer (4,203 HDD) than the normal average, while in 1984, the weather was 2 percent colder than the normal average. Previous analysis of the 1987 RECS indicated that households were maintaining higher indoor temperatures in 1987 than in 1984 (*Housing Characteristics 1987*, DOE/EIA-0314(87)). This behavior would normally result in increased consumption. Since consumption decreased it appeared that weather in 1987 had a greater influence than behavior.

Space-Heating Intensity

A method of adjusting the amount of energy consumed for space heating for the effects of both the weather and size of a residence is to compute a ratio of the space-heating consumption to HDD and to floorspace. (See the Heating and Cooling Intensities box in this section.) This ratio provides a measure of the heating intensity.

In 1987, the average household's heating intensity was 8.7 Btu per HDD and per square foot. Heating intensities varied by type of main heating fuel, and the type and age of the residence. Heating intensities ranged from 3.4 Btu per HDD and per square foot for electrically heated homes to 10.0 Btu per HDD and per square foot for natural gas-heated homes. When site electricity was adjusted, the heating intensity for electrically heated homes increased from 3.4 Btu per HDD and per square foot to 10.2 Btu per HDD and per square foot, making electricity consumption comparable to fossil fuels.

Type of Housing Unit: Heating intensities in single-family units and multiunit structures differed by the type of primary heating fuel. When the main heat was a fossil fuel, single-family housing units had lower heat-

ing intensities than multifamily housing units. When electricity was the main source of heating energy, the average amount of electricity used for space heating did not differ at a statistically significant level between single and multiunit structures, after adjusting for the weather and the size of the housing unit (Table 4).

Age of Housing Unit: The heating efficiency of newer homes can be addressed by looking at the average heating intensity by the age of the housing structure. In newer homes (housing units constructed in 1980 or after), the average heating intensities of all main space heating fuels were significantly lower than in homes constructed in the 1950's and 1960's.

Single-family housing units that were heated with natural gas showed a consistent decrease in space-heating consumption by the age of the housing unit beginning with 10.7 Btu per HDD and per square foot for homes built before 1950 and decreasing to 7.0 Btu per HDD and per square foot for homes built in 1980 or after. Electrically heated homes constructed in 1980 and after used one-third less site electricity per HDD and per square foot for space heating than homes constructed in the 1950's and 1960's. Homes constructed between 1950 and 1969 consumed 3.9 Btu per HDD and per square foot. Homes constructed in 1980 and after consumed 2.6 Btu per HDD and per square foot (Figure 6).

Table 4. U.S. Heating Intensities by Type of Housing Structures and Main Heating Fuel, 1987
(Btu per HDD and per Square Foot)

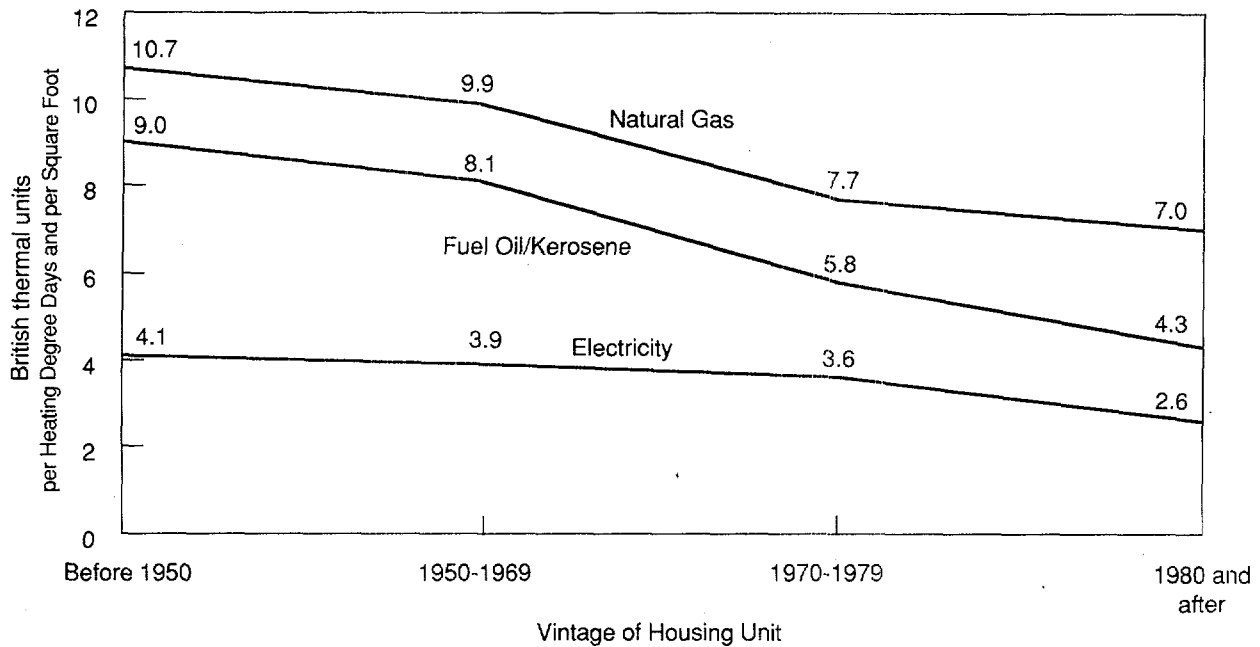
Type of Main Heating Fuel	Type of Structure		
	Single Family	Multiunit	Mobile Home
All Fuels	8.2	10.9	10.9
Electricity (Site)	3.4	3.1	5.6
Natural Gas	9.6	12.3	13.3
Fuel Oil/Kerosene	8.1	13.2	13.8
Liquefied Petroleum Gas	8.9	NC	11.9

NC = No cases in sample.

Notes: • End-use estimates are based on the 1987 RECS and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

Figure 6. U.S. Heating Intensity for Single-Family Homes by Vintage of Housing Unit and Main Heating Fuel, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • See Appendix C, "Quality of the Data" for a discussion of heating intensity. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

Heating and Cooling Intensities

A conventional method of adjusting or controlling for the effects of the weather and the size of a residence on consumption is to present consumption in terms of Btu per heating degree-day or cooling degree-day and per square foot of the housing unit. These values then provide a measurement of the heating or cooling intensity of that housing unit.

The procedure used to calculate the estimates of the heating intensity for a category of households in the 1987 RECS is:

$$\text{Heating Intensity} = \frac{\text{BTU}}{\text{HDD} \times \text{Sq.Ft.}}$$

Where:

- Btu is the average consumption in Btu for space heating for all households in the category,
- HDD is the average heating degree-days experienced by all households in the category, and
- Sq.Ft. is the average heated square footage of the housing unit for all households in the category.

See Appendix C, "Quality of the Data" for a discussion of an alternative method that was used to calculate the estimates of the Btu per heating degree-day and per square foot that were presented in the *RECS: Consumption and Expenditures March 1984 through April 1985 Part 2: Regional Data*.

Energy Expenditure Patterns

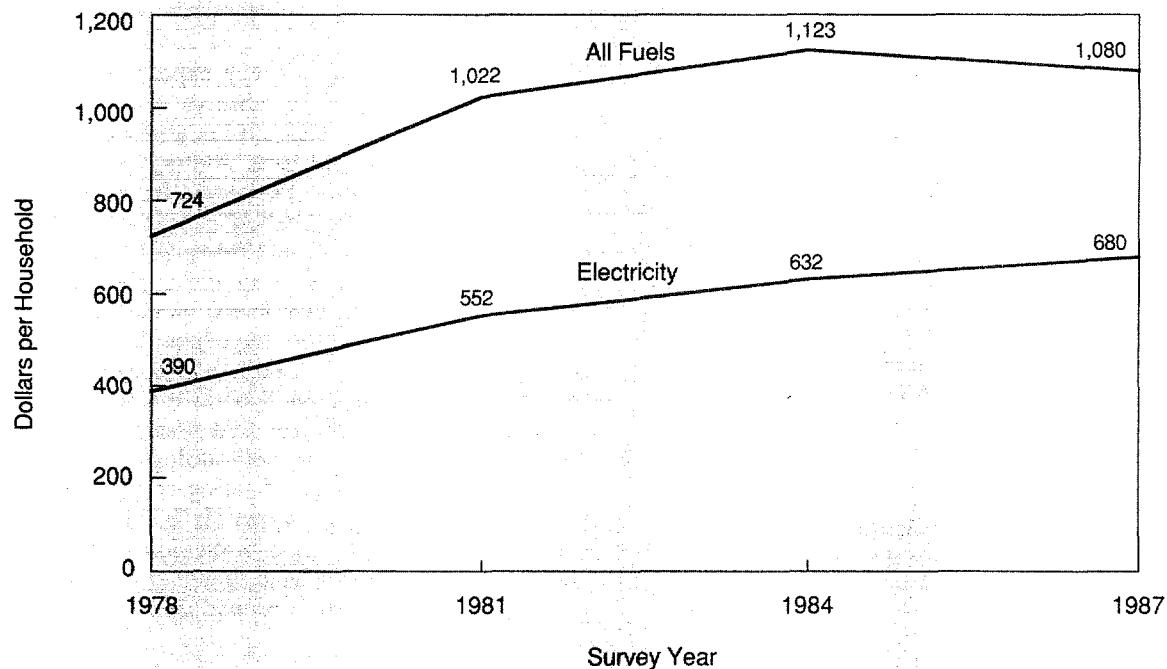
Household Average Energy Expenditures were Less

The household's average energy expenditures were \$43 less in 1987 than in 1984. This marked the first time that a RECS showed a drop in the household's average energy expenditures from the previous RECS. Lower per household energy expenditures reflected in the 1987 RECS were due to a decrease in energy consumption coupled with relatively unchanging overall energy

prices between the 1984 RECS and the 1987 RECS. (Fossil fuel prices declined but electricity prices remained essentially unchanged.)

There was not a decline in expenditures, however, for all types of energy. Electricity expenditures continued to climb while fossil fuel expenditures declined (Figure 7). Energy expenditures are tied directly to both the price of energy and the level of energy consumption. Therefore, even though electricity prices were stable, average electricity expenditures increased, since households were using more electricity in 1987 than in 1984.

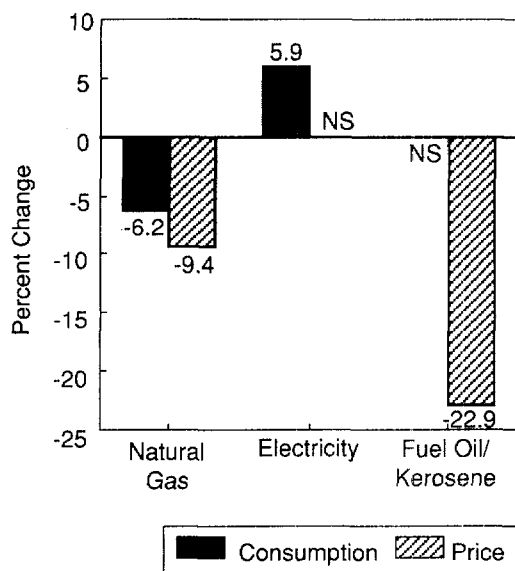
Figure 7. Expenditures per U.S. Household for All Fuels and for Electricity for 1978, 1981, 1984 and 1987



Source: Energy Information Administration, Office of Energy Markets and End Use, 1978, 1981, 1984, and 1987 Residential Energy Consumption Surveys.

Change in Energy Prices: The change in the price of energy did not appear to influence the total residential energy consumption as expected. While fossil-fuel prices declined from 1984 to 1987, the consumption of these fuels also declined. Conversely, households consumed more electricity in 1987 even though there was no statistically significant change in electricity prices from 1984 to 1987 (Figure 8). A mild winter in 1987 and newer homes that were more energy efficient may have had a stronger effect on consumption than the decline in fossil-fuel prices.

Figure 8. Percent Change in U.S. Household Average Energy Consumption and Price, 1984 and 1987



NS= Not statistically significant at the 0.05 level.

Note: • Electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1984 and 1987 Residential Energy Consumption Surveys.

Energy Prices and End-Use Consumption: The price of electricity influenced how a household used electricity. For example, the proportion of households that used

electricity as the main cooking fuel declined from 81 percent of the households to 29 percent when the standard price of electricity increased from less than 5 cents per kilowatt-hour (kWh) to 10 cents or more per kWh (Table 5). The standard price of electricity is the potential monthly cost of electricity to the household if they consumed 1,000 kWh each month. A standard electricity price was assigned to each RECS household. (See Appendix A, "How the Survey Was Conducted" for a discussion of the standard price of electricity.)

Greater Proportion of Energy Expenditures Used for Appliances

Household appliance usage constituted the largest share of average energy expenditures with 43 percent of the households energy bill spent for operating appliances. Space heating followed with 32 percent (Figure 9).

Air-Conditioning Expenditures Increased by 25 Percent

The decrease in overall energy expenditures and the increase in electricity expenditures were reflected in the changes in energy expenditure patterns from 1984 to 1987 for specific end uses. Average space-heating expenditures declined by 18 percent from \$427 in 1984 to \$350 in 1987. Water-heating expenditures declined by 10 percent from \$171 in 1984 to \$154 in 1987. Expenditures for air conditioning and appliances, which are both heavy electricity users, increased. Between 1984 and 1987, air-conditioning expenditures increased by 25 percent (\$87 in 1984, \$109 in 1987) and appliances by 7 percent (\$438 in 1984, \$467 in 1987). The amount of decrease in expenditures that was attributed to a change in the estimation methodology was approximately 10 percent for space heating and 28 percent for electric appliances. (See Appendix B, "End-Use Estimation Methodology" for a discussion of the change in energy used for space heating and appliances due to a change in the estimation procedure.)

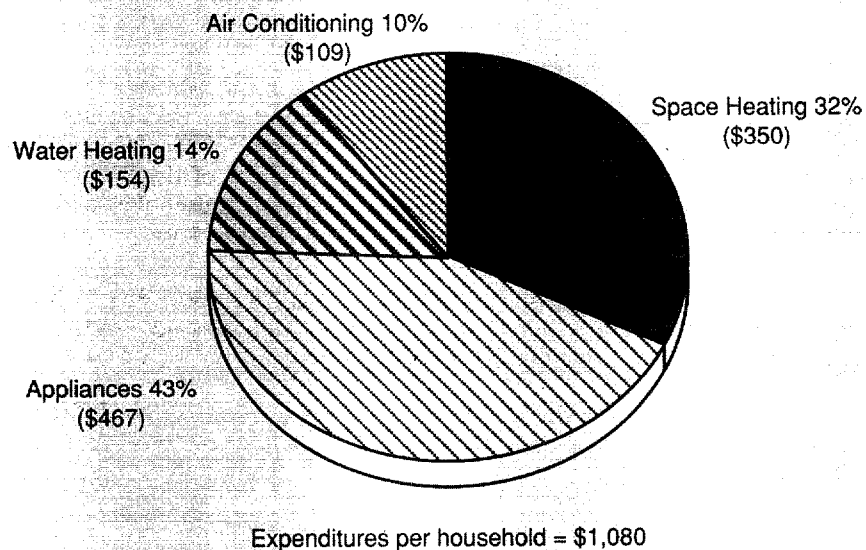
Table 5. Percent of U.S. Households with Electric Appliances by Standard Price of Electricity, 1987

	Number of Households (million)	Percent of Households Using Electricity for							
		Main Space Heating Fuel	Main Water Heating Fuel	Air Conditioning		Appliances			
				Central	Room	Main Cooking Fuel	Clothes Dryer	Dishwasher	Freezer
United States	90.5	19.8	35.3	33.2	30.8	58.1	50.7	43.1	34.0
Standard Price (cents per kWh)									
Less than 5	4.5	39.2	65.0	19.7	16.0	80.6	73.0	59.6	48.3
5 to 5.99	8.5	25.7	50.0	43.6	30.9	68.2	62.0	40.4	40.5
6 to 6.99	23.9	15.8	37.8	37.5	30.4	61.8	56.6	42.7	41.4
7 to 7.99	21.0	27.8	43.1	40.7	29.6	62.6	51.1	42.3	30.5
8 to 8.99	15.3	18.0	26.3	28.0	28.7	54.5	44.5	47.1	28.8
9 to 9.99	11.7	10.1	18.0	25.5	36.6	44.6	42.1	40.1	29.1
10 or More	5.6	8.1	10.0	13.3	42.2	29.4	24.4	33.6	17.9

Note: Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

Figure 9. Expenditures per U.S. Household by End Uses, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

What was a Typical Energy Budget in 1987?

A typical energy budget was calculated for two types of housing units. Housing unit Type A was a single family house that: used only natural gas for space heating, water heating and main cooking; used only natural gas or electricity for appliances; and used only electricity for air conditioning. Housing unit Type B was an all-electric apartment that used only electricity for space heating, water heating, main cooking, air conditioning, and appliances.

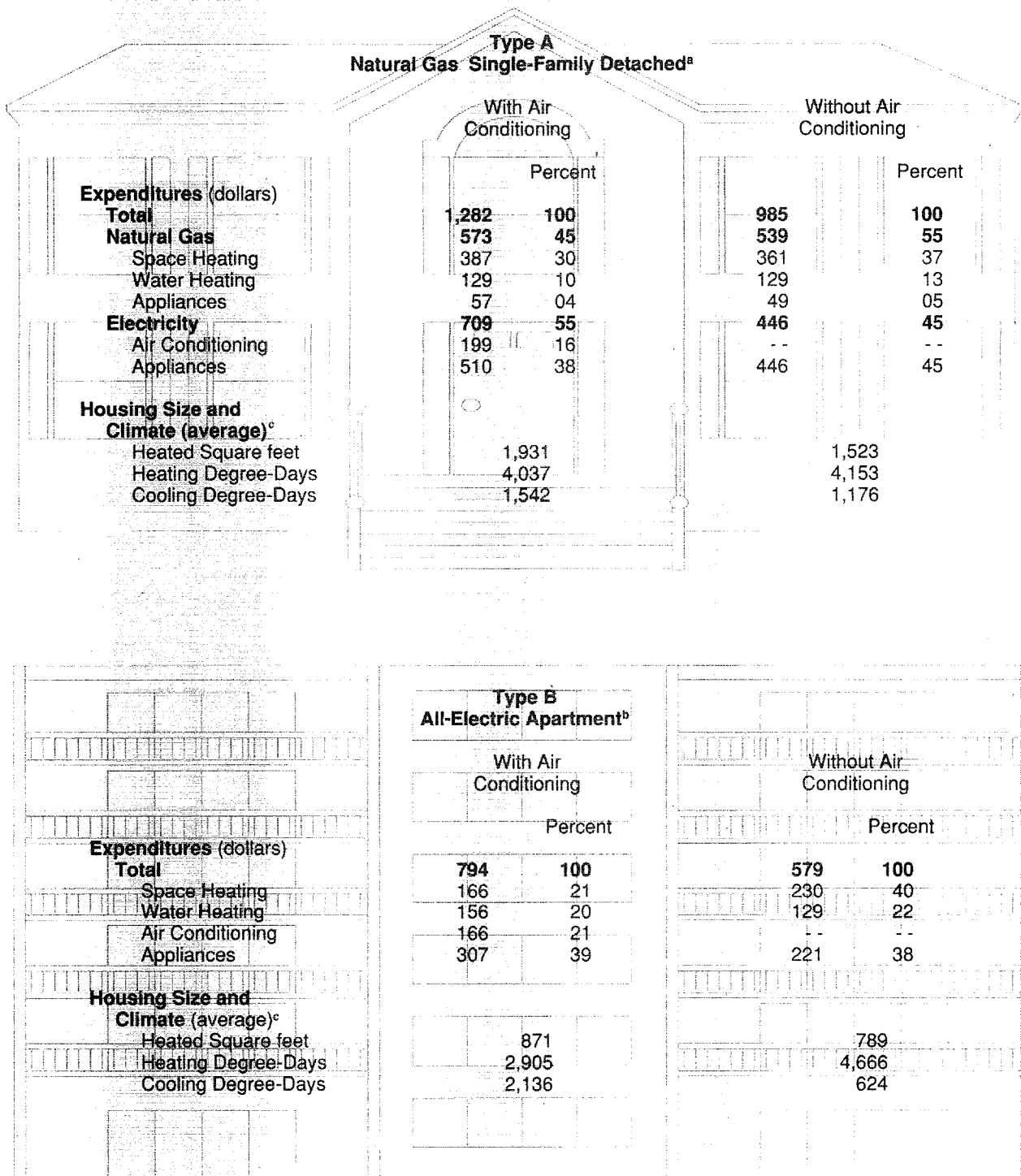
Households living in single-family detached housing units that primarily used natural gas (Type A), spent an average of \$1,172 for their total energy use in 1988. Energy expenditures for households living in an all-electric apartment (Type B) spent an average of \$736.

These total expenditures varied by whether the household used air conditioning or not. The households living in an air-conditioned Type A house spent an average of \$1,282 for energy. Of this total, \$573 was spent for natural gas and \$709 was spent for electricity. Approximately 28 percent of the \$709 spent for electricity was used for air conditioning. The average expenditures for Type A households without air conditioning were almost \$300 less than the households with air conditioning (Figure 10).

Households living in a Type B all-electric apartment with air conditioning spent an average of \$794 for energy. Approximately one-fifth of this total amount was used for air conditioning. Average energy expenditures for households living in all-electric apartments without air conditioning were \$579 (Figure 10).

Figure 10 also lists the average HDD and CDD for the households, since a portion of the difference in energy expenditures between households that use air conditioning and those that do not use it can be explained by the weather. Also included in the figure is the average heated square feet for each type of household.

Figure 10. Energy Expenditures by End Uses for Two Typical Housing Units, 1987



-- Not Applicable.

^a Type A home: Single-family detached housing unit, with natural gas used for space heating, water heating and main cooking; natural gas and electricity used for appliances, and electricity used for air conditioning.

^b Type B home: All-electric apartment with electricity used for space heating, water heating, cooking air conditioning and appliances.

^c Averages are national averages over all RECS households. HDD's and CDD's differ by building type because apartments heated by electricity are more heavily weighted toward warmer regions.

Notes: ● End-use estimates are based on the 1987 RECS and were obtained using a nonlinear regression technique. ● Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.



Energy Use And The Elderly

Elderly Use More Space-Heating Energy

One type of demographic information collected by the RECS is the age of the household members. For the following discussion, the elderly are defined as 60 years or older, based on the age of the householder. The elderly constitute an increasing proportion of the U.S. population and their energy demands differ from the nonelderly. In the 1987 RECS, 28 percent of the households had a householder age 60 years or older.

Consumption and Expenditure Patterns 1987: There was no statistically significant difference between the elderly and the nonelderly in the overall per household amount of energy they consumed. However, there were differences between the two groups in the way they used energy. The elderly used approximately 10 percent more energy to heat their homes even after adjusting for the weather and size of the housing unit. They used less energy for water heating, air conditioning, and appliance usage than the nonelderly.

While there was no difference in the overall consumption between the two groups, there was a statistically significant difference between the elderly and nonelderly in the amount of money spent for energy. The elderly spent \$98 less per household for energy. They spent less for all end uses except one--space heating. The elderly spent an average of \$49 (13 percent) more for home heating than did the nonelderly (Table 6). Higher space-heating consumption and expenditures among the elderly may be related to the following factors: 1) a greater proportion of the elderly live in older homes that may be less energy efficient and 2) in 1987, a greater proportion of the elderly kept their thermostats at a higher level than the nonelderly households.

In 1987, approximately 61 percent of the elderly's household energy consumption was used for space heating (nationally, 54 percent of energy was used for space heating and among the nonelderly, 51 percent was used.) The proportions of energy used by the

Table 6. Difference in U.S. Energy Consumption and Expenditure Patterns Between Elderly and Nonelderly by End Use, 1987

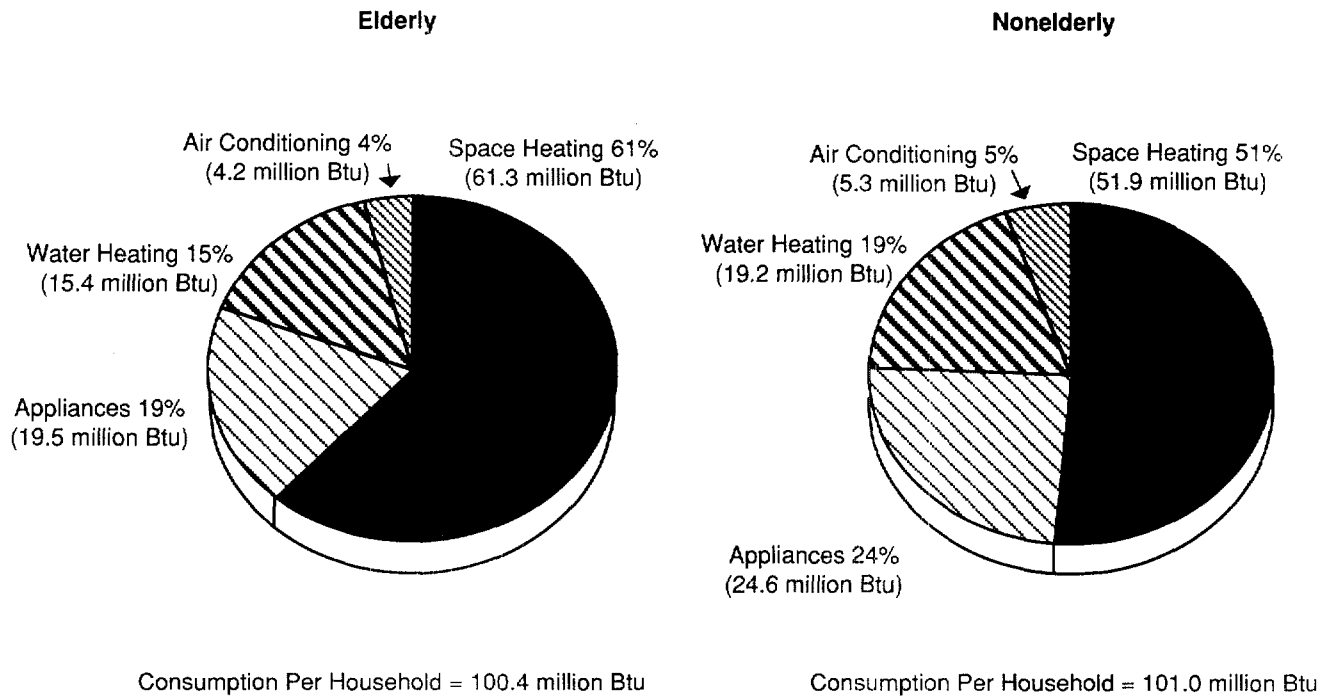
	Age of Householder		Absolute Difference	Percent Difference (percent)
	60 Years or Older	Less than 60 Years		
Consumption				
(million Btu)	100.4	101.0	NS	NS
Space Heating	61.3	51.9	+9.4	+15
Water Heating	15.4	19.2	-3.8	-25
Air Conditioning	4.2	5.3	-1.1	-26
Appliance Usage	19.5	24.6	-5.1	-26
Space Heating/ HDD*Sq.Ft. (Btu)	9.4	8.4	+1	+10
Expenditures				
(dollars)	1,010	1,108	-98	-10
Space Heating	385	336	+49	+13
Water Heating	131	163	-32	-24
Air Conditioning	93	115	-22	-24
Appliance Usage	401	494	-93	-23

NS = Not statistically significant at the 0.05 level.

Notes: • End-use estimates are based on the 1987 RECS and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

Figure 11. Energy Consumption per U.S. Household by End Uses for the Elderly and Nonelderly, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • The electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy. • Data may not sum due to rounding.
 Source: Energy Information Administration, Office for Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

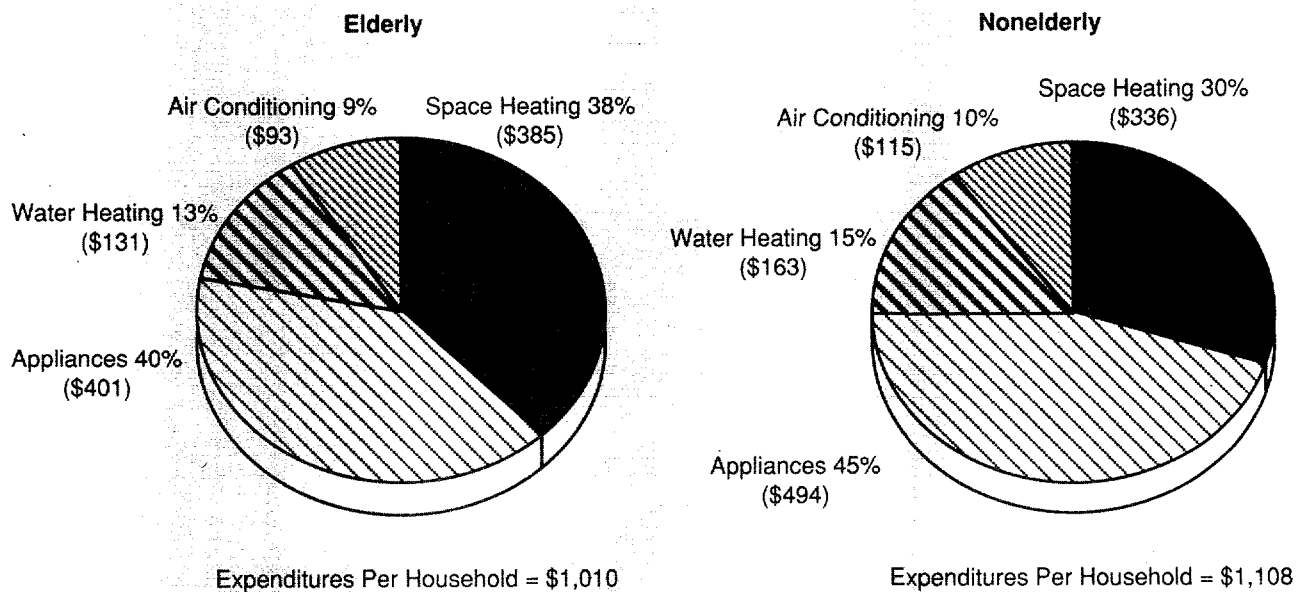
elderly for water heating, air conditioning, and appliances were 15 percent, 4 percent, and 19 percent, respectively. Figure 11 provides the proportion of energy used for the four end uses for the elderly and nonelderly.

Among the elderly, the proportion of total energy expenditures used for space heating was approximately 38 percent. Among the nonelderly it was approximately 30 percent (Figure 12).

Changes in Consumption and Expenditure Patterns: Both the elderly and nonelderly used less energy for

space heating and more energy for air conditioning in 1987 than in 1984. In the same time period, for nonelderly households only, there was a statistically significant decrease in the amount of energy used for water heating and an increase in the amount of energy used for appliances. The change in average energy expenditures between 1984 and 1987 mirrored the consumption patterns for space heating and air conditioning but not for water heating or appliances. Water-heating expenditures decreased for both the elderly and nonelderly, while appliance expenditures increased for both age categories (Figure 13).

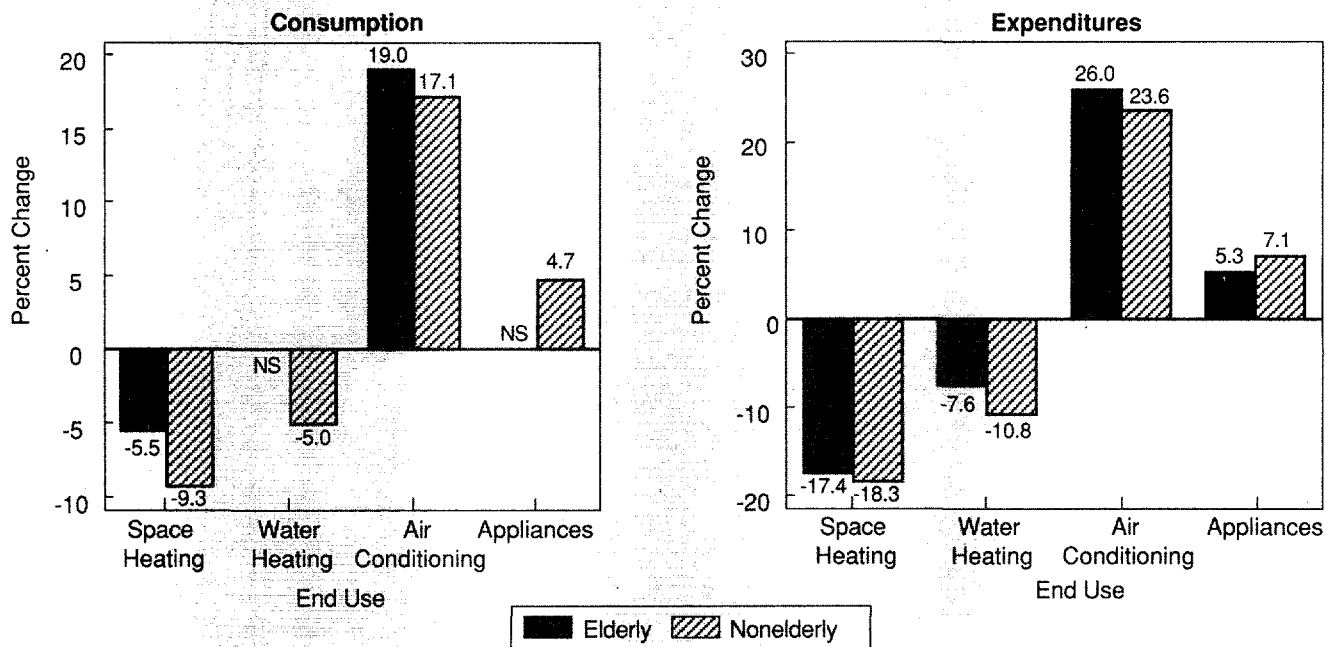
Figure 12. Energy Expenditures per U.S. Household by End Uses for the Elderly and Nonelderly, 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • Data may not sum due to rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1987 Residential Energy Consumption Survey.

Figure 13. Percent Change in Energy End-Use Consumption and Expenditures per U.S. Household for the Elderly and Nonelderly, 1984 and 1987



Notes: • End-use estimates are based on the 1987 Residential Energy Consumption Survey and were obtained using a nonlinear regression technique. • Electricity component is site electricity. No adjustment was made for the primary fuels consumed to produce the electricity. See "Glossary" for definition of site energy.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1984, and 1987 Residential Energy Consumption Surveys.



Detailed Statistics

Table Organization

The following tables present detailed energy consumption and expenditure data in the residential sector. Data are from the 1987 RECS.

There are two types of tables in this section. Tables 7 through 22, the Consumption and Expenditures Data Tables, provide household energy consumption and expenditure data that were obtained from the household's energy suppliers. Tables 23 through 32, the Energy End Use Tables, contain nonlinear regression estimates of energy consumption and expenditures by four end uses--space heating, water heating, air conditioning and appliances (See Appendix B, "End-Use Estimation Methodology"). All consumption and expenditure data are presented by housing structure characteristics and household characteristics. Tables have been grouped together to make it easier to find related

information. The Quick Reference Guide to the Detailed Statistics indicates the major topics of each table.

Row and Column Factors

The tables present estimates of energy consumption and expenditures for all households in the United States. Since the estimates are based on the sample surveyed, they are subject to error. To help the reader compute an approximated relative standard error (RSE) for each of the estimates in the detailed tables, shaded row and column factors are displayed on the top line and in the far right column of each table, except in tables 13 and 21. To calculate the RSE for a specific estimate, multiply the row factor by the column factor (See Figure C1 and the related discussion in Appendix C, "Quality of the Data," for more details).

Quick Reference Guide

Quick Reference Guide to the Detailed Tables

Data Item/Category	Table Numbers
Consumption & Expenditures Data Tables	
All Major Fuels	
Total Consumption & Expenditures	7
Percent Distribution of Total	8
Percent Distribution of Consumption	9
Percent Distribution of Expenditures	10
Average Consumption	11
Average Expenditures	12
Expenditures as a Percent of Income	13
Natural Gas Consumption & Expenditures	
Total and Averages	14
As Main Heating Fuel	15
Electricity Consumption & Expenditures	
Total and Averages	16
As Main Heating Fuel	17
Not as Main Heating Fuel	18
Fuel Oil or Kerosene Consumption & Expenditures	19
Liquefied Petroleum Gas (LPG) Consumption & Expenditures	20
Wood Consumption	21
Energy Prices	22
Energy End-Use Tables	
All Major Fuels Expenditures	23
Natural Gas Consumption & Expenditures	24
Electricity Consumption & Expenditures	25
Fuel Oil or Kerosene Consumption & Expenditures	26
Liquefied Petroleum Gas (LPG) Consumption & Expenditures	27
Space Heating	
With Natural Gas as Main Heating Fuel	28
With Electricity as Main Heating Fuel	29
With Fuel Oil, Kerosene, or LPG as Main Heating Fuel	30
Water Heating	31
Air Conditioning	32

Consumption and Expenditures Data Tables

Table 7. Household Energy Consumption and Expenditures by Major Fuel, 1987

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	
RSE Column Factors:	0.554	0.588	0.565	0.905	0.900	0.661	0.637	1.531	1.497	2.684	2.576	
Total U.S. Households	90.5	9.13	97.7	4.83	26.1	2.76	61.6	1.22	7.2	0.32	2.8	3.46
Census Region and Division												
Northeast	19.0	2.37	24.3	1.03	6.7	.44	12.3	.87	5.1	.02	.2	5.81
New England	4.3	.52	5.2	.15	1.0	.10	2.6	.26	1.6	.01	.1	8.06
Middle Atlantic	14.8	1.85	19.1	.89	5.7	.35	9.8	.61	3.5	.01	.1	6.76
Midwest	22.3	2.73	25.0	1.83	9.0	.61	14.1	.16	1.0	.13	1.0	5.77
East North Central	15.9	1.99	18.2	1.35	6.8	.42	10.0	.13	.8	.08	.7	6.99
West North Central	6.4	.74	6.8	.48	2.2	.19	4.1	.02	.1	.05	.3	9.44
South	30.9	2.61	33.4	1.09	6.1	1.22	25.1	.17	1.1	.12	1.1	6.30
South Atlantic	15.6	1.26	17.6	.45	2.9	.61	13.1	.15	.9	.06	.6	9.20
East South Central	6.1	.51	6.0	.19	.9	.27	4.7	.03	.2	.03	.3	12.36
West South Central	9.2	.83	9.8	.45	2.2	.35	7.4	Q	Q	Q	Q	10.94
West	18.3	1.42	15.0	.88	4.4	.48	10.0	.02	.1	.05	.4	7.87
Mountain	4.4	.46	4.2	.31	1.4	.12	2.6	Q	Q	Q	Q	11.78
Pacific	13.9	.96	10.8	.56	3.0	.36	7.4	Q	.1	.03	.3	7.95
Metropolitan Status												
Metropolitan	70.2	7.23	76.8	4.07	22.3	2.07	47.6	.96	5.6	.13	1.3	3.60
Central City	29.6	3.00	29.7	1.91	10.5	.74	17.1	.34	1.9	.02	.2	5.21
Outside Central City	40.6	4.23	47.1	2.16	11.8	1.33	30.5	.62	3.7	.11	1.1	4.55
Nonmetropolitan	20.3	1.90	21.0	.76	3.9	.69	14.0	.26	1.6	.19	1.5	7.47
Climate Zone												
Under 2,000 CDD and--												
Over 7,000 HDD	8.5	.94	8.8	.42	2.1	.23	4.8	.21	1.2	.08	.7	19.61
5,500 to 7,000 HDD	25.9	3.26	30.0	2.09	10.6	.69	16.3	.44	2.6	.05	.5	8.73
4,000 to 5,499 HDD	21.9	2.34	24.9	1.09	6.6	.67	14.9	.51	2.9	.06	.5	10.94
Under 4,000 HDD	17.8	1.38	16.6	.73	4.1	.53	11.5	.05	.4	.07	.7	14.32
2,000 CDD or More and --												
Under 4,000 HDD	16.3	1.20	17.4	.51	2.8	.64	14.2	Q	Q	.04	.4	13.24
Payment Method for Utilities												
All Paid by Household	73.7	7.76	84.8	4.01	21.5	2.49	54.9	.95	5.8	.30	2.7	3.82
Some Paid, Some in Rent	10.0	.78	7.6	.47	2.8	.14	4.0	.16	.8	Q	*	14.03
All Included in Rent	4.5	.38	3.2	.24	1.3	.07	1.6	.06	.3	Q	Q	15.65
Other Method	2.3	.20	2.1	.11	.6	.05	1.2	.05	.3	Q	Q	20.96
Housing Structure by Status of Unit												
Single-Family Detached	55.2	6.32	67.6	3.30	17.5	1.97	43.1	.80	4.8	.25	2.2	4.25
Owned	47.7	5.56	60.0	2.86	15.2	1.76	38.5	.73	4.4	.21	1.9	4.44
Rented	7.4	.75	7.6	.43	2.3	.21	4.6	.07	.4	.04	.3	9.93
Single-Family Attached	5.3	.53	6.0	.29	1.7	.16	3.8	.07	.5	Q	Q	20.82
Owned	3.9	.40	4.6	.23	1.4	.11	2.8	.06	.4	Q	Q	23.00
Rented	1.5	.12	1.5	.06	.4	.05	1.1	.01	.1	Q	Q	30.76
Building of 2 to 4 Units	10.1	.94	9.1	.61	3.4	.20	4.9	.13	.8	Q	Q	9.95
Owned	2.0	.24	2.3	.15	.9	.04	1.1	.05	.3	Q	Q	19.12
Rented	8.1	.70	6.8	.46	2.6	.15	3.7	.08	.5	Q	Q	11.16
Building of 5 or More Units	14.9	.96	10.1	.51	2.8	.28	6.5	.17	.8	Q	Q	12.53
Owned	1.0	.07	.8	.03	.2	.02	.6	Q	Q	NC	NC	49.63
Rented	13.9	.89	9.3	.48	2.7	.25	5.9	.16	.8	Q	Q	12.79
Mobile Home	5.1	.39	4.8	.12	.6	.16	3.3	.05	.3	.06	.6	15.74
Owned	4.3	.33	4.1	.10	.5	.14	2.8	.04	.2	.05	.5	17.70
Rented .....	.9	.06	.8	.02	.1	.02	.5	.01	.1	.01	.1	24.53

See footnotes at end of table.

Table 7. Household Energy Consumption and Expenditures by Major Fuel, 1987 (Continued)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	
RSE Column Factors:	0.554	0.588	0.565	0.905	0.900	0.661	0.637	1.531	1.497	2.684	2.576	
Number of Rooms												
1	0.7	0.03	0.4	0.02	0.1	0.01	0.2	Q	Q	Q	Q	47.50
2	2.4	.13	1.2	.06	.3	.03	.7	0.03	0.1	Q	Q	22.77
3	9.8	.59	6.5	.29	1.6	.18	4.2	.10	.5	0.02	0.2	11.53
4	17.7	1.37	14.9	.70	3.8	.42	9.3	.16	.9	.08	.8	7.41
5	20.9	2.01	21.5	1.07	5.7	.61	13.5	.25	1.5	.08	.7	5.79
6	17.4	1.97	21.1	1.09	5.9	.59	13.5	.23	1.4	.05	.4	7.12
7	11.2	1.43	15.4	.76	4.2	.44	9.8	.20	1.2	.04	.3	8.26
8 or More	10.4	1.59	16.7	.83	4.5	.47	10.4	.25	1.5	.04	.3	8.71
Number of Rooms That Can Be Air Conditioned												
All	40.8	3.95	47.5	2.00	10.7	1.58	34.3	.24	1.4	.13	1.1	5.36
Some	16.8	1.97	19.5	1.06	6.0	.44	10.6	.41	2.5	.06	.5	6.11
None	32.9	3.21	30.7	1.77	9.5	.74	16.7	.57	3.3	.13	1.2	6.83
Measured Heated Area of Residence (square feet)												
Fewer than 600	8.4	.53	5.7	.26	1.4	.14	3.4	.11	.6	.03	.3	9.23
600 to 999	23.9	1.85	19.7	1.01	5.5	.55	12.3	.22	1.2	.08	.7	6.37
1,000 to 1,599	25.6	2.37	26.7	1.17	6.3	.83	17.9	.26	1.6	.11	.9	5.90
1,600 to 1,999	11.3	1.28	13.9	.69	3.8	.40	8.9	.16	1.0	.04	.3	7.53
2,000 to 2,399	8.4	1.10	11.5	.62	3.4	.31	7.0	.14	.9	.02	.2	10.09
2,400 to 2,999	7.7	1.12	11.2	.64	3.4	.29	6.6	.17	1.0	.02	.2	9.58
3,000 or More	5.3	.89	9.1	.44	2.3	.25	5.5	.17	1.0	.03	.2	10.80
Year of Construction												
1939 or Before	21.5	2.59	23.7	1.53	8.4	.48	11.7	.51	3.0	.07	.6	7.29
1940 to 1949	8.2	.85	8.6	.48	2.7	.22	4.9	.13	.7	.03	.3	10.05
1950 to 1959	13.1	1.43	14.6	.79	4.2	.38	8.7	.22	1.3	.04	.4	7.43
1960 to 1969	16.4	1.63	17.4	.92	5.1	.50	11.0	.18	1.0	.04	.3	8.50
1970 to 1974	9.6	.92	10.2	.49	2.5	.31	6.8	.07	.4	.05	.5	10.35
1975 to 1979	10.5	.90	11.9	.34	1.7	.44	9.3	.08	.5	.05	.4	10.11
1980 to 1984	7.4	.53	7.3	.20	1.1	.28	5.8	.02	.1	.03	.2	15.02
1985 or After	3.9	.27	4.0	.10	.5	.15	3.3	Q	Q	.01	.1	20.11
Status of Unit												
Owned	58.8	6.60	71.8	3.38	18.2	2.07	45.8	.89	5.4	.27	2.4	4.21
Condominium	1.5	.11	1.4	.06	.3	.04	1.0	Q	Q	NC	NC	39.41
Not a Condominium	57.3	6.49	70.4	3.32	17.9	2.02	44.8	.88	5.3	.27	2.4	4.25
Rented	31.7	2.53	26.0	1.45	8.0	.69	15.7	.34	1.8	.05	.4	5.94
Public Housing	2.5	.18	1.7	.10	.6	.04	.9	.03	.1	Q	Q	25.64
Not Public Housing	29.2	2.35	24.3	1.35	7.4	.65	14.8	.31	1.7	.05	.4	6.40
Rent Subsidy	1.4	.11	1.1	.06	.4	.03	.7	.02	.1	Q	Q	25.21
No Rent Subsidy	27.8	2.25	23.2	1.29	7.0	.62	14.2	.29	1.6	.05	.4	6.72
1987 Family Income												
Less than \$5,000	6.2	.51	5.1	.30	1.6	.13	2.8	.05	.3	.03	.3	13.20
\$5,000 to \$9,999	11.5	1.03	10.1	.57	3.0	.26	5.8	.16	.9	.04	.4	9.04
\$10,000 to \$14,999	12.6	1.15	11.7	.62	3.3	.31	6.9	.16	.9	.06	.5	7.98
\$15,000 to \$19,999	9.0	.83	8.7	.45	2.4	.24	5.3	.11	.7	.03	.3	8.29
\$20,000 to \$24,999	8.8	.84	9.1	.42	2.2	.27	5.9	.12	.7	.03	.3	8.91
\$25,000 to \$34,999	16.2	1.60	17.7	.81	4.4	.52	11.5	.22	1.3	.05	.5	6.40
\$35,000 to \$49,999	13.4	1.50	16.8	.77	4.2	.51	11.2	.19	1.1	.03	.2	7.36
\$50,000 or More	12.9	1.67	18.6	.90	4.9	.52	12.1	.22	1.3	.03	.3	8.20

See footnotes at end of table.

Table 7. Household Energy Consumption and Expenditures by Major Fuel, 1987 (Continued)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	
RSE Column Factors:	0.554	0.588	0.565	0.905	0.900	0.661	0.637	1.531	1.497	2.684	2.576	
Below 100 Percent of Poverty Line	11.8	1.05	10.6	0.60	3.3	0.28	6.2	0.11	0.6	0.07	0.6	9.68
Below 125 Percent of Poverty Line	18.2	1.65	16.7	.93	5.0	.44	9.8	.19	1.1	.09	.8	7.91
Assistance for Heating in Winter												
Yes	4.8	.48	4.6	.28	1.5	.10	2.4	.05	.3	.04	.3	12.36
No	85.8	8.65	93.2	4.55	24.6	2.65	59.2	1.17	6.9	.28	2.5	3.34
Assistance for Weatherization of Residence												
Yes	1.0	.10	.9	.06	.3	.02	.5	.01	.1	Q	Q	23.10
No	89.5	9.03	96.8	4.77	25.8	2.74	61.1	1.21	7.1	.31	2.8	3.26
Household Owns or Has Regular Use of a Vehicle												
Yes	79.4	8.09	88.0	4.22	22.6	2.57	56.9	1.01	6.0	.29	2.5	3.35
No	11.1	1.04	9.7	.61	3.6	.19	4.7	.22	1.2	.03	.3	8.45
Race of Householder												
White	76.6	7.68	83.3	3.95	21.0	2.42	53.6	1.04	6.1	.28	2.5	3.54
Black	10.9	1.21	12.0	.75	4.4	.28	6.5	.16	.9	.02	.2	12.22
Other	3.0	.24	2.5	.14	.7	.06	1.5	.03	.2	Q	Q	16.22
Householder of Hispanic Descent												
Yes	5.0	.44	4.9	.23	1.3	.13	3.2	.06	.3	.01	.1	12.31
No	85.5	8.69	92.9	4.60	24.9	2.63	58.4	1.16	6.9	.30	2.7	3.35
Age of Householder												
Under 25 Years	6.5	.50	5.4	.28	1.5	.16	3.5	.05	.3	.01	.1	13.37
25 to 34 Years	21.5	2.02	21.9	1.11	6.0	.63	14.1	.22	1.3	.06	.5	5.82
35 to 44 Years	18.0	1.90	21.3	.96	5.1	.64	14.2	.25	1.5	.06	.5	6.26
45 to 59 Years	18.9	2.13	23.3	1.10	6.0	.68	15.0	.27	1.6	.08	.7	5.83
60 Years and Over	25.7	2.58	25.9	1.38	7.6	.66	14.8	.43	2.5	.11	1.0	5.69
Household Size												
1 Person	21.6	1.71	16.6	.99	5.3	.42	9.4	.25	1.4	.06	.6	5.90
2 Persons	30.7	2.95	31.9	1.51	8.1	.92	20.4	.42	2.5	.10	.9	5.24
3 Persons	15.4	1.66	18.2	.85	4.6	.54	11.8	.22	1.3	.05	.4	5.86
4 Persons	13.6	1.64	18.0	.86	4.6	.53	11.7	.20	1.2	.06	.6	6.92
5 Persons	6.1	.75	8.4	.41	2.3	.24	5.4	.08	.5	.02	.2	9.80
6 or More Persons	3.1	.41	4.5	.21	1.2	.12	2.9	.05	.3	.02	.2	15.07
Secondary Heating												
Yes	37.4	4.00	44.7	1.89	10.1	1.38	29.7	.54	3.3	.18	1.6	5.04
Over 33 Percent of Home's Total Heat	3.2	.30	3.6	.09	.5	.12	2.6	.07	.4	.02	.1	12.92
No	53.2	5.13	53.1	2.94	16.1	1.37	31.9	.68	3.9	.13	1.2	3.98

See footnotes at end of table.

Table 7. Household Energy Consumption and Expenditures by Major Fuel, 1987 (Continued)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	
RSE Column Factors:	0.554	0.588	0.565	0.905	0.900	0.661	0.637	1.531	1.497	2.684	2.576	
Fuel Combinations												
Use Natural Gas for Main Heat	50.0	5.89	53.7	4.65	24.8	1.22	28.6	0.03	0.2	Q	Q	7.07
Use Natural Gas To Heat Water and Have A/C	28.6	3.48	32.7	2.70	14.4	.76	18.2	.02	.1	Q	Q	8.70
and Lack A/C	16.3	1.85	15.1	1.57	8.3	.27	6.7	Q	Q	NC	NC	9.03
Use Electricity To Heat Water and Have A/C	3.4	.37	4.0	.24	1.3	.13	2.7	*	*	Q	Q	17.65
and Lack A/C	1.6	.17	1.6	.13	.7	.05	.9	Q	Q	NC	NC	16.95
Other .....	.2	.02	.3	.02	.1	.01	.2	Q	Q	Q	Q	43.75
Use Electricity for Main Heat	17.9	.97	18.6	.06	.3	.90	18.1	.01	.1	0.01	0.1	12.15
Use Electricity To Heat Water and Have A/C	12.4	.71	14.3	.01	*	.70	14.1	.01	.1	*	.1	16.14
and Lack A/C	3.0	.14	2.4	Q	Q	.13	2.4	Q	*	Q	Q	23.42
Other	2.5	.12	1.9	.05	.3	.07	1.6	Q	Q	Q	Q	28.70
Use Fuel Oil for Main Heat	10.9	1.43	14.0	.07	.7	.27	6.9	1.08	6.2	.01	.2	8.56
Use Fuel Oil To Heat Water and Have A/C	2.6	.37	3.6	.01	.1	.05	1.7	.31	1.8	*	*	17.09
and Lack A/C	2.5	.33	2.8	.01	.1	.03	1.1	.28	1.6	*	*	13.63
Use Electricity To Heat Water and Have A/C	2.0	.26	2.8	Q	Q	.08	1.7	.17	1.0	Q	Q	17.40
and Lack A/C	2.1	.24	2.5	Q	Q	.07	1.5	.16	.9	Q	*	18.10
Other	1.7	.24	2.3	.05	.4	.03	.9	.15	.9	.01	.1	14.26
Use Wood for Main Heat	5.1	.29	4.4	.05	.3	.18	3.6	.04	.2	.03	.3	16.45
Use LPG for Main Heat	4.1	.38	4.8	NC	NC	.12	2.7	.01	.1	.25	2.1	16.78
Use Kerosene for Main Heat	1.3	.11	1.4	Q	Q	.04	.9	.06	.4	*	.1	23.68
Use Coal for Main Heat .....	.4	.01	.2	Q	Q	.01	.2	Q	Q	Q	Q	69.02
No Heating Fuel/Other Fuel .....	.8	.03	.7	Q	Q	.02	.6	Q	Q	*	*	25.20

NC No cases in sample.
 * Data cannot be displayed due to rounding.
 Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 8. Percentage of Consumption Across Household Characteristics by Major Fuels, 1987
(Percent)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	
	RSE Column Factors:	0.614	0.631	0.620	0.868	0.859	0.708	0.688	1.440	1.416	2.406		2.332
Total U.S. Households	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00
Census Region and Division												
Northeast	21.0	26.0	24.9	21.4	25.5	16.1	20.0	71.4	70.3	5.7	8.5	4.90
New England	4.7	5.7	5.3	3.0	3.8	3.6	4.2	21.5	21.6	2.8	3.7	8.50
Middle Atlantic	16.3	20.3	19.5	18.3	21.7	12.6	15.9	49.9	48.7	2.9	4.8	5.94
Midwest	24.6	29.9	25.6	37.8	34.4	22.1	22.9	13.0	13.2	41.6	35.4	5.33
East North Central	17.5	21.8	18.6	27.9	25.9	15.2	16.2	11.0	11.2	26.5	24.3	6.55
West North Central	7.1	8.1	7.0	9.9	8.6	6.9	6.7	2.0	1.9	15.1	11.0	9.91
South	34.1	28.5	34.2	22.7	23.1	44.2	40.8	14.1	15.0	37.9	40.7	5.28
South Atlantic	17.2	13.8	18.0	9.3	11.2	22.0	21.2	11.9	12.6	18.3	22.9	8.75
East South Central	6.7	5.6	6.2	3.9	3.6	9.6	7.6	2.0	2.3	10.0	10.3	12.52
West South Central	10.2	9.1	10.0	9.4	8.4	12.6	12.0	Q	Q	Q	7.5	11.04
West	20.2	15.6	15.4	18.1	16.9	17.5	16.3	1.5	1.6	14.8	15.4	8.10
Mountain	4.9	5.0	4.3	6.5	5.4	4.5	4.3	Q	Q	Q	Q	11.27
Pacific	15.3	10.6	11.1	11.7	11.5	13.1	12.0	Q	1.2	8.6	11.0	8.10
Metropolitan Status												
Metropolitan	77.6	79.2	78.5	84.3	85.2	75.0	77.3	78.4	77.8	41.2	45.0	2.99
Central City	32.7	32.9	30.4	39.6	40.0	26.8	27.8	27.4	25.9	5.3	6.9	4.85
Outside Central City	44.8	46.3	48.2	44.7	45.2	48.2	49.5	50.9	51.9	35.9	38.1	3.40
Nonmetropolitan	22.4	20.8	21.5	15.7	14.8	25.0	22.7	21.6	22.2	58.8	55.0	6.11
Climate Zone												
Under 2,000 CDD and--												
Over 7,000 HDD	9.4	10.3	9.0	8.6	8.0	8.4	7.8	17.3	17.0	26.0	23.4	18.75
5,500 to 7,000 HDD	28.6	35.8	30.7	43.2	40.5	24.9	26.5	35.7	36.4	17.2	17.4	8.52
4,000 to 5,499 HDD	24.2	25.6	25.5	22.6	25.3	24.3	24.1	41.9	40.7	20.3	18.4	10.56
Under 4,000 HDD	19.7	15.1	17.0	15.1	15.7	19.1	18.6	4.4	4.9	23.3	25.0	14.21
2,000 CDD or More and --												
Under 4,000 HDD	18.0	13.2	17.8	10.5	10.6	23.4	23.0	Q	Q	13.2	15.8	12.97
Payment Method for Utilities												
All Paid by Household	81.5	85.0	86.8	83.0	82.2	90.5	89.1	77.5	80.2	95.6	95.4	1.53
Some Paid, Some in Rent	11.1	8.6	7.8	9.8	10.7	5.2	6.4	13.4	11.7	Q	Q	13.38
All Included in Rent	5.0	4.2	3.2	5.0	4.8	2.6	2.5	5.2	4.1	Q	Q	14.66
Other Method	2.5	2.2	2.1	2.2	2.3	1.7	1.9	3.9	4.1	Q	Q	20.69
Housing Structure by Status of Unit												
Single-Family Detached	60.9	69.2	69.2	68.3	66.9	71.4	70.0	65.2	66.9	79.7	77.5	2.37
Owned	52.7	60.9	61.4	59.3	58.2	63.7	62.6	59.4	60.9	68.0	66.1	2.60
Rented	8.2	8.3	7.8	9.0	8.7	7.7	7.5	5.7	6.0	11.7	11.3	9.31
Single-Family Attached	5.9	5.8	6.2	6.1	6.7	5.8	6.2	5.9	6.4	Q	Q	19.71
Owned	4.3	4.4	4.7	4.8	5.3	4.0	4.5	5.1	5.5	Q	Q	21.81
Rented	1.6	1.3	1.5	1.3	1.3	1.8	1.7	.8	.9	Q	Q	30.10
Building of 2 to 4 Units	11.1	10.3	9.3	12.6	13.2	7.1	7.9	10.8	11.0	Q	Q	10.05
Owned	2.2	2.6	2.4	3.1	3.3	1.5	1.9	3.9	4.0	Q	Q	18.98
Rented	8.9	7.7	7.0	9.5	9.9	5.6	6.0	6.9	7.0	Q	Q	11.15
Building of 5 or More Units	16.5	10.5	10.4	10.5	10.8	10.0	10.6	14.1	11.2	Q	Q	12.23
Owned	1.1	.7	.8	.6	.7	.8	1.0	Q	Q	NC	NC	47.15
Rented	15.4	9.8	9.5	9.9	10.1	9.2	9.6	13.1	10.5	Q	Q	12.54
Mobile Home	5.6	4.3	5.0	2.5	2.4	5.7	5.3	4.1	4.5	19.7	21.8	15.02
Owned	4.7	3.6	4.2	2.2	2.1	4.9	4.6	2.9	3.3	16.3	17.8	16.70
Rented	1.0	.7	.8	.4	.4	.8	.8	1.1	1.2	3.4	4.0	25.01

See footnotes at end of table.

MAJOR FUELS CONSUMPTION

Table 8. Percentage of Consumption Across Household Characteristics by Major Fuels, 1987 (Continued)
(Percent)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Flow Factors
	Number of Households	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	
Number of Rooms												
1	0.7	0.4	0.4	0.4	0.5	0.3	0.3	Q	Q	Q	Q	44.86
2	2.7	1.4	1.2	1.3	1.2	1.1	1.1	2.5	2.0	Q	Q	22.18
3	10.9	6.5	6.6	6.0	6.1	6.6	6.8	8.3	7.2	5.0	5.6	11.12
4	19.6	15.0	15.2	14.5	14.6	15.3	15.1	13.3	13.1	26.0	28.6	6.68
5	23.1	22.1	22.0	22.0	22.0	22.0	22.0	20.2	20.7	26.5	25.2	5.07
6	19.2	21.5	21.6	22.6	22.5	21.6	21.9	18.8	19.2	14.9	15.1	6.25
7	12.4	15.7	15.8	15.8	15.9	15.8	15.9	16.3	16.5	11.6	11.2	7.60
8 or More	11.5	17.5	17.1	17.3	17.2	17.1	16.9	20.3	21.0	13.0	11.2	7.97
Number of Rooms That Can Be Air Conditioned												
All	45.1	43.2	48.6	41.4	40.8	57.1	55.7	19.7	19.8	41.2	40.5	4.55
Some	18.6	21.6	20.0	22.0	22.8	15.9	17.3	33.6	34.0	18.8	16.8	5.30
None	36.4	35.2	31.4	36.6	36.4	27.0	27.1	46.6	46.2	40.0	42.7	5.69
Measured Heated Area of Residence (square feet)												
Fewer than 600	9.3	5.8	5.8	5.3	5.5	5.0	5.5	8.7	7.8	8.4	9.7	8.89
600 to 999	26.4	20.2	20.2	20.8	20.9	19.8	20.0	17.7	17.1	24.2	26.2	6.03
1,000 to 1,599	28.2	26.0	27.3	24.3	24.2	30.0	29.1	21.4	22.0	34.6	32.3	4.81
1,600 to 1,999	12.4	14.0	14.3	14.3	14.5	14.5	14.4	12.7	13.2	11.2	11.3	6.80
2,000 to 2,999	9.3	12.0	11.7	12.9	12.9	11.3	11.4	11.4	11.9	6.5	7.5	9.60
2,400 to 2,999	8.5	12.2	11.4	13.2	13.1	10.5	10.6	13.8	13.8	6.8	6.3	8.99
3,000 or More	5.8	9.7	9.3	9.1	8.9	8.9	8.9	14.2	14.3	8.4	6.6	9.79
Year of Construction												
1939 or Before	23.7	28.3	24.3	31.6	32.3	17.5	19.0	41.7	41.9	21.5	20.3	6.22
1940 to 1949	9.1	9.4	8.8	10.0	10.3	7.8	7.9	10.4	10.1	9.9	10.6	9.70
1950 to 1959	14.4	15.7	15.0	16.3	16.0	13.8	14.1	18.3	18.6	13.7	14.6	6.79
1960 to 1969	18.1	17.9	17.8	19.1	19.4	18.0	17.8	14.5	13.9	12.4	11.8	7.97
1970 to 1974	10.6	10.1	10.5	10.1	9.6	11.4	11.1	5.8	6.0	14.8	16.0	9.83
1975 to 1979	11.6	9.9	12.1	7.0	6.4	15.9	15.1	6.7	7.1	15.0	14.1	9.08
1980 to 1984	8.1	5.8	7.4	4.1	4.0	10.1	9.5	1.8	1.9	8.4	7.8	14.54
1985 or After	4.3	3.0	4.1	2.0	2.0	5.6	5.4	Q	Q	4.4	4.8	19.60
Status of Unit												
Owned	64.9	72.3	73.4	69.9	69.5	75.0	74.4	72.3	74.4	84.4	84.2	1.88
Condominium	1.7	1.2	1.4	1.2	1.1	1.6	1.7	Q	Q	NC	NC	37.53
No Condominium	63.2	71.1	72.0	68.7	68.4	73.4	72.8	72.1	74.1	84.4	84.2	1.92
Rented	35.1	27.7	26.6	30.1	30.5	25.0	25.6	27.7	25.6	15.6	15.8	5.50
Public Housing	2.8	1.9	1.7	2.1	2.2	1.6	1.5	2.5	2.0	Q	Q	24.85
No Public Housing	32.3	25.8	24.9	27.9	28.2	23.4	24.0	25.2	23.6	15.6	15.8	6.06
Rent Subsidy	1.5	1.2	1.2	1.3	1.5	1.0	1.1	1.3	1.1	Q	Q	24.54
No Rent Subsidy	30.7	24.6	23.7	26.6	26.8	22.4	23.0	23.9	22.5	15.2	15.4	6.46
1987 Family Income												
Less than \$5,000	6.8	5.6	5.2	6.1	6.1	4.5	4.6	4.5	4.4	10.4	11.1	12.70
\$5,000 to \$9,999	12.7	11.3	10.4	11.8	11.6	9.5	9.4	12.7	12.4	14.0	14.7	8.18
\$10,000 to \$14,999	13.9	12.6	12.0	12.9	12.8	11.2	11.2	12.9	12.9	19.2	18.3	7.05
\$15,000 to \$19,999	10.0	9.1	8.9	9.2	9.2	8.7	8.6	9.3	9.5	10.9	11.3	8.07
\$20,000 to \$24,999	9.7	9.2	9.3	8.6	8.4	9.8	9.6	9.5	9.7	10.9	10.3	8.44
\$25,000 to \$34,999	17.9	17.5	18.1	16.8	16.9	18.9	18.7	17.6	17.5	16.6	16.6	5.50
\$35,000 to \$49,999	14.8	16.4	17.2	16.0	16.1	18.4	18.3	15.6	15.6	8.9	8.3	6.63
\$50,000 or More	14.3	18.3	19.0	18.5	18.9	19.0	19.6	17.8	18.0	9.4	9.4	7.54

See footnotes at end of table.

Table 8. Percentage of Consumption Across Household Characteristics by Major Fuels, 1987 (Continued)
(Percent)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	
RSE Column Factors:	0.614	0.631	0.620	0.868	0.859	0.708	0.688	1.440	1.416	2.406	2.332	
Below 100 Percent of Poverty Line	13.0	11.5	10.9	12.4	12.4	10.1	10.1	8.9	8.7	20.8	19.8	8.83
Below 125 Percent of Poverty Line	20.1	18.1	17.1	19.3	19.2	15.9	15.9	15.8	15.5	29.9	29.9	6.88
Assistance for Heating in Winter												
Yes	5.3	5.3	4.7	5.9	5.9	3.8	3.9	4.4	4.5	12.2	10.5	11.85
No	94.7	94.7	95.3	94.1	94.1	96.2	96.1	95.6	95.5	87.8	89.5	1.42
Assistance for Weatherization of Residence												
Yes	1.1	1.1	1.0	1.2	1.2	.8	.8	1.2	1.3	Q	Q	22.45
No	98.9	98.9	99.0	98.8	98.8	99.2	99.2	98.8	98.7	98.2	98.3	99.99
Household Owns or Has Regular Use of a Vehicle												
Yes	87.7	88.6	90.1	87.3	86.4	93.2	92.3	82.4	83.9	91.9	90.7	1.11
No	12.3	11.4	9.9	12.7	13.6	6.8	7.7	17.6	16.1	8.1	9.3	7.62
Race of Householder												
White	84.6	84.1	85.2	81.7	80.4	87.7	87.0	84.7	85.2	88.3	88.3	1.75
Black	12.1	13.2	12.3	15.5	16.8	10.1	10.5	12.8	12.5	7.3	7.9	11.84
Other	3.3	2.7	2.6	2.9	2.8	2.2	2.4	2.5	2.2	Q	3.7	16.44
Householder of Hispanic Descent												
Yes	5.5	4.8	5.0	4.8	4.8	4.7	5.2	5.2	4.7	3.9	3.3	12.83
No	94.5	95.2	95.0	95.2	95.2	95.3	94.8	94.8	95.3	96.1	96.7	.73
Age of Householder												
Under 25 Years	7.1	5.5	5.5	5.7	5.7	5.8	5.7	4.0	4.1	4.0	5.0	13.37
25 to 34 Years	23.8	22.1	22.4	22.9	22.8	22.7	22.8	18.4	18.1	19.1	18.7	4.77
35 to 44 Years	19.9	20.9	21.8	19.9	19.6	23.1	23.0	20.4	20.6	17.7	17.1	5.17
45 to 59 Years	20.8	23.3	23.8	22.9	22.9	24.6	24.4	22.0	22.4	24.3	24.1	4.84
60 Years and Over	28.4	28.2	26.5	28.6	29.1	23.8	24.1	35.3	34.8	34.9	35.1	4.30
Household Size												
1 Person	23.9	18.8	17.0	20.5	20.1	15.1	15.2	20.1	19.6	19.9	20.0	4.68
2 Persons	33.9	32.3	32.7	31.2	31.1	33.3	33.1	34.6	34.5	31.6	31.6	4.28
3 Persons	17.0	18.1	18.7	17.6	17.7	19.4	19.2	18.2	18.7	15.1	15.4	5.31
4 Persons	15.0	18.0	18.4	17.7	17.7	19.1	19.0	16.1	16.0	20.5	20.5	5.94
5 Persons	6.8	8.3	8.6	8.5	8.8	8.6	8.8	6.8	7.0	6.3	6.2	9.01
6 or More Persons	3.5	4.5	4.6	4.4	4.6	4.4	4.6	4.3	4.3	6.5	6.3	14.54
Secondary Heating												
Yes	41.3	43.8	45.7	39.1	38.5	50.1	48.2	44.4	45.4	57.4	58.0	3.26
Over 33 Percent of Home's Total Heat	3.5	3.2	3.7	1.8	1.7	4.5	4.2	5.6	5.8	4.8	5.3	11.95
No	58.7	56.2	54.3	60.9	61.5	49.9	51.8	55.6	54.6	42.6	42.0	2.84

See footnotes at end of table.

Table 8. Percentage of Consumption Across Household Characteristics by Major Fuels, 1987 (Continued)
(Percent)

Household Characteristics	All Major Fuels			Natural Gas		Electricity		Fuel Oil or Kerosene		Liquefied Petroleum Gas		RSE Row Factors
	Number of Households	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	Total Btu Consumed	Total Expenditures	
	0.614	0.631	0.620	0.869	0.859	0.708	0.688	1.440	1.416	2.406	2.332	
Fuel Combinations												
Use Natural Gas for Main Heat	55.2	64.6	54.9	96.2	95.0	44.1	46.5	2.4	2.6	Q	Q	7.57
Use Natural Gas to Heat Water												
and Have A/C	31.5	38.1	33.5	55.8	55.1	27.7	29.6	1.3	1.3	Q	Q	7.46
and Lack A/C	18.0	20.3	15.4	32.5	31.9	9.8	10.9	Q	Q	NC	NC	7.86
Use Electricity to Heat Water												
and Have A/C	3.7	4.1	4.1	4.9	5.1	4.8	4.3	.2	.3	Q	Q	17.33
and Lack A/C	1.7	1.9	1.6	2.6	2.6	1.7	1.5	Q	Q	NC	NC	16.15
Other .....	.3	.3	.3	.3	.4	.2	.3	Q	Q	Q	Q	41.51
Use Electricity for Main Heat	19.8	10.7	19.0	1.2	1.3	32.6	29.4	.9	1.2	2.4	3.5	12.19
Use Electricity to Heat Water												
and Have A/C	13.7	7.8	14.6	.1	.2	25.2	23.0	.7	.8	1.5	2.1	16.16
and Lack A/C	3.3	1.5	2.5	Q	Q	4.8	3.9	Q	.3	Q	Q	21.98
Other	2.8	1.3	1.9	1.0	1.1	2.5	2.5	Q	Q	Q	Q	27.81
Use Fuel Oil for Main Heat	12.0	15.7	14.3	1.5	2.5	9.8	11.2	88.0	86.5	4.6	7.5	7.03
Use Fuel Oil to Heat Water												
and Have A/C	2.9	4.1	3.7	.2	.5	1.9	2.7	25.2	24.5	.1	.3	17.47
and Lack A/C	2.8	3.6	2.8	.2	.5	1.3	1.7	23.2	22.1	.2	.4	13.74
Use Electricity to Heat Water												
and Have A/C	2.2	2.8	2.9	Q	Q	2.8	2.7	14.2	14.2	Q	Q	16.49
and Lack A/C	2.3	2.6	2.5	Q	Q	2.6	2.4	13.2	13.1	Q	1.2	17.10
Other	1.8	2.6	2.4	1.0	1.5	1.2	1.5	12.1	12.6	2.4	3.2	14.45
Use Wood for Main Heat	5.6	3.2	4.5	.9	1.0	6.4	5.8	3.4	3.5	9.9	11.1	15.59
Use LPG for Main Heat	4.6	4.2	4.9	NC	NC	4.4	4.4	.6	.8	80.2	73.7	12.22
Use Kerosene for Main Heat	1.5	1.2	1.4	Q	Q	1.6	1.5	4.5	5.2	1.4	2.2	22.97
Use Coal for Main Heat .....	.5	.2	.2	Q	Q	.4	.4	Q	Q	Q	Q	63.60
No Heating Fuel/Other Fuel .....	.9	.3	.7	Q	Q	.7	1.0	Q	Q	.7	1.3	25.99

NC No cases in sample.
 Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • Percentages are 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 9. Percentage of Consumption Across Major Fuels by Household Characteristics, 1987
(Percent of Total Btu)

Household Characteristics	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	RSE Row Factors
	RSE Column Factors: 0.000	0.555	0.513	1.378	2.546	
Total U.S. Households	100.0	52.9	30.2	13.4	3.5	4.68
Census Region and Division						
Northeast	100.0	43.6	18.7	36.9	.8	8.42
New England	100.0	28.4	19.0	50.9	1.7	9.08
Middle Atlantic	100.0	47.8	18.7	33.0	.5	10.68
Midwest	100.0	67.0	22.4	5.8	4.8	7.70
East North Central	100.0	67.9	21.1	6.8	4.2	10.22
West North Central	100.0	64.6	25.7	3.3	6.4	8.46
South	100.0	42.0	46.8	6.6	4.6	8.94
South Atlantic	100.0	35.8	48.1	11.6	4.6	13.51
East South Central	100.0	37.0	52.0	4.9	6.2	14.63
West South Central	100.0	54.6	41.7	Q	Q	12.65
West	100.0	61.5	33.9	1.3	3.3	11.16
Mountain	100.0	68.0	26.9	Q	Q	12.45
Pacific	100.0	58.4	37.3	Q	2.8	7.65
Metropolitan Status						
Metropolitan	100.0	56.3	28.6	13.3	1.8	5.16
Central City	100.0	63.7	24.6	11.2	.6	6.86
Outside Central City	100.0	51.1	31.4	14.7	2.7	6.39
Nonmetropolitan	100.0	40.0	36.3	13.9	9.8	10.91
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD	100.0	44.2	24.7	22.4	8.7	13.21
5,500 to 7,000 HDD	100.0	63.9	21.0	13.4	1.7	7.86
4,000 to 5,499 HDD	100.0	46.7	28.7	21.9	2.7	9.54
Under 4,000 HDD	100.0	52.7	38.0	3.9	5.3	10.81
2,000 CDD or More and --						
Under 4,000 HDD	100.0	42.3	53.5	Q	3.4	11.13
Payment Method for Utilities						
All Paid by Household	100.0	51.7	32.2	12.2	3.9	5.10
Some Paid, Some in Rent	100.0	60.3	18.2	20.9	Q	13.46
All Included in Rent	100.0	62.6	19.1	16.5	Q	14.28
Other Method	100.0	52.2	23.0	23.6	Q	17.61
Housing Structure by Status of Unit						
Single-Family Detached	100.0	52.2	31.2	12.6	4.0	5.19
Owned	100.0	51.5	31.6	13.1	3.9	5.35
Rented	100.0	57.7	28.1	9.3	4.9	9.08
Single-Family Attached	100.0	55.7	30.5	13.8	Q	19.66
Owned	100.0	56.9	27.6	15.5	Q	22.43
Rented	100.0	51.8	40.2	8.1	Q	24.51
Building of 2 to 4 Units	100.0	64.9	20.9	14.1	Q	8.72
Owned	100.0	62.6	17.4	19.9	Q	13.11
Rented	100.0	65.7	22.2	12.1	Q	10.93
Building of 5 or More Units	100.0	53.1	28.8	18.0	Q	14.67
Owned	100.0	47.6	35.1	Q	NC	39.80
Rented	100.0	53.5	28.3	18.0	Q	14.68
Mobile Home	100.0	31.4	40.1	12.7	15.9	13.36
Owned	100.0	31.9	41.4	11.0	15.7	15.12
Rented	100.0	28.4	33.1	21.6	16.8	19.63
Number of Rooms						
1	100.0	60.8	23.5	Q	Q	35.07
2	100.0	48.3	22.2	23.2	Q	26.88
3	100.0	49.2	31.0	17.2	2.7	13.08
4	100.0	51.2	30.8	12.0	6.0	7.65
5	100.0	53.1	30.5	12.3	4.1	6.40
6	100.0	55.6	30.3	11.7	2.4	6.81
7	100.0	53.1	30.4	13.9	2.6	7.85
8 or More	100.0	52.4	29.5	15.6	2.6	8.79

See footnotes at end of table.

CONSUMPTION BY HOUSEHOLD FEATURES

Table 9. Percentage of Consumption Across Major Fuels by Household Characteristics, 1987 (Continued)
(Percent of Total Btu)

Household Characteristics	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	RSE Row Factors
	0.000	0.555	0.513	1.376	2.546	
Number of Rooms That Can Be Air Conditioned						
All	100.0	50.7	39.9	6.1	3.3	5.77
Some	100.0	53.9	22.2	20.9	3.0	6.10
None	100.0	55.1	23.2	17.8	3.9	7.12
Measured Heated Area of Residence (square feet)						
Fewer than 600	100.0	48.8	26.1	20.1	5.0	9.73
600 to 999	100.0	54.5	29.6	11.8	4.1	7.08
1,000 to 1,599	100.0	49.5	34.8	11.1	4.6	6.70
1,600 to 1,999	100.0	54.0	31.1	12.2	2.8	7.75
2,000 to 2,999	100.0	57.0	28.3	12.8	1.9	9.11
2,400 to 2,999	100.0	57.0	26.0	15.1	1.9	8.52
3,000 or More	100.0	49.7	27.7	19.6	3.0	11.15
Year of Construction						
1939 or Before	100.0	59.0	18.7	19.7	2.6	6.94
1940 to 1949	100.0	56.3	25.2	14.9	3.6	9.23
1950 to 1959	100.0	54.9	26.5	15.7	3.0	6.59
1960 to 1969	100.0	56.4	30.3	10.9	2.4	7.70
1970 to 1974	100.0	54.2	34.2	7.8	5.1	10.27
1975 to 1979	100.0	37.2	48.4	9.1	5.2	10.49
1980 to 1984	100.0	37.6	53.1	4.2	5.0	15.53
1985 or After	100.0	36.0	56.2	Q	5.1	18.53
Status of Unit						
Owned	100.0	51.2	31.3	13.4	4.0	5.26
Condominium	100.0	56.5	40.5	Q	NC	27.45
Not a Condominium	100.0	51.1	31.2	13.6	4.1	5.27
Rented	100.0	57.4	27.3	13.4	1.9	6.41
Public Housing	100.0	57.8	25.1	17.1	Q	25.82
Not Public Housing	100.0	57.4	27.4	13.1	2.1	6.97
Rent Subsidy	100.0	58.4	26.0	15.4	Q	23.04
No Rent Subsidy	100.0	57.3	27.5	13.0	2.1	7.21
1987 Family Income						
Less than \$5,000	100.0	56.2	24.5	10.8	6.5	12.14
\$5,000 to \$9,999	100.0	55.4	25.3	15.1	4.3	9.02
\$10,000 to \$14,999	100.0	54.0	26.9	13.8	5.3	8.60
\$15,000 to \$19,999	100.0	53.5	28.7	13.7	4.1	8.38
\$20,000 to \$24,999	100.0	49.8	32.3	13.9	4.1	8.07
\$25,000 to \$34,999	100.0	50.7	32.6	13.5	3.2	7.11
\$35,000 to \$49,999	100.0	51.6	33.8	12.7	1.9	8.01
\$50,000 or More	100.0	53.7	31.4	13.1	1.8	8.47
Below 100 Percent of Poverty Line	100.0	57.0	26.4	10.3	6.2	9.00
Below 125 Percent of Poverty Line	100.0	56.2	26.4	11.7	5.7	7.35
Assistance for Heating in Winter						
Yes	100.0	59.0	21.7	11.3	8.0	10.09
No	100.0	52.6	30.7	13.5	3.2	4.72
Assistance for Weatherization of Residence						
Yes	100.0	58.7	20.9	14.8	Q	19.61
No	100.0	52.9	30.3	13.4	3.4	4.70
Household Owns or Has Regular Use of a Vehicle						
Yes	100.0	52.2	31.8	12.5	3.6	4.73
No	100.0	58.9	18.0	20.7	2.4	8.97

See footnotes at end of table.

CONSUMPTION BY HOUSEHOLD FEATURES

Table 9. Percentage of Consumption Across Major Fuels by Household Characteristics, 1987 (Continued)
(Percent of Total Btu)

Household Characteristics	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	RSE Row Factors
RSE Column Factors:	0.000	0.555	0.513	1.378	2.548	RSE Row Factors
Race of Householder						
White	100.0	51.4	31.5	13.5	3.6	5.11
Black	100.0	62.0	23.1	13.0	1.9	9.56
Other	100.0	57.0	24.8	12.4	Q	14.03
Householder of Hispanic Descent						
Yes	100.0	52.9	29.6	14.7	2.8	11.36
No	100.0	52.9	30.2	13.3	3.5	4.74
Age of Householder						
Under 25 Years	100.0	55.7	31.9	9.8	2.6	13.07
25 to 34 Years	100.0	54.9	31.0	11.1	3.0	6.14
35 to 44 Years	100.0	50.5	33.5	13.1	2.9	7.17
45 to 59 Years	100.0	51.9	31.9	12.6	3.6	6.22
60 Years and Over	100.0	53.5	25.4	16.8	4.3	6.29
Household Size						
1 Person	100.0	57.7	24.3	14.3	3.7	8.43
2 Persons	100.0	51.1	31.1	14.3	3.4	5.92
3 Persons	100.0	51.4	32.3	13.4	2.9	6.16
4 Persons	100.0	52.1	32.0	12.0	3.9	7.21
5 Persons	100.0	54.7	31.5	11.1	2.6	8.95
6 or More Persons	100.0	52.3	29.9	12.7	5.0	13.48
Secondary Heating						
Yes	100.0	47.3	34.6	13.6	4.5	5.63
Over 33 Percent of Home's Total Heat	100.0	29.5	42.2	23.2	5.1	11.89
No	100.0	57.3	26.8	13.3	2.6	5.13
Fuel Combinations						
Use Natural Gas for Main Heat	100.0	78.9	20.6	.5	Q	9.42
Use Natural Gas to Heat Water and Have A/C	100.0	77.6	21.9	.5	Q	10.83
Use Electricity to Heat Water and Have A/C	100.0	84.9	14.6	Q	NC	4.20
Other	100.0	64.0	35.3	.7	Q	10.62
Use Electricity for Main Heat	100.0	72.7	26.9	Q	NC	5.65
Use Electricity to Heat Water and Lack A/C	100.0	67.8	27.0	Q	Q	16.58
Other	100.0	5.7	92.3	1.2	.8	15.89
Use Fuel Oil for Main Heat and Have A/C	100.0	.7	97.4	1.2	.7	23.96
Use Fuel Oil to Heat Water and Have A/C	100.0	Q	96.6	Q	Q	3.17
Other	100.0	41.6	57.2	Q	Q	13.47
Use Fuel Oil for Main Heat and Have A/C	100.0	4.9	18.9	75.2	1.0	5.88
Use Electricity to Heat Water and Lack A/C	100.0	3.2	14.2	82.5	.1	7.79
Use Electricity to Heat Water and Have A/C	100.0	2.9	10.5	86.3	.2	16.74
Other	100.0	Q	30.3	67.6	Q	4.97
Use Wood for Main Heat	100.0	20.1	30.4	68.6	.9	8.25
Use LPG for Main Heat	100.0	15.5	13.9	62.8	3.2	6.34
Use Kerosene for Main Heat	100.0	NC	59.9	14.0	10.6	13.80
Use Coal for Main Heat	100.0	Q	32.0	1.9	66.1	6.55
No Heating Fuel/Other Fuel	100.0	Q	39.8	51.0	4.2	9.03
	100.0	21.2	78.7	Q	7.5	22.92
			68.8	Q		30.79

NC No cases in sample.
 Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • Percentages are 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

EXPENDITURES BY HOUSEHOLD FEATURES

Table 10. Percentage of Energy Expenditures Across Major Fuels by Household Characteristics, 1987
(Percent of Total Dollars)

Household Characteristics	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	RSE Flow Factors
	0.000	0.797	0.205	1.537	2.767	
Total U.S. Households	100.0	26.8	63.0	7.4	2.9	4.09
Census Region and Division						
Northeast	100.0	27.4	50.8	20.8	1.0	6.72
New England	100.0	19.0	49.1	29.8	2.0	8.15
Middle Atlantic	100.0	29.7	51.2	18.4	.7	8.50
Midwest	100.0	36.0	56.3	3.8	4.0	7.15
East North Central	100.0	37.1	54.7	4.4	3.8	9.11
West North Central	100.0	32.9	60.5	2.1	4.5	8.54
South	100.0	18.1	75.2	3.2	3.4	7.76
South Atlantic	100.0	16.7	74.5	5.2	3.7	11.66
East South Central	100.0	15.4	77.1	2.7	4.8	12.29
West South Central	100.0	22.3	75.5	Q	Q	7.89
West	100.0	29.5	66.9	.7	2.9	9.80
Mountain	100.0	33.9	62.6	Q	Q	8.50
Pacific	100.0	27.8	68.5	.8	2.9	11.86
Metropolitan Status						
Metropolitan	100.0	29.0	62.0	7.3	1.6	4.49
Central City	100.0	35.3	57.8	6.3	.7	5.75
Outside Central City	100.0	25.1	64.7	7.9	2.3	5.69
Nonmetropolitan	100.0	18.4	66.6	7.6	7.4	9.16
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD	100.0	23.8	54.7	14.0	7.5	12.08
5,500 to 7,000 HDD	100.0	35.3	54.3	8.7	1.6	6.47
4,000 to 5,499 HDD	100.0	26.6	59.6	11.8	2.1	8.22
Under 4,000 HDD	100.0	24.7	69.0	2.1	4.2	9.35
2,000 CDD or More and --						
Under 4,000 HDD	100.0	15.8	81.2	Q	2.5	8.40
Payment Method for Utilities						
All Paid by Household	100.0	25.3	64.7	6.8	3.2	4.46
Some Paid, Some in Rent	100.0	36.5	51.9	11.0	.6	10.98
All Included in Rent	100.0	39.5	49.3	9.4	Q	12.89
Other Method	100.0	28.9	55.9	14.0	Q	17.16
Housing Structure by Status of Unit						
Single-Family Detached	100.0	25.9	63.8	7.1	3.2	4.60
Owned	100.0	25.4	64.2	7.3	3.1	4.76
Rented	100.0	29.9	60.3	5.7	4.2	8.18
Single-Family Attached	100.0	29.0	63.3	7.7	Q	17.63
Owned	100.0	30.7	60.5	8.7	Q	19.67
Rented	100.0	23.8	71.9	4.4	Q	21.63
Building of 2 to 4 Units	100.0	37.9	53.3	8.7	Q	7.89
Owned	100.0	37.5	49.8	12.6	Q	11.98
Rented	100.0	38.0	54.5	7.4	Q	9.57
Building of 5 or More Units	100.0	27.8	64.1	8.0	Q	12.19
Owned	100.0	20.8	72.6	Q	NC	28.62
Rented	100.0	28.4	63.3	8.1	Q	12.28
Mobile Home	100.0	13.1	67.6	6.7	12.6	10.76
Owned	100.0	13.2	68.8	5.8	12.2	11.97
Rented	100.0	12.8	61.3	11.3	14.6	16.93
Number of Rooms						
1	100.0	33.2	57.6	Q	Q	30.28
2	100.0	26.0	55.9	11.7	6.3	20.67
3	100.0	24.7	60.9	8.0	2.4	11.66
4	100.0	25.7	62.6	6.4	5.4	6.73
5	100.0	26.7	63.1	6.9	3.3	5.43
6	100.0	27.8	63.6	6.5	2.0	5.98
7	100.0	27.0	63.3	7.7	2.0	7.13
8 or More	100.0	26.9	62.2	9.1	1.9	7.80

See footnotes at end of table.

EXPENDITURES BY HOUSEHOLD FEATURES

Table 10. Percentage of Energy Expenditures Across Major Fuels by Household Characteristics, 1987 (Continued)
(Percent of Total Dollars)

Household Characteristics	RSE Column Factors:					RSE Row Factors
	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
0.000	0.797	0.296	1.537	2.767		
Number of Rooms That Can Be Air Conditioned						
All	100.0	22.4	72.2	3.0	2.4	5.18
Some	100.0	30.6	54.4	12.6	2.4	5.15
None	100.0	31.0	54.3	10.8	3.9	6.14
Measured Heated Area of Residence (square feet)						
Fewer than 600	100.0	25.5	59.8	9.9	4.8	8.41
600 to 999	100.0	27.6	62.4	6.2	3.7	6.19
1,000 to 1,599	100.0	23.7	67.0	5.9	3.4	6.00
1,600 to 1,999	100.0	27.1	63.8	6.8	2.3	6.87
2,000 to 2,399	100.0	29.5	61.2	7.5	1.8	8.25
2,400 to 2,999	100.0	30.7	58.8	8.9	1.6	7.61
3,000 or More	100.0	25.8	60.8	11.4	2.1	10.01
Year of Construction						
1939 or Before	100.0	36.5	48.4	12.7	2.4	5.83
1940 to 1949	100.0	31.3	56.7	8.5	3.5	8.22
1950 to 1959	100.0	28.6	59.5	9.2	2.8	5.94
1960 to 1969	100.0	29.2	63.2	5.8	1.9	6.71
1970 to 1974	100.0	24.6	66.8	4.2	4.4	8.94
1975 to 1979	100.0	14.2	78.2	4.3	3.3	8.83
1980 to 1984	100.0	14.5	80.6	1.9	3.0	12.18
1985 or After	100.0	12.8	82.8	Q	3.3	15.51
Status of Unit						
Owned	100.0	25.3	63.9	7.5	3.3	4.67
Condominium	100.0	22.2	76.4	Q	NC	20.73
Not a Condominium	100.0	25.4	63.6	7.6	3.4	4.68
Rented	100.0	30.6	60.6	7.1	1.7	5.41
Public Housing	100.0	36.0	56.3	8.7	Q	21.66
Not Public Housing	100.0	30.3	60.8	7.0	1.8	5.70
Rent Subsidy	100.0	34.2	57.7	7.1	Q	24.04
No Rent Subsidy	100.0	30.2	61.0	7.0	1.9	5.79
1987 Family Income						
Less than \$5,000	100.0	31.7	55.8	6.3	6.2	10.69
\$5,000 to \$9,999	100.0	30.1	57.0	8.8	4.1	8.28
\$10,000 to \$14,999	100.0	28.5	59.1	8.0	4.4	7.18
\$15,000 to \$19,999	100.0	27.6	60.9	7.9	3.6	8.16
\$20,000 to \$24,999	100.0	24.1	65.0	7.7	3.2	6.97
\$25,000 to \$34,999	100.0	25.0	65.2	7.1	2.6	6.28
\$35,000 to \$49,999	100.0	25.0	66.9	6.7	1.4	7.25
\$50,000 or More	100.0	26.6	65.0	7.0	1.4	7.53
Below 100 Percent of Poverty Line	100.0	30.6	58.3	5.9	5.2	7.74
Below 125 Percent of Poverty Line	100.0	30.0	58.3	6.7	5.0	6.47
Assistance for Heating in Winter						
Yes	100.0	33.8	52.6	7.1	6.5	8.84
No	100.0	26.4	63.5	7.4	2.7	4.11
Assistance for Weatherization of Residence						
Yes	100.0	34.0	51.1	9.8	Q	16.32
No	100.0	26.7	63.1	7.4	2.9	4.10
Household Owns or Has Regular Use of a Vehicle						
Yes	100.0	25.7	64.6	6.9	2.9	4.10
No	100.0	36.7	48.6	12.0	2.7	8.13

See footnotes at end of table.

Table 10. Percentage of Energy Expenditures Across Major Fuels by Household Characteristics, 1987 (Continued)
(Percent of Total Dollars)

Household Characteristics	All Major Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	RSE Row Factors
RSE Column Factors:	0.000	0.797	0.295	1.537	2.767	
Race of Householder						
White	100.0	25.3	64.4	7.4	3.0	4.44
Black	100.0	36.6	54.0	7.5	1.9	8.84
Other	100.0	29.4	60.0	6.4	4.2	13.71
Householder of Hispanic Descent						
Yes	100.0	25.8	65.3	7.0	1.9	10.45
No	100.0	26.8	62.9	7.4	2.9	4.15
Age of Householder						
Under 25 Years	100.0	27.4	64.6	5.4	2.6	12.13
25 to 34 Years	100.0	27.3	64.3	6.0	2.4	5.25
35 to 44 Years	100.0	24.1	66.7	7.0	2.3	6.01
45 to 59 Years	100.0	25.7	64.5	6.9	2.9	5.48
60 Years and Over	100.0	29.3	57.2	9.7	3.8	5.87
Household Size						
1 person	100.0	31.7	56.5	8.5	3.4	7.43
2 Persons	100.0	25.5	63.9	7.8	2.8	5.22
3 Persons	100.0	25.4	64.9	7.4	2.4	5.52
4 Persons	100.0	25.7	64.8	6.4	3.2	5.98
5 Persons	100.0	27.3	64.6	6.0	2.1	8.09
6 or More Persons	100.0	26.2	63.0	6.9	3.9	11.26
Secondary Heating						
Yes	100.0	22.6	66.5	7.3	3.6	5.09
Over 33 Percent of Home's Total Heat	100.0	12.6	71.7	11.6	4.1	10.23
No	100.0	30.3	60.1	7.4	2.2	4.30
Fuel Combinations						
Use Natural Gas for Main Heat	100.0	46.3	53.3	.4	Q	4.79
Use Natural Gas to Heat Water and Have A/C	100.0	44.0	55.7	.3	Q	5.69
and Lack A/C	100.0	55.3	44.3	Q	NC	2.68
Use Electricity to Heat Water and Have A/C	100.0	33.3	66.2	.5	Q	9.53
and Lack A/C	100.0	42.5	57.1	Q	NC	7.94
Other	100.0	35.1	61.1	Q	Q	17.88
Use Electricity for Main Heat	100.0	1.8	97.2	.5	.5	12.21
Use Electricity to Heat Water and Have A/C	100.0	.3	98.8	.4	.4	19.04
and Lack A/C	100.0	Q	98.1	.9	Q	31.90
Other	100.0	15.3	83.8	Q	Q	9.58
Use Fuel Oil for Main Heat	100.0	4.7	49.2	44.6	1.5	5.55
Use Fuel Oil to Heat Water and Have A/C	100.0	3.7	47.0	49.1	.2	6.12
and Lack A/C	100.0	4.5	37.8	57.3	.4	8.40
Use Electricity to Heat Water and Have A/C	100.0	Q	60.5	36.6	Q	6.56
and Lack A/C	100.0	Q	60.6	37.9	1.3	9.15
Other	100.0	16.6	40.6	38.9	3.9	6.13
Use Wood for Main Heat	100.0	5.7	81.5	5.7	7.1	11.56
Use LPG for Main Heat	100.0	NC	55.9	1.1	43.0	7.71
Use Kerosene for Main Heat	100.0	Q	65.8	27.4	4.4	8.64
Use Coal for Main Heat	100.0	Q	90.2	Q	Q	17.10
No Heating Fuel/Other Fuel	100.0	Q	88.4	Q	5.3	12.03

NC No cases in sample.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • Percentages are 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

AVERAGE CONSUMPTION BY HEATING FUEL

Table 11. Consumption of All Major Fuels and Consumption of Electricity per Household by Main Heating Fuel, 1987
(Million Btu per Household)

Household Characteristics	Consumption of Natural Gas, Electricity, Fuel Oil or Kerosene, LPG						Consumption of Electricity						RSE Flow Factors
	In All Households			In Households Where:			In All Households			In Households Where:			
	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity	Main Heating Fuel is Oil or Kerosene	Main Heating Fuel is Electricity	Main Heating Fuel is Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity	Main Heating Fuel is Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas			
RSE Column Factors:	0.475	0.497	1.043	1.866	0.852	1.459	0.585	0.624	1.112	2.119	1.235	1.648	
Total U.S. Households	100.8	117.9	56.4	45.7	126.4	92.5	30.5	24.3	52.5	40.2	25.7	29.6	2.78
Census Region and Division													
Northeast	124.4	138.8	53.1	54.4	134.9	Q	23.3	18.8	49.1	51.2	20.4	Q	5.59
New England	121.0	130.2	49.9	48.4	135.9	Q	22.9	16.9	47.6	42.2	21.9	Q	8.71
Middle Atlantic	125.4	140.3	53.6	58.4	134.5	Q	23.4	19.2	49.4	57.2	19.7	Q	6.64
Midwest	122.5	132.1	68.6	75.1	122.6	115.2	27.4	22.5	64.9	63.5	36.0	29.9	5.53
East North Central	125.3	134.5	68.3	76.6	126.4	117.3	26.4	20.9	65.2	65.9	37.2	31.3	7.18
West North Central	115.8	126.1	69.2	Q	108.0	111.3	29.8	26.5	64.3	Q	31.4	27.4	6.58
South	81.0	113.9	55.6	39.1	103.9	78.4	39.5	32.6	53.4	35.8	35.4	31.1	4.41
South Atlantic	84.3	111.0	56.6	33.6	103.2	72.7	38.9	29.7	53.8	29.7	30.1	30.1	6.54
East South Central	84.1	112.0	62.9	47.0	106.0	87.8	43.7	33.7	60.6	46.1	45.2	35.2	6.63
West South Central	90.1	108.0	53.7	Q	Q	80.4	37.5	34.7	46.7	Q	Q	29.0	9.84
West	77.8	91.5	51.1	41.0	92.3	93.3	26.4	21.1	43.6	35.3	39.6	Q	6.99
Mountain	103.5	116.1	54.0	54.2	Q	124.2	27.8	22.5	50.4	42.7	Q	29.8	9.66
Pacific	69.6	82.2	49.7	40.1	89.4	78.2	26.0	20.6	40.4	34.8	40.6	19.3	8.72
Metropolitan Status													
Metropolitan	102.9	118.1	54.3	43.3	130.0	82.4	29.4	24.0	50.0	37.7	23.7	27.9	3.41
Central City	101.2	115.9	49.4	39.9	115.3	63.6	24.9	21.2	45.2	29.9	17.5	24.7	5.62
Outside Central City	104.1	120.0	57.4	45.6	139.4	86.5	32.7	26.5	53.1	42.8	27.7	28.6	4.15
Nonmetropolitan	93.7	116.9	66.1	53.1	114.4	100.5	34.0	25.8	64.0	48.2	32.2	30.9	4.66
Climate Zone													
Under 2,000 HDD and--													
Over 7,000 HDD	110.4	126.8	62.4	57.1	121.5	112.9	27.2	22.1	61.8	46.6	27.9	25.6	6.85
5,500 to 7,000 HDD	126.0	136.6	66.4	54.5	145.7	114.3	26.5	20.7	63.5	51.9	26.9	32.8	5.47
4,000 to 5,499 HDD	106.7	127.6	60.4	43.8	123.3	100.4	30.6	24.9	57.3	42.4	22.0	30.4	5.09
Under 4,000 HDD	77.4	87.7	54.4	36.7	93.6	93.4	29.4	22.9	48.3	23.3	33.6	32.7	5.19
2,000 CDD or More and --													
Under 4,000 HDD	73.7	98.6	52.6	27.3	68.9	60.5	39.5	35.2	49.2	22.3	37.6	27.5	6.97
Payment Method for Utilities													
All Paid by Household	105.2	124.9	59.5	50.2	134.4	94.0	33.8	27.1	56.7	46.1	30.7	30.3	2.98
Some Paid, Some in Rent	78.2	84.1	37.1	29.2	102.5	Q	14.3	12.4	26.1	19.3	10.0	Q	8.24
All included in Rent	85.0	97.7	39.3	35.4	93.5	Q	16.2	14.6	30.4	29.9	8.9	Q	11.45
Other Method	90.3	105.0	43.0	Q	123.6	Q	20.8	15.8	38.5	Q	20.5	Q	14.94

See footnotes at end of table.

AVERAGE CONSUMPTION BY HEATING FUEL

Table 11. Consumption of All Major Fuels and Consumption of Electricity per Household by Main Heating Fuel, 1987 (Continued)
(Million Btu per Household)

Household Characteristics	Consumption of Natural Gas, Electricity, Fuel Oil or Kerosene, LPG										Consumption of Electricity										RSE Row Factors
	In Households Where:					In Households Where:					In Households Where:					In Households Where:					
	In All Households	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Liquefied Petroleum Gas	In All Households	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Liquefied Petroleum Gas	In All Households	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Liquefied Petroleum Gas	In All Households	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Liquefied Petroleum Gas	
			With Air Conditioning	Without Air Conditioning				With Air Conditioning	Without Air Conditioning				With Air Conditioning	Without Air Conditioning				With Air Conditioning	Without Air Conditioning		
0.475	0.497	1.043	1.866	0.652	1.469	0.695	0.624	1.112	2.119	1.235	1.648										
Housing Structure by Status of Unit																					
Single-Family Detached	114.5	132.4	70.9	62.9	139.0	101.6	35.7	29.3	66.7	56.2	32.5	31.1	2.98								
Owned	116.6	134.4	71.5	63.5	142.5	105.1	36.8	30.2	67.4	56.5	32.4	32.5	3.17								
Rented	101.3	120.6	63.5	60.2	108.6	85.1	28.5	23.3	57.4	54.6	33.1	24.3	7.97								
Single-Family Attached	98.9	112.6	54.2	Q	142.1	NC	30.2	21.3	52.7	Q	24.8	NC	11.51								
Owned	104.7	117.8	52.1	Q	145.2	NC	28.9	20.4	50.5	Q	25.3	NC	12.77								
Rented	93.7	98.4	56.9	Q	133.6	NC	33.6	23.7	57.9	Q	Q	NC	18.12								
Building of 2 to 4 Units	83.4	102.4	44.0	41.3	120.6	NC	19.6	15.8	41.5	36.9	15.8	NC	18.12								
Owned	121.1	133.3	Q	Q	149.0	NC	21.0	21.2	Q	Q	16.9	NC	12.98								
Rented	86.6	95.3	45.3	40.2	109.2	NC	19.2	14.6	42.8	35.7	15.3	NC	8.00								
Building of 5 or More Units	64.2	77.6	36.0	29.7	96.8	NC	18.5	12.7	31.4	23.9	8.9	NC	5.91								
Owned	67.1	97.8	40.5	Q	83.7	NC	23.6	19.5	32.9	Q	9.9	NC	21.02								
Rented	64.0	76.6	35.5	29.7	97.9	NC	18.1	12.4	31.2	24.3	8.8	NC	6.30								
Mobile Home	76.5	95.6	56.6	43.4	88.1	70.8	30.6	22.9	54.6	41.1	26.1	25.9	6.76								
Owned	76.9	97.4	58.2	45.8	83.1	74.2	31.9	23.4	56.2	45.2	24.4	27.7	7.27								
Rented	74.1	86.5	Q	Q	104.9	55.6	24.5	20.7	Q	Q	31.7	18.1	13.80								
Number of Rooms																					
1	52.1	63.5	Q	Q	Q	Q	12.2	9.2	Q	Q	Q	Q	27.98								
2	54.3	60.9	33.1	37.6	76.3	Q	12.1	8.7	19.0	21.9	4.7	Q	12.02								
3	60.0	73.2	35.1	29.1	93.3	67.0	18.6	11.5	32.2	24.2	11.3	19.2	6.88								
4	77.1	91.9	45.4	37.8	98.7	73.0	23.8	16.9	42.6	35.2	20.8	24.0	4.01								
5	96.3	109.0	60.3	52.0	115.5	93.3	29.4	22.5	56.4	46.9	25.9	28.7	3.72								
6	112.9	128.3	62.6	59.2	135.7	121.3	34.1	27.5	60.7	51.5	29.4	40.3	4.76								
7	127.9	144.1	76.3	73.1	148.3	115.6	38.9	31.7	70.7	72.0	30.7	41.4	5.34								
8 or More	153.7	174.4	88.9	86.0	184.8	126.8	45.3	38.8	82.9	71.5	38.4	38.4	5.23								
Number of Rooms That Can Be Air Conditioned																					
All	96.7	119.2	56.6	NC	119.7	102.4	38.6	30.9	52.7	NC	31.9	36.8	3.68								
Some	117.3	123.6	54.4	NC	141.6	91.0	26.1	21.7	50.7	NC	25.4	30.5	4.44								
None	97.6	113.1	—	45.7	119.8	83.4	22.6	17.7	—	40.2	23.0	22.0	3.88								
Measured Heated Area of Residence (square feet)																					
Fewer than 600	63.1	74.3	36.1	30.7	99.0	68.0	16.5	11.9	27.5	20.1	9.7	18.4	7.65								
600 to 999	77.2	91.3	42.7	38.8	96.0	68.6	22.9	17.1	39.5	35.9	19.7	23.2	4.18								
1,000 to 1,599	92.8	108.7	55.9	53.5	119.5	103.8	32.3	24.0	53.7	48.1	26.6	32.3	4.20								
1,600 to 1,999	113.9	131.4	66.7	63.8	127.9	96.7	35.5	28.2	63.7	60.2	27.8	37.8	5.36								
2,000 to 2,999	129.7	144.1	73.9	Q	143.8	116.4	36.7	31.5	66.1	Q	28.9	35.8	6.31								
3,000 or More	145.0	160.7	82.2	Q	152.1	125.3	37.6	32.4	79.6	Q	33.1	37.2	5.10								
3,000 or More	169.0	184.1	96.0	Q	207.4	166.9	46.8	38.6	87.9	Q	42.7	42.4	6.95								
Year of Construction																					
1939 or Before	120.4	131.9	53.2	48.0	137.3	87.8	22.5	19.4	47.9	33.2	23.0	26.5	6.18								
1940 to 1949	103.9	113.3	54.3	46.2	122.1	106.1	26.2	22.8	52.9	44.5	23.6	33.3	8.32								
1950 to 1959	109.6	117.8	58.0	47.1	129.1	96.5	29.0	26.1	53.0	39.7	27.9	27.3	6.67								
1960 to 1969	99.7	110.4	59.4	58.8	114.1	88.8	30.2	26.8	54.6	32.7	24.7	31.3	6.20								
1970 to 1974	95.3	116.9	59.0	43.0	106.1	90.5	32.6	25.2	53.4	33.0	29.6	27.7	7.40								
1975 to 1979	86.1	116.5	58.3	48.6	126.3	103.4	41.7	30.8	53.9	46.9	35.5	34.8	7.77								
1980 to 1984	71.2	97.0	53.6	49.2	89.1	75.9	25.3	25.3	50.1	48.0	27.2	27.2	8.55								
1985 or After	71.1	108.6	52.2	Q	Q	93.0	39.9	22.7	51.7	Q	Q	32.8	9.62								

See footnotes at end of table.

Table 11. Consumption of All Major Fuels and Consumption of Electricity per Household by Main Heating Fuel, 1987 (Continued)
(Million Btu per Household)

Household Characteristics	Consumption of Natural Gas, Electricity, Fuel Oil or Kerosene, LPG						Consumption of Electricity						RSE Row Factors
	In All Households	In Households Where:					In All Households	In Households Where:					
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas	
			With Air Conditioning	Without Air Conditioning					With Air Conditioning	Without Air Conditioning			
RSE Column Factors:	0.475	0.497	1.043	1.866	0.852	1.459	0.585	0.824	1.112	2.119	1.235	1.648	
Status of Unit													
Owned	112.3	131.1	66.4	59.1	137.2	96.1	35.2	28.8	62.6	53.1	30.1	31.1	2.99
Condominium	68.8	93.2	41.1	Q	Q	NC	27.9	20.2	36.1	Q	Q	NC	15.49
Not a Condominium	113.5	132.1	68.6	59.5	137.2	96.1	35.4	29.0	64.9	53.4	30.1	31.1	2.96
Rented	79.7	94.3	41.0	36.7	103.9	76.0	21.7	16.4	37.1	31.6	16.6	22.4	4.81
Public Housing	69.4	78.5	36.3	31.2	97.6	NC	17.4	13.9	31.1	28.3	8.9	NC	15.18
Not Public Housing	80.6	95.8	41.4	37.6	104.5	76.0	22.1	16.6	37.5	32.1	17.3	22.4	5.09
Rent Subsidy	76.4	95.4	33.2	33.4	87.5	Q	19.1	15.9	31.6	33.4	11.2	Q	15.01
No Rent Subsidy	80.8	95.8	41.7	37.9	105.7	75.5	22.2	16.7	37.7	32.1	17.7	22.3	5.33
1987 Family Income													
Less than \$5,000	82.6	105.3	41.3	31.8	97.2	71.1	20.2	15.6	36.7	26.3	17.0	24.4	9.10
\$5,000 to \$9,999	89.8	103.3	49.0	35.2	109.6	82.1	22.7	17.7	45.7	31.7	19.3	22.6	6.38
\$10,000 to \$14,999	91.1	106.5	45.2	40.5	113.9	85.6	24.5	19.9	40.7	35.9	24.6	25.8	5.74
\$15,000 to \$19,999	92.4	107.0	42.7	46.3	124.1	94.6	26.5	21.0	40.9	43.1	23.4	32.8	6.65
\$20,000 to \$24,999	95.8	110.9	59.2	51.9	111.7	109.7	30.9	22.8	53.6	48.3	25.9	35.4	5.77
\$25,000 to \$34,999	98.7	117.3	54.4	45.2	120.8	99.8	32.2	25.8	52.6	36.1	25.2	32.8	5.24
\$35,000 to \$49,999	112.4	131.3	62.8	57.4	146.8	105.6	38.0	29.7	60.3	56.7	31.9	36.5	5.74
\$50,000 or More	129.0	144.6	74.7	58.6	172.0	129.4	40.5	33.8	66.9	45.0	33.4	40.7	6.13
Below 100 Percent of Poverty Line													
.....	89.3	109.8	49.1	36.4	102.0	80.9	23.6	18.6	44.3	30.9	21.8	24.7	6.50
Below 125 Percent of Poverty Line													
.....	90.7	108.8	49.8	37.0	105.6	84.8	24.0	19.1	45.3	30.2	21.7	24.4	5.23
Assistance for Heating in Winter													
Yes	101.1	119.5	52.9	41.4	107.9	94.5	22.0	17.7	49.3	27.6	21.3	20.6	8.87
No	100.8	117.8	56.5	45.8	127.5	92.2	30.9	24.7	52.6	40.8	25.9	30.6	2.87
Assistance for Weatherization of Residence													
Yes	102.2	116.8	Q	Q	115.8	Q	21.4	18.3	Q	Q	23.9	Q	13.96
No	100.8	117.9	56.4	45.9	126.5	92.2	30.6	24.4	52.5	40.4	25.7	29.6	2.78
Household Owns or Has Regular Use of a Vehicle													
Yes	101.8	119.6	57.5	47.5	131.0	93.1	32.4	25.8	53.7	42.2	28.9	30.5	2.88
No	93.8	106.2	41.6	35.3	108.4	84.2	16.9	14.0	36.5	29.0	13.2	18.0	7.86
Race of Householder													
White	100.2	118.7	56.1	46.0	125.4	93.4	31.6	25.0	52.4	41.5	27.2	29.9	2.86
Black	110.3	120.1	60.1	41.2	139.7	75.4	25.4	22.2	55.1	30.8	18.3	27.9	7.90
Other	81.7	90.6	52.7	45.8	101.0	Q	20.3	16.6	45.2	34.3	9.7	Q	11.08
Householder of Hispanic Descent													
Yes	87.3	94.2	60.4	47.9	119.4	Q	25.8	19.0	55.0	36.4	16.6	Q	10.83
No	101.6	119.3	56.2	45.5	126.8	92.0	30.7	24.6	52.4	40.4	26.2	29.5	2.79

See footnotes at end of table.

AVERAGE CONSUMPTION BY HEATING FUEL

Table 11. Consumption of All Major Fuels and Consumption of Electricity per Household by Main Heating Fuel, 1987 (Continued)
(Million Btu per Household)

Household Characteristics	Consumption of Natural Gas, Electricity, Fuel Oil or Kerosene, LPG				Consumption of Electricity				RSE Row Factors				
	In Households Where:				In Households Where:								
	In All Households	Main Heating Fuel is Electricity		Main Heating Fuel is Natural Gas	In All Households	Main Heating Fuel is Electricity		Main Heating Fuel is Natural Gas					
		With Air Conditioning	Without Air Conditioning			With Air Conditioning	Without Air Conditioning						
RSE Column Factors	0.475	1.043	1.866	0.852	1.459	0.585	0.624	1.112	2.119	1.235	1.648		
Age of Householder													
Under 25 Years	76.9	94.3	43.3	32.1	113.2	72.7	24.6	16.7	39.2	29.7	28.2	25.5	7.84
25 to 34 Years	93.9	111.1	51.9	44.6	115.1	95.0	29.1	22.6	48.2	37.0	24.1	32.9	4.29
35 to 44 Years	105.7	124.3	62.7	55.4	133.4	105.0	35.4	26.9	58.1	53.0	31.6	30.5	4.53
45 to 59 Years	112.9	134.5	66.0	49.3	142.8	91.9	36.0	30.7	62.7	42.5	29.6	30.6	4.63
60 Years and Over	100.4	113.2	52.9	43.7	121.9	90.1	25.6	21.3	49.4	37.6	20.9	27.4	4.76
Household Size													
1 Person	79.4	94.8	39.5	33.2	100.2	80.1	19.3	14.6	35.3	30.4	13.4	20.8	5.53
2 Persons	96.0	113.3	53.7	44.1	125.3	83.8	29.9	24.0	50.8	36.7	25.3	28.0	3.61
3 Persons	107.8	123.2	65.1	55.6	133.6	98.6	34.8	27.5	61.1	53.7	30.8	36.2	4.78
4 Persons	120.8	140.8	71.3	67.3	142.3	116.8	38.6	31.7	65.6	59.8	33.0	33.6	5.16
5 Persons	123.2	140.8	81.1	Q	144.3	99.3	38.8	31.7	79.0	Q	31.9	35.8	5.62
6 or More Persons	131.2	148.2	84.0	82.1	175.4	113.9	39.2	31.9	77.7	61.8	43.3	40.2	9.48
Secondary Heating													
Yes	107.0	129.3	67.5	54.6	135.3	92.1	37.0	29.9	62.2	47.0	34.2	29.9	3.77
Over 33 Percent of Home's Total Heat	91.9	104.3	71.7	56.8	134.1	61.8	38.8	28.4	64.0	42.1	42.0	25.6	9.87
No	96.5	111.3	48.7	39.1	120.2	92.9	25.9	21.1	45.8	35.3	19.8	29.2	3.44

- Data not applicable.

nc No cases in sample.

o Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • Percentages are 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

AVERAGE EXPENDITURES FOR ALL FUELS

Table 12. Energy Expenditures per Household for All Major Fuels, 1987

Household Characteristics	Average Total Fuel Expenditure (dollars per household)							RSE Row Factors
	In All Households	In Households Where:						
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas		
RSE Column Factors:	0.451	0.578	1.186	2.231	1.012	1.432		
Total U.S. Households	1,080	1,073	1,103	772	1,260	1,163	2.32	
Census Region and Division								
Northeast	1,276	1,313	1,188	1,200	1,294	Q	5.52	
New England	1,222	1,220	1,133	1,022	1,284	Q	7.11	
Middle Atlantic	1,292	1,329	1,198	1,318	1,299	Q	6.51	
Midwest	1,124	1,096	1,257	1,273	1,271	1,309	4.89	
East North Central	1,149	1,113	1,286	1,308	1,298	1,382	6.61	
West North Central	1,064	1,053	1,176	Q	1,168	1,175	6.50	
South	1,081	1,110	1,108	720	1,185	1,090	3.29	
South Atlantic	1,128	1,171	1,185	673	1,185	1,112	4.52	
East South Central	992	990	1,045	770	1,189	1,112	5.05	
West South Central	1,060	1,104	993	Q	Q	1,020	8.19	
West	819	834	913	605	892	1,071	6.50	
Mountain	944	923	1,108	824	Q	1,152	7.65	
Pacific	779	800	819	590	900	1,031	8.53	
Metropolitan Status								
Metropolitan	1,093	1,086	1,087	738	1,276	1,117	2.86	
Central City	1,001	1,029	931	645	1,075	1,009	4.77	
Outside Central City	1,160	1,136	1,184	798	1,405	1,140	3.53	
Nonmetropolitan	1,035	1,007	1,179	881	1,208	1,200	3.96	
Climate Zone								
Under 2,000 CDD and--								
Over 7,000 HDD	1,030	970	1,188	1,012	1,188	1,175	5.29	
5,500 to 7,000 HDD	1,156	1,118	1,248	931	1,427	1,407	4.96	
4,000 to 5,499 HDD	1,138	1,202	1,127	687	1,198	1,218	5.10	
Under 4,000 HDD	931	898	1,000	608	1,174	1,217	4.99	
2,000 CDD or More and --								
Under 4,000 HDD	1,068	1,093	1,107	596	1,026	952	5.46	
Payment Method for Utilities								
All Paid by Household	1,150	1,151	1,176	847	1,382	1,185	2.55	
Some Paid, Some in Rent	762	751	663	549	918	Q	8.37	
All Included in Rent	703	731	666	572	706	Q	10.18	
Other Method	928	941	811	Q	1,222	Q	12.76	

See footnotes at end of table.

AVERAGE EXPENDITURES FOR ALL FUELS

Table 12: Energy Expenditures per Household for All Major Fuels, 1987 (Continued)

Household Characteristics	Average Total Fuel Expenditure (dollars per household)							RSE Row Factors
	In All Households	In Households Where:					Main Heating Fuel is Liquefied Petroleum Gas	
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene			
			With Air Conditioning	Without Air Conditioning				
RSE Column Factors	0.451	0.573	1.186	2.231	1.012	1.432		
Housing Structure by Status of Unit								
Single-Family Detached	1,226	1,213	1,374	1,068	1,425	1,240	2.46	
Owned	1,257	1,242	1,393	1,087	1,453	1,286	2.64	
Rented	1,027	1,038	1,125	982	1,185	1,024	6.35	
Single-Family Attached	1,135	1,112	1,096	Q	1,424	NC	8.98	
Owned	1,180	1,160	1,071	Q	1,449	NC	10.15	
Rented	1,017	982	1,156	Q	Q	NC	15.78	
Building of 2 to 4 Units	905	896	898	694	1,159	NC	5.24	
Owned	1,159	1,215	Q	Q	1,378	NC	5.24	
Rented	842	823	907	668	1,071	NC	10.65	
Building of 5 or More Units	681	665	709	482	793	NC	5.36	
Owned	848	999	824	Q	697	NC	4.96	
Rented	669	649	696	481	802	NC	19.74	
Mobile Home	948	885	1,101	768	1,031	NC	5.04	
Owned	960	903	1,121	782	980	NC	6.65	
Rented	887	795	Q	Q	1,202	1,032	7.73	
						759	11.24	
Number of Rooms								
1	546	586	Q	Q	Q	Q	43.90	
2	508	460	488	626	527	Q	10.28	
3	659	607	731	471	808	872	5.00	
4	840	809	877	661	1,018	974	3.25	
5	1,028	987	1,159	856	1,185	1,131	3.03	
6	1,214	1,191	1,255	957	1,391	1,552	3.74	
7	1,374	1,363	1,498	1,306	1,459	1,468	4.52	
8 or More	1,614	1,602	1,725	1,430	1,873	1,486	4.43	
Number of Rooms That Can Be Air Conditioned								
All	1,164	1,173	1,109	NC	1,303	1,337	3.04	
Some	1,161	1,107	1,053	NC	1,408	1,117	4.12	
None	933	931	—	772	1,147	1,016	3.18	
Measured Heated Area of Residence (square feet)								
Fewer than 600	675	631	617	509	839	852	6.60	
600 to 999	825	805	851	658	978	912	3.36	
1,000 to 1,599	1,046	1,010	1,111	889	1,232	1,248	3.47	
1,600 to 1,999	1,238	1,234	1,312	1,121	1,306	1,307	4.12	
2,000 to 2,399	1,358	1,337	1,445	Q	1,432	1,572	5.21	
2,400 to 2,999	1,448	1,447	1,576	Q	1,517	1,538	3.85	
3,000 or More	1,724	1,650	1,827	Q	2,039	1,812	6.14	
Year of Construction								
1939 or Before	1,105	1,093	1,017	802	1,312	1,044	6.05	
1940 to 1949	1,042	1,037	1,098	865	1,166	1,348	6.79	
1950 to 1959	1,121	1,100	1,089	805	1,301	1,191	6.02	
1960 to 1969	1,060	1,069	1,075	660	1,163	1,148	4.87	
1970 to 1974	1,062	1,068	1,126	618	1,194	1,135	7.18	
1975 to 1979	1,131	1,142	1,138	841	1,402	1,307	6.95	
1980 to 1984	984	941	1,082	828	1,028	1,006	8.05	
1985 or After	1,049	965	1,110	Q	Q	1,268	8.10	

See footnotes at end of table.

AVERAGE EXPENDITURES FOR ALL FUELS

Table 12. Energy Expenditures per Household for All Major Fuels, 1987 (Continued)

Household Characteristics	Average Total Fuel Expenditure (dollars per household)							RSE Row Factors
	In All Households	In Households Where:						
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas		
RSE Column Factors:	0.451	0.578	1.186	2.231	1.012	1.432		
Status of Unit								
Owned	1,221	1,218	1,303	1,021	1,397	1,211	2.52	
Condominium	883	892	873	Q	Q	NC	13.86	
Not a Condominium	1,230	1,226	1,341	1,024	1,398	1,211	2.53	
Rented	819	816	798	606	977	942	3.82	
Public Housing	651	668	656	486	719	NC	14.43	
Not Public Housing	833	829	807	626	1,000	942	4.13	
Rent Subsidy	810	881	689	668	786	Q	11.62	
No Rent Subsidy	834	827	813	624	1,017	938	4.34	
1987 Family Income								
Less than \$5,000	818	862	753	552	904	976	7.50	
\$5,000 to \$9,999	881	871	912	622	1,016	988	5.44	
\$10,000 to \$14,999	927	930	843	661	1,126	1,056	4.12	
\$15,000 to \$19,999	967	938	833	833	1,235	1,194	6.01	
\$20,000 to \$24,999	1,038	1,004	1,075	852	1,158	1,341	4.94	
\$25,000 to \$34,999	1,091	1,084	1,094	770	1,218	1,262	4.74	
\$35,000 to \$49,999	1,257	1,239	1,285	985	1,488	1,358	5.12	
\$50,000 or More	1,440	1,417	1,463	923	1,759	1,608	5.06	
Below 100 Percent of Poverty Line	904	937	903	631	1,005	1,002	5.34	
Below 125 Percent of Poverty Line	918	938	909	625	1,030	1,041	4.49	
Assistance for Heating in Winter								
Yes	957	978	954	588	1,070	1,015	7.44	
No	1,086	1,079	1,107	780	1,271	1,180	2.40	
Assistance for Weatherization of Residence								
Yes	950	967	Q	Q	1,148	Q	12.13	
No	1,081	1,074	1,103	776	1,282	1,163	2.29	
Household Owns or Has Regular Use of a Vehicle								
Yes	1,109	1,100	1,128	798	1,333	1,171	2.41	
No	873	885	773	624	976	1,067	7.09	
Race of Householder								
White	1,087	1,082	1,099	775	1,269	1,181	2.38	
Black	1,097	1,091	1,175	708	1,291	994	6.24	
Other	832	790	1,000	809	887	Q	9.30	
Householder of Hispanic Descent								
Yes	977	869	1,333	841	1,098	Q	9.66	
No	1,086	1,086	1,091	769	1,270	1,160	2.30	

See footnotes at end of table.

Table 12. Energy Expenditures per Household for All Major Fuels, 1987 (Continued)

Household Characteristics	Average Total Fuel Expenditure (dollars per household)						RSE Row Factors
	In Households Where:						
	In All Households	Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas	
With Air Conditioning			Without Air Conditioning				
RSE Column Factors	0.451	0.578	1.188	2.231	1.012	1.432	
Age of Householder							
Under 25 Years	836	809	846	577	1,211	905	6.55
25 to 34 Years	1,016	1,011	1,013	757	1,171	1,231	3.81
35 to 44 Years	1,180	1,142	1,240	960	1,407	1,216	3.56
45 to 59 Years	1,235	1,264	1,296	837	1,461	1,173	3.89
60 Years and Over	1,010	1,008	1,019	706	1,130	1,138	4.14
Household Size							
1 Person	769	775	749	557	883	972	4.35
2 Persons	1,040	1,042	1,070	711	1,214	1,085	3.31
3 Persons	1,188	1,150	1,275	1,067	1,416	1,298	3.89
4 Persons	1,324	1,315	1,392	1,151	1,492	1,386	4.17
5 Persons	1,369	1,357	1,553	Q	1,588	1,198	4.45
6 or More Persons	1,452	1,420	1,695	1,216	1,871	1,479	9.13
Secondary Heating							
Yes	1,195	1,205	1,296	860	1,406	1,190	3.37
Over 33 Percent of Home's Total Heat	1,127	1,006	1,390	812	1,470	921	9.28
No	999	997	969	708	1,160	1,132	2.97

NC No cases in sample.

— Data not applicable.

Q Data withheld because fewer than 10 households were sampled, or, if the statistic is a median, fewer than 25 households were sampled. See Appendix C for a method for calculating RSE's for statistics in this table.

Notes: • Because of rounding, data may not sum to totals. • Percentages are 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 13. Household Energy Expenditures as a Percent of Income by Main Heating Fuel, 1987

Household Characteristics	Expenditure as a Percent of Income (median percent)					
	In All Households	In Households Where:				
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas
			With Air Conditioning	Without Air Conditioning		
Total U.S. Households	4	4	4	4	5	7
Census Region and Division						
Northeast	5	5	3	5	5	Q
New England	4	4	3	Q	5	Q
Middle Atlantic	5	5	3	Q	5	Q
Midwest	5	5	4	Q	5	7
East North Central	5	5	5	Q	5	7
West North Central	5	4	4	Q	6	6
South	5	5	4	6	7	8
South Atlantic	5	4	4	6	7	6
East South Central	5	5	4	Q	Q	8
West South Central	5	5	4	Q	Q	Q
West	3	3	3	2	Q	4
Mountain	4	4	3	Q	Q	Q
Pacific	2	2	3	2	Q	Q
Metropolitan Status						
Metropolitan	4	4	3	3	5	6
Central City	4	5	3	4	6	Q
Outside Central City	4	4	4	3	5	6
Nonmetropolitan	6	6	5	6	7	7
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD	5	4	Q	5	5	6
5,500 to 7,000 HDD	4	5	3	4	5	9
4,000 to 5,499 HDD	4	4	3	3	5	6
Under 4,000 HDD	4	3	4	3	11	8
2,000 CDD or More and --						
Under 4,000 HDD	5	5	4	Q	Q	7
Payment Method for Utilities						
All Paid by Household	4	4	4	4	5	7
Some Paid, Some in Rent	4	4	2	4	5	Q
All Included in Rent	6	6	7	6	6	Q
Other Method	4	4	Q	Q	6	Q

See footnotes at end of table.

Table 13. Household Energy Expenditures as a Percent of Income by Main Heating Fuel, 1987 (Continued)

Household Characteristics	Expenditure as a Percent of Income (median percent)					
	In All Households	In Households Where:				
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas
			With Air Conditioning	Without Air Conditioning		
Housing Structure by Status of Unit						
Single-Family Detached	4	4	4	4	5	7
Owned	4	4	4	4	5	7
Rented	6	6	4	Q	6	7
Single-Family Attached	4	4	3	Q	7	NC
Owned	3	3	3	Q	7	NC
Rented	4	4	Q	Q	Q	NC
Building of 2 to 4 Units	5	5	5	5	5	NC
Owned	5	4	Q	Q	6	NC
Rented	5	5	5	4	5	NC
Building of 5 or More Units	4	4	3	2	4	NC
Owned	2	Q	Q	Q	Q	NC
Rented	4	4	4	2	4	NC
Mobile Home	6	6	6	Q	8	6
Owned	6	5	6	Q	8	6
Rented	8	6	Q	Q	Q	Q
Number of Rooms						
1	4	4	Q	Q	Q	Q
2	4	3	4	Q	Q	Q
3	4	5	4	4	5	Q
4	5	5	5	4	6	7
5	5	5	4	3	6	8
6	4	4	4	Q	5	7
7	4	4	3	Q	5	5
8 or More	3	3	4	Q	4	4
Number of Rooms That Can Be Air Conditioned						
All	4	4	4	NC	4	6
Some	5	4	5	NC	5	8
None	5	4	--	4	6	7
Measured Heated Area of Residence (square feet)						
Fewer than 600	5	6	4	4	6	8
600 to 999	5	5	4	4	6	7
1,000 to 1,599	4	4	4	3	6	8
1,600 to 1,999	4	4	4	5	5	6
2,000 to 2,399	4	3	3	Q	5	Q
2,400 to 2,999	4	4	3	Q	4	Q
3,000 or More	3	3	4	Q	4	Q
Year of Construction						
1939 or Before	6	6	5	4	6	6
1940 to 1949	4	4	3	Q	5	Q
1950 to 1959	4	4	5	Q	5	7
1960 to 1969	4	4	5	4	5	7
1970 to 1974	4	4	5	3	6	7
1975 to 1979	4	4	3	4	4	8
1980 to 1984	3	3	4	3	Q	Q
1985 or After	3	3	3	Q	Q	Q

See footnotes at end of table.

Table 13. Household Energy Expenditures as a Percent of Income by Main Heating Fuel, 1987 (Continued)

Household Characteristics	Expenditure as a Percent of Income (median percent)						
	In All Households	In Households Where:				Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity				
			With Air Conditioning	Without Air Conditioning			
Status of Unit							
Owned	4	4	4	4	5	7	
Condominium	2	2	2	Q	Q	NC	
Not a Condominium	4	4	4	4	5	7	
Rented	5	5	4	3	5	8	
Public Housing	9	9	9	8	6	NC	
Not Public Housing	4	4	4	3	5	8	
Rent Subsidy	11	14	Q	Q	Q	Q	
No Rent Subsidy	4	4	4	3	5	8	
1987 Family Income							
Less than \$5,000	25	25	27	13	24	31	
\$5,000 to \$9,999	11	11	10	8	13	11	
\$10,000 to \$14,999	7	7	7	5	9	8	
\$15,000 to \$19,999	5	5	5	4	6	7	
\$20,000 to \$24,999	4	4	5	3	5	6	
\$25,000 to \$34,999	3	3	3	2	4	4	
\$35,000 to \$49,999	3	3	3	Q	3	Q	
\$50,000 or More	2	2	2	1	2	Q	
Below 100 Percent of Poverty Line							
.....	16	16	19	12	18	23	
Below 125 Percent of Poverty Line							
.....	13	13	13	10	14	17	
Assistance for Heating in Winter							
Yes	13	14	13	Q	15	18	
No	4	4	4	4	5	6	
Assistance for Weatherization of Residence							
Yes	11	13	Q	Q	Q	Q	
No	4	4	4	4	5	7	
Household Owns or Has Regular Use of a Vehicle							
Yes	4	4	4	4	5	6	
No	10	11	8	8	8	Q	
Race of Householder							
White	4	4	4	4	5	6	
Black	7	7	5	11	8	13	
Other	3	3	Q	Q	4	Q	
Householder of Hispanic Descent							
Yes	4	4	3	Q	6	Q	
No	4	4	4	4	5	7	

See footnotes at end of table.

Table 13. Household Energy Expenditures as a Percent of Income by Main Heating Fuel, 1987 (Continued)

Household Characteristics	Expenditure as a Percent of Income (median percent)					
	In All Households	In Households Where:				
		Main Heating Fuel is Natural Gas	Main Heating Fuel is Electricity		Main Heating Fuel is Fuel Oil or Kerosene	Main Heating Fuel is Liquefied Petroleum Gas
			With Air Conditioning	Without Air Conditioning		
Age of Householder						
Under 25 Years	5	5	4	3	6	Q
25 to 34 Years	4	4	3	3	4	6
35 to 44 Years	4	3	3	3	5	8
45 to 59 Years	4	4	4	3	4	6
60 Years and Over	6	6	7	6	7	8
Household Size						
1 Person	5	5	3	4	7	10
2 Persons	4	4	3	3	4	7
3 Persons	4	4	4	5	5	6
4 Persons	4	4	3	4	5	4
5 Persons	5	5	4	Q	5	Q
6 or More Persons	5	5	Q	Q	7	Q
Secondary Heating						
Yes	4	4	3	3	5	6
Over 33 Percent of Home's Total Heat	4	3	4	Q	6	Q
No	5	5	4	5	6	7

NC No cases in sample.
 --- Data not applicable.
 Q Data withheld because fewer than 10 households were sampled, or, if the statistic is a median, fewer than 25 households were sampled. See Appendix C for a method for calculating RSE's for statistics in this table.
 Notes: • Because of rounding, data may not sum to totals. • Percentages are calculated on unrounded numbers. • Relative Standard Error (RSE) row and column factors were not calculated on any table that presented a median value. • 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 14. Household Natural Gas Consumption and Expenditures, 1987

Household Characteristics	Natural Gas Used:								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (trillion cf)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per thousand cf)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.304	1.529	1.529	1.534	0.384	0.812	0.812	0.844	
Total U.S. Households	57.3	4.69	4.83	26.1	5.58	81.8	84.3	456	2.49
Census Region and Division									
Northeast	11.7	1.00	1.03	6.7	6.65	85.9	88.5	571	7.20
New England	1.7	.14	.15	1.0	6.96	84.2	86.8	586	7.12
Middle Atlantic	10.0	.86	.89	5.7	6.60	86.1	86.8	568	8.32
Midwest	17.1	1.77	1.83	9.0	5.08	103.5	106.8	526	2.92
East North Central	12.2	1.31	1.35	6.8	5.17	107.1	110.5	553	3.72
West North Central	4.9	.46	.48	2.2	4.83	94.6	97.5	457	4.79
South	15.1	1.06	1.09	6.1	5.70	70.1	72.3	400	6.19
South Atlantic	5.9	.44	.45	2.9	6.71	74.7	77.0	501	6.65
East South Central	2.5	.18	.19	.9	5.07	73.8	76.1	374	11.30
West South Central	6.8	.44	.45	2.2	4.96	64.8	66.9	322	8.19
West	13.4	.85	.88	4.4	5.21	63.5	65.5	331	3.14
Mountain	3.5	.30	.31	1.4	4.69	87.5	90.2	410	6.11
Pacific	9.9	.55	.56	3.0	5.50	55.1	56.8	303	3.63
Metropolitan Status									
Metropolitan	48.7	3.95	4.07	22.3	5.64	81.1	83.6	457	2.65
Central City	23.3	1.85	1.91	10.5	5.65	79.5	81.9	449	3.38
Outside Central City	25.4	2.10	2.16	11.8	5.63	82.6	85.1	465	3.02
Nonmetropolitan	8.6	.74	.76	3.9	5.26	85.6	88.3	450	6.16
Climate Zone									
Under 2,000 CDD and--									
Over 7,000 HDD	4.2	.40	.42	2.1	5.18	97.1	100.1	503	6.42
5,500 to 7,000 HDD	19.1	2.03	2.09	10.6	5.22	106.2	109.5	555	3.54
4,000 to 5,499 HDD	13.1	1.06	1.09	6.6	6.26	80.6	83.1	505	8.36
Under 4,000 HDD	12.2	.71	.73	4.1	5.80	57.9	59.7	336	5.04
2,000 CDD or More and --									
Under 4,000 HDD	8.8	.49	.51	2.8	5.59	56.4	58.1	315	9.18
All Gas Paid by Household									
Yes	44.3	3.91	4.03	21.7	5.54	88.3	91.1	490	2.93
Budget Plan	7.6	.89	.91	5.0	5.82	116.1	119.7	652	4.91
No Budget Plan	36.6	3.02	3.12	16.7	5.52	82.5	85.1	456	3.00
No	13.1	.78	.80	4.5	5.76	59.6	61.4	343	5.48
Housing Structure by Status of Unit									
Single-Family Detached	33.6	3.20	3.30	17.5	5.47	95.3	98.2	521	2.88
Owned	28.9	2.78	2.86	15.2	5.48	96.2	99.2	527	2.99
Rented	4.7	.42	.43	2.3	5.41	89.5	92.2	484	5.09
Single-Family Attached	3.5	.28	.29	1.7	6.16	80.3	82.8	495	10.34
Owned	2.6	.22	.23	1.4	6.27	84.6	87.2	531	11.19
Rented .....	.9	.06	.06	.4	5.75	67.8	69.9	390	16.84
Building of 2 to 4 Units	8.0	.59	.61	3.4	5.83	74.1	76.4	431	4.83
Owned	1.7	.15	.15	.9	5.91	87.1	89.8	515	10.20
Rented	6.3	.45	.46	2.6	5.80	70.6	72.8	409	4.55
Building of 5 or More Units	10.5	.49	.51	2.8	5.73	47.0	48.5	269	7.57
Owned .....	.6	.03	.03	.2	5.71	47.1	48.6	269	32.59
Rented	9.8	.46	.48	2.7	5.73	47.0	48.5	269	7.43
Mobile Home	1.7	.12	.12	.6	5.35	68.9	71.1	369	10.24
Owned	1.4	.10	.10	.5	5.31	69.9	72.1	372	11.41
Rented .....	.3	.02	.02	.1	5.55	63.8	65.8	354	14.45
Number of Rooms									
1 .....	.4	.02	.02	.1	5.90	45.4	46.8	268	25.67
2	1.6	.06	.06	.3	5.18	38.5	39.7	200	11.31
3	6.1	.28	.29	1.6	5.69	46.0	47.4	262	7.44
4	10.6	.68	.70	3.8	5.64	64.1	66.1	362	4.28
5	13.2	1.04	1.07	5.7	5.54	78.3	80.7	433	3.12
6	11.6	1.06	1.09	5.9	5.55	91.5	94.3	507	3.41
7	7.2	.74	.76	4.2	5.63	102.3	105.4	576	4.17
8 or More	6.5	.81	.83	4.5	5.56	124.1	128.0	690	4.96

See footnotes at end of table.

Table 14. Household Natural Gas Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Natural Gas Used:								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (trillion cf)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars thousand cf)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors	1.304	1.529	1.529	1.534	0.394	0.912	0.812	0.844	
Number of Rooms That Can Be Air Conditioned									
All	24.9	1.94	2.00	10.7	5.49	78.0	80.4	428	3.19
Some	11.7	1.03	1.06	6.0	5.79	87.9	90.6	509	4.50
None	20.7	1.72	1.77	9.5	5.55	82.8	85.4	460	3.46
Measured Heated Area of Residence (square feet)									
Fewer than 600	5.3	.25	.26	1.4	5.76	47.4	48.8	273	5.37
600 to 999	15.4	.98	1.01	5.5	5.59	63.5	65.4	355	3.69
1,000 to 1,999	14.9	1.14	1.17	6.3	5.56	76.2	78.5	423	3.24
2,000 to 2,999	7.2	.67	.69	3.8	5.64	92.8	95.7	524	4.21
3,000 or More	5.9	.61	.62	3.4	5.58	102.8	106.0	574	5.06
	5.3	.62	.64	3.4	5.54	117.6	121.2	652	5.63
	3.3	.43	.44	2.3	5.46	128.4	132.3	700	5.91
Year of Construction									
1939 or Before	15.7	1.48	1.53	8.4	5.70	94.5	97.4	539	4.63
1940 to 1949	6.0	.47	.48	2.7	5.77	77.7	80.1	449	5.14
1950 to 1959	9.1	.76	.79	4.2	5.50	83.5	86.1	459	4.45
1960 to 1969	11.9	.89	.92	5.1	5.67	75.4	77.7	427	4.46
1970 to 1974	5.8	.47	.49	2.5	5.34	81.2	83.7	433	5.69
1975 to 1979	4.7	.33	.34	1.7	5.15	70.1	72.2	361	7.51
1980 to 1984	3.0	.19	.20	1.1	5.50	63.6	65.5	350	10.43
1985 or After	1.2	.10	.10	.5	5.41	79.6	82.0	430	12.97
Status of Unit									
Owned	35.3	3.28	3.38	18.2	5.55	92.9	95.8	516	2.84
Condominium	1.0	.06	.06	.3	5.19	59.3	61.1	308	22.10
Not a Condominium	34.3	3.22	3.32	17.9	5.55	93.9	96.8	522	2.89
Rented	22.0	1.41	1.45	8.0	5.65	63.9	65.9	361	3.33
Public Housing	1.8	.10	.10	.6	5.85	54.0	55.7	316	11.40
Not Public Housing	20.2	1.31	1.35	7.4	5.64	64.8	66.8	365	3.53
Rent Subsidy	.9	.06	.06	.4	6.40	66.3	68.4	424	17.13
No Rent Subsidy	19.3	1.25	1.29	7.0	5.60	64.7	66.7	363	3.64
1987 Family Income									
Less than \$5,000	3.8	.29	.30	1.6	5.56	75.6	78.0	421	7.35
\$5,000 to \$9,999	7.4	.55	.57	3.0	5.50	75.2	77.5	413	4.27
\$10,000 to \$14,999	8.0	.60	.62	3.3	5.54	75.1	77.4	416	4.18
\$15,000 to \$19,999	5.6	.43	.45	2.4	5.57	78.4	78.8	426	4.43
\$20,000 to \$24,999	5.3	.40	.42	2.2	5.41	76.9	79.3	416	4.54
\$25,000 to \$34,999	9.9	.79	.81	4.4	5.63	79.2	81.7	446	3.67
\$35,000 to \$49,999	8.3	.75	.77	4.2	5.60	90.9	93.7	509	4.54
\$50,000 or More	9.0	.87	.90	4.9	5.68	96.3	99.3	547	4.12
Below 100 Percent of Poverty Line	7.4	.58	.60	3.3	5.60	78.3	80.8	438	5.22
Below 125 Percent of Poverty Line	11.5	.90	.93	5.0	5.56	78.2	80.6	435	4.17
Assistance for Heating in Winter									
Yes	3.1	.28	.28	1.5	5.59	90.2	93.0	505	6.68
No	54.3	4.41	4.55	24.6	5.58	81.3	83.8	454	2.48
Assistance for Weatherization of Residence									
Yes	.7	.06	.06	.3	5.55	86.0	90.7	488	12.52
No	56.7	4.63	4.77	25.8	5.58	81.7	84.2	456	2.50

See footnotes at end of table.

Table 14. Household Natural Gas Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Natural Gas Used:								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (trillion cf)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per thousand cf)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.304	1.529	1.529	1.534	0.384	0.812	0.812	0.844	
Household Owns or Has Regular Use of a Vehicle									
Yes	48.9	4.09	4.22	22.6	5.52	83.7	86.3	462	2.41
No	8.4	.59	.61	3.6	5.99	70.5	72.7	422	5.58
Race of Householder									
White	46.6	3.83	3.95	21.0	5.49	82.2	84.7	452	2.70
Black	8.5	.73	.75	4.4	6.05	84.8	87.5	514	5.27
Other	2.2	.13	.14	.7	5.45	60.9	62.8	332	8.67
Householder of Hispanic Descent									
Yes	3.7	.22	.23	1.3	5.62	60.7	62.5	341	6.50
No	53.6	4.46	4.60	24.9	5.58	83.2	85.8	464	2.56
Age of Householder									
Under 25 Years	4.1	.27	.28	1.5	5.50	65.4	67.4	360	6.59
25 to 34 Years	13.9	1.08	1.11	6.0	5.55	77.1	79.5	429	3.87
35 to 44 Years	10.7	.93	.96	5.1	5.49	86.7	89.4	476	3.51
45 to 59 Years	11.7	1.07	1.10	6.0	5.58	91.7	94.6	512	3.41
60 Years and Over	16.8	1.34	1.38	7.6	5.68	79.5	82.0	452	3.77
Household Size									
1 Person	14.3	.96	.99	5.3	5.49	67.1	69.1	368	4.36
2 Persons	18.7	1.46	1.51	8.1	5.57	78.1	80.5	435	2.77
3 Persons	9.7	.82	.85	4.6	5.61	85.3	87.9	479	3.34
4 Persons	8.5	.83	.86	4.6	5.57	97.6	100.6	543	4.31
5 Persons	4.1	.40	.41	2.3	5.72	97.9	100.9	560	5.07
6 or More Persons	2.0	.21	.21	1.2	5.72	104.4	107.6	597	7.68
Secondary Heating									
Yes	20.9	1.83	1.89	10.1	5.49	87.7	90.4	481	3.18
Over 33 Percent of Home's Total Heat	1.2	.08	.09	.5	5.40	70.4	72.6	380	7.35
No	36.4	2.85	2.94	16.1	5.64	78.4	80.8	442	2.92
Fuel Combinations									
Use Natural Gas for Main Heat	50.0	4.51	4.65	24.8	5.51	90.2	93.0	497	2.40
Use Natural Gas to Heat Water and Have A/C	28.6	2.62	2.70	14.4	5.50	91.7	94.5	504	2.97
Use Natural Gas to Heat Water and Lack A/C	16.3	1.52	1.57	8.3	5.47	93.6	96.5	512	3.68
Use Electricity to Heat Water and Have A/C	3.4	.23	.24	1.3	5.82	68.8	71.0	401	6.57
Use Electricity to Heat Water and Lack A/C	1.6	.12	.13	.7	5.49	77.2	79.6	424	7.30
Other .....	.2	.02	.02	.1	6.13	61.2	63.1	375	20.83
Use Electricity for Main Heat	2.6	.05	.06	.3	6.14	20.9	21.5	128	13.70
Use Fuel Oil for Main Heat	3.7	.07	.07	.7	9.62	18.5	19.1	178	10.73
Use Wood for Main Heat .....	.8	.04	.05	.3	5.66	57.9	59.6	327	10.34
Other/None .....	.2	.01	.01	.1	5.99	47.3	48.8	283	25.89
Main Heating Equipment Using Natural Gas									
Central Warm Air Furnace	31.6	2.96	3.06	15.9	5.37	93.7	96.6	503	3.01
Steam or Hot-Water System	9.2	.97	1.00	5.7	5.93	104.9	108.1	622	5.22
Floor, Wall or Pipeless Furnace	5.1	.31	.32	1.6	5.28	60.7	62.5	320	6.50
Room Heater	3.9	.26	.27	1.5	5.76	66.6	68.6	383	6.51
None/Other	7.4	.18	.19	1.3	7.36	24.7	25.5	182	7.17

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors.
 • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, F of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 15. Natural Gas Consumption and Expenditures for Households Using Natural Gas as Main Heating Fuel, 1987

Household Characteristics	Natural Gas Used:										RSE Row Factors		
	As Main Heating Fuel					Not as Main Heating Fuel							
	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)					
RSE Column Factors:	0.897	0.433	0.433	0.464	2.254	1.879	1.879	1.611					
Total U.S. Households	50.0	90.2	93.0	497	7.3	24.4	25.2	179				4.21	
Census Region and Division													
Northeast	8.1	115.4	119.0	742	3.6	18.9	19.5	183				8.02	
New England	1.2	108.5	111.9	738	.5	27.6	28.5	234				8.64	
Middle Atlantic	6.9	116.6	120.2	743	3.1	17.5	18.0	174				9.33	
Midwest	16.5	105.5	108.8	534	.6	46.5	47.9	286				5.46	
East North Central	11.8	109.2	112.6	562	.4	50.3	51.8	307				5.83	
West North Central	4.8	96.4	99.4	464	1.1	35.4	36.5	227				9.51	
South	13.5	75.4	77.8	429	1.6	25.0	25.8	151				11.53	
South Atlantic	5.3	80.0	82.5	533	.6	26.4	27.2	207				14.88	
East South Central	2.4	75.8	78.2	384	.9	Q	Q	Q				21.59	
West South Central	5.9	71.2	73.4	354	1.6	28.2	29.1	162				12.10	
West	11.8	68.3	70.4	354	1.2	38.0	39.2	198				6.06	
Mountain	3.3	90.7	93.5	424	.2	38.0	39.2	198				11.39	
Pacific	8.5	59.7	61.5	327	1.4	26.7	27.5	156				7.17	
Metropolitan Status													
Metropolitan	41.9	90.6	93.4	504	6.9	23.0	23.8	173				4.55	
Central City	19.5	90.9	93.7	504	3.8	20.8	21.5	165				5.78	
Outside Central City	22.3	90.4	93.2	504	3.1	25.8	26.6	182				5.98	
Nonmetropolitan	8.1	87.9	90.7	460	.5	44.7	46.1	279				9.31	
Climate Zone													
Under 2,000 CDD and--													
Over 7,000 HDD	3.9	101.2	104.3	522	.3	34.9	36.0	214				10.56	
5,500 to 7,000 HDD	17.7	111.6	115.1	578	1.3	34.4	35.4	245				6.14	
4,000 to 5,499 HDD	10.2	98.4	101.4	598	2.9	18.3	18.9	176				8.92	
Under 4,000 HDD	10.6	62.8	64.7	364	1.6	26.5	27.3	153				8.03	
2,000 CDD or More and --													
Under 4,000 HDD	7.6	61.5	63.4	342	1.2	22.9	23.6	142				14.89	
All Gas Paid by Household													
Yes	40.0	94.4	97.3	518	4.2	30.4	31.3	225				4.43	
Budget Plan	7.6	116.1	119.7	652	NC	NC	NC	NC				7.08	
No Budget Plan	32.4	89.3	92.1	486	4.2	30.4	31.3	225				4.57	
No	10.0	73.1	75.3	413	3.1	16.2	16.7	117				8.23	
Housing Structure by Status of Unit													
Single-Family Detached	31.2	99.5	102.6	541	2.4	39.7	41.0	258				4.00	
Owned	26.7	100.7	103.8	548	2.1	40.4	41.6	263				4.27	
Rented	4.5	92.6	95.5	499	.3	34.2	35.2	218				8.39	
Single-Family Attached	3.1	87.7	90.4	529	.4	24.0	24.8	238				11.31	
Owned	2.9	93.8	96.7	575	.3	23.9	24.6	237				11.89	
Rented	.8	71.2	73.4	401	.1	Q	Q	Q				38.58	
Building of 2 to 4 Units	6.7	83.8	86.4	474	1.3	24.8	25.6	218				7.33	
Owned	1.2	108.7	112.0	624	.4	24.2	24.9	195				13.89	
Rented	5.4	78.0	80.5	439	.9	25.2	26.0	229				8.46	
Building of 5 or More Units	7.3	61.8	63.7	344	3.1	12.5	12.9	95				9.69	
Owned	.3	75.9	78.3	409	.1	Q	Q	Q				31.55	
Rented	7.0	61.1	63.0	341	2.8	12.4	12.7	109				9.91	
Mobile Home	1.7	70.2	72.4	375	.1	Q	Q	Q				14.88	

See footnotes at end of table.

Table 15. Natural Gas Consumption and Expenditures for Households Using Natural Gas as Main Heating Fuel, 1987 (Continued)

Household Characteristics RSE Column Factors:	Natural Gas Used:								RSE Row Factors
	As Main Heating Fuel				Not as Main Heating Fuel				
	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
	0.897	0.433	0.433	0.464	2.254	1.879	1.879	1.611	
Number of Rooms									
1	0.4	52.3	53.9	309	Q	Q	Q	Q	39.11
2	1.1	48.5	50.0	253	0.5	18.1	18.7	91	14.79
3	4.4	59.4	61.3	328	1.7	11.4	11.8	93	10.45
4	9.1	71.5	73.7	396	1.4	17.4	17.9	145	6.39
5	11.9	83.5	86.0	456	1.3	30.8	31.8	233	4.66
6	10.5	97.6	100.7	535	1.1	32.3	33.3	237	6.15
7	6.6	108.4	111.7	607	.6	36.3	37.4	244	6.92
8 or More	6.0	131.2	135.3	723	.5	46.3	47.8	327	7.89
Number of Rooms That Can Be Air Conditioned									
All	22.0	85.2	87.8	465	2.9	23.3	24.0	151	6.69
Some	10.1	97.9	100.9	555	1.6	26.6	27.5	228	8.72
None	17.9	92.0	94.8	503	2.8	24.2	25.0	180	4.40
Measured Heated Area of Residence (square feet)									
Fewer than 600	3.7	59.6	61.4	331	1.6	19.4	20.0	139	9.19
600 to 999	13.1	71.5	73.7	393	2.3	16.6	17.2	131	6.65
1,000 to 1,599	13.4	81.4	84.0	448	1.5	29.3	30.2	204	5.75
1,600 to 1,999	6.6	99.4	102.5	555	.6	26.3	27.1	205	6.37
2,000 to 2,399	5.4	108.7	112.1	602	.5	40.2	41.4	281	8.27
2,400 to 2,999	4.9	124.2	128.0	684	.4	33.5	34.5	238	8.57
3,000 or More	2.9	140.8	145.2	756	.4	38.3	39.5	296	8.26
Year of Construction									
1939 or Before	12.9	108.7	112.1	604	2.8	28.4	29.2	237	6.29
1940 to 1949	5.2	87.1	89.8	496	.8	17.7	18.3	144	8.00
1950 to 1959	8.4	88.6	91.3	484	.8	27.9	28.8	184	7.07
1960 to 1969	10.8	80.6	83.1	454	1.0	20.2	20.9	143	7.48
1970 to 1974	5.2	87.4	90.2	466	.6	27.2	28.0	151	9.77
1975 to 1979	3.7	82.3	84.8	422	.9	20.0	20.6	113	15.10
1980 to 1984	2.6	69.5	71.7	379	.4	21.1	21.7	137	18.13
1985 or After	1.1	83.3	85.8	448	Q	Q	Q	Q	20.31
Status of Unit									
Owned	32.0	99.0	102.0	544	3.3	33.9	35.0	236	4.25
Condominium .....	.8	70.8	73.0	356	Q	Q	Q	Q	35.84
Not a Condominium	31.2	99.7	102.7	549	3.1	35.1	36.2	243	4.01
Rented	18.0	74.5	76.8	413	4.1	16.7	17.2	134	6.26
Public Housing	1.5	61.1	63.0	355	.3	Q	Q	Q	17.91
Not Public Housing	16.4	75.8	78.1	418	3.8	16.8	17.3	136	6.94
Rent Subsidy .....	.8	77.0	79.4	484	.2	16.7	17.2	146	26.15
No Rent Subsidy	15.7	75.7	78.1	415	3.6	16.8	17.3	135	7.04
1987 Family Income									
Less than \$5,000	3.2	86.2	88.9	477	.6	14.8	15.3	97	9.49
\$5,000 to \$9,999	6.6	81.8	84.3	444	.8	22.4	23.1	170	7.89
\$10,000 to \$14,999	7.0	83.3	85.9	455	1.1	21.4	22.1	165	7.00
\$15,000 to \$19,999	5.0	82.9	85.5	454	.6	24.9	25.7	197	8.01
\$20,000 to \$24,999	4.4	85.3	88.0	454	.8	31.7	32.7	214	7.52
\$25,000 to \$34,999	8.6	88.0	90.7	487	1.3	21.6	22.3	171	7.29
\$35,000 to \$49,999	7.4	98.2	101.3	546	.8	26.2	27.0	186	7.64
\$50,000 or More	7.8	107.2	110.6	603	1.3	29.2	30.1	207	7.60

See footnotes at end of table.

Table 15. Natural Gas Consumption and Expenditures for Households Using Natural Gas as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Natural Gas Used:								RSE Row Factors
	As Main Heating Fuel				Not as Main Heating Fuel				
	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	Number of Households (million)	Average Amount Consumed (thousand cf)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	0.897	0.433	0.433	0.464	2.254	1.879	1.879	1.611	
Below 100 Percent of Poverty Line	6.4	86.9	89.6	481	1.0	23.4	24.1	163	8.05
Below 125 Percent of Poverty Line	10.1	86.0	88.6	473	1.4	24.2	25.0	171	6.82
Assistance for Heating in Winter									
Yes	2.7	98.4	101.5	545	.4	29.7	30.6	208	11.08
No	47.3	89.7	92.5	494	7.0	24.1	24.9	178	4.29
Assistance for Weatherization of Residence									
Yes .....	.6	94.3	97.2	519	Q	Q	Q	Q	24.20
No	49.4	90.1	92.9	497	7.3	24.4	25.2	180	4.21
Household Owns or Has Regular Use of a Vehicle									
Yes	43.7	90.4	93.2	495	5.2	27.8	28.6	191	4.15
No	6.3	88.6	91.3	512	2.1	16.1	16.6	152	8.85
Race of Householder									
White	40.9	90.3	93.1	491	5.7	23.9	24.7	170	4.45
Black	7.4	93.8	96.7	558	1.2	29.0	29.9	236	7.21
Other	1.8	71.4	73.6	375	.4	17.9	18.4	155	11.42
Householder of Hispanic Descent									
Yes	2.9	72.4	74.7	393	.8	20.3	20.9	162	9.39
No	47.1	91.2	94.1	503	6.5	24.9	25.7	182	4.35
Age of Householder									
Under 25 Years	3.5	73.1	75.4	400	.6	19.8	20.4	123	12.40
25 to 34 Years	12.1	85.3	88.0	468	1.9	24.5	25.3	175	6.73
35 to 44 Years	9.5	94.0	96.9	510	1.3	33.5	34.6	230	5.46
45 to 59 Years	10.4	100.0	103.1	552	1.3	26.5	27.3	199	5.75
60 Years and Over	14.6	88.8	91.5	497	2.2	19.0	19.6	157	6.17
Household Size									
1 Person	12.0	77.2	79.6	419	2.3	13.2	13.6	100	7.18
2 Persons	16.5	85.9	88.5	472	2.3	21.6	22.2	162	5.08
3 Persons	8.6	92.3	95.1	512	1.1	28.0	28.8	208	5.53
4 Persons	7.5	105.5	108.8	579	1.0	37.0	38.2	269	6.39
5 Persons	3.6	105.2	108.5	595	.5	43.4	44.7	298	8.20
6 or More Persons	1.7	112.6	116.1	634	.3	49.3	50.8	347	9.42
Secondary Heating									
Yes	18.3	95.2	98.1	517	2.6	35.8	36.9	235	5.46
Over 33 Percent of Home's Total Heat	1.0	72.1	74.3	380	.2	61.5	63.4	383	14.83
No	31.7	87.3	90.0	485	4.7	17.9	18.5	148	5.24

NC No cases in sample.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors.

• Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, F of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 16. Household Electricity Consumption and Expenditures, 1987

Household Characteristics	Electricity								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (cents per kWh)	Total Amount Consumed (billion kWh)	Average Amount Consumed (thousand kWh)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.250	1.486	1.434	0.416	1.486	0.869	0.889	0.805	
Total U.S. Households	90.5	2.76	61.6	7.6	808	8.93	30.5	680	1.34
Census Region and Division									
Northeast	19.0	.44	12.3	9.5	130	6.83	23.3	648	2.50
New England	4.3	.10	2.6	8.9	29	6.73	22.9	600	4.49
Middle Atlantic	14.8	.35	9.8	9.6	101	6.87	23.4	661	2.60
Midwest	22.3	.61	14.1	7.9	179	8.03	27.4	633	3.75
East North Central	15.9	.42	10.0	8.1	123	7.74	26.4	628	4.33
West North Central	6.4	.19	4.1	7.4	56	8.73	29.8	644	3.69
South	30.9	1.22	25.1	7.0	357	11.56	39.5	813	2.48
South Atlantic	15.6	.61	13.1	7.4	178	11.42	38.9	840	3.80
East South Central	6.1	.27	4.7	6.0	78	12.81	43.7	765	4.32
West South Central	9.2	.35	7.4	7.3	102	11.00	37.5	800	5.18
West	18.3	.48	10.0	7.1	142	7.74	26.4	548	2.99
Mountain	4.4	.12	2.6	7.3	36	8.15	27.8	591	6.17
Pacific	13.9	.36	7.4	7.0	105	7.61	26.0	534	3.19
Metropolitan Status									
Metropolitan	70.2	2.07	47.6	7.9	606	8.62	29.4	678	1.52
Central City	29.6	.74	17.1	7.9	216	7.29	24.9	578	2.45
Outside Central City	40.6	1.33	30.5	7.8	390	9.59	32.7	750	1.93
Nonmetropolitan	20.3	.69	14.0	6.9	202	9.98	34.0	690	3.49
Climate Zone									
Under 2,000 CDD and--									
Over 7,000 HDD	8.5	.23	4.8	7.1	68	7.98	27.2	564	5.99
5,500 to 7,000 HDD	25.9	.69	16.3	8.1	201	7.75	26.5	629	5.62
4,000 to 5,499 HDD	21.9	.67	14.9	7.6	196	8.96	30.6	678	4.74
Under 4,000 HDD	17.8	.53	11.5	7.4	154	8.63	29.4	642	5.34
2,000 CDD or More and --									
Under 4,000 HDD	16.3	.64	14.2	7.5	189	11.56	39.5	868	4.79
All Electricity Paid by Household									
Yes	83.2	2.62	58.5	7.6	768	9.22	31.5	703	1.45
Budget Plan	1.3	.09	1.7	6.6	25	18.85	64.3	1,246	7.75
No Budget Plan	81.9	2.53	56.8	7.7	742	9.06	30.9	694	1.42
No	7.3	.14	3.1	7.6	40	5.55	18.9	423	7.12
Housing Structure by Status of Unit									
Single-Family Detached	55.1	1.97	43.1	7.5	577	10.46	35.7	782	1.86
Owned	47.7	1.76	38.5	7.5	515	10.79	36.8	808	2.05
Rented	7.4	.21	4.6	7.4	62	8.34	28.5	619	4.11
Single-Family Attached	5.3	.16	3.8	8.1	47	8.84	30.2	718	10.71
Owned	3.9	.11	2.8	8.4	33	8.46	28.9	714	11.68
Rented	1.5	.05	1.1	7.4	14	9.86	33.6	731	15.19
Building of 2 to 4 Units	10.1	.20	4.9	8.4	58	5.73	19.6	483	5.93
Owned	2.0	.04	1.1	9.4	12	6.16	21.0	577	8.92
Rented	8.1	.15	3.7	8.2	45	5.63	19.2	459	6.88
Building of 5 or More Units	14.9	.28	6.5	8.0	81	5.42	18.5	436	5.85
Owned	1.0	.02	.6	8.9	7	6.90	23.6	616	18.06
Rented	13.9	.25	5.9	8.0	74	5.32	18.1	424	6.11
Mobile Home	5.1	.16	3.3	7.1	46	8.98	30.6	641	6.99
Owned	4.3	.14	2.8	7.1	40	9.34	31.9	661	7.73
Rented .....	.9	.02	.5	7.6	6	7.19	24.5	544	10.41

See footnotes at end of table.

Table 16. Household Electricity Consumption and Expenditures, 1987
(Continued)

Household Characteristics	Electricity							RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (cents per kWh)	Total Amount Consumed (billion kWh)	Average Amount Consumed (thousand kWh)	Average Amount Consumed (million Btu)		Average Expenditures per Household (dollars)
RSE Column Factors:	1.250	1.486	1.434	0.416	1.486	0.869	0.869	0.805
Number of Rooms								
1	0.7	0.01	0.2	8.8	2	3.59	12.2	314
2	2.4	.03	.7	8.0	9	3.54	12.1	284
3	9.8	.18	4.2	7.8	54	5.45	18.6	427
4	17.7	.42	9.3	7.5	123	6.97	23.8	526
5	20.9	.61	13.5	7.5	180	8.62	29.4	648
6	17.4	.59	13.5	7.7	174	10.01	34.1	773
7	11.2	.44	9.8	7.6	128	11.40	38.9	871
8 or More	10.4	.47	10.4	7.6	138	13.29	45.3	1,003
Number of Rooms That Can Be Air Conditioned								
All	40.8	1.58	34.3	7.4	462	11.31	38.6	840
Some	16.8	.44	10.6	8.3	129	7.65	26.1	632
None	32.9	.74	16.7	7.7	218	6.62	22.6	507
Measured Heated Area of Residence (square feet)								
Fewer than 600	8.4	.14	3.4	8.3	41	4.83	16.5	403
600 to 999	23.9	.55	12.3	7.7	160	6.70	22.9	515
1,000 to 1,599	25.6	.83	17.9	7.4	242	9.48	32.3	701
1,600 to 1,999	11.2	.40	8.9	7.6	117	10.39	35.5	791
2,000 to 2,399	8.4	.31	7.0	7.7	91	10.77	36.7	831
2,400 to 2,999	7.7	.29	6.6	7.7	85	11.03	37.6	851
3,000 or More	5.3	.25	5.5	7.6	72	13.73	46.8	1,049
Year of Construction								
1939 or Before	21.5	.48	11.7	8.3	141	6.58	22.5	545
1940 to 1949	8.2	.22	4.9	7.7	63	7.67	26.2	592
1950 to 1959	13.1	.38	8.7	7.8	111	8.51	29.0	666
1960 to 1969	16.4	.50	11.0	7.6	145	8.85	30.2	670
1970 to 1974	9.6	.31	6.8	7.4	92	9.55	32.6	709
1975 to 1979	10.5	.44	9.3	7.2	128	12.23	41.7	885
1980 to 1984	7.4	.28	5.8	7.1	82	11.10	37.9	793
1985 or After	3.9	.15	3.3	7.4	45	11.70	39.9	868
Status of Unit								
Owned	58.8	2.07	45.8	7.6	606	10.31	35.2	780
Condominium	1.5	.04	1.0	8.3	13	8.17	27.9	674
Not a Condominium	57.2	2.02	44.8	7.6	593	10.37	35.4	783
Rented	31.7	.69	15.7	7.8	202	6.36	21.7	496
Public Housing	2.5	.04	.9	7.2	13	5.10	17.4	367
Not Public Housing	29.2	.65	14.8	7.8	189	6.47	22.1	507
Rent Subsidy	1.4	.03	.7	8.3	8	5.61	19.1	467
No Rent Subsidy	27.8	.62	14.2	7.8	181	6.52	22.2	509
1987 Family Income								
Less than \$5,000	6.2	.13	2.8	7.7	37	5.93	20.2	457
\$5,000 to \$9,999	11.5	.26	5.8	7.5	76	6.66	22.7	502
\$10,000 to \$14,999	12.6	.31	6.9	7.6	91	7.18	24.5	548
\$15,000 to \$19,999	9.0	.24	5.3	7.6	70	7.77	26.5	589
\$20,000 to \$24,999	8.8	.27	5.3	7.5	79	9.05	30.9	675
\$25,000 to \$34,999	16.2	.52	11.5	7.5	153	9.43	32.2	711
\$35,000 to \$49,999	13.4	.51	11.2	7.6	149	11.15	38.0	842
\$50,000 or More	12.9	.52	12.1	7.9	153	11.88	40.5	937

See footnotes at end of table.

**Table 16. Household Electricity Consumption and Expenditures, 1987
(Continued)**

Household Characteristics	Electricity								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (cents per kWh)	Total Amount Consumed (billion kWh)	Average Amount Consumed (thousand kWh)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.250	1.486	1.434	0.416	1.486	0.869	0.869	0.805	
Below 100 Percent of Poverty Line	11.8	0.28	6.2	7.6	81	6.91	23.6	527	4.24
Below 125 Percent of Poverty Line	18.2	.44	9.8	7.6	128	7.02	24.0	535	3.54
Assistance for Heating in Winter									
Yes	4.8	.10	2.4	7.8	31	6.45	22.0	503	6.24
No	85.7	2.65	59.2	7.6	777	9.06	30.9	690	1.43
Assistance for Weatherization of Residence									
Yes	1.0	.02	.5	7.7	6	6.27	21.4	485	9.53
No	89.5	2.74	61.1	7.6	802	8.96	30.6	682	1.35
Household Owns or Has Regular Use of a Vehicle									
Yes	79.4	2.57	56.9	7.6	753	9.48	32.4	716	1.48
No	11.1	.19	4.7	8.6	55	4.94	16.9	424	3.96
Race of Householder									
White	76.6	2.42	53.6	7.6	709	9.25	31.6	700	1.42
Black	10.9	.28	6.5	8.0	82	7.46	25.4	593	6.06
Other	3.0	.06	1.5	8.5	18	5.94	20.3	502	7.92
Householder of Hispanic Descent									
Yes	5.0	.13	3.2	8.4	38	7.57	25.8	639	6.31
No	85.5	2.63	58.4	7.6	770	9.01	30.7	683	1.37
Age of Householder									
Under 25 Years	6.5	.16	3.5	7.5	47	7.20	24.6	540	5.83
25 to 34 Years	21.5	.63	14.1	7.7	183	8.53	29.1	653	2.53
35 to 44 Years	18.0	.64	14.2	7.6	187	10.38	35.4	787	2.63
45 to 59 Years	18.8	.68	15.0	7.6	199	10.54	36.0	797	2.67
60 Years and Over	25.7	.66	14.8	7.7	192	7.49	25.6	578	2.86
Household Size									
1 Person	21.6	.42	9.4	7.7	122	5.66	19.3	435	2.68
2 Persons	30.7	.92	20.4	7.6	269	8.76	29.9	665	2.37
3 Persons	15.4	.54	11.8	7.5	157	10.21	34.8	770	2.91
4 Persons	13.6	.53	11.7	7.6	154	11.32	38.6	858	2.95
5 Persons	6.1	.24	5.4	7.8	70	11.39	38.8	884	4.13
6 or More Persons	3.1	.12	2.9	8.0	36	11.49	39.2	915	6.06
All-Electric Home									
Yes	15.0	.81	16.1	6.8	237	15.82	54.0	1,075	4.21
No	75.5	1.95	45.5	8.0	571	7.56	25.8	602	1.30
Secondary Heating									
Yes	37.4	1.38	29.7	7.3	405	10.85	37.0	795	2.27
Over 33 Percent of Home's Total Heat									
Yes	3.2	.12	2.6	7.1	37	11.37	38.8	808	6.57
No	53.2	1.37	31.9	7.9	403	7.58	25.9	600	1.66

See footnotes at end of table.

**Table 16. Household Electricity Consumption and Expenditures, 1987
(Continued)**

Household Characteristics	Electricity								RSE Row Factors
	Number of Households (million)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (cents per kWh)	Total Amount Consumed (billion kWh)	Average Amount Consumed (thousand kWh)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.250	1.486	1.434	0.416	1.486	0.869	0.869	0.805	
Fuel Combinations									
Use Natural Gas for Main Heat	50.0	1.22	28.6	8.0	356	7.13	24.3	572	2.20
Use Natural Gas to Heat Water and Have A/C	28.6	.76	18.2	8.1	223	7.83	26.7	638	2.84
and Lack A/C	16.3	.27	6.7	8.4	79	4.86	16.6	411	3.43
Use Electricity to Heat Water and Have A/C	3.4	.13	2.7	7.0	38	11.46	39.1	797	5.94
and Lack A/C	1.6	.05	.9	6.6	14	8.62	29.4	570	6.74
Other .....	.2	.01	.2	8.9	2	7.35	25.1	652	24.33
Use Electricity for Main Heat	17.9	.90	18.1	6.9	263	14.69	50.1	1,010	4.07
Use Electricity to Heat Water and Have A/C	12.4	.70	14.1	6.9	204	16.45	56.1	1,141	4.40
and Lack A/C	3.0	.13	2.4	6.1	39	12.97	44.2	792	8.53
Other	2.5	.07	1.6	7.7	20	8.03	27.4	620	11.74
Use Fuel Oil for Main Heat	10.9	.27	6.9	8.7	79	7.28	24.8	633	4.47
Use Fuel Oil to Heat Water and Have A/C	2.6	.05	1.7	10.9	16	5.95	20.3	646	10.09
and Lack A/C	2.5	.03	1.1	10.3	10	4.08	13.9	422	8.02
Use Electricity to Heat Water and Have A/C	2.0	.08	1.7	7.4	23	11.42	39.0	848	7.29
and Lack A/C	2.1	.07	1.5	7.2	21	10.00	34.1	716	8.42
Other	1.7	.03	.9	9.8	10	5.76	19.7	567	7.72
Use Wood for Main Heat	5.1	.18	3.6	6.9	52	10.22	34.9	707	5.93
Use LPG for Main Heat	4.1	.12	2.7	7.5	36	8.66	29.6	650	6.96
Use Kerosene for Main Heat	1.3	.04	.9	7.2	13	9.56	32.6	687	10.41
Use Coal for Main Heat .....	.4	.01	.2	6.8	3	7.71	26.3	524	24.53
No Heating Fuel/Other Fuel .....	.8	.02	.6	10.1	6	7.43	25.4	752	16.07

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors.
 • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 17. Consumption and Expenditures for Households Using Electricity as Main Heating Fuel, 1987

Household Characteristics	Electricity Used: As Main Heating Fuel												RSE Row Factors
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Used For Air Conditioning				Not Used for Air Conditioning				
					Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
Total U.S. Households	17.9	14.69	50.1	1,010	14.4	15.40	52.5	1,077	3.5	11.78	40.2	735	4.55
Census Region and Division													
Northeast	2.1	14.53	49.6	1,160	1.6	14.40	49.1	1,155	.5	15.01	51.2	1,176	12.18
New England .....	.4	13.26	45.2	1,055	.2	13.94	47.6	1,110	.2	12.38	42.2	983	18.87
Middle Atlantic	1.7	14.84	50.7	1,186	1.4	14.47	49.4	1,163	.3	16.76	57.2	1,304	13.84
Midwest	1.5	18.92	64.5	1,220	1.1	19.01	64.9	1,231	.3	18.61	63.5	1,185	12.47
South	10.5	15.27	52.1	1,058	9.8	15.64	53.4	1,086	.8	10.50	35.8	690	5.94
South Atlantic	5.8	15.17	51.8	1,123	5.3	15.77	53.8	1,169	.5	8.71	29.7	634	8.91
East South Central	2.2	17.32	59.1	1,001	2.0	17.77	60.6	1,028	.2	13.52	46.1	765	6.08
West South Central	2.5	13.73	46.8	958	2.5	13.70	46.7	957	Q	Q	Q	Q	15.84
West	3.8	11.53	39.3	713	1.8	12.79	43.6	865	2.0	10.34	35.3	571	10.10
Mountain .....	.7	14.39	49.1	1,026	.6	14.78	50.4	1,082	.1	12.52	42.7	766	16.14
Pacific	3.1	10.85	37.0	640	1.2	11.84	40.4	760	1.8	10.19	34.8	558	12.33
Metropolitan Status													
Metropolitan	14.5	14.00	47.8	993	11.8	14.67	50.0	1,059	2.7	11.05	37.7	701	5.34
Central City	5.6	12.39	42.3	844	4.5	13.23	45.2	903	1.1	8.77	29.9	588	6.09
Outside Central City	8.9	15.01	51.2	1,086	7.3	15.55	53.1	1,155	1.6	12.53	42.8	774	6.96
Nonmetropolitan	3.4	17.62	60.1	1,082	2.6	18.77	64.0	1,160	.8	14.12	48.2	844	7.22
Climate Zone													
Under 2,000 CDD and--													
Over 7,000 HDD .....	.6	15.43	52.6	1,032	.2	18.10	61.8	1,174	.4	13.65	46.6	937	20.96
5,500 to 7,000 HDD	2.6	17.24	58.8	1,099	1.6	18.60	63.5	1,223	1.1	15.22	51.9	917	10.29
4,000 to 5,499 HDD	4.2	15.68	53.5	996	3.2	16.78	57.3	1,106	1.1	12.42	42.4	672	7.95
Under 4,000 HDD	4.0	12.87	43.9	887	3.3	14.14	48.3	963	.7	6.83	23.3	527	9.24
2,000 CDD or More and --													
Under 4,000 HDD	6.4	14.05	47.9	1,057	6.1	14.42	49.2	1,082	.3	6.52	22.3	546	7.62
All Electricity Paid by Household													
Yes	16.1	15.28	52.1	1,047	13.3	15.83	54.0	1,105	2.8	12.71	43.4	777	4.83
Budget Plan	1.3	18.85	64.3	1,246	1.0	18.75	64.0	1,280	.3	19.13	65.3	1,148	8.05
No Budget Plan	14.8	14.96	51.0	1,030	12.3	15.59	53.2	1,091	2.5	11.84	40.4	726	5.17
No	1.8	9.32	31.8	667	1.1	10.22	34.9	734	.7	7.83	26.7	558	12.87
Housing Structure by Status of Unit													
Single-Family Detached	8.4	19.07	65.1	1,293	7.1	19.55	66.7	1,343	1.3	16.46	56.2	1,021	5.00
Owned	7.6	19.31	65.9	1,317	6.6	19.76	67.4	1,363	1.1	16.56	56.5	1,037	5.34
Rented .....	.8	16.57	56.5	1,045	.5	16.82	57.4	1,089	.2	16.02	54.6	946	15.16
Single-Family Attached	1.5	15.01	51.2	1,046	1.4	15.44	52.7	1,080	Q	Q	Q	Q	15.53
Building of 2 to 4 Units	1.5	11.55	39.4	785	.8	12.16	41.5	880	.7	10.82	36.9	670	12.14
Building of 5 or More Units	5.5	8.75	29.8	635	4.4	9.19	31.4	683	1.1	7.01	23.9	445	8.42
Mobile Home	1.0	14.87	50.8	983	.7	16.01	54.6	1,080	.3	12.03	41.1	739	11.67
Number of Rooms													
1 .....	.2	5.46	18.6	414	Q	Q	Q	Q	Q	Q	Q	Q	38.68
2 .....	.7	5.86	20.0	454	.4	5.57	19.0	431	.2	6.43	21.9	500	13.37
3	3.4	8.84	30.2	643	2.5	9.43	32.2	712	.9	7.09	24.2	442	8.66
4	4.0	11.95	40.8	805	3.0	12.47	42.6	858	1.0	10.32	35.2	640	6.04
5	3.4	16.04	54.7	1,073	2.8	16.54	56.4	1,127	.6	13.75	46.9	820	6.84
6	2.9	17.50	59.7	1,202	2.6	17.80	60.7	1,238	.3	15.10	51.5	911	7.35
7	1.8	20.79	70.9	1,437	1.5	20.73	70.7	1,463	.3	21.10	72.0	1,298	8.04
8 or More	1.6	23.85	81.4	1,638	1.4	24.29	82.9	1,682	.2	20.96	71.5	1,348	8.83

See footnotes at end of table.

Table 17. Consumption and Expenditures for Households Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Electricity Used: As Main Heating Fuel												RSE Row Factors
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Used For Air Conditioning				Not Used for Air Conditioning				
					Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
RSE Column Factors:	1.470	0.629	0.629	0.600	1.702	0.695	0.695	0.655	2.392	1.326	1.326	1.258	
Number of Rooms That Can Be Air Conditioned													
All	13.0	15.45	52.7	1,082	13.0	15.45	52.7	1,082	NC	NC	NC	NC	4.76
Some	1.4	14.87	50.7	1,027	1.4	14.87	50.7	1,027	NC	NC	NC	NC	7.83
None	3.5	11.78	40.2	735	—	—	—	—	3.5	11.78	40.2	735	7.11
Measured Heated Area of Residence (square feet)													
Fewer than 600	2.0	7.21	24.6	521	1.2	8.07	27.5	578	.8	5.89	20.1	434	9.86
600 to 999	5.3	11.34	38.7	786	4.1	11.58	39.5	828	1.2	10.51	35.9	638	7.14
1,000 to 1,599	6.0	15.45	52.7	1,053	4.9	15.74	53.7	1,095	1.0	14.09	48.1	859	6.58
1,600 to 1,999	2.0	18.50	63.1	1,254	1.7	18.68	63.7	1,286	.3	17.64	60.2	1,093	8.20
2,000 to 2,399	1.3	19.18	65.5	1,375	1.2	19.36	66.1	1,395	Q	Q	Q	Q	8.32
2,400 to 2,999 .....	.8	23.38	79.8	1,524	.6	23.34	79.6	1,549	Q	Q	Q	Q	8.57
3,000 or More .....	.7	25.68	87.6	1,765	.7	25.77	87.9	1,771	Q	Q	Q	Q	14.00
Year of Construction													
1939 or Before	1.1	12.43	42.4	877	.7	14.03	47.9	976	.4	9.74	33.2	709	14.63
1940 to 1949 .....	.6	14.98	51.1	1,029	.5	15.50	52.9	1,078	.1	13.03	44.5	847	15.58
1950 to 1959	1.1	14.59	49.8	983	.9	15.54	53.0	1,056	.3	11.64	39.7	756	13.40
1960 to 1969	2.5	14.47	49.4	941	1.9	16.01	54.6	1,045	.6	9.59	32.7	612	8.87
1970 to 1974	2.4	14.42	49.2	984	1.9	15.64	53.4	1,092	.5	9.68	33.0	564	13.23
1975 to 1979	4.6	15.43	52.7	1,057	3.8	15.80	53.9	1,107	.8	13.74	46.9	827	9.59
1980 to 1984	3.4	14.58	49.7	1,010	2.7	14.70	50.1	1,056	.6	14.07	48.0	814	8.89
1985 or After	2.1	14.92	50.9	1,092	2.0	15.14	51.7	1,106	Q	Q	Q	Q	9.70
Status of Unit													
Owned	10.1	17.96	61.3	1,232	8.7	18.35	62.6	1,273	1.4	15.57	53.1	978	5.29
Condominium .....	.7	10.57	36.1	836	.7	10.59	36.1	835	Q	Q	Q	Q	16.91
Not a Condominium	9.4	18.54	63.3	1,263	8.0	19.04	64.9	1,312	1.4	15.66	53.4	980	5.20
Rented	7.8	10.43	35.6	721	5.7	10.86	37.1	776	2.1	9.26	31.6	573	6.75
Public Housing .....	.7	8.73	29.8	555	.4	9.10	31.1	630	.3	8.29	28.3	468	22.38
Not Public Housing	7.1	10.59	36.1	736	5.3	10.98	37.5	785	1.8	9.42	32.1	591	7.49
Rent Subsidy .....	.3	9.43	32.2	675	.2	9.27	31.6	678	Q	9.79	33.4	668	20.93
No Rent Subsidy	6.8	10.64	36.3	739	5.1	11.06	37.7	790	1.7	9.40	32.1	586	7.82
1987 Family Income													
Less than \$5,000	1.2	9.83	33.5	667	.8	10.75	36.7	728	.4	7.71	26.3	526	14.61
\$5,000 to \$9,999	1.8	12.13	41.4	798	1.3	13.39	45.7	888	.6	9.29	31.7	595	9.55
\$10,000 to \$14,999	2.0	11.60	39.6	763	1.5	11.94	40.7	808	.5	10.51	35.9	621	7.96
\$15,000 to \$19,999	1.8	12.12	41.3	851	1.4	11.99	40.9	861	.4	12.62	43.1	813	10.48
\$20,000 to \$24,999	1.8	15.38	52.5	995	1.4	15.70	53.6	1,039	.4	14.15	48.3	822	8.96
\$25,000 to \$34,999	3.5	14.71	50.2	1,027	3.0	15.43	52.6	1,082	.5	10.58	36.1	710	7.85
\$35,000 to \$49,999	3.1	17.51	59.8	1,222	2.6	17.67	60.3	1,266	.5	16.63	56.7	976	10.23
\$50,000 or More	2.7	18.65	63.6	1,324	2.3	19.61	66.9	1,408	.4	13.19	45.0	841	10.64
Below 100 Percent of Poverty Line	2.0	11.82	40.3	791	1.4	12.99	44.3	874	.6	9.06	30.9	596	10.57
Below 125 Percent of Poverty Line	3.0	11.94	40.7	787	2.1	13.28	45.3	878	.9	8.86	30.2	580	8.67

See footnotes at end of table.

Table 17. Consumption and Expenditures for Households Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Electricity Used: As Main Heating Fuel												RSE Row Factors
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Used For Air Conditioning				Not Used for Air Conditioning				
					Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
RSE Column Factors:	1.479	0.629	0.629	0.600	1.702	0.695	0.695	0.655	2.392	1.326	1.326	1.258	
Assistance for Heating in Winter													
Yes	0.5	12.58	42.9	807	0.4	14.46	49.3	933	0.2	8.08	27.6	504	17.71
No	17.4	14.75	50.3	1,016	14.0	15.42	52.6	1,081	3.4	11.95	40.8	745	4.67
Assistance for Weatherization of Residence													
Yes	Q	10.78	36.8	692	Q	Q	Q	Q	Q	Q	Q	Q	56.62
No	17.8	14.70	50.2	1,011	14.4	15.40	52.5	1,077	3.5	11.83	40.4	738	4.57
Household Owns or Has Regular Use of a Vehicle													
Yes	16.4	15.13	51.6	1,040	13.4	15.74	53.7	1,102	3.0	12.36	42.2	762	4.72
No	1.5	9.93	33.9	686	1.0	10.69	36.5	742	.5	8.49	29.0	580	14.62
Race of Householder													
White	16.0	14.77	50.4	1,012	13.0	15.37	52.4	1,074	3.0	12.16	41.5	744	4.62
Black	1.4	14.82	50.6	1,045	1.1	16.16	55.1	1,140	.3	9.03	30.8	632	14.31
Other .....	.5	11.69	39.9	834	.3	13.23	45.2	926	.2	10.04	34.3	737	19.57
Householder of Hispanic Descent													
Yes .....	.9	15.13	51.6	1,198	.7	16.11	55.0	1,290	.2	10.67	36.4	780	22.10
No	17.0	14.66	50.0	1,000	13.7	15.36	52.4	1,066	3.4	11.83	40.4	733	4.41
Age of Householder													
Under 25 Years	2.0	10.91	37.2	772	1.6	11.48	39.2	827	.4	8.71	29.7	563	12.17
25 to 34 Years	4.7	13.59	46.4	944	3.9	14.12	48.2	990	.8	10.83	37.0	708	5.72
35 to 44 Years	4.1	16.80	57.3	1,166	3.5	17.02	58.1	1,205	.6	15.55	53.0	942	6.53
45 to 59 Years	3.4	17.17	58.6	1,171	2.7	18.36	62.7	1,271	.7	12.47	42.5	781	7.65
60 Years and Over	3.7	13.53	46.2	903	2.7	14.49	49.4	991	1.0	11.03	37.6	671	8.21
Household Size													
1 Person	4.9	10.01	34.2	680	3.7	10.36	35.3	725	1.2	8.92	30.4	538	6.79
2 Persons	6.6	14.02	47.8	967	5.2	14.88	50.8	1,048	1.4	10.76	36.7	662	5.58
3 Persons	2.9	17.59	60.0	1,221	2.4	17.91	61.1	1,249	.4	15.75	53.7	1,055	7.01
4 Persons	2.4	18.96	64.7	1,311	2.1	19.22	65.6	1,349	.4	17.51	59.8	1,092	9.02
5 Persons .....	.7	22.85	78.0	1,526	.7	23.16	79.0	1,540	Q	Q	Q	Q	8.79
6 or More Persons .....	.4	21.51	73.4	1,485	.3	22.77	77.7	1,631	.1	18.12	61.8	1,093	17.19
All-Electric Home													
Yes	15.0	15.82	54.0	1,075	12.1	16.48	56.2	1,142	2.8	13.04	44.5	793	4.65
No	2.9	8.89	30.3	675	2.3	9.63	32.8	730	.7	6.40	21.8	487	11.08
Secondary Heating													
Yes	7.4	17.34	59.2	1,169	5.9	18.24	62.2	1,259	1.5	13.76	47.0	808	6.61
Over 33 Percent of Home's Total Heat .....	.8	16.77	57.2	1,133	.6	18.76	64.0	1,333	.3	12.34	42.1	687	13.24
No	10.5	12.82	43.7	898	8.5	13.41	45.8	950	2.0	10.34	35.3	682	4.97

See footnotes at end of table.

Table 17. Consumption and Expenditures for Households Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Electricity Used: As Main Heating Fuel												RSE Row Factors
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Used For Air Conditioning				Not Used for Air Conditioning				
					Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
RSE Column Factors:	1.478	0.629	0.629	0.600	1.702	0.695	0.695	0.655	2.392	1.326	1.326	1.258	
Main Heating Equipment Using Electricity													
Central Warm Air Furnace	6.9	14.68	50.1	1,005	6.2	14.74	50.3	1,019	0.7	14.06	48.0	865	7.89
Built-in Electric Units	5.4	13.80	47.1	921	3.0	15.38	52.5	1,082	2.4	11.85	40.4	722	7.60
Heat Pump	4.5	16.53	56.4	1,171	4.5	16.53	56.4	1,172	—	—	—	—	6.21
Other	1.1	11.44	39.0	807	.7	13.79	47.0	938	.4	7.80	26.6	604	11.91

NC No cases in sample.
 — Data not applicable.
 □ Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors.
 • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 18. Electricity Consumption and Expenditures for Households Not Using Electricity as Main Heating Fuel, 1987

Household Characteristics	Electricity Used: Not As Main Heating Fuel												RSE Row Factors
					Used For Air Conditioning				Not Used for Air Conditioning				
	Number of Households (mil-lion)	Avg Amount Consumed (thou-sand kWh)	Avg Amount Consumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	Number of House-holds (mil-lion)	Avg Amount Consumed (thou-sand kWh)	Avg Amount Consumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	Number of House-holds (mil-lion)	Avg Amount Consumed (thou-sand kWh)	Avg Amount Consumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	
RSE Column Factors:	1.220	0.720	0.720	0.704	1.785	0.931	0.931	0.888	1.930	0.955	0.955	0.930	
Total U.S. Households	72.6	7.5	25.6	599	42.7	8.6	29.2	683	29.9	6.0	20.5	480	1.77
Census Region and Division													
Northeast	16.9	5.9	20.1	584	8.7	6.6	22.6	673	8.3	5.1	17.4	491	3.25
New England	3.9	6.0	20.5	551	1.6	6.8	23.0	612	2.2	5.5	18.7	508	4.84
Middle Atlantic	13.1	5.8	19.9	594	7.1	6.6	22.5	687	6.0	4.9	16.9	485	4.14
Midwest	20.8	7.3	24.8	591	13.9	7.7	26.3	634	6.9	6.4	21.8	504	3.24
East North Central	14.8	6.9	23.6	583	9.2	7.2	24.7	624	5.6	6.4	22.0	517	4.30
West North Central	6.0	8.1	27.6	612	4.8	8.6	29.4	655	1.2	6.1	20.9	447	5.15
South	20.4	9.6	32.9	686	15.5	10.7	36.5	754	4.9	6.3	21.6	474	4.15
South Atlantic	9.8	9.2	31.4	672	7.0	10.1	34.4	735	2.7	6.9	23.5	512	6.22
East South Central	3.9	10.2	34.9	630	3.2	11.1	38.0	678	.7	6.3	21.6	424	6.42
West South Central	6.7	10.0	34.0	740	5.3	11.2	38.2	824	1.4	5.3	18.1	424	6.60
West	14.5	6.7	23.0	505	4.6	7.6	26.0	607	9.9	6.3	21.6	457	3.20
Mountain	3.7	6.9	23.6	506	.9	8.0	27.3	625	2.8	6.6	22.4	465	5.88
Pacific	10.8	6.7	22.8	504	3.7	7.5	25.7	603	7.1	6.2	21.3	453	3.81
Metropolitan Status													
Metropolitan	55.7	7.2	24.6	595	33.6	8.3	28.3	682	22.1	5.6	19.1	463	2.14
Central City	24.1	6.1	20.8	517	13.3	7.3	25.1	614	10.8	4.6	15.6	397	3.09
Outside Central City	31.7	8.1	27.5	655	20.4	8.9	30.4	726	11.3	6.6	22.4	527	2.86
Nonmetropolitan	16.9	8.4	28.8	611	9.0	9.6	32.6	684	7.8	7.1	24.4	527	3.29
Climate Zone													
Under 2,000 CDD and--													
Over 7,000 HDD	7.9	7.4	25.2	527	3.1	7.9	26.8	553	4.8	7.1	24.3	511	4.50
5,500 to 7,000 HDD	23.3	6.7	22.8	575	13.3	7.1	24.4	630	10.0	6.0	20.6	503	3.83
4,000 to 5,499 HDD	17.7	7.3	25.1	602	11.7	7.9	27.1	663	6.0	6.2	21.1	485	5.00
Under 4,000 HDD	13.8	7.4	25.2	571	7.3	9.3	31.9	706	6.5	5.2	17.8	420	5.19
2,000 CDD or More and --													
Under 4,000 HDD	9.9	10.0	34.0	746	7.4	11.6	39.5	841	2.6	5.4	18.3	475	5.42
All Electricity Paid by Household													
Yes	67.1	7.8	26.5	620	40.4	8.8	29.9	700	26.7	6.3	21.4	500	1.81
No	5.5	4.3	14.8	344	2.3	5.0	17.1	382	3.2	3.8	13.0	316	7.99
Housing Structure by Status of Unit													
Single-Family Detached	46.8	8.9	30.4	691	28.0	10.1	34.5	784	18.8	7.1	24.3	552	2.16
Owned	40.1	9.2	31.3	711	25.0	10.3	35.0	795	15.0	7.4	25.1	570	2.23
Rented	6.7	7.4	25.3	571	3.0	9.0	30.9	687	3.7	6.1	20.8	478	4.69
Single-Family Attached	3.8	6.4	22.0	591	2.5	7.1	24.1	660	1.4	5.3	18.1	464	10.02
Owned	2.9	6.3	21.5	597	1.8	6.9	23.5	677	1.1	5.4	18.3	467	10.52
Rented	1.0	6.9	23.5	573	.7	7.5	25.7	618	.3	5.2	17.7	455	18.86
Building of 2 to 4 Units	8.5	4.7	16.1	429	4.0	5.5	18.8	510	4.6	4.0	13.7	360	5.72
Owned	1.9	5.8	19.8	554	1.1	6.2	21.0	615	.8	5.3	18.1	465	10.17
Rented	6.7	4.4	15.0	395	2.8	5.3	18.0	469	3.8	3.8	12.8	339	6.49
Building of 5 or More Units	9.4	3.5	11.9	320	5.9	3.9	13.1	355	3.5	2.8	9.7	262	6.18
Owned .....	.5	4.8	16.4	510	.4	4.5	15.3	525	Q	Q	Q	Q	24.15
Rented	8.9	3.4	11.6	309	5.5	3.8	13.0	342	3.4	2.7	9.4	256	6.10
Mobile Home	4.1	7.5	25.5	554	2.4	8.3	28.3	611	1.7	6.3	21.5	474	6.25
Owned	3.3	7.6	26.0	564	2.0	8.4	28.7	618	1.4	6.5	22.2	485	7.19
Rented .....	.7	6.8	23.2	508	.4	7.8	26.8	576	.3	5.5	18.9	429	12.48

See footnotes at end of table.

NOT ELECTRICALLY HEATED

Table 18. Electricity Consumption and Expenditures for Households Not Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Electricity Used: Not As Main Heating Fuel										RSE Row Factors	
	Used For Air Conditioning					Not Used for Air Conditioning						
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)		Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)
RSE Column Factors	1.220	0.720	0.720	0.704	1.785	0.931	0.931	0.888	1.930	0.955	0.955	0.930
Number of Rooms												
1	0.5	2.8	9.5	272	0.7	4.4	15.0	446	0.3	1.5	5.1	132
2	1.7	2.6	9.0	217	0.7	3.3	11.1	277	1.0	2.2	7.4	175
3	6.5	3.7	12.6	315	3.3	4.1	13.9	354	3.2	3.3	11.2	614
4	13.8	5.5	18.9	445	7.6	6.0	20.5	485	6.2	5.0	16.9	397
5	17.5	7.2	24.4	565	10.1	8.0	27.3	622	7.4	6.0	20.5	487
6	14.5	8.5	29.0	687	8.8	9.5	32.6	771	5.7	6.9	23.5	556
7	9.4	9.6	32.7	762	5.9	10.8	37.0	858	3.5	7.5	25.5	599
8 or More	8.8	11.4	38.9	890	6.1	12.2	41.7	967	2.7	9.6	32.6	720
Number of Rooms That Can Be Air Conditioned												
All	27.8	9.4	32.0	727	27.3	9.4	32.2	731	5	6.0	20.4	500
Some	15.4	7.0	23.8	596	15.4	7.0	23.8	596	Q	Q	Q	Q
None	29.4	6.0	20.5	480	—	—	—	—	29.4	6.0	20.5	480
Measured Heated Area of Residence (square feet)												
Fewer than 600	6.4	4.1	14.0	368	2.4	5.1	17.5	439	4.0	3.5	12.0	325
600 to 999	18.6	5.4	18.4	438	10.7	5.9	20.2	478	7.9	4.7	16.0	384
1,000 to 1,999	19.6	7.7	26.1	594	11.3	8.5	29.0	655	8.3	6.5	22.2	511
2,000 to 2,999	9.2	8.6	29.5	691	6.1	9.6	32.8	773	3.2	6.8	23.1	532
3,000 to 3,999	7.2	9.3	31.6	734	4.7	10.0	34.2	806	2.5	7.8	26.7	596
4,000 to 4,999	7.0	9.7	33.1	778	4.3	11.0	37.4	888	2.7	7.7	26.2	604
5,000 or More	4.5	11.9	40.4	936	3.2	12.8	43.6	1,028	1.3	9.7	33.0	731
Year of Construction												
1939 or Before	20.4	6.3	21.4	527	9.3	7.4	25.3	625	11.1	5.3	18.2	446
1940 to 1949	7.6	7.0	24.0	555	4.1	8.4	28.8	652	3.5	5.4	18.5	447
1950 to 1959	11.9	7.9	27.1	637	7.3	8.9	30.5	725	4.6	6.4	21.7	423
1960 to 1969	13.9	7.8	26.8	621	9.4	8.8	29.9	690	4.5	5.9	20.3	479
1970 to 1974	7.2	7.9	27.1	618	5.0	8.5	29.0	668	2.3	6.7	22.9	512
1975 to 1979	5.8	9.7	33.0	748	4.0	10.4	35.6	818	1.8	8.0	27.3	594
1980 to 1984	4.0	8.2	27.9	611	2.7	8.4	28.5	625	1.3	7.8	26.6	580
1985 or After	1.7	7.7	26.2	587	1.0	8.2	28.0	641	.7	6.9	23.7	515
Status of Unit												
Owned	48.6	8.7	29.7	686	30.3	9.7	33.1	767	18.3	7.1	24.2	553
Condominium	.8	6.0	20.4	528	.6	6.3	21.4	579	.2	5.2	17.9	392
Not a Condominium	47.8	8.8	29.9	689	29.7	9.8	33.4	770	18.1	7.1	24.2	555
Rented	24.0	5.0	17.2	423	12.4	5.7	19.6	477	11.6	4.3	14.7	364
Public Housing	1.9	3.8	13.1	300	.7	5.0	17.2	361	1.2	3.1	10.5	263
Not Public Housing	22.1	5.1	17.5	433	11.7	5.8	19.7	484	10.4	4.4	15.1	376
Rent Subsidy	1.1	4.5	15.2	405	.6	5.0	17.0	449	.4	3.7	12.7	344
No Rent Subsidy	21.0	5.2	17.7	434	11.0	5.8	19.9	486	10.0	4.5	15.2	377
1987 Family Income												
Less than \$5,000	5.0	5.0	17.2	408	2.1	6.4	21.9	503	2.9	4.1	13.8	342
\$5,000 to \$9,999	9.7	5.6	19.2	447	4.5	6.8	23.2	524	5.2	4.6	15.7	378
\$10,000 to \$14,999	10.6	6.3	21.7	507	5.6	7.0	23.7	552	5.0	5.7	19.3	457
\$15,000 to \$19,999	7.2	6.7	22.8	524	4.0	7.7	26.2	592	3.2	5.4	18.6	439
\$20,000 to \$24,999	7.0	7.4	25.3	593	4.1	8.2	27.9	656	2.9	6.4	21.7	504
\$25,000 to \$34,999	12.7	8.0	27.2	624	8.0	8.8	29.9	679	4.7	6.7	22.8	531
\$35,000 or \$49,999	10.2	9.2	31.4	726	7.0	9.8	33.5	777	3.3	7.9	27.0	618
\$50,000 or More	10.2	10.0	34.3	832	7.4	10.7	36.7	907	2.8	8.2	27.9	630

See footnotes at end of table.

Table 18. Electricity Consumption and Expenditures for Households Not Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics	Electricity Used: Not As Main Heating Fuel												RSE Row Factors
	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Used For Air Conditioning				Not Used for Air Conditioning				
					Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (thousand kWh)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
RSE Column Factors:	1.220	0.720	0.720	0.704	1.785	0.931	0.931	0.888	1.930	0.955	0.955	0.930	
Below 100 Percent of Poverty Line	9.8	5.9	20.2	473	3.9	7.4	25.4	576	5.9	4.9	16.7	405	5.18
Below 125 Percent of Poverty Line	15.2	6.1	20.6	486	6.7	7.3	25.0	573	8.5	5.1	17.2	417	4.01
Assistance for Heating in Winter													
Yes	4.3	5.7	19.4	466	1.5	6.5	22.3	535	2.8	5.2	17.9	429	5.53
No	68.3	7.6	26.0	607	41.2	8.6	29.4	688	27.2	6.1	20.8	485	1.83
Assistance for Weatherization of Residence													
Yes .....	.9	5.9	20.1	467	.3	7.4	25.3	587	.6	5.0	16.9	395	10.60
No	71.7	7.5	25.7	601	42.3	8.6	29.2	683	29.4	6.0	20.6	482	1.77
Household Owns or Has Regular Use of a Vehicle													
Yes	63.0	8.0	27.3	632	38.9	8.9	30.5	706	24.1	6.6	22.3	513	1.83
No	9.6	4.2	14.2	383	3.8	4.8	16.4	443	5.8	3.7	12.7	343	4.78
Race of Householder													
White	60.6	7.8	26.6	617	36.5	8.7	29.6	694	24.1	6.4	22.0	500	1.86
Black	9.5	6.4	21.7	526	5.1	8.2	28.0	636	4.4	4.3	14.5	400	5.38
Other	2.5	4.8	16.4	437	1.1	5.7	19.4	497	1.4	4.1	14.1	391	8.50
Householder of Hispanic Descent													
Yes	4.1	5.9	20.3	519	2.1	7.4	25.1	635	2.1	4.5	15.5	403	7.08
No	68.5	7.6	25.9	604	40.6	8.6	29.4	685	27.9	6.1	20.9	486	1.78
Age of Householder													
Under 25 Years	4.5	5.5	18.8	436	2.4	6.4	21.8	500	2.1	4.5	15.4	361	6.32
25 to 34 Years	16.8	7.1	24.3	572	9.7	7.9	26.9	634	7.2	6.1	20.7	488	3.30
35 to 44 Years	13.9	8.5	29.0	676	8.2	9.6	32.8	763	5.7	6.9	23.5	550	3.34
45 to 59 Years	15.4	9.1	31.0	715	9.4	10.4	35.4	817	6.1	7.1	24.2	556	3.05
60 Years and Over	22.0	6.5	22.1	523	13.0	7.5	25.5	604	8.9	5.0	17.0	405	3.22
Household Size													
1 Person	16.7	4.4	14.9	363	9.2	5.0	17.0	411	7.5	3.6	12.3	304	3.63
2 Persons	24.1	7.3	25.0	582	15.0	8.3	28.5	662	9.1	5.6	19.2	448	2.63
3 Persons	12.5	8.5	29.1	668	7.5	9.7	33.0	765	5.0	6.8	23.3	522	3.33
4 Persons	11.2	9.7	32.9	758	6.9	10.7	36.7	842	4.3	7.9	27.0	625	3.55
5 Persons	5.4	9.9	33.8	800	2.9	11.6	39.4	933	2.5	8.0	27.3	647	4.03
6 or More Persons	2.7	10.0	34.0	828	1.2	11.9	40.4	991	1.5	8.5	29.0	703	6.39
Secondary Heating													
Yes	30.0	9.2	31.5	702	17.6	10.4	35.4	796	12.3	7.6	26.0	568	2.49
Over 33 Percent of Home's Total Heat	2.4	9.5	32.3	694	1.2	10.1	34.4	744	1.2	8.9	30.2	642	8.22
No	42.6	6.3	21.4	526	25.1	7.3	24.8	603	17.6	4.9	16.7	418	2.38

See footnotes at end of table.

Table 18. Electricity Consumption and Expenditures for Households Not Using Electricity as Main Heating Fuel, 1987 (Continued)

Household Characteristics		Electricity Used: Not As Main Heating Fuel												RSE Row Factors
		Used For Air Conditioning						Not Used for Air Conditioning						
		Num-ber of House-holds (mil-lion)	Avg Amount Con-sumed (thou-sand kWh)	Avg Amount Con-sumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	Num-ber of House-holds (mil-lion)	Avg Amount Con-sumed (thou-sand kWh)	Avg Amount Con-sumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	Num-ber of House-holds (mil-lion)	Avg Amount Con-sumed (thou-sand kWh)	Avg Amount Con-sumed (mil-lion Btu)	Avg Expend-itures per House-hold (dol-lars)	
RSE Column Factors:		1.220	0.720	0.720	0.704	1.785	0.931	0.931	0.888	1.930	0.955	0.955	0.930	
Fuel Combinations														
Use Natural Gas for Main Heat		50.0	7.1	24.3	572	31.6	8.3	28.2	658	18.4	5.2	17.7	425	2.25
Water and Have A/C		28.6	7.8	26.7	638	28.1	7.9	26.8	641	Q	5.6	19.0	453	3.93
and Lack A/C		16.3	4.9	16.6	411	--	--	--	--	16.3	4.9	16.6	411	2.82
Use Electricity to Heat Water and Have A/C		3.4	11.5	39.1	797	3.4	11.5	39.1	797	NC	NC	NC	NC	5.40
and Lack A/C		1.6	8.6	29.4	570	--	--	--	--	1.6	8.6	29.4	570	5.69
Other		2	7.4	25.1	652	.2	9.1	31.0	848	Q	Q	Q	27.21	5.07
Use Fuel Oil for Main Heat		10.9	7.3	24.8	633	5.6	8.0	27.4	719	5.3	6.5	22.1	541	5.07
Use Fuel Oil to Heat Water and Have A/C		2.6	5.9	20.3	646	2.6	5.9	20.3	646	NC	NC	NC	NC	9.33
and Lack A/C		2.5	4.1	13.9	422	--	--	--	--	2.5	4.1	13.9	422	7.60
Use Electricity to Heat Water and Have A/C		2.0	11.4	39.0	848	2.0	11.4	39.0	848	NC	NC	NC	NC	6.23
Use Natural Gas to Heat Water and Have A/C		9	6.5	22.3	652	.9	6.5	22.3	652	NC	NC	NC	NC	10.35
Other		2.9	8.6	29.4	649	.1	8.2	28.0	673	2.8	8.6	29.5	648	10.99
Use Wood for Main Heat		5.1	10.2	34.9	707	2.0	12.2	41.6	847	3.1	9.0	30.6	619	5.15
Use LPG for Main Heat		4.1	8.7	29.6	650	2.4	10.1	34.6	753	1.7	6.6	22.5	504	6.90
Use Kerosene for Main Heat		1.3	9.6	32.6	687	.8	9.8	33.6	681	.6	9.2	31.3	695	12.26
Use Coal for Main Heat		4	7.7	26.3	524	Q	Q	Q	Q	Q	8.0	27.2	515	23.79
No Heating Fuel/Other Fuel		8	7.4	25.4	752	.2	12.0	41.0	1,045	.6	5.6	19.2	635	15.22

NC No cases in sample.

-- Data not applicable.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 19. Household Fuel Oil or Kerosene Consumption and Expenditures, 1987

Household Characteristics	Fuel Oil or Kerosene Used:									RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per gallon)	As Main Heating Fuel				
						Number of Households (million)	Average Amount Consumed (gallons)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.399	1.636	1.637	1.584	0.235	1.607	0.744	0.747	0.803	
Total U.S. Households	17.4	8.85	1.22	7.2	0.81	12.2	671	92.9	542	3.69
Census Region and Division										
Northeast	9.1	6.31	.87	5.1	.80	8.0	761	105.4	608	4.73
New England	2.6	1.90	.26	1.6	.82	2.4	773	107.1	634	4.96
Middle Atlantic	6.5	4.41	.61	3.5	.79	5.6	756	104.7	597	6.35
Midwest	3.1	1.15	.16	1.0	.82	1.5	585	80.9	475	7.52
East North Central	2.5	.98	.13	.8	.83	1.2	606	83.7	496	8.43
West North Central .....	.6	.18	.02	.1	.79	.3	506	70.0	398	13.54
South	4.6	1.25	.17	1.1	.86	2.3	456	62.8	391	7.37
South Atlantic	3.6	1.06	.15	.9	.86	2.0	463	63.8	397	7.92
East South Central	1.0	.18	.03	.2	.89	.3	441	60.3	373	20.32
West South Central	Q	Q	Q	Q	Q	Q	Q	Q	Q	a
West .....	.6	.13	.02	.1	.85	Q	369	51.1	289	31.10
Metropolitan Status										
Metropolitan	12.6	6.93	.96	5.6	.81	9.4	700	96.9	563	3.87
Central City	5.0	2.42	.34	1.9	.77	3.7	615	85.2	469	6.75
Outside Central City	7.6	4.51	.62	3.7	.83	5.7	754	104.4	623	5.31
Nonmetropolitan	4.8	1.92	.26	1.6	.83	2.8	576	79.4	474	9.79
Climate Zone										
Under 2,000 CDD and--										
Over 7,000 HDD	2.8	1.53	.21	1.2	.80	2.0	648	89.7	518	13.39
5,500 to 7,000 HDD	5.0	3.16	.44	2.6	.83	3.7	801	110.8	663	7.39
4,000 to 5,499 HDD	7.1	3.70	.51	2.9	.79	5.3	663	91.9	521	6.52
Under 4,000 HDD	1.8	.40	.05	.4	.89	.8	402	55.1	353	13.05
2,000 CDD or More and --										
Under 4,000 HDD .....	.7	Q	Q	Q	1.07	.3	Q	Q	Q	26.44
Fuel Oil or Kerosene Paid by Household										
Yes	14.0	6.92	.96	5.8	.84	9.2	693	95.9	578	4.07
Budget Plan	1.4	1.27	.18	1.1	.84	1.4	894	123.8	755	9.01
No Budget Plan	12.6	5.64	.78	4.7	.84	7.8	656	90.7	546	4.13
No	3.4	1.94	.27	1.4	.72	3.0	603	83.7	432	7.03
Housing Structure by Status of Unit										
Single-Family Detached	11.1	5.77	.80	4.8	.84	7.2	727	100.7	603	4.39
Owned	9.7	5.26	.73	4.4	.83	6.4	753	104.2	624	4.38
Rented	1.4	.51	.07	.4	.85	.7	507	70.0	424	11.79
Single-Family Attached .....	.9	.52	.07	.5	.88	.7	762	105.5	657	14.50
Owned .....	.7	.45	.06	.4	.88	.6	787	108.9	682	17.75
Rented .....	.2	.07	.01	.1	.91	Q	Q	Q	Q	22.90
Building of 2 to 4 Units	1.7	.95	.13	.8	.83	1.5	633	87.7	527	6.95
Owned .....	.5	.35	.05	.3	.84	.4	806	111.7	675	13.48
Rented	1.2	.61	.08	.5	.83	1.1	564	78.2	468	9.86
Building of 5 or More Units	2.5	1.24	.17	.8	.65	2.0	580	80.4	378	8.88
Mobile Home	1.3	.37	.05	.3	.88	.8	408	55.6	354	12.46
Number of Rooms										
1	Q	Q	Q	Q	.73	Q	Q	Q	Q	92.16
2 .....	.6	.22	.03	.1	.65	.4	491	68.1	317	18.95
3	1.6	.73	.10	.5	.71	1.3	539	74.6	380	8.58
4	2.7	1.18	.16	.9	.80	2.1	510	70.3	405	6.72
5	4.4	1.79	.25	1.5	.83	2.8	585	80.9	483	5.34
6	3.3	1.66	.23	1.4	.83	2.2	702	97.2	578	6.65
7	2.4	1.44	.20	1.2	.83	1.6	801	110.9	655	7.27
8 or More	2.4	1.79	.25	1.5	.85	1.7	1,001	138.6	842	7.34

See footnotes at end of table.

Table 19. Household Fuel Oil or Kerosene Consumption and Expenditures, 1987 (Continued)

Household Characteristics RSE Column Factors	Fuel Oil or Kerosene Used:									RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per gallon)	As Main Heating Fuel				
						Number of Households (million)	Average Amount Consumed (gallons)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors	1.399	1.636	1.637	1.584	0.235	1.607	0.744	0.747	0.803	
Number of Rooms That Can Be Air Conditioned										
All	4.6	1.75	0.24	1.4	0.82	2.7	585	80.9	473	7.19
Some	5.0	2.97	.41	2.5	.82	3.7	767	106.2	628	5.20
None	7.8	4.13	.57	3.3	.81	5.8	650	90.0	520	5.54
Measured Heated Area of Residence (square feet)										
Fewer than 600	1.7	.77	.11	.6	.73	1.3	562	77.8	407	8.72
600 to 999	4.1	1.57	.22	1.2	.78	3.0	497	68.6	386	7.65
1,000 to 1,599	4.4	1.90	.26	1.6	.83	2.8	616	85.2	510	5.27
1,600 to 1,999	2.3	1.13	.16	1.0	.84	1.5	676	93.6	563	6.85
2,000 to 2,399	1.7	1.01	.14	.9	.85	1.2	778	107.8	651	7.82
2,400 to 2,999	2.0	1.22	.17	1.0	.82	1.4	812	112.5	662	6.72
3,000 or More	1.4	1.26	.17	1.0	.82	1.1	1,124	155.7	920	7.43
Year of Construction										
1939 or Before	6.1	3.69	.51	3.0	.82	4.7	735	101.8	598	6.22
1940 to 1949	2.0	.92	.13	.7	.79	1.4	631	87.4	496	7.70
1950 to 1959	2.8	1.62	.22	1.3	.83	2.2	702	97.2	576	6.98
1960 to 1969	2.7	1.29	.18	1.0	.78	1.9	618	85.5	480	8.05
1970 to 1974	1.4	.52	.07	.4	.83	.8	530	72.9	433	12.83
1975 to 1979	1.7	.60	.08	.5	.85	.8	643	89.0	542	10.33
1980 to 1984 .....	.6	.16	.02	.1	.85	.3	409	56.7	324	17.89
1985 or After .....	.2	Q	Q	Q	.83	Q	Q	Q	Q	25.78
Status of Unit										
Owned	12.2	6.40	.89	5.4	.84	8.2	724	100.1	602	4.12
Condominium	Q	Q	Q	Q	Q	Q	Q	Q	Q	a
Not a Condominium	12.1	6.38	.88	5.3	.84	8.2	723	100.1	602	4.13
Rented	5.2	2.45	.34	1.8	.75	4.0	562	77.8	419	5.38
Public Housing .....	.4	.22	.03	.1	.66	Q	596	82.6	398	30.72
Not Public Housing	4.8	2.23	.31	1.7	.76	3.6	559	77.4	420	6.46
Rent Subsidy .....	.3	.12	.02	.1	.68	.3	467	64.8	318	15.35
No Rent Subsidy	4.5	2.11	.28	1.6	.77	3.4	566	78.3	428	7.33
1987 Family Income										
Less than \$5,000	1.0	.40	.05	.3	.79	.7	528	72.7	403	15.43
\$5,000 to \$9,999	2.1	1.13	.16	.9	.80	1.7	607	83.9	481	8.07
\$10,000 to \$14,999	2.6	1.15	.16	.9	.81	1.8	605	83.5	488	7.86
\$15,000 to \$19,999	1.7	.83	.11	.7	.83	1.2	653	90.4	537	8.83
\$20,000 to \$24,999	1.8	.84	.12	.7	.83	1.3	566	78.2	460	7.19
\$25,000 to \$34,999	3.5	1.56	.22	1.3	.81	2.3	621	86.0	496	7.17
\$35,000 to \$49,999	2.4	1.38	.19	1.1	.82	1.6	780	108.1	633	6.26
\$50,000 or More	2.2	1.57	.22	1.3	.83	1.6	937	129.9	773	8.85

See footnotes at end of table.

Table 19. Household Fuel Oil or Kerosene Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Fuel Oil or Kerosene Used:									RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per gallon)	As Main Heating Fuel				
						Number of Households (million)	Average Amount Consumed (gallons)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.399	1.636	1.637	1.584	0.235	1.607	0.744	0.747	0.803	
Below 100 Percent of Poverty Line	2.0	0.79	0.11	0.6	0.79	1.3	515	71.0	395	8.44
Below 125 Percent of Poverty Line	3.2	1.40	.19	1.1	.80	2.3	552	76.2	432	6.50
Assistance for Heating in Winter										
Yes .....	.9	.39	.05	.3	.82	.7	533	73.6	430	8.24
No	16.5	8.46	1.17	6.9	.81	11.5	679	94.0	549	3.76
Assistance for Weatherization of Residence										
Yes .....	.2	.11	.01	.1	.85	.1	633	87.7	512	17.88
No	17.2	8.74	1.21	7.1	.81	12.0	671	92.9	543	3.70
Household Owns or Has Regular Use of a Vehicle										
Yes	14.5	7.29	1.01	6.0	.83	9.7	688	95.1	567	3.81
No	2.9	1.56	.22	1.2	.74	2.5	606	84.0	447	6.81
Race of Householder										
White	14.5	7.50	1.04	6.1	.82	10.4	665	92.1	541	4.29
Black	2.5	1.14	.16	.9	.79	1.4	735	101.7	581	9.28
Other .....	.4	.22	.03	.2	.74	.4	582	80.8	415	9.29
Householder of Hispanic Descent										
Yes .....	.9	.46	.06	.3	.74	.7	662	91.8	488	8.25
No	16.6	8.39	1.16	6.9	.82	11.5	671	92.9	545	3.78
Age of Householder										
Under 25 Years .....	.8	.35	.05	.3	.83	.5	533	73.5	434	12.29
25 to 34 Years	3.8	1.63	.22	1.3	.80	2.5	596	82.5	472	5.89
35 to 44 Years	3.8	1.80	.25	1.5	.82	2.5	677	93.8	550	5.99
45 to 59 Years	3.7	1.94	.27	1.6	.83	2.3	751	104.0	619	8.16
60 Years and Over	5.3	3.12	.43	2.5	.80	4.4	686	94.9	551	5.78
Household Size										
1 Person	3.9	1.78	.25	1.4	.79	2.9	582	80.5	458	8.04
2 Persons	5.7	3.06	.42	2.5	.81	4.1	683	94.5	551	5.84
3 Persons	3.2	1.61	.22	1.3	.84	2.2	682	94.3	567	5.88
4 Persons	2.9	1.42	.20	1.2	.81	1.9	716	99.0	574	6.02
5 Persons	1.2	.60	.08	.5	.83	.8	720	99.8	597	8.47
6 or More Persons .....	.6	.38	.05	.3	.83	.4	822	113.9	668	17.21
Secondary Heating										
Yes	10.0	3.93	.54	3.3	.83	5.0	674	93.3	554	4.96
Over 33 Percent of Home's Total Heat	1.3	.50	.07	.4	.85	.6	608	84.0	498	12.46
No	7.4	4.92	.68	3.9	.80	7.2	669	92.6	534	4.93

See footnotes at end of table.

Table 19. Household Fuel Oil or Kerosene Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Fuel Oil or Kerosene Used:									RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Total Amount Consumed (quadrillion Btu)	Total Expenditures (billion dollars)	Average Price (dollars per gallon)	As Main Heating Fuel				
						Number of Households (million)	Average Amount Consumed (gallons)	Average Amount Consumed (million Btu)	Average Expenditures per Household (dollars)	
RSE Column Factors:	1.399	1.636	1.637	1.584	0.235	1.607	0.744	0.747	0.803	
Fuel Combinations										
Use Fuel Oil for Main Heat	10.9	7.77	1.08	6.2	0.80	10.9	715	99.1	573	3.79
Use Fuel Oil to Heat Water and Have A/C	2.1	1.17	.16	.9	.81	2.1	556	76.9	447	9.94
Use Fuel Oil to Heat Water and Lack A/C	2.6	2.23	.31	1.8	.79	2.6	851	118.0	676	9.06
Use Electricity to Heat Water and Have A/C	2.0	1.25	.17	1.0	.82	2.0	629	87.1	513	8.52
Use Natural Gas to Heat Water and Have A/C .....	.9	.63	.09	.5	.86	.9	699	96.8	597	9.79
Other	3.3	2.49	.35	2.0	.79	3.3	765	106.0	602	5.74
Use Kerosene for Main Heat	1.3	.41	.06	.4	.93	1.3	309	41.7	286	12.48
Other Fuel	5.2	.67	.09	.6	.89	--	--	--	--	9.87
Main Heating Equipment Using Fuel Oil										
Steam or Hot Water system	6.3	5.15	.71	4.1	.79	6.3	812	112.6	643	4.86
Central Warm Air Furnace	4.0	2.32	.32	1.9	.82	4.0	574	79.5	471	6.54
Other/None	7.0	1.37	.19	1.2	.89	1.8	391	53.4	345	8.43

-- Data not applicable.

* No applicable RSE row factor.

□ Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors.

• Because of rounding, data may not sum to totals. • 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. Forms EIA-457 A, B, C, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 20. Household Liquefied Petroleum Gas Consumption and Expenditures, 1987

Household Characteristics	Liquefied Petroleum Gas (LPG) Used:											RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Avg Price (dollars per gallon)	As Main Heating Fuel				Not as Main Heating Fuel				
				Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
Total U.S. Households	7.7	3.45	0.81	4.1	669	61.1	500	3.5	193	17.6	209	7.90
Census Region and Division												
Northeast	1.1	.20	1.21	Q	Q	Q	Q	1.0	131	12.0	171	13.61
Midwest	2.3	1.44	.69	1.3	909	83.1	602	.9	240	22.0	205	11.18
East North Central	1.5	.92	.75	.9	906	82.8	650	.7	216	19.7	196	16.81
West North Central .....	.8	.52	.60	.5	915	83.6	515	.3	294	26.8	223	11.21
South	3.3	1.31	.87	2.1	494	45.1	402	1.2	215	19.6	238	12.72
South Atlantic	1.9	.63	1.02	1.1	422	38.6	397	.8	220	20.1	267	17.62
East South Central .....	.8	.35	.83	.5	570	52.1	461	.2	173	15.8	179	15.00
West South Central .....	.7	Q	.64	Q	563	51.4	349	Q	Q	Q	Q	42.00
West	1.0	.51	.85	.6	773	70.6	601	.4	162	14.8	222	18.58
Mountain	Q	Q	.59	Q	1,033	94.4	584	Q	Q	Q	Q	37.82
Pacific .....	.7	.30	1.04	.4	646	59.0	610	.3	144	13.1	221	20.47
Metropolitan Status												
Metropolitan	3.5	1.42	.89	1.8	585	53.4	476	1.7	208	19.0	233	11.75
Central City .....	.6	.18	1.06	.3	400	36.6	401	.2	220	20.1	263	24.44
Outside Central City	2.9	1.24	.86	1.5	625	57.1	492	1.4	206	18.8	228	13.55
Nonmetropolitan	4.2	2.03	.76	2.3	736	67.2	519	1.9	179	16.3	187	10.79
Climate Zone												
Under 2,000 CDD and--												
Over 7,000 HDD	1.7	.90	.73	.8	920	84.0	617	.9	182	16.6	185	18.59
5,500 to 7,000 HDD	1.4	.59	.82	.5	887	81.0	643	.9	154	14.1	178	13.40
4,000 to 5,499 HDD	1.4	.70	.74	.8	759	69.3	537	.6	185	16.9	167	13.36
Under 4,000 HDD	1.6	.81	.87	1.0	635	58.0	512	.6	303	27.6	328	17.10
2,000 CDD or More and --												
Under 4,000 HDD	1.6	.45	.97	1.1	346	31.6	308	.5	150	13.7	205	18.24
All LPG Paid by Household												
Yes	7.3	3.34	.81	4.0	676	61.8	504	3.3	196	17.9	213	7.97
Budget Plan	4.0	2.69	.75	4.0	676	61.8	504	NC	NC	NC	NC	8.12
No Budget Plan	3.3	.65	1.09	NC	NC	NC	NC	3.3	196	17.9	213	9.25
No .....	.4	.12	.87	Q	Q	Q	398	.2	148	13.5	155	30.10
Housing Structure by Status of Unit												
Single-Family Detached	5.7	2.76	.79	2.9	751	68.6	545	2.8	203	18.6	212	9.12
Owned	4.7	2.35	.79	2.4	773	70.6	565	2.3	213	19.5	218	9.39
Rented	1.0	.41	.79	.5	650	59.4	453	.5	153	14.0	182	17.04
Building of 2 or More Units	Q	Q	Q	NC	NC	NC	NC	Q	Q	Q	Q	a
Mobile Home	1.9	.68	.90	1.2	473	43.2	392	.7	148	13.5	197	15.23
Number of Rooms												
1 to 3 .....	.9	.28	.89	.4	541	49.4	433	.5	134	12.2	159	19.06
4	2.2	.90	.89	1.4	527	48.1	438	.9	194	17.7	227	12.38
5	2.0	.91	.77	1.1	692	63.2	485	.9	163	14.9	192	13.75
6	1.1	.51	.82	.5	812	74.2	621	.6	225	20.6	220	13.80
7 .....	.8	.40	.79	.4	770	70.4	563	.4	238	21.7	224	16.39
8 or More .....	.7	.45	.70	.4	966	88.3	623	.3	236	21.5	244	19.46
Number of Rooms That Can Be Air Conditioned												
All	2.8	1.42	.80	1.6	699	63.8	525	1.2	238	21.7	238	9.87
Some	1.5	.65	.72	.8	646	59.0	429	.7	156	14.2	161	13.37
None	3.3	1.38	.87	1.7	651	59.5	511	1.7	176	16.1	208	12.35

See footnotes at end of table.

Table 20. Household Liquefied Petroleum Gas Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Liquefied Petroleum Gas (LPG) Used:											RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Avg Price (dollars per gallon)	As Main Heating Fuel				Not as Main Heating Fuel				
				Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
-RSE Column Factors:	1.177	1.509	0.418	1.491	0.706	0.706	0.638	1.404	1.328	1.328	1.145	
Measured Heated Area of Residence (square feet)												
Fewer than 600	0.9	0.29	0.95	0.4	540	49.3	444	0.6	145	13.2	184	15.70
600 to 999	2.3	.83	.88	1.4	477	43.5	379	1.0	181	16.6	220	10.42
1,000 to 1,999	2.3	1.19	.76	1.3	776	70.9	551	1.0	219	20.0	213	13.20
1,600 to 1,999 .....	.8	.39	.82	.5	591	54.0	470	.3	246	22.5	230	15.89
2,000 to 2,999 .....	.5	.23	.94	.2	882	80.6	775	.3	163	14.9	185	23.37
2,400 to 2,999 .....	.4	.23	.75	.2	960	87.7	654	.2	136	12.4	181	18.96
3,000 or More .....	.3	.29	.64	.2	1,280	116.9	774	.2	286	26.1	240	21.82
Year of Construction												
1939 or Before	1.8	.74	.77	.8	660	60.3	414	1.0	190	17.3	223	12.49
1940 to 1949 .....	.7	.34	.87	.4	738	67.4	601	.3	208	18.9	232	18.85
1950 to 1959	1.0	.47	.87	.6	709	64.8	592	.4	141	12.8	157	15.22
1960 to 1969	1.0	.43	.78	.5	628	57.4	458	.5	183	16.7	177	17.44
1970 to 1974	1.0	.51	.88	.6	672	61.3	535	.3	265	24.2	333	15.32
1975 to 1979	1.0	.52	.77	.6	746	68.1	545	.4	205	18.8	195	17.70
1980 to 1984 .....	.8	.29	.76	.4	512	46.7	362	.4	193	17.6	169	20.03
1985 or After .....	.3	.15	.88	.2	657	60.0	549	Q	Q	Q	Q	21.30
Status of Unit												
Owned	6.2	2.91	.81	3.4	689	63.0	517	2.8	202	18.5	215	8.21
Rented	1.5	.54	.83	.7	575	52.6	419	.7	155	14.2	185	14.33
1987 Family Income												
Less than \$5,000 .....	.9	.36	.86	.6	487	44.5	402	.3	187	17.1	203	15.91
\$5,000 to \$9,999	1.4	.49	.85	.6	652	59.5	517	.8	142	12.9	145	16.98
\$10,000 to \$14,999	1.3	.66	.77	1.0	646	59.0	468	.4	125	11.4	175	18.51
\$15,000 to \$19,999 .....	.7	.38	.84	.4	669	61.1	489	.3	304	27.8	366	17.18
\$20,000 to \$24,999 .....	.8	.38	.77	.4	730	66.7	516	.4	187	17.1	197	16.61
\$25,000 to \$34,999	1.3	.56	.84	.6	727	66.4	544	.7	190	17.3	210	12.54
\$35,000 to \$49,999 .....	.6	.31	.76	.3	755	69.0	548	.3	202	18.4	179	17.33
\$50,000 or More .....	.6	.33	.81	.2	907	82.8	657	.3	323	29.5	328	19.17
Below 100 Percent of Poverty Line												
.....	1.6	.72	.78	1.0	599	54.7	439	.7	209	19.1	199	15.90
Below 125 Percent of Poverty Line												
.....	2.5	1.03	.82	1.3	645	58.9	487	1.2	172	15.7	183	13.32
Assistance for Heating in Winter												
Yes .....	.8	.42	.70	.4	795	72.6	528	.4	248	22.7	211	21.00
No	6.9	3.03	.83	3.7	655	59.8	497	3.2	186	17.0	209	8.23
Assistance for Weatherization of Residence												
Yes	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	a
No	7.6	3.39	.81	4.1	667	60.9	499	3.5	193	17.6	208	7.97
Household Owns or Has Regular Use of a Vehicle												
Yes	7.1	3.17	.80	3.8	666	60.9	490	3.2	192	17.5	208	8.22
No .....	.6	.28	.94	.3	704	64.3	629	.3	205	18.7	222	19.85

See footnotes at end of table.

Table 20. Household Liquefied Petroleum Gas Consumption and Expenditures, 1987 (Continued)

Household Characteristics	Liquefied Petroleum Gas (LPG) Used:											RSE Row Factors
	Number of Households (million)	Total Amount Consumed (billion gallons)	Avg Price (dollars per gallon)	As Main Heating Fuel				Not as Main Heating Fuel				
				Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	Number of Households (million)	Avg Amount Consumed (gallons)	Avg Amount Consumed (million Btu)	Avg Expenditures per Household (dollars)	
RSE Column Factors:	1.177	1.509	0.418	1.491	0.706	0.706	0.638	1.404	1.328	1.328	1.145	
Race of Householder												
White	6.7	3.05	.81	3.6	681	62.2	512	3.1	186	17.0	201	7.97
Black .....	.8	.25	.88	.4	452	41.3	361	.3	194	17.7	217	15.80
Other .....	.2	Q	.68	Q	Q	Q	Q	.1	338	30.8	358	29.89
Householder of Hispanic Descent												
Yes .....	.2	.13	.68	Q	Q	Q	Q	Q	Q	Q	Q	31.54
No	7.5	3.32	.82	4.0	664	60.7	498	3.5	191	17.5	209	8.07
Age of Householder												
Under 25 Years .....	.4	.14	1.01	.2	514	47.0	373	.2	172	15.7	Q	25.65
25 to 34 Years	1.6	.66	.80	.8	666	60.9	493	.8	192	17.5	188	12.21
35 to 44 Years	1.5	.61	.79	.5	791	72.2	519	1.0	220	20.1	227	15.18
45 to 59 Years	1.8	.84	.81	1.1	636	58.0	484	.7	189	17.3	201	10.92
60 Years and Over	2.4	1.21	.82	1.6	674	61.6	524	.8	171	15.7	191	13.21
Household Size												
1 Person	1.5	.69	.82	1.0	630	57.5	492	.5	136	12.4	153	15.47
2 Persons	2.5	1.09	.81	1.4	604	55.2	459	1.1	201	18.3	206	10.08
3 Persons	1.3	.52	.83	.7	635	58.0	486	.6	152	13.9	174	13.06
4 Persons	1.5	.71	.81	.6	893	81.6	625	.9	227	20.7	246	14.21
5 Persons .....	.5	.22	.80	.2	687	62.8	480	.3	201	18.4	225	17.55
6 or More Persons .....	.4	.23	.79	.2	769	70.2	544	.2	273	25.0	310	24.23
Secondary Heating												
Yes	4.2	1.98	.82	2.3	665	60.7	515	1.9	256	23.3	245	9.68
Over 33 Percent of Home's Total Heat .....	.6	.17	.90	.3	354	32.3	304	.3	196	17.9	195	21.27
No	3.5	1.47	.80	1.9	674	61.6	481	1.6	119	10.9	166	9.83
Main Heating Equipment Using LPG												
Central Warm Air Furnace	2.4	1.84	.73	2.4	762	69.6	554	--	--	--	--	7.75
Other/None	5.3	1.61	.91	1.7	539	49.2	424	3.5	193	17.6	209	10.36

-- Data not applicable.

* No applicable RSE row factor.

NC No cases in sample.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • 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, Form EIA-457 A, B, C, D of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

WOOD CONSUMPTION

Table 21. Household Wood Consumption for the Year Ending November 1987

Household Characteristics	Number of Households Burning Wood		Total Amount Consumed			Mean Amount Consumed per Household		Median Amount Consumed per Household	
	(million)	(percent)	(million cords)	(quadrillion Btu)	(percent)	(cords)	(million Btu)	(cords)	(million Btu)
Total U.S. Households	22.5	100.0	42.6	0.85	100.0	1.9	38.0	0.7	14.0
Census Region and Division									
Northeast	3.7	16.6	8.3	.17	19.6	2.2	44.7	.7	14.0
New England	1.2	5.3	2.1	.04	5.0	1.8	35.5	1.0	20.0
Middle Atlantic	2.5	11.3	6.2	.12	14.6	2.5	49.1	.7	14.0
Midwest	5.2	22.9	12.5	.25	29.2	2.4	48.4	1.0	20.0
East North Central	3.7	16.7	9.4	.19	22.0	2.5	50.2	.7	14.0
West North Central	1.4	6.3	3.1	.06	7.2	2.2	43.6	1.0	20.0
South	7.5	33.6	13.2	.26	31.0	1.8	35.1	.7	14.0
South Atlantic	3.8	17.1	6.8	.14	16.0	1.8	35.5	.7	14.0
East South Central	1.7	7.5	4.0	.08	9.4	2.4	47.9	1.5	30.0
West South Central	2.0	9.0	2.4	.05	5.6	1.2	23.7	.5	10.0
West	6.0	26.8	8.6	.17	20.2	1.4	28.5	.5	10.0
Mountain	1.3	5.8	1.3	.03	3.1	1.0	20.1	.3	6.0
Pacific	4.7	21.0	7.3	.15	17.1	1.5	30.8	.7	14.0
Metropolitan Status									
Metropolitan	15.9	71.0	21.6	.43	50.6	1.4	27.1	.5	10.0
Central City	4.2	18.5	3.7	.07	8.6	.9	17.6	.3	6.0
Outside Central City	11.8	52.4	17.9	.36	42.1	1.5	30.5	.5	10.0
Nonmetropolitan	6.5	29.0	21.0	.42	49.4	3.2	64.5	2.0	40.0
Climate Zone									
Under 2,000 CDD and--									
Over 7,000 HDD	2.9	13.0	12.8	.26	30.0	4.4	88.0	2.5	50.0
5,500 to 7,000 HDD	6.6	29.3	10.2	.20	24.0	1.6	31.2	.5	10.0
4,000 to 5,499 HDD	5.0	22.4	8.8	.18	18.0	1.8	35.1	1.0	20.0
Under 4,000 HDD	4.8	21.5	7.7	.15	18.0	1.6	31.7	.7	14.0
2,000 CDD or More and --									
Under 4,000 HDD	3.1	13.9	3.1	.06	7.3	1.0	19.9	.5	10.0
Payment Method for Utilities									
All Paid by Household	21.7	96.6	41.8	.84	98.1	1.9	38.5	.7	14.0
Some Paid, Some in Rent .....	.3	1.4	.1	Q	.2	.3	5.2	Q	Q
All Included in Rent	1.1	.7	.3	.01	.7	1.9	38.1	Q	Q
Other Method .....	.3	1.3	.5	.01	1.1	1.6	32.4	Q	Q
Housing Structure by Status of Unit									
Single-Family Detached									
Owned	19.4	86.2	37.0	.74	86.7	1.9	38.2	.7	14.0
Rented	17.6	78.5	32.0	.64	75.1	1.8	36.3	.7	14.0
Single-Family Attached									
Owned	1.7	7.6	5.0	.10	11.6	2.9	57.7	2.0	40.0
Rented .....	.8	3.8	1.7	.03	3.9	2.0	39.5	.3	6.0
Building of 2 to 4 Units									
Owned .....	.8	3.5	1.6	.03	3.8	2.1	41.2	.3	6.0
Rented	Q	Q	Q	Q	Q	Q	Q	Q	Q
Building of 5 or More Units									
Owned .....	.9	4.0	1.5	.03	3.5	1.7	33.3	.5	10.0
Rented	4	1.8	.7	.01	1.6	1.6	32.5	Q	Q
Building of 5 or More Units									
Owned .....	.5	2.2	.8	.02	2.0	1.7	34.0	.5	10.0
Rented .....	.6	2.6	.3	.01	.7	.5	10.9	Q	Q
Mobile Home									
Owned	Q	Q	Q	Q	Q	Q	Q	Q	Q
Rented .....	.5	2.1	.3	.01	.7	.6	12.3	Q	Q
Mobile Home									
Owned .....	.8	3.5	2.2	.04	5.1	2.8	55.4	2.0	40.0
Rented .....	.7	3.3	1.9	.04	4.5	2.6	52.5	2.0	40.0
Mobile Home									
Owned	Q	Q	Q	Q	Q	Q	Q	Q	Q

See footnotes at end of table.

Table 21. Household Wood Consumption for the Year Ending November 1987 (Continued)

Household Characteristics	Number of Households Burning Wood		Total Amount Consumed			Mean Amount Consumed per Household		Median Amount Consumed per Household	
	(million)	(percent)	(million cords)	(quadrillion Btu)	(percent)	(cords)	(million Btu)	(cords)	(million Btu)
Number of Rooms									
1 to 3	1.0	4.6	2.0	0.04	4.8	2.0	39.3	0.7	14.0
4	2.3	10.1	5.7	.11	13.4	2.5	50.5	2.0	40.0
5	4.4	19.4	8.8	.18	20.8	2.0	40.5	1.0	20.0
6	5.3	23.7	11.3	.23	26.6	2.1	42.6	.7	14.0
7	4.4	19.6	7.8	.16	18.3	1.8	35.5	.7	14.0
8 or More	5.1	22.6	6.9	.14	16.1	1.4	27.1	.3	6.0
Number of Rooms That Can Be Air Conditioned									
All	9.8	43.6	11.0	.22	25.9	1.1	22.5	.5	10.0
Some	3.5	15.5	5.8	.12	13.7	1.7	33.4	.5	10.0
None	9.2	40.9	25.8	.52	60.4	2.8	56.1	1.3	26.0
Measured Heated Area of Residence (square feet)									
Fewer than 600 .....	.6	2.7	2.9	.06	6.7	4.7	94.3	3.0	60.0
600 to 999	2.6	11.7	5.8	.12	13.6	2.2	43.9	1.5	30.0
1,000 to 1,599	6.5	28.8	14.1	.28	33.0	2.2	43.6	1.0	20.0
1,600 to 1,999	3.4	15.3	5.6	.11	13.0	1.6	32.3	.7	14.0
2,000 to 2,399	3.4	15.0	4.5	.09	10.5	1.3	26.6	.5	10.0
2,400 to 2,999	3.2	14.4	6.3	.13	14.7	1.9	38.7	.5	10.0
3,000 or More	2.7	12.0	3.6	.07	8.4	1.3	26.7	.3	6.0
Year of Construction									
1939 or Before	4.2	18.6	12.5	.25	29.4	3.0	60.1	1.5	30.0
1940 to 1949	1.7	7.7	3.9	.08	9.1	2.2	44.9	.7	14.0
1950 to 1959	2.9	12.8	4.2	.08	9.8	1.4	29.0	.5	10.0
1960 to 1969	3.7	16.7	5.0	.10	11.7	1.3	26.8	.5	10.0
1970 to 1974	2.3	10.3	3.2	.06	7.5	1.4	27.6	.5	10.0
1975 to 1979	3.8	16.9	7.1	.14	16.7	1.9	37.4	.5	10.0
1980 to 1984	2.9	12.7	5.2	.10	12.2	1.8	36.5	1.0	20.0
1985 or After	1.0	4.3	1.5	.03	3.6	1.6	31.3	1.0	20.0
Status of Unit									
Owned	19.7	87.6	36.3	.73	85.1	1.8	36.9	.7	14.0
Condominium .....	.4	1.7	.1	Q	.2	.2	4.7	Q	Q
Not a Condominium	19.3	85.9	36.2	.72	84.8	1.9	37.5	.7	14.0
Rented	2.8	12.4	6.4	.13	14.9	2.3	45.7	1.0	20.0
1987 Family Income									
Less than \$5,000 .....	.7	3.3	2.1	.04	4.9	2.8	56.6	2.0	40.0
\$5,000 to \$9,999	1.4	6.1	4.8	.10	11.2	3.5	69.6	2.5	50.0
\$10,000 to \$14,999	2.1	9.5	6.9	.14	16.1	3.2	64.4	1.5	30.0
\$15,000 to \$19,999	1.5	6.7	3.1	.06	7.2	2.0	40.8	1.0	20.0
\$20,000 to \$24,999	2.1	9.2	5.5	.11	13.0	2.7	53.9	1.0	20.0
\$25,000 to \$34,999	4.0	17.7	7.9	.16	18.4	2.0	39.6	.7	14.0
\$35,000 to \$49,999	4.9	21.8	6.6	.13	15.5	1.3	27.0	.5	10.0
\$50,000 or More	5.8	25.7	5.8	.12	13.6	1.0	20.1	.3	6.0

See footnotes at end of table.

Table 21. Household Wood Consumption for the Year Ending November 1987 (Continued)

Household Characteristics	Number of Households Burning Wood		Total Amount Consumed			Mean Amount Consumed per Household		Median Amount Consumed per Household	
	(million)	(percent)	(million cords)	(quadrillion Btu)	(percent)	(cords)	(million Btu)	(cords)	(million Btu)
Below 100 Percent of Poverty Line	1.7	7.4	5.6	0.11	13.2	3.4	67.9	2.5	50.0
Below 125 Percent of Poverty Line	2.6	11.4	8.5	.17	19.9	3.3	66.4	2.0	40.0
Assistance for Heating in Winter									
Yes	.7	3.0	3.1	.06	7.2	4.5	89.5	4.0	80.0
No	21.8	97.0	39.6	.79	92.8	1.8	36.4	.7	14.0
Assistance for Weatherization of Residence									
Yes	.2	.9	.9	.02	2.1	4.7	94.4	Q	Q
No	22.3	99.1	41.7	.83	97.9	1.9	37.5	.7	14.0
Household Owns or Has Regular Use of a Vehicle									
Yes	21.8	96.8	40.6	.81	95.3	1.9	37.3	.7	14.0
No	.7	3.2	2.0	.04	4.7	2.8	56.8	2.0	40.0
Race of Householder									
White	21.0	93.5	39.9	.80	93.7	1.9	38.1	.7	14.0
Black	1.1	4.9	2.0	.04	4.8	1.9	37.1	1.0	20.0
Other	.4	1.6	.7	.01	1.5	1.8	35.5	Q	Q
Householder of Hispanic Descent									
Yes	.7	3.1	.9	.02	2.0	1.3	25.1	.3	6.0
No	21.8	96.9	41.8	.84	98.0	1.9	38.4	.7	14.0
Age of Householder									
Under 25 Years	.6	2.6	1.7	.03	3.9	2.8	56.1	1.5	30.0
25 to 34 Years	4.9	21.9	8.2	.16	19.3	1.7	33.5	.5	10.0
35 to 44 Years	5.8	26.0	11.0	.22	25.7	1.9	37.5	.5	10.0
45 to 59 Years	6.1	27.1	10.7	.21	25.1	1.8	35.2	.7	14.0
60 Years and Over	5.0	22.4	11.1	.22	26.0	2.2	44.1	1.0	20.0
Household Size									
1 Person	2.8	12.3	4.1	.08	9.6	1.5	29.6	.5	10.0
2 Persons	8.0	35.5	14.8	.30	34.7	1.9	37.1	.7	14.0
3 Persons	4.0	17.9	8.2	.16	19.3	2.0	41.0	.7	14.0
4 Persons	4.4	19.8	8.5	.17	19.9	1.9	38.2	1.0	20.0
5 Persons	2.4	10.5	4.2	.08	9.9	1.8	35.9	1.0	20.0
6 or More Persons	.9	4.0	2.8	.06	6.6	3.1	62.2	.7	14.0
Secondary Heating									
Yes	21.3	94.8	37.1	.74	86.9	1.7	34.8	.7	14.0
Over 35 Percent of Home's Total Heat									
Yes	2.3	10.2	7.8	.15	17.8	3.3	66.1	2.0	40.0
No	1.2	5.2	5.6	.11	13.1	4.8	95.2	4.0	80.0

See footnotes at end of table.

Table 21. Household Wood Consumption for the Year Ending November 1987 (Continued)

Household Characteristics	Number of Households Burning Wood		Total Amount Consumed			Mean Amount Consumed per Household		Median Amount Consumed per Household	
	(million)	(percent)	(million cords)	(quadrillion Btu)	(percent)	(cords)	(million Btu)	(cords)	(million Btu)
Main Heating Fuel									
Natural Gas	9.1	40.4	6.9	0.14	16.3	0.8	15.3	0.3	6.0
Fuel Oil or Kerosene	2.7	12.2	5.7	.11	13.3	2.1	41.6	.5	10.0
Electricity	4.3	19.2	4.2	.08	9.8	1.0	19.4	.5	10.0
Wood	5.0	22.4	23.5	.47	55.1	4.7	93.4	4.0	80.0
Fireplace .....	.3	1.2	.8	.02	1.8	2.8	55.5	Q	Q
Airtight Stove	3.9	17.2	17.7	.35	41.4	4.6	91.4	3.5	70.0
Nonairtight Stove .....	.2	.9	1.1	.02	2.7	5.7	114.3	Q	Q
Furnace/Other .....	.7	3.1	3.9	.08	9.2	5.6	112.9	5.0	100.0
LPG	1.0	4.6	2.1	.04	4.8	2.0	39.7	1.0	20.0
Other .....	.3	1.3	.3	.01	.7	1.1	22.7	Q	Q
Amount of Wood Burned									
Less than 0.5 Cord	8.6	38.4	1.6	.03	3.8	.2	3.8	.1	2.0
0.5 to 1.4 Cords	5.5	24.3	4.1	.08	9.7	.8	15.1	.7	14.0
1.5 to 2.4 Cords	2.8	12.7	5.3	.11	12.4	1.9	37.1	2.0	40.0
2.5 to 3.4 Cords	1.6	7.2	4.7	.09	11.0	2.9	58.0	3.0	60.0
3.5 to 4.4 Cords .....	.9	3.9	3.4	.07	8.1	3.9	78.5	4.0	80.0
4.5 Cords or More	3.0	13.6	23.5	.47	55.1	7.7	154.3	6.0	120.0

^Q Data withheld because fewer than 10 households were sampled, or, if the statistic is a median, fewer than 25 households were sampled. See Appendix C for a method for calculating RSE's for statistics in this table.

Notes: • Because of rounding, data may not sum to totals. • Percentages are calculated on unrounded numbers. • Relative Standard Error (RSE) row and column factors were not calculated on any table that presented a median value. • 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, Forms EIA-457 A, B, C of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

ENERGY PRICES

Table 22. Household Average Energy Prices, 1987
(Dollars per Million Btu)

Household Characteristics	Average Energy Prices					RSE Row Factors
	All Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
	0.825	0.789	0.661	0.907	2.563	
Total U.S. Households	10.71	5.41	22.34	5.89	8.91	1.37
Census Region and Division						
Northeast	10.26	6.45	27.78	5.79	13.24	1.76
New England	10.09	6.75	26.16	5.91	11.93	2.00
Middle Atlantic	10.30	6.40	28.24	5.74	14.48	2.29
Midwest	9.18	4.93	23.09	5.97	7.58	2.18
East North Central	9.17	5.01	23.77	6.01	8.18	2.47
West North Central	9.19	4.69	21.60	5.74	6.52	3.38
South	12.82	5.53	20.61	6.29	9.56	2.75
South Atlantic	13.93	6.50	21.57	6.24	11.15	2.99
East South Central	11.79	4.92	17.50	6.53	9.14	2.87
West South Central	11.77	4.81	21.31	Q	6.96	5.92
West	10.53	5.05	20.76	6.11	9.30	4.92
Mountain	9.12	4.54	21.26	5.54	6.41	10.95
Pacific	11.21	5.34	20.58	6.27	11.35	4.49
Metropolitan Status						
Metropolitan	10.62	5.47	23.03	5.85	9.72	1.57
Central City	9.89	5.48	23.25	5.57	11.57	2.67
Outside Central City	11.14	5.47	22.91	6.00	9.45	1.85
Nonmetropolitan	11.06	5.10	20.27	6.04	8.34	2.45
Climate Zone						
Under 2,000 HDD and--						
Over 7,000 HDD	9.33	5.02	20.70	5.81	8.03	3.45
5,500 to 7,000 HDD	9.18	5.07	23.76	6.00	8.99	2.42
4,000 to 5,499 HDD	10.67	6.07	25.20	5.73	8.09	2.84
Under 4,000 HDD	12.03	5.63	21.82	6.52	9.55	2.30
2,000 CDD or More and --						
Under 4,000 HDD	14.49	5.42	21.99	7.90	10.66	5.05
Payment Method for Utilities						
All Paid by Household	10.94	5.36	22.01	6.09	8.89	1.54
Some Paid, Some in Rent	9.74	5.90	27.74	5.12	10.78	5.27
All Included in Rent	8.27	5.22	21.39	4.69	8.40	4.11
Other Method	10.27	5.70	24.94	6.10	Q	4.64
Housing Structure by Status of Unit						
Single-Family Detached						
Owned	10.71	5.30	21.92	6.04	8.65	1.62
Rented	10.79	5.31	21.94	6.03	8.66	1.63
Single-Family Attached						
Owned	11.47	5.98	23.81	6.19	8.60	2.60
Rented	11.27	6.08	24.72	6.35	Q	4.98
Building of 2 to 4 Units						
Owned	12.15	5.58	21.73	6.58	Q	5.79
Rented	9.89	5.65	24.98	6.01	3.16	7.18
Building of 5 or More Units						
Owned	9.57	5.73	27.46	6.05	Q	4.70
Rented	9.73	5.62	23.93	6.00	Q	2.93
Mobile Home						
Owned	10.60	5.56	23.58	4.70	Q	2.89
Rented	12.64	5.53	26.14	4.78	NC	12.85
Other						
Owned	10.45	5.56	23.35	4.68	Q	2.97
Rented	12.40	5.19	20.93	6.48	9.86	3.25
Mobile Home						
Owned	12.48	5.15	20.74	6.56	9.76	3.79
Rented	11.96	5.98	22.15	6.25	10.35	4.36

See footnotes at end of table.

Table 22. Household Average Energy Prices, 1987 (Continued)
(Dollars per Million Btu)

Household Characteristics	Average Energy Prices					RSE Row Factors
	All Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
RSE Column Factors:	0.825	0.783	0.661	0.907	2.583	
Number of Rooms						
1	10.47	5.72	25.69	5.27	Q	16.57
2	9.34	5.03	23.52	4.72	9.45	6.46
3	10.98	5.52	22.99	5.10	9.96	3.02
4	10.90	5.47	22.11	5.80	9.78	2.35
5	10.67	5.37	22.03	6.02	8.47	1.75
6	10.76	5.38	22.63	6.00	9.02	1.96
7	10.77	5.46	22.40	5.98	8.61	1.98
8 or More	10.50	5.39	22.13	6.11	7.67	2.20
Number of Rooms That Can Be Air Conditioned						
All	12.03	5.33	21.76	5.91	8.76	1.64
Some	9.90	5.62	24.23	5.96	7.92	1.75
None	9.58	5.38	22.44	5.83	9.53	1.88
Measured Heated Area of Residence (square feet)						
Fewer than 600	10.70	5.59	24.46	5.27	10.39	2.53
600 to 999	10.69	5.42	22.51	5.68	9.67	2.01
1,000 to 1,599	11.27	5.39	21.67	6.04	8.32	2.01
1,600 to 1,999	10.88	5.47	22.31	6.10	9.01	1.74
2,000 to 2,399	10.46	5.42	22.60	6.10	10.28	2.59
2,400 to 2,999	9.99	5.37	22.61	5.92	8.25	2.90
3,000 or More	10.21	5.29	22.39	5.91	7.02	2.43
Year of Construction						
1939 or Before	9.18	5.53	24.27	5.91	8.41	2.14
1940 to 1949	10.05	5.60	22.65	5.71	9.55	2.37
1950 to 1959	10.22	5.33	22.97	5.97	9.49	2.32
1960 to 1969	10.64	5.50	22.18	5.63	8.53	2.10
1970 to 1974	11.14	5.18	21.77	6.01	9.62	2.86
1975 to 1979	13.13	5.00	21.20	6.17	8.40	2.53
1980 to 1984	13.81	5.34	20.94	6.14	8.28	4.06
1985 or After	14.76	5.24	21.74	6.10	9.65	4.97
Status of Unit						
Owned	10.87	5.38	22.17	6.06	8.88	1.58
Condominium	12.82	5.04	24.21	Q	NC	10.88
Not a Condominium	10.84	5.39	22.13	6.06	8.88	1.58
Rented	10.28	5.48	22.83	5.44	9.05	1.93
Public Housing	9.38	5.67	21.06	4.78	Q	7.27
Not Public Housing	10.34	5.47	22.96	5.51	9.04	2.17
Rent Subsidy	10.60	6.20	24.42	4.92	Q	5.58
No Rent Subsidy	10.33	5.43	22.89	5.54	9.05	2.31
1987 Family Income						
Less than \$5,000	9.91	5.40	22.58	5.77	9.47	3.06
\$5,000 to \$9,999	9.81	5.33	22.10	5.76	9.30	2.22
\$10,000 to \$14,999	10.18	5.38	22.36	5.88	8.47	2.21
\$15,000 to \$19,999	10.47	5.40	22.24	5.99	9.21	2.39
\$20,000 to \$24,999	10.84	5.25	21.87	5.99	8.43	2.31
\$25,000 to \$34,999	11.05	5.46	22.09	5.82	9.17	2.00
\$35,000 to \$49,999	11.20	5.43	22.14	5.90	8.30	2.09
\$50,000 or More	11.16	5.51	23.11	5.96	8.92	1.86

See footnotes at end of table.

Table 22. Household Average Energy Prices, 1987 (Continued)
(Dollars per Million Btu)

Household Characteristics	Average Energy Prices					RSE Row Factors
	All Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
RSE Column Factors:	0.825	0.783	0.661	0.907	2.583	
Below 100 Percent of Poverty Line	10.12	5.43	22.34	5.75	8.51	2.57
Below 125 Percent of Poverty Line	10.12	5.40	22.34	5.78	8.93	2.14
Assistance for Heating in Winter						
Yes	9.46	5.42	22.88	5.95	7.70	2.89
No	10.78	5.41	22.32	5.89	9.08	1.38
Assistance for Weatherization of Residence						
Yes	9.30	5.38	22.68	6.14	Q	4.91
No	10.72	5.41	22.34	5.89	8.91	1.38
Household Owns or Has Regular Use of a Vehicle						
Yes	10.89	5.35	22.13	6.00	8.79	1.42
No	9.31	5.81	25.17	5.37	10.28	2.19
Race of Householder						
White	10.84	5.33	22.17	5.93	8.92	1.49
Black	9.95	5.87	23.30	5.75	9.67	2.68
Other	10.26	5.29	24.81	5.31	7.50	6.16
Householder of Hispanic Descent						
Yes	11.19	5.46	24.73	5.34	7.50	3.61
No	10.68	5.41	22.22	5.92	8.96	1.37
Age of Householder						
Under 25 Years	10.87	5.34	22.00	6.00	11.08	3.45
25 to 34 Years	10.82	5.39	22.46	5.79	8.72	1.75
35 to 44 Years	11.16	5.33	22.22	5.96	8.64	2.13
45 to 59 Years	10.95	5.41	22.16	6.01	8.83	1.80
60 Years and Over	10.06	5.51	22.61	5.81	8.95	1.83
Household Size						
1 Person	9.70	5.32	22.53	5.73	8.93	2.27
2 Persons	10.83	5.40	22.23	5.87	8.90	1.43
3 Persons	11.02	5.45	22.11	6.06	9.13	1.76
4 Persons	10.96	5.40	22.19	5.85	8.88	2.19
5 Persons	11.11	5.55	22.75	6.02	8.72	2.36
6 or More Persons	11.07	5.54	23.33	5.97	8.65	3.44
Secondary Heating						
Yes	11.17	5.33	21.48	6.02	8.99	1.67
Over 33 Percent of Home's Total Heat	12.26	5.24	20.83	6.13	9.86	3.36
No	10.35	5.47	23.21	5.78	8.80	1.57

See footnotes at end of table.

Table 22. Household Average Energy Prices, 1987 (Continued)
(Dollars per Million Btu)

Household Characteristics RSE Column Factors:	Average Energy Prices					RSE Row Factors
	All Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
	0.825	0.783	0.661	0.907	2.583	
Fuel Combinations						
Use Natural Gas for Main Heat	9.10	5.34	23.53	6.43	Q	2.24
Use Natural Gas to Heat Water and Have A/C	9.41	5.34	23.88	5.93	Q	2.61
and Lack A/C	8.15	5.31	24.76	6.59	NC	3.69
Use Electricity to Heat Water and Have A/C	10.86	5.64	20.37	8.42	Q	4.32
and Lack A/C	9.12	5.33	19.39	Q	NC	4.29
Other	11.47	5.95	26.00	Q	Q	7.90
Use Electricity for Main Heat	19.13	5.95	20.15	7.31	12.78	3.88
Use Electricity to Heat Water and Have A/C	20.04	8.65	20.33	7.01	12.95	5.03
and Lack A/C	17.64	Q	17.91	8.25	Q	6.84
Other	15.43	5.65	22.62	Q	Q	6.28
Use Fuel Oil for Main Heat	9.76	9.33	25.49	5.79	14.29	3.24
Use Fuel Oil to Heat Water and Have A/C	9.61	11.00	31.84	5.73	17.82	3.91
and Lack A/C	8.45	13.05	30.30	5.60	16.93	3.69
Use Electricity to Heat Water and Have A/C	10.88	Q	21.75	5.89	16.73	5.30
and Lack A/C	10.52	Q	20.97	5.82	15.73	4.86
Other	9.86	8.12	28.85	6.11	12.15	3.28
Use Wood for Main Heat	14.90	5.49	20.28	6.07	10.00	3.23
Use LPG for Main Heat	12.58	NC	21.99	7.41	8.18	3.48
Use Kerosene for Main Heat	12.74	Q	21.06	6.85	13.47	3.52
Use Coal for Main Heat	17.37	Q	19.92	Q	Q	10.94
No Heating Fuel/Other Fuel	23.07	5.63	29.64	Q	16.39	6.20

NC No cases in sample.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • 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, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Energy End Use Tables

END-USE EXPENDITURES

Table 23. Expenditures for Energy End Use per Household, 1987

Household Characteristics	Number of Households (million)	Total Expenditures (dollars)	End-Use Expenditures					RSE Row Factors
			Space Heating (dollars)	Water Heating (dollars)	Appliances (dollars)	Air Conditioning (dollars)		
RSE Column Factors:	1.343	0.845	1.005	0.825	0.719	1.939		
Total U.S. Households	90.5	1,080	350	154	467	109	1.54	
Census Region and Division								
Northeast	19.0	1,276	520	179	517	60	3.56	
New England	4.3	1,222	518	194	480	30	4.73	
Middle Atlantic	14.8	1,292	521	174	528	68	3.40	
Midwest	22.3	1,124	427	136	469	93	3.09	
East North Central	15.9	1,149	454	142	473	79	3.45	
West North Central	6.4	1,064	360	120	456	128	3.85	
South	30.9	1,081	277	182	456	186	2.95	
South Atlantic	15.6	1,128	309	184	462	172	3.78	
East South Central	6.1	992	291	156	392	152	4.31	
West South Central	9.2	1,060	212	129	487	231	5.32	
West	18.3	819	203	135	434	48	3.51	
Mountain	4.4	944	286	122	463	73	5.48	
Pacific	13.9	779	176	139	424	40	3.54	
Metropolitan Status								
Metropolitan	70.2	1,093	351	150	477	115	1.75	
Central City	29.6	1,001	340	137	423	101	2.93	
Outside Central City	40.6	1,160	359	159	516	126	2.20	
Nonmetropolitan	20.3	1,035	347	168	435	85	3.53	
Climate Zone								
Under 2,000 CDD and--	8.5	1,030	427	160	412	30	5.33	
Over 7,000 HDD	25.9	1,156	458	147	484	68	3.23	
5,500 to 7,000 HDD	21.9	1,138	415	156	464	103	4.02	
4,000 to 5,499 HDD	17.8	931	235	158	446	92	4.31	
Under 4,000 HDD	16.3	1,068	177	152	499	239	4.64	
2,000 CDD or More and --								
Under 4,000 HDD								
Housing Structure by Status of Unit								
Single-Family Detached	55.2	1,226	391	167	542	127	1.79	
Owned	47.7	1,257	400	166	558	134	1.89	
Rented	7.4	1,027	331	174	442	79	4.02	
Single-Family Attached	5.3	1,135	404	148	472	111	7.55	
Owned	3.9	1,180	434	149	497	100	8.03	
Rented	1.5	1,017	325	146	406	140	12.84	
Building of 2 to 4 Units	10.1	905	338	131	376	60	4.18	
Owned	2.0	1,159	452	130	499	78	8.93	
Rented	8.1	842	310	131	346	55	4.22	
Building of 5 or More Units	14.9	681	206	114	276	85	4.28	
Owned	1.0	848	215	107	416	110	16.94	
Rented	13.9	669	206	114	266	83	4.42	
Mobile Home	5.1	948	297	180	397	74	5.20	
Owned	4.3	960	298	178	408	77	5.86	
Rented	.9	887	296	189	342	61	10.20	
Number of Rooms								
1	.7	546	205	97	194	49	20.74	
2	2.4	508	178	96	199	35	8.64	
3	9.8	659	261	116	261	67	4.69	
4	17.7	840	270	140	354	77	2.86	
5	20.9	1,028	319	158	453	98	2.27	
6	17.4	1,214	381	165	536	132	2.44	
7	11.2	1,374	454	172	610	138	3.11	
8 or More	10.4	1,614	561	183	698	172	3.23	

See footnotes at end of table.

END-USE EXPENDITURES

Table 23. Expenditures for Energy End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	Total Expenditures (dollars)	End-Use Expenditures				RSE Row Factors
			Space Heating (dollars)	Water Heating (dollars)	Appliances (dollars)	Air Conditioning (dollars)	
			1,005	0.825	0.718	1,939	
RSE Column Factors:							
	1.343	0.645					
Measured Heated Area of Residence (square feet)							
Fewer than 600	8.4	675	210	130	290	46	
600 to 999	23.9	825	260	138	349	78	
1,000 to 1,599	25.6	1,046	315	159	461	112	
1,600 to 1,999	11.3	1,238	409	157	538	134	
2,000 to 2,999	8.4	1,358	455	168	598	137	
3,000 or More	7.7	1,448	518	171	625	133	
	5.3	1,724	610	186	732	197	
Year of Construction							
1939 or Before	21.5	1,105	452	152	446	55	
1940 to 1949	8.2	1,042	357	152	450	82	
1950 to 1959	13.1	1,121	360	152	498	111	
1960 to 1969	16.4	1,060	324	145	459	133	
1970 to 1974	9.6	1,062	320	154	468	120	
1975 to 1979	10.5	1,131	310	158	500	163	
1980 to 1984	7.4	984	230	162	463	130	
1985 or After	3.9	1,049	258	183	472	137	
1987 Family Income							
Less than \$5,000	6.2	818	312	135	316	55	
\$5,000 to \$9,999	11.5	881	324	139	354	63	
\$10,000 to \$14,999	12.6	927	319	145	388	75	
\$15,000 to \$19,999	9.0	967	323	148	414	83	
\$20,000 to \$24,999	8.8	1,038	330	152	452	105	
\$25,000 to \$34,999	16.2	1,091	341	153	475	121	
\$35,000 to \$49,999	13.4	1,257	374	171	570	142	
\$50,000 or More	12.9	1,440	440	171	650	179	
	5.0	977	250	160	457	111	
	85.5	1,086	356	153	468	108	
Age of Householder							
Under 25 Years	6.5	836	268	144	339	86	
25 to 34 Years	21.5	1,016	310	159	442	104	
35 to 44 Years	18.0	1,180	342	173	544	121	
45 to 59 Years	18.9	1,235	383	163	558	131	
60 Years and Over	25.7	1,010	385	131	401	93	
Householder of Hispanic Descent							
Yes	5.0	977	250	160	457	111	
No	85.5	1,086	356	153	468	108	
Age of Householder							
Under 25 Years	6.5	836	268	144	339	86	
25 to 34 Years	21.5	1,016	310	159	442	104	
35 to 44 Years	18.0	1,180	342	173	544	121	
45 to 59 Years	18.9	1,235	383	163	558	131	
60 Years and Over	25.7	1,010	385	131	401	93	
Household Size							
1 Person	21.6	769	322	94	289	65	
2 Persons	30.7	1,040	345	140	443	111	
3 Persons	15.4	1,188	361	176	525	127	
4 Persons	13.6	1,324	381	200	601	143	
5 Persons	6.1	1,369	358	223	652	136	
6 or More Persons	3.1	1,452	389	253	715	96	

See footnotes at end of table.

Table 23. Expenditures for Energy End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	Total Expenditures (dollars)	End-Use Expenditures				RSE Row Factors
			Space Heating (dollars)	Water Heating (dollars)	Appliances (dollars)	Air Conditioning (dollars)	
RSE Column Factors:	1.343	0.645	1.005	0.825	0.718	1.939	
Main Heating Fuel							
Natural Gas	50.0	1,073	366	127	470	110	2.06
Electricity	17.9	1,038	290	171	417	160	3.96
Fuel Oil or Kerosene	12.2	1,260	479	206	515	60	3.92
LPG	4.1	1,163	430	180	462	90	6.21
Secondary Heating							
Yes	37.4	1,195	374	168	530	123	2.09
Over 33 Percent of Home's Total Heat	3.2	1,127	301	194	542	91	6.70
No	53.2	999	333	144	423	98	1.77

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • Electricity consumption is based on site electricity. No adjustment is made for primary fuels consumed to produce electricity. • Energy expenditures include natural gas, electricity, fuel oil, kerosene and LPG. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, D, E, F, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 24. Natural Gas Consumption and Expenditures by End Use per Household, 1987

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.309	0.799	0.834	0.982	1.003	0.742	0.845	1.305	1.424	
Total U.S. Households Using Natural Gas	57.3	84.3	456	59.0	315	19.2	105	5.9	35	2.47
Census Region and Division										
Northeast	11.7	88.5	571	62.8	391	18.4	122	7.3	58	7.04
New England	1.7	86.8	586	60.0	396	20.3	141	6.6	49	7.43
Middle Atlantic	10.0	88.8	568	63.3	391	18.1	119	7.4	59	8.19
Midwest	17.1	106.8	526	82.4	405	19.2	95	5.1	25	3.22
East North Central	12.2	110.5	553	85.2	427	19.8	100	5.4	27	4.19
West North Central	4.9	97.5	457	75.2	352	17.8	84	4.5	21	4.50
South	15.1	72.3	400	49.1	273	17.5	96	5.1	29	5.91
South Atlantic	5.9	77.0	501	56.4	365	16.4	108	4.2	28	8.50
East South Central	2.5	76.1	374	55.8	274	15.6	77	4.6	24	13.74
West South Central	6.8	66.9	322	40.4	193	19.2	93	6.2	31	8.02
West	13.4	65.5	331	37.0	180	21.7	113	6.4	36	3.34
Mountain	3.5	90.2	410	63.9	283	21.0	99	4.4	23	5.75
Pacific	9.9	56.8	303	27.6	144	22.0	118	7.1	41	3.90
Metropolitan Status										
Metropolitan	48.7	83.6	457	57.4	310	19.7	109	6.2	38	2.70
Central City	23.3	81.9	449	56.2	302	19.0	105	6.3	40	3.53
Outside Central City	25.4	85.1	465	58.6	317	20.4	113	6.1	36	3.18
Nonmetropolitan	8.6	88.3	450	68.0	345	16.2	83	4.1	22	5.78
Climate Zone										
Under 2,000 CDD and--										
Over 7,000 HDD	4.2	100.1	503	80.7	405	16.2	81	3.2	17	5.23
5,500 to 7,000 HDD	19.1	109.5	555	82.8	416	20.7	107	5.8	31	3.38
4,000 to 5,499 HDD	13.1	83.1	505	58.7	348	17.9	109	6.5	48	6.85
Under 4,000 HDD	12.2	59.7	336	32.9	187	20.5	112	6.3	36	5.02
2,000 CDD or More and --										
Under 4,000 HDD	8.8	58.1	315	33.9	182	17.5	97	5.8	33	7.85
Housing Structure by Status of Unit										
Single-Family Detached	33.6	98.2	521	70.1	369	21.4	115	6.6	37	2.57
Owned	28.9	99.2	527	71.3	376	21.1	113	6.6	37	2.75
Rented	4.7	92.2	484	62.5	325	23.2	122	6.4	35	4.87
Single-Family Attached	3.5	82.8	495	58.3	342	18.6	114	5.9	39	9.56
Owned	2.6	87.2	531	62.0	369	19.0	119	6.2	43	10.23
Rented	.9	69.9	390	47.4	263	17.5	98	5.0	29	17.13
Building of 2 to 4 Units	8.0	76.4	431	52.4	288	17.9	103	5.9	40	4.38
Owned	1.7	89.8	515	65.1	359	17.5	105	7.2	50	8.99
Rented	6.3	72.8	409	49.1	269	18.0	103	5.6	37	4.64
Building of 5 or More Units	10.5	48.5	269	30.2	162	14.2	79	3.5	25	8.83
Owned	.6	48.6	269	30.3	162	14.0	83	4.3	29	32.25
Rented	9.8	48.5	269	30.1	163	14.2	78	3.4	25	8.85
Mobile Home	1.7	71.1	369	50.5	262	14.3	72	6.2	35	9.71
Owned	1.4	72.1	372	51.0	262	14.7	74	6.4	36	10.89
Rented	.3	65.8	354	48.1	261	12.5	64	5.2	29	13.37
Measured Heated Area of Residence (square feet)										
Fewer than 600	5.3	48.8	273	29.1	158	15.4	85	4.2	30	6.86
600 to 999	15.4	65.4	355	43.5	232	16.7	91	4.9	30	4.03
1,000 to 1,599	14.9	78.5	423	53.8	287	18.9	103	5.6	33	3.12
1,600 to 1,999	7.2	95.7	524	69.0	373	20.0	112	6.6	39	4.28
2,000 to 2,399	5.9	106.0	574	76.0	408	22.9	125	7.1	42	4.60
2,400 to 2,999	5.3	121.2	652	90.0	481	22.7	124	7.8	44	5.34
3,000 or More	3.3	132.3	700	100.7	522	24.0	133	7.4	44	5.45

See footnotes at end of table.

Table 24. Natural Gas Consumption and Expenditures by End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.309	0.799	0.834	0.982	1.003	0.742	0.845	1.305	1.424	
Year of Construction										
1939 or Before	15.7	97.4	539	72.6	391	18.7	107	6.1	41	4.44
1940 to 1949	6.0	80.1	449	56.1	310	17.4	98	6.6	41	4.67
1950 to 1959	9.1	86.1	459	59.0	311	20.3	109	6.3	36	3.79
1960 to 1969	11.9	77.7	427	52.5	287	18.9	105	5.7	32	4.58
1970 to 1974	5.8	83.7	433	57.0	292	20.8	109	5.8	32	6.37
1975 to 1979	4.7	72.2	361	49.1	244	18.7	94	4.5	23	9.29
1980 to 1984	3.0	65.5	350	42.4	224	18.9	101	4.3	25	11.80
1985 or After	1.2	82.0	430	50.7	262	23.9	127	7.5	41	12.26
1987 Family Income										
Less than \$5,000	3.8	78.0	421	56.0	300	17.4	94	4.6	27	7.01
\$5,000 to \$9,999	7.4	77.5	413	55.0	287	17.0	91	5.2	32	4.49
\$10,000 to \$14,999	8.0	77.4	416	54.7	289	17.2	94	5.3	33	4.44
\$15,000 to \$19,999	5.6	78.8	426	55.5	295	17.4	95	5.4	33	5.06
\$20,000 to \$24,999	5.3	79.3	416	55.8	290	17.8	93	5.7	32	4.26
\$25,000 to \$34,999	9.9	81.7	446	57.2	308	19.0	105	5.5	33	4.27
\$35,000 to \$49,999	8.3	93.7	509	65.2	351	22.0	121	6.3	37	4.47
\$50,000 or More	9.0	99.3	547	67.8	369	23.1	130	7.9	47	4.53
Below 100 Percent of Poverty Line	7.4	80.8	438	53.9	288	20.4	112	6.3	38	5.00
Below 125 Percent of Poverty Line	11.5	80.6	435	55.2	293	19.5	106	5.8	35	4.18
Race of Householder										
White	46.6	84.7	452	60.2	317	18.7	101	5.6	33	2.71
Black	8.5	87.5	514	58.0	334	21.8	129	7.6	50	4.85
Other	2.2	62.8	332	37.4	190	19.1	103	6.0	37	6.88
Householder of Hispanic Descent										
Yes	3.7	62.5	341	36.3	192	19.7	108	6.4	41	6.13
No	53.6	85.8	464	60.6	323	19.2	105	5.8	35	2.58
Age of Householder										
Under 25 Years	4.1	67.4	360	44.4	235	18.0	97	4.4	25	7.11
25 to 34 Years	13.9	79.5	429	53.3	283	20.1	109	5.9	36	3.96
35 to 44 Years	10.7	89.4	476	58.8	314	22.8	122	6.8	40	3.39
45 to 59 Years	11.7	94.6	512	66.3	353	21.0	116	7.0	41	3.18
60 Years and Over	16.8	82.0	452	61.8	335	15.2	85	4.8	30	3.94
Household Size										
1 Person	14.3	69.1	368	53.6	282	12.2	65	3.0	19	4.86
2 Persons	18.7	80.5	435	58.6	312	16.8	91	5.1	31	3.05
3 Persons	9.7	87.9	479	59.3	318	21.5	118	7.1	42	3.27
4 Persons	8.5	100.6	543	66.1	353	26.0	142	8.0	46	4.17
5 Persons	4.1	100.9	560	62.4	340	28.2	158	9.9	60	5.25
6 or More Persons	2.0	107.6	597	63.7	345	33.5	190	9.8	59	6.74
All Gas Paid by Household										
Yes	44.3	91.1	490	64.6	343	20.0	108	6.3	38	2.76
Budget Plan	7.6	119.7	652	90.7	493	22.8	125	6.2	34	3.82
No Budget Plan	36.6	85.1	456	59.2	312	19.4	105	6.3	38	2.91
No	13.1	61.4	343	40.0	219	16.4	94	4.3	27	5.49

See footnotes at end of table.

Table 24. Natural Gas Consumption and Expenditures by End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.309	0.789	0.834	0.982	1.003	0.742	0.845	1.305	1.424	
Secondary Heating										
Yes	20.9	90.4	481	63.4	335	20.5	110	6.2	36	3.27
Over 33 Percent of Home's Total Heat	1.2	72.6	380	42.2	216	23.4	124	7.1	40	8.28
No	36.4	80.8	442	56.5	303	18.4	102	5.7	35	3.02

^a Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because the small amount of natural gas that is used for air conditioning is omitted and because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, F of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 25. Electricity Consumption and Expenditures by End Use per Household, 1987

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		Air Conditioning		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	0.835	0.610	0.564	2.371	2.295	1.463	1.473	0.443	0.456	1.214	1.210	
Total U.S. Households Using Electricity	90.5	30.5	680	3.1	61	3.5	71	19.0	440	4.8	108	2.54
Census Region and Division												
Northeast	19.0	23.3	648	2.5	59	2.2	54	16.6	475	2.0	60	5.43
New England	4.3	22.9	600	2.3	54	2.6	66	16.9	451	1.2	30	9.66
Middle Atlantic	14.8	23.4	661	2.6	60	2.1	50	16.5	483	2.3	68	5.57
Midwest	22.3	27.4	633	2.0	39	2.7	55	18.8	446	3.9	93	6.28
East North Central	15.9	26.4	628	2.1	41	2.9	59	18.4	450	3.1	79	7.55
West North Central	6.4	29.8	644	1.8	33	2.3	47	19.9	436	5.8	128	5.95
South	30.9	39.5	813	4.4	84	5.3	108	20.9	435	8.9	185	4.01
South Atlantic	15.6	38.9	840	4.4	90	6.3	136	20.4	442	7.9	172	5.53
East South Central	6.1	43.7	765	6.8	114	6.9	120	21.4	378	8.7	152	5.57
West South Central	9.2	37.5	800	2.7	55	2.6	55	21.4	462	10.8	228	8.83
West	18.3	26.4	548	3.0	51	2.7	46	18.7	404	2.0	46	5.42
Mountain	4.4	27.8	591	2.1	40	2.1	40	20.6	442	2.9	69	9.69
Pacific	13.9	26.0	534	3.3	55	2.8	48	18.1	392	1.7	39	5.80
Metropolitan Status												
Metropolitan	70.2	29.4	678	2.9	58	2.8	58	18.7	447	5.0	115	2.89
Central City	29.6	24.9	578	2.3	46	2.1	43	16.0	391	4.4	99	4.45
Outside Central City	40.6	32.7	750	3.3	67	3.3	70	20.7	488	5.5	126	3.53
Nonmetropolitan	20.3	34.0	690	4.0	71	5.8	116	20.1	417	4.2	85	5.29
Climate Zone												
Under 2,000 CDD and--												
Over 7,000 HDD	8.5	27.2	564	2.2	44	4.7	96	18.9	394	1.5	30	7.20
5,500 to 7,000 HDD	25.9	26.5	629	2.9	54	2.5	50	18.5	457	2.7	67	6.76
4,000 to 5,499 HDD	21.9	30.6	678	4.0	76	3.5	67	18.5	432	4.5	103	5.74
Under 4,000 HDD	17.8	29.4	642	3.1	62	3.6	74	18.4	414	4.3	92	6.33
2,000 CDD or More and --												
Under 4,000 HDD	16.3	39.5	868	2.9	60	4.2	94	21.4	476	11.0	238	5.70
Housing Structure by Status of Unit												
Single-Family Detached	55.1	35.7	782	3.3	63	3.9	79	22.8	514	5.7	127	3.01
Owned	47.7	36.8	808	3.4	66	3.9	79	23.4	529	6.1	134	3.23
Rented	7.4	28.5	619	2.4	43	4.1	83	18.5	414	3.5	78	6.10
Single-Family Attached	5.3	30.2	718	4.8	97	3.1	65	17.6	446	4.6	111	12.37
Owned	3.9	28.9	714	4.3	90	2.8	57	17.9	467	4.0	100	13.73
Rented	1.5	33.6	731	6.3	119	4.1	84	16.9	388	6.3	140	18.05
Building of 2 to 4 Units	10.1	19.6	483	2.2	43	1.8	36	13.1	344	2.4	59	8.59
Owned	2.0	21.0	577	Q	Q	1.1	22	16.4	457	2.6	78	18.07
Rented	8.1	19.2	459	2.5	48	2.0	40	12.4	317	2.4	55	9.36
Building of 5 or More Units	14.9	18.5	436	2.4	52	2.0	43	10.4	258	3.6	83	7.53
Owned	1.0	23.6	616	3.0	71	1.6	38	14.9	397	4.0	110	21.84
Rented	13.9	18.1	424	2.4	51	2.0	43	10.1	248	3.5	81	7.75
Mobile Home	5.1	30.6	641	3.6	67	6.8	143	16.8	358	3.4	74	7.59
Owned	4.3	31.9	661	4.0	73	6.8	141	17.5	370	3.6	77	8.30
Rented	.9	24.5	544	1.5	34	6.8	150	13.5	298	2.8	61	13.95
Measured Heated Area of Residence (square feet)												
Fewer than 600	8.4	16.5	403	1.9	40	2.5	56	10.2	262	1.9	45	8.01
600 to 999	23.9	22.9	515	2.5	49	3.2	67	13.8	323	3.4	77	4.32
1,000 to 1,599	25.6	32.3	701	3.6	68	4.2	84	19.5	438	5.1	111	3.71
1,600 to 1,999	11.2	35.5	791	3.8	75	3.6	72	22.0	510	6.0	134	4.71
2,000 to 2,399	8.4	36.7	831	3.3	66	3.1	64	24.4	563	6.0	137	6.34
2,400 to 2,999	7.7	37.6	851	3.2	62	3.2	66	25.3	591	5.8	132	6.16
3,000 or More	5.3	46.8	1,049	4.0	79	3.7	73	30.5	700	8.7	196	6.68

See footnotes at end of table.

Table 25. Electricity Consumption and Expenditures by End Use per Household, 1987 (Continued)

Household Characteristics	RSE Column Factors	All End Uses		Space Heating		Water Heating		Appliances		Air Conditioning		RSE Row Factors	
		Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)		Expenditures (dollars)
Year of Construction													
1939 or Before	21.5	22.5	545	1.2	25	2.5	54	16.5	412	2.3	55	5.39	
1940 to 1949	8.2	26.2	592	1.5	30	3.1	63	17.8	418	3.8	82	6.51	
1950 to 1959	13.1	29.0	666	1.7	32	2.7	55	19.9	470	4.8	110	5.58	
1960 to 1969	16.4	30.2	670	2.8	52	2.7	55	18.8	432	5.9	130	5.29	
1970 to 1974	9.6	32.6	709	3.9	75	3.8	77	19.4	438	5.4	120	6.54	
1975 to 1979	10.5	41.7	885	7.1	137	5.1	102	22.2	482	7.4	163	8.06	
1980 to 1984	7.4	37.9	793	5.4	106	5.4	110	21.1	448	6.0	130	8.66	
1985 or After	3.9	39.9	868	6.6	139	6.4	137	20.8	455	6.1	137	8.33	
1987 Family Income													
Less than \$5,000	6.2	20.2	457	2.5	48	2.8	61	12.4	294	2.5*	55	8.10	
\$5,000 to \$9,999	11.5	22.7	502	2.5	48	3.2	66	14.1	326	2.8	62	6.11	
\$10,000 to \$14,999	12.6	24.5	548	2.1	40	3.4	72	15.6	362	3.3	74	4.80	
\$15,000 to \$19,999	9.0	26.5	589	2.6	52	3.5	72	16.7	384	3.7	81	5.81	
\$20,000 to \$24,999	8.8	30.9	675	3.4	62	4.1	81	18.7	428	4.7	105	5.23	
\$25,000 to \$34,999	16.2	32.2	711	3.3	66	3.6	73	19.8	451	5.5	121	4.22	
\$35,000 to \$49,999	13.4	38.0	842	3.8	75	3.9	79	23.9	546	6.4	142	4.83	
\$50,000 or More	12.9	40.5	937	4.1	84	3.0	63	25.8	612	7.6	177	4.82	
Below 100 Percent of Poverty Line	11.8	23.6	527	2.6	49	3.5	72	14.8	345	2.7	60	6.20	
Below 125 Percent of Poverty Line	18.2	24.0	535	2.5	47	3.5	72	15.2	353	2.9	63	4.94	
Race of Householder													
White	76.6	31.6	700	3.3	65	3.6	74	19.7	450	4.9	110	2.53	
Black	10.9	25.4	593	2.0	40	2.8	59	15.9	388	4.8	105	7.96	
Other	3.0	20.3	502	2.2	46	1.7	38	14.0	363	2.3	56	11.39	
Householder of Hispanic Descent													
Yes	5.0	25.8	639	1.9	43	2.5	60	16.9	425	4.5	110	9.14	
No	85.5	30.7	683	3.2	62	3.5	72	19.2	441	4.8	108	2.55	
Age of Householder													
Under 25 Years	6.5	24.6	540	3.2	65	3.7	77	13.9	314	3.8	84	7.30	
25 to 34 Years	21.5	29.1	653	3.0	60	3.6	75	17.8	415	4.6	103	3.78	
35 to 44 Years	18.0	35.4	787	3.7	73	3.9	80	22.4	513	5.4	121	3.96	
45 to 59 Years	18.8	36.0	797	3.3	63	3.7	75	23.1	529	5.9	130	4.03	
60 Years and Over	25.7	25.6	578	2.7	51	2.8	58	16.0	377	4.0	92	4.52	
Household Size													
1 Person	21.6	19.3	435	3.0	58	1.9	40	11.6	273	2.8	64	4.82	
2 Persons	30.7	29.9	665	3.2	62	3.4	71	18.3	421	5.0	111	3.39	
3 Persons	15.4	34.8	770	3.3	65	4.2	86	21.6	493	5.6	126	4.11	
4 Persons	13.6	38.6	858	3.3	65	4.4	90	24.6	560	6.4	142	4.45	
5 Persons	6.1	38.8	884	2.6	50	4.5	91	25.8	608	6.0	134	5.93	
6 or More Persons	3.1	39.2	915	2.9	55	4.9	103	27.5	663	3.9	93	9.02	
All Electricity Paid by Householder													
Yes	83.2	31.5	703	3.2	62	3.6	74	19.7	456	5.0	112	2.67	
Budget Plan	1.3	64.3	1,246	23.3	440	9.0	174	24.9	489	7.1	143	7.06	
No Budget Plan	81.9	30.9	694	2.8	55	3.5	72	19.6	455	5.0	111	2.71	
No	7.3	18.9	423	2.6	55	2.0	43	11.3	263	2.9	62	9.96	
All-Electric Home													
Yes	15.0	54.0	1,075	15.9	305	9.1	182	21.1	424	7.9	165	3.88	
No	75.5	25.8	602	.6	13	2.4	49	18.6	443	4.2	97	2.72	

See footnotes at end of table.

Table 25. Electricity Consumption and Expenditures by End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		Air Conditioning		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	0.835	0.610	0.564	2.371	2.295	1.463	1.473	0.443	0.456	1.214	1.210	
Secondary Heating												
Yes	37.4	37.0	795	4.0	77	4.5	90	22.9	505	5.6	123	3.34
Over 33 Percent of Home's Total Heat	3.2	38.8	808	3.7	71	6.5	129	24.4	518	4.2	91	9.35
No	53.2	25.9	600	2.5	50	2.7	58	16.3	394	4.3	98	2.67

^a Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • Electricity consumption is based on site electricity. No adjustment is made for primary fuels consumed to produce electricity. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 26. Fuel Oil or Kerosene Consumption and Expenditures per Household by End Use, 1987

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.389	0.930	0.922	0.917	0.915	
Total U.S. Households Using Fuel Oil or Kerosene	17.4	70.3	414	60.5	359	3.18
Census Region and Division						
Northeast	9.1	96.0	556	78.0	455	3.55
New England	2.6	102.1	604	83.6	496	3.82
Middle Atlantic	6.5	93.6	537	75.8	440	4.59
Midwest	3.1	51.8	309	51.4	307	6.42
East North Central	2.5	54.2	326	53.7	323	6.19
West North Central	.6	41.6	239	41.2	237	22.26
South	4.6	37.0	233	36.2	228	7.70
South Atlantic	3.6	41.1	256	40.0	250	8.26
East South Central	1.0	25.8	168	25.7	168	22.25
West South Central	Q	Q	Q	Q	Q	a
West	.6	31.1	190	29.9	177	25.24
Mountain	.2	Q	Q	Q	Q	28.01
Pacific	.4	32.9	207	31.2	189	22.75
Metropolitan Status						
Metropolitan	12.6	75.9	444	63.6	375	3.62
Central City	5.0	66.9	372	54.7	310	6.90
Outside Central City	7.6	81.8	491	69.5	418	5.02
Nonmetropolitan	4.8	55.4	334	52.4	317	8.68
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD	2.8	74.5	433	68.5	399	6.91
5,500 to 7,000 HDD	5.0	88.2	529	74.8	449	6.43
4,000 to 5,499 HDD	7.1	72.5	415	60.6	352	5.86
Under 4,000 HDD	1.8	29.4	192	28.9	189	13.90
2,000 CDD or More and --						
Under 4,000 HDD	.7	12.6	99	Q	Q	38.54
Housing Structure by Status of Unit						
Single-Family Detached	11.1	71.8	434	63.5	384	3.76
Owned	9.7	74.9	452	65.6	396	3.66
Rented	1.4	50.5	312	48.5	298	12.35
Single-Family Attached	.9	78.1	498	70.7	452	14.13
Owned	.7	84.1	535	75.4	480	15.39
Rented	.2	53.5	352	51.4	339	25.22
Building of 2 to 4 Units	1.7	78.6	473	66.3	398	7.09
Owned	.5	95.2	575	83.1	501	15.53
Rented	1.2	71.5	429	59.1	355	9.05
Building of 5 or More Units	2.5	70.1	329	50.2	238	8.61
Owned	.2	64.5	308	47.1	226	29.53
Rented	2.3	70.5	331	50.4	239	8.76
Mobile Home	1.3	39.7	257	39.7	257	10.24
Owned	1.0	34.8	228	34.8	228	14.40
Rented	.2	62.9	393	62.9	393	18.59
Measured Heated Area of Residence (square feet)						
Fewer than 600	1.7	63.6	335	48.1	256	8.44
600 to 999	4.1	53.3	303	45.4	263	7.54
1,000 to 1,599	4.4	59.7	361	51.5	313	5.77
1,600 to 1,999	2.3	69.2	422	62.5	381	8.23
2,000 to 2,399	1.7	82.8	505	73.0	446	8.69
2,400 to 2,999	2.0	85.1	503	73.3	435	6.39
3,000 or More	1.4	127.7	755	112.8	665	8.69

See footnotes at end of table.

Table 26. Fuel Oil or Kerosene Consumption and Expenditures per Household by End Use, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.389	0.930	0.922	0.917	0.915	
Year of Construction						
1939 or Before	6.1	84.3	498	74.9	445	5.58
1940 to 1949	2.0	63.0	360	54.5	314	9.27
1950 to 1959	2.6	81.1	485	68.6	410	7.80
1960 to 1969	2.7	67.1	378	54.1	309	7.99
1970 to 1974	1.4	50.0	301	43.1	263	12.61
1975 to 1979	1.7	49.4	305	42.5	263	11.83
1980 to 1984 .....	.6	35.2	216	29.8	185	15.26
1985 or After .....	.2	Q	Q	Q	Q	23.79
1987 Family Income						
Less than \$5,000	1.0	54.3	313	45.4	270	16.18
\$5,000 to \$9,999	2.1	72.3	416	63.8	372	8.96
\$10,000 to \$14,999	2.6	60.4	355	54.0	320	8.00
\$15,000 to \$19,999	1.7	67.1	402	57.2	345	9.71
\$20,000 to \$24,999	1.8	62.9	377	54.4	329	7.80
\$25,000 to \$34,999	3.5	62.6	364	54.7	320	7.72
\$35,000 to \$49,999	2.4	79.6	470	66.9	396	7.24
\$50,000 or More	2.2	97.6	582	81.8	489	10.09
Below 100 Percent of Poverty Line						
.....	2.0	55.1	317	46.9	277	9.14
Below 125 Percent of Poverty Line						
.....	3.2	59.7	345	50.7	299	6.99
Race of Householder						
White	14.5	71.4	423	62.2	371	3.37
Black	2.5	63.8	367	52.7	308	10.99
Other .....	.4	68.6	364	48.4	258	11.27
Householder of Hispanic Descent						
Yes .....	.9	74.6	398	56.8	310	10.62
No	16.6	70.0	415	60.7	362	3.22
Age of Householder						
Under 25 Years .....	.8	63.9	384	59.5	360	15.10
25 to 34 Years	3.8	59.7	345	50.3	295	6.32
35 to 44 Years	3.8	64.9	387	53.1	319	6.20
45 to 59 Years	3.7	72.0	433	62.8	379	6.54
60 Years and Over	5.3	81.3	473	71.7	419	5.86
Household Size						
1 Person	3.9	63.7	365	54.8	318	6.60
2 Persons	5.7	73.7	433	65.7	388	5.85
3 Persons	3.2	70.1	425	60.3	367	6.34
4 Persons	2.9	68.8	402	58.4	345	6.97
5 Persons	1.2	72.7	438	55.1	332	9.92
6 or More Persons .....	.6	81.8	488	69.5	416	19.88
Fuel Oil or Kerosene Paid by Household						
Yes	14.0	68.2	416	60.7	370	3.63
Budget Plan	1.4	123.8	755	106.5	650	7.30
No Budget Plan	12.6	61.9	377	55.6	339	3.97
No	3.4	78.6	406	59.7	312	6.79

See footnotes at end of table.

Table 26. Fuel Oil or Kerosene Consumption and Expenditures per Household by End Use, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.389	0.930	0.922	0.917	0.915	
Secondary Heating						
Yes	10.0	54.2	326	48.9	296	4.83
Over 33 Percent of Home's Total Heat	1.3	52.7	323	48.7	300	13.50
No	7.4	92.0	532	76.3	444	4.60

a No applicable RSE row factor.
 b Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.
 Notes: • Includes only households using fuel oil or kerosene. • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 27. Liquefied Petroleum Gas Consumption and Expenditures by End Use per Household, 1987

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.136	0.778	0.643	0.933	0.870	1.383	1.273	1.049	1.173	
Total U.S. Households Using Liquefied Petroleum Gas	7.7	41.1	366	28.9	241	7.3	65	4.8	60	7.62
Census Region and Division										
Northeast	1.1	16.5	218	5.9	68	4.0	50	6.5	101	19.71
New England	.5	18.9	226	Q	Q	6.9	75	5.1	81	15.75
Middle Atlantic	.6	14.7	212	Q	Q	Q	Q	7.6	115	27.96
Midwest	2.3	57.6	436	44.4	331	9.3	71	3.8	34	10.45
East North Central	1.5	55.5	454	43.5	349	8.6	71	3.5	33	15.06
West North Central	.8	61.6	402	46.4	294	10.8	71	4.5	36	11.32
South	3.3	35.8	342	24.7	226	6.3	55	4.8	62	12.12
South Atlantic	1.9	30.5	341	20.1	207	4.7	51	5.7	82	17.21
East South Central	.8	41.3	378	34.1	305	4.3	39	2.9	33	15.68
West South Central	.7	44.0	306	26.8	189	Q	81	4.6	36	30.70
West	1.0	48.5	451	33.1	283	10.2	101	5.2	67	19.10
Mountain	Q	78.7	504	60.4	371	12.2	80	Q	Q	30.02
Pacific	.7	38.1	433	23.7	252	9.5	108	4.9	72	22.68
Metropolitan Status										
Metropolitan	3.5	37.0	360	23.1	210	7.9	72	5.9	78	11.14
Central City	.6	29.7	343	17.5	190	7.8	88	4.3	65	21.42
Outside Central City	2.9	38.4	363	24.2	214	7.9	69	6.2	80	12.43
Nonmetropolitan	4.2	44.5	371	33.8	268	6.8	59	3.9	45	9.46
Climate Zone										
Under 2,000 CDD and--										
Over 7,000 HDD	1.7	48.5	389	36.2	273	7.8	65	4.4	51	19.38
5,500 to 7,000 HDD	1.4	39.4	354	27.5	228	7.1	66	4.9	61	15.92
4,000 to 5,499 HDD	1.4	45.8	371	34.7	269	6.6	51	4.5	51	14.80
Under 4,000 HDD	1.6	46.0	439	30.5	283	9.2	77	6.3	79	17.26
2,000 CDD or More and --										
Under 4,000 HDD	1.6	25.7	274	15.9	155	5.8	63	4.0	56	17.04
Housing Structure by Status of Unit										
Single-Family Detached	5.7	44.4	384	31.2	254	8.5	75	4.7	55	8.33
Owned	4.7	45.8	397	32.6	266	8.5	74	4.8	57	9.10
Rented	1.0	37.6	323	24.7	197	8.9	81	4.0	45	16.03
Mobile Home	1.9	32.8	323	23.5	214	4.0	35	5.3	74	17.03
Owned	1.5	34.4	336	25.0	228	4.0	34	5.4	74	18.47
Rented	.4	26.7	276	18.0	165	Q	Q	4.9	73	26.10
Other	.1	Q	173	Q	Q	Q	Q	Q	Q	47.25
Measured Heated Area of Residence (square feet)										
Fewer than 600	.9	27.9	289	18.4	168	4.2	48	5.3	74	16.85
600 to 999	2.3	32.4	313	21.1	185	6.0	55	5.3	73	11.90
1,000 to 1,599	2.3	48.0	399	34.9	286	9.2	74	3.9	40	12.14
1,600 to 1,999	.8	42.0	379	29.5	259	7.7	68	4.8	52	18.50
2,000 to 2,399	.5	39.9	409	24.5	241	8.2	77	7.2	91	29.63
2,400 to 2,999	.4	52.3	432	41.9	311	6.1	62	4.4	59	20.33
3,000 or More	.3	76.0	534	60.7	406	11.6	91	3.7	36	24.93
Year of Construction										
1939 or Before	1.8	36.9	310	26.5	192	6.2	58	4.2	59	12.98
1940 to 1949	.7	45.2	432	32.4	295	8.7	87	4.2	50	20.42
1950 to 1959	1.0	44.0	418	34.8	319	6.4	62	2.8	37	17.74
1960 to 1969	1.0	38.0	324	27.2	217	5.8	51	5.0	56	17.53
1970 to 1974	1.0	48.0	462	34.0	300	6.3	59	7.7	103	16.77
1975 to 1979	1.0	47.0	395	29.3	238	10.9	84	6.9	74	17.72
1980 to 1984	.8	31.7	262	18.6	149	9.1	71	4.0	41	18.11
1985 or After	.3	41.7	403	33.1	318	Q	Q	3.0	37	28.54

See footnotes at end of table.

Table 27. Liquefied Petroleum Gas Consumption and Expenditures by End Use per Household, 1987 (Continued)

Household Characteristics	Number of Households (million)	All End Uses		Space Heating		Water Heating		Appliances		RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1.136	0.778	0.643	0.933	0.870	1.383	1.273	1.049	1.173	
1987 Family Income										
Less than \$5,000	0.9	35.7	338	26.4	237	5.8	59	3.5	42	15.59
\$5,000 to \$9,999	1.4	31.6	294	20.5	178	6.4	55	4.7	62	15.50
\$10,000 to \$14,999	1.3	45.3	384	33.5	273	7.6	62	4.2	49	17.09
\$15,000 to \$19,999	.7	47.8	440	31.3	256	8.8	73	7.7	111	19.07
\$20,000 to \$24,999	.8	43.7	368	32.9	262	6.6	56	4.1	50	17.45
\$25,000 to \$34,999	1.3	38.7	355	27.1	234	7.5	72	4.1	49	15.56
\$35,000 to \$49,999	.6	44.1	366	29.5	234	10.7	91	4.0	41	18.72
\$50,000 or More	.6	53.1	474	38.0	311	6.4	60	8.8	104	22.85
Below 100 Percent of Poverty Line	1.6	39.8	339	25.9	212	9.2	77	4.7	49	13.32
Below 125 Percent of Poverty Line	2.5	38.2	341	25.3	213	8.3	72	4.6	56	11.10
Race of Householder										
White	6.7	41.5	370	29.9	250	6.9	61	4.7	59	7.83
Black	.8	30.6	296	19.5	178	7.1	73	4.0	44	18.10
Other	.2	61.4	460	Q	Q	19.2	149	12.5	Q	32.71
Householder of Hispanic Descent										
Yes	.2	61.6	462	Q	Q	Q	Q	Q	Q	34.05
No	7.5	40.5	363	28.6	240	7.1	63	4.8	60	7.68
Age of Householder										
Under 25 Years	.4	29.4	326	17.7	160	Q	Q	Q	Q	28.56
25 to 34 Years	1.6	38.4	335	26.0	215	8.1	68	4.4	53	11.98
35 to 44 Years	1.5	37.8	326	20.1	155	9.6	78	8.1	93	16.67
45 to 59 Years	1.8	42.7	377	33.0	278	6.4	58	3.3	41	14.22
60 Years and Over	2.4	45.7	408	35.2	299	6.7	66	3.8	44	10.90
Household Size										
1 Person	1.5	42.1	376	34.1	292	4.5	43	3.5	40	17.41
2 Persons	2.5	39.3	349	28.5	240	7.0	66	3.8	43	8.52
3 Persons	1.3	36.8	336	27.1	232	5.7	49	4.0	55	12.90
4 Persons	1.5	44.3	393	26.6	210	9.9	80	7.7	103	15.55
5 Persons	.5	40.2	350	26.9	227	8.8	73	4.5	51	17.84
6 or More Persons	.4	52.0	450	29.1	224	13.8	119	9.1	107	25.26
All LPG Paid by Household										
Yes	7.3	41.8	371	29.7	248	7.3	64	4.8	60	7.69
Budget Plan	4.0	61.8	504	50.5	414	8.1	62	3.2	28	7.97
No Budget Plan	3.3	17.9	213	4.8	48	6.3	67	6.8	97	13.03
No	.4	27.5	261	14.1	120	8.6	78	4.7	63	28.32
Secondary Heating										
Yes	4.2	43.5	391	31.4	273	7.7	69	4.4	49	9.66
Over 33 Percent of Home's Total Heat	.6	25.8	255	16.2	154	5.9	52	3.8	48	23.65
No	3.5	38.1	336	25.9	204	6.8	59	5.4	73	10.69

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • Includes only households that use LPG. • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, D of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 28. Space-Heating Natural Gas Consumption and Expenditures per Household when Natural Gas was the Main Heating Fuel, 1987

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*square foot)	Expenditures (cents/hdd*1000 square feet)	
				1.669	0.927		0.943	0.773	0.887
RSE Column Factors:						
Total U.S. Households	50.0	66.9	356	10.0	5.3	2.05
Census Region and Division						
Northeast	8.1	89.5	556	9.6	6.0	4.47
New England	1.2	83.9	552	10.2	6.7	5.14
Middle Atlantic	6.9	90.4	556	9.6	5.9	5.14
Midwest	16.5	84.6	416	8.7	4.3	2.57
East North Central	11.8	87.6	438	8.8	4.4	3.20
West North Central	4.8	77.1	360	8.3	3.9	4.91
South	13.5	54.2	300	12.6	7.0	5.32
South Atlantic	5.3	61.7	398	11.4	7.3	8.89
East South Central	2.4	57.9	283	13.2	6.4	10.06
West South Central	5.9	45.9	220	13.9	6.7	5.88
West	11.8	41.3	200	10.1	4.9	3.30
Mountain	3.3	67.1	297	9.7	4.3	4.53
Pacific	8.5	31.4	163	10.3	5.4	4.12
Metropolitan Status						
Metropolitan	41.9	66.2	356	10.0	5.4	2.21
Central City	19.5	66.4	356	11.3	6.0	2.85
Outside Central City	22.3	66.0	356	9.1	4.9	2.82
Nonmetropolitan	8.1	70.5	356	10.1	5.1	5.13
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD	3.9	85.2	427	7.2	3.6	4.34
5,500 to 7,000 HDD	17.7	88.3	443	9.2	4.6	2.81
4,000 to 5,499 HDD	10.2	74.8	441	9.8	5.8	4.63
Under 4,000 HDD	10.6	37.1	210	12.4	7.0	5.25
2,000 CDD or More and --						
Under 4,000 HDD	7.6	38.5	206	14.3	7.7	6.05
Housing Structure by Status of Unit						
Single-Family Detached	31.2	74.5	391	9.7	5.1	2.49
Owned	26.7	76.0	400	9.2	4.9	2.63
Rented	4.5	65.5	340	13.5	7.0	4.96
Single-Family Attached	3.1	65.7	385	8.4	4.9	10.80
Owned	2.3	71.1	422	7.9	4.7	11.22
Rented .....	.8	51.1	284	10.5	5.8	18.88
Building of 2 to 4 Units	6.7	62.3	341	12.4	6.8	4.44
Owned	1.2	87.1	480	10.3	5.7	10.16
Rented	5.4	56.6	309	13.2	7.2	4.93
Building of 5 or More Units	7.3	42.6	228	12.1	6.5	5.80
Owned .....	.3	55.2	282	7.8	4.0	28.06
Rented	7.0	42.0	225	12.5	6.7	6.02
Mobile Home	1.7	51.9	269	13.3	6.9	7.73
Owned	1.4	52.6	271	12.9	6.6	8.59
Rented .....	.3	48.1	261	15.6	8.5	16.34
Measured Heated Area of Residence (square feet)						
Fewer than 600	3.7	41.1	221	20.6	11.1	5.40
600 to 999	13.1	50.5	269	14.8	7.9	3.29
1,000 to 1,599	13.4	58.9	313	12.1	6.4	2.91
1,600 to 1,999	6.6	75.5	407	9.4	5.1	3.43
2,000 to 2,399	5.4	81.9	438	8.2	4.4	4.22
2,400 to 2,999	4.9	96.5	516	7.6	4.1	4.44
3,000 or More	2.9	113.4	586	5.5	2.9	4.48

See footnotes at end of table.

Table 28. Space-Heating Natural Gas Consumption and Expenditures per Household when Natural Gas was the Main Heating Fuel, 1987 (Continued)

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*square foot)	Expenditures (cents/hdd*1000 square feet)	
RSE Column Factors:	1.669	0.927	0.943	0.773	0.887	
Year of Construction						
1939 or Before	12.9	86.9	466	11.3	6.1	3.50
1940 to 1949	5.2	64.7	357	11.0	6.1	4.48
1950 to 1959	8.4	63.7	336	10.9	5.8	3.72
1960 to 1969	10.8	56.9	311	9.7	5.3	4.41
1970 to 1974	5.2	63.1	323	8.7	4.4	4.85
1975 to 1979	3.7	60.2	299	7.9	3.9	6.61
1980 to 1984	2.6	47.6	251	7.1	3.8	10.15
1985 or After	1.1	53.6	277	7.1	3.7	12.69
1987 Family Income						
Less than \$5,000	3.2	65.7	351	15.5	8.3	5.91
\$5,000 to \$9,999	6.6	61.4	320	12.7	6.6	4.11
\$10,000 to \$14,999	7.0	62.5	329	11.8	6.2	3.76
\$15,000 to \$19,999	5.0	61.9	328	10.3	5.5	4.25
\$20,000 to \$24,999	4.4	63.7	328	10.1	5.2	3.71
\$25,000 to \$34,999	8.6	65.3	351	9.3	5.0	3.76
\$35,000 to \$49,999	7.4	72.0	387	8.9	4.8	4.37
\$50,000 or More	7.8	78.0	424	8.5	4.6	3.61
Below 100 Percent of Poverty Line						
.....	6.4	61.9	330	14.5	7.7	4.43
Below 125 Percent of Poverty Line						
.....	10.1	62.7	332	13.6	7.2	3.75
Race of Householder						
White	40.9	67.9	357	9.4	4.9	2.10
Black	7.4	66.4	382	15.2	8.7	4.50
Other	1.8	45.5	229	9.6	4.9	8.42
Householder of Hispanic Descent						
Yes	2.9	46.1	242	11.8	6.2	6.67
No	47.1	68.2	363	9.9	5.3	2.09
Age of Householder						
Under 25 Years	3.5	51.8	274	12.4	6.6	4.47
25 to 34 Years	12.1	61.0	323	10.6	5.6	3.53
35 to 44 Years	9.5	66.5	349	9.1	4.8	3.41
45 to 59 Years	10.4	74.0	393	9.8	5.2	3.21
60 Years and Over	14.6	70.6	381	10.2	5.5	2.90
Household Size						
1 Person	12.0	63.4	333	11.7	6.1	3.72
2 Persons	16.5	65.8	350	9.7	5.2	2.76
3 Persons	8.6	66.0	354	10.1	5.4	3.18
4 Persons	7.5	73.4	390	9.6	5.1	3.98
5 Persons	3.6	69.6	379	9.5	5.2	5.32
6 or More Persons	1.7	72.6	393	8.7	4.7	8.02
All Gas Paid by Household						
Yes	40.0	70.6	374	9.8	5.2	2.42
Budget Plan	7.6	90.7	493	8.9	4.8	4.01
No Budget Plan	32.4	65.9	346	10.0	5.3	2.56
No	10.0	52.0	283	12.5	6.8	4.58
Main Heating Equipment Using Natural Gas						
Central Warm Air Furnace	31.6	70.4	366	9.3	4.8	2.43
Steam or Hot-Water System	9.2	80.8	463	10.3	5.9	4.24
Floor, Wall or Pipeless Furnace	5.1	37.0	188	12.6	6.4	5.45
Room Heater/Other	4.0	45.2	249	15.0	8.3	6.07

See footnotes at end of table.

Table 28. Space-Heating Natural Gas Consumption and Expenditures per Household when Natural Gas was the Main Heating Fuel, 1987 (Continued)

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*square foot)	Expenditures (cents/hdd*1000 square feet)	
RSE Column Factors:	1.669	0.927	0.943	0.773	0.887	
Secondary Heating Fuel (more than one may be used)						
Yes	18.3	70.6	370	9.3	4.9	2.93
Wood	10.2	75.0	389	8.4	4.4	3.75
Electricity	6.7	64.8	343	10.3	5.4	4.13
Fuel Oil/Kerosene	2.0	80.4	442	10.1	5.5	7.65
Other .....	.3	65.6	336	6.6	3.4	9.50
No	31.7	64.8	348	10.6	5.7	2.33

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • Btu/hdd*square foot and cents/hdd*1000 square feet are the Btu or cents per heating degree-day and square foot of the housing unit. They are values that have been adjusted for the effects of the weather and size of the residence. See Appendix C for a comparison of the two methods used to calculate the values. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, F of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 29. Space-Heating Electricity Consumption and Expenditures per Household when Electricity was the Main Heating Fuel, 1987

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*quare foot)	Expenditures (cents/hdd*1000 square feet)	
RSE Column Factors	1.580	1.157	1.064	0.732	0.702	
Total U.S. Households	17.9	14.5	282	3.4	6.7	4.35
Census Region and Division						
Northeast	2.1	21.0	492	2.5	5.9	7.86
New England .....	.4	21.2	498	3.1	7.3	11.09
Middle Atlantic	1.7	21.0	490	2.4	5.6	9.15
Midwest	1.5	27.6	519	3.3	6.2	7.82
East North Central	1.1	28.8	551	3.5	6.7	10.36
West North Central .....	.4	24.5	435	2.8	5.0	11.31
South	10.5	12.0	231	3.9	7.5	6.03
South Atlantic	5.8	11.2	227	3.9	7.9	9.71
East South Central	2.2	18.0	304	3.9	6.6	8.20
West South Central	2.5	8.8	179	3.8	7.7	10.77
West	3.8	13.0	214	3.4	5.6	10.52
Mountain .....	.7	11.7	217	3.8	7.1	15.70
Pacific	3.1	13.3	214	3.3	5.3	12.45
Metropolitan Status						
Metropolitan	14.5	12.8	258	3.3	6.7	5.26
Central City	5.6	11.4	221	3.6	6.9	6.78
Outside Central City	8.9	13.7	280	3.2	6.6	6.55
Nonmetropolitan	3.4	21.8	385	3.6	6.4	6.45
Climate Zone						
Under 2,000 CDD and--						
Over 7,000 HDD .....	.6	27.3	537	3.2	6.4	15.45
5,500 to 7,000 HDD	2.6	25.8	479	3.3	6.1	7.41
4,000 to 5,499 HDD	4.2	19.5	365	2.9	5.4	6.61
Under 4,000 HDD	4.0	12.4	247	3.7	7.4	8.21
2,000 CDD or More and --						
Under 4,000 HDD	6.4	6.8	142	4.4	9.3	9.07
Housing Structure by Status of Unit						
Single-Family Detached	8.4	19.4	367	3.5	6.6	4.93
Owned	7.6	19.3	367	3.4	6.5	5.05
Rented .....	.8	20.3	360	5.0	8.8	14.36
Single-Family Attached	1.5	16.8	336	2.9	5.7	18.47
Owned	1.0	16.0	333	2.5	5.3	22.43
Rented .....	.5	18.4	344	3.6	6.8	19.07
Building of 2 to 4 Units	1.5	13.7	264	4.6	8.8	11.59
Rented	1.4	13.9	265	4.5	8.7	10.32
Building of 5 or More Units	5.5	6.5	138	2.6	5.5	8.27
Owned .....	.5	6.1	145	1.8	4.2	26.52
Rented	5.0	6.5	137	2.8	5.8	7.55
Mobile Home	1.0	16.7	306	5.6	10.3	10.24
Owned .....	.9	17.8	322	5.3	9.6	10.50
Measured Heated Area of Residence (square feet)						
Fewer than 600	2.0	7.7	162	4.6	9.8	7.93
600 to 999	5.3	10.5	204	4.2	8.2	7.81
1,000 to 1,599	6.0	14.2	270	3.9	7.4	6.32
1,600 to 1,999	2.0	19.7	381	3.2	6.1	7.88
2,000 to 2,399	1.3	20.0	404	2.6	5.2	9.17
2,400 to 2,999 .....	.8	29.6	548	2.5	4.7	10.73
3,000 or More .....	.7	26.2	511	2.1	4.2	10.85
Year of Construction						
1939 or Before	1.1	17.6	358	3.9	8.0	14.11
1940 to 1949 .....	.6	16.4	314	4.6	8.9	12.54
1950 to 1959	1.1	15.4	282	4.6	8.4	11.02
1960 to 1969	2.5	16.7	308	3.9	7.1	8.51
1970 to 1974	2.4	14.9	282	3.9	7.4	9.32
1975 to 1979	4.6	15.6	302	3.3	6.3	8.82

See footnotes at end of table.

Table 29. Space-Heating Electricity Consumption and Expenditures per Household when Electricity was the Main Heating Fuel, 1987 (Continued)

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*square foot)	Expenditures (cents/hdd*1000 square feet)	
RSE Column Factors	1.580	1.157	1.064	0.732	0.702	
Year of Construction						
1980 to 1984	3.4	11.5	226	2.9	5.6	7.98
1985 or After	2.1	11.6	244	2.8	5.8	12.72
1987 Family Income						
Less than \$5,000	1.2	12.2	231	5.0	9.5	14.36
\$5,000 to \$9,999	1.8	14.5	270	4.1	7.7	10.46
\$10,000 to \$14,999	2.0	12.2	224	4.3	7.9	7.47
\$15,000 to \$19,999	1.8	12.1	238	3.5	6.8	10.82
\$20,000 to \$24,999	1.8	15.7	284	3.7	6.7	8.32
\$25,000 to \$34,999	3.5	14.1	280	3.3	6.5	6.93
\$35,000 to \$49,999	3.1	15.1	297	3.2	6.2	7.38
\$50,000 or More	2.7	18.0	363	3.0	6.0	8.20
Below 100 Percent of Poverty Line	2.0	13.9	261	5.0	9.4	10.95
Below 125 Percent of Poverty Line	3.0	13.8	256	4.6	8.4	9.23
Race of Householder						
White	16.0	14.7	283	3.4	6.6	4.55
Black	1.4	13.7	272	3.9	7.7	11.33
Other .....	.5	12.3	253	3.4	7.0	17.79
Householder of Hispanic Descent						
Yes .....	.9	10.0	222	3.1	6.9	17.10
No	17.0	14.8	285	3.5	6.7	4.48
Age of Householder						
Under 25 Years	2.0	9.9	205	3.4	7.1	11.91
25 to 34 Years	4.7	12.9	255	3.4	6.8	5.42
35 to 44 Years	4.1	15.4	302	3.4	6.6	6.55
45 to 59 Years	3.4	16.3	309	3.3	6.2	7.20
60 Years and Over	3.7	16.6	310	3.7	6.9	7.51
Household Size						
1 Person	4.9	12.2	236	3.5	6.7	7.19
2 Persons	6.6	13.7	266	3.4	6.5	5.50
3 Persons	2.9	16.4	321	3.7	7.2	7.17
4 Persons	2.4	16.9	329	3.4	6.7	7.99
5 Persons .....	.7	20.1	382	3.6	6.8	12.28
6 or More Persons .....	.4	19.0	357	3.9	7.4	17.94
All Electricity Paid by Household						
Yes	16.1	15.0	289	3.4	6.6	4.45
Budget Plan	1.3	23.3	440	3.3	6.3	8.15
No Budget Plan	14.8	14.3	276	3.4	6.6	4.71
No	1.8	10.2	212	3.8	7.9	12.68
All-Electric Home						
Yes	15.0	15.9	305	3.4	6.5	4.17
No	2.9	7.6	165	3.3	7.2	11.78
Main Heating Equipment Using Electricity						
Central Warm Air Furnace	6.9	12.8	242	4.0	7.5	7.72
Built-In Electric Units	5.4	17.5	334	3.5	6.8	6.09

See footnotes at end of table.

Table 29. Space-Heating Electricity Consumption and Expenditures per Household when Electricity was the Main Heating Fuel, 1987 (Continued)

Household Characteristics	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		RSE Row Factors
				Consumption (Btu/hdd*square foot)	Expenditures (cents/hdd*1000 square feet)	
RSE Column Factors	1.580	1.157	1.064	0.732	0.702	
Main Heating Equipment Using Electricity						
Heat Pump	4.5	14.4	291	2.8	5.7	6.41
Other	1.1	11.8	236	4.5	9.0	11.10
Secondary Heating Fuel (more than one may be used)						
Yes	7.4	17.2	324	3.3	6.1	6.26
Wood	5.0	18.8	350	3.2	5.9	7.66
Natural Gas .....	.5	9.7	212	2.9	6.4	28.49
Fuel Oil/Kerosene	1.2	18.6	349	3.1	5.8	7.33
Other .....	.2	19.0	422	2.4	5.4	26.80
No	10.5	12.7	252	3.6	7.2	4.81

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates.
 • Btu/hdd*square foot and cents/hdd*1000 square feet are the Btu or cents per heating degree-day and square foot of the housing unit. They are values that have been adjusted for the effects of the weather and size of the residence. See Appendix C for a comparison of the two methods used to calculate the values. • Electricity consumption is based on site electricity. No adjustment is made for primary fuels consumed to produce electricity. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.
 Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 30. Space-Heating Fuel Oil, Kerosene and Liquefied Petroleum Gas Consumption and Expenditures per Household by Main Heating Fuel, 1987

Household Characteristics	Fuel Oil or Kerosene as Main Heating Fuel					Liquefied Petroleum Gas as Main Heating Fuel					RSE Row Factors
	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		
				Consumption (Btu/hdd*sqf)	Expenditures (cents/hdd* 1000 sqf)				Consumption (Btu/hdd*sqf)	Expenditures (cents/hdd* 1000 sqf)	
RSE Column Factors	1.346	0.663	0.709	0.716	0.743	2.217	1.086	1.039	0.997	1.191	
Total U.S. Households	12.2	78.6	461	9.1	5.3	4.1	49.6	407	9.5	7.8	4.54
Census Region and Division											
Northeast	8.0	85.0	494	9.4	5.4	Q	Q	Q	Q	Q	5.22
New England	2.4	87.4	519	7.4	4.4	Q	Q	Q	Q	Q	5.60
Middle Atlantic	5.6	83.9	483	10.4	6.0	Q	Q	Q	Q	Q	7.26
Midwest	1.5	78.9	462	6.2	3.6	1.3	69.4	506	7.6	5.6	6.90
East North Central	1.2	81.4	480	6.3	3.7	.9	69.9	553	7.1	5.6	8.98
West North Central .....	.3	69.3	394	5.7	3.3	.5	68.4	421	8.8	5.4	8.93
South	2.3	59.9	372	12.6	7.8	2.1	36.3	325	12.3	11.0	9.10
South Atlantic	2.0	60.3	375	12.6	7.8	1.1	32.5	326	12.9	13.0	12.61
East South Central .....	.3	60.3	373	12.6	7.8	.5	46.2	411	12.1	10.8	13.58
West South Central	Q	Q	Q	Q	Q	Q	33.9	232	11.3	7.7	16.99
West	Q	51.0	288	5.4	3.1	.6	53.2	451	8.8	7.4	20.64
Mountain	Q	Q	Q	Q	Q	Q	76.1	468	8.5	Q	19.59
Pacific	Q	47.4	274	5.0	2.9	.4	41.9	443	8.8	9.3	26.35
Metropolitan Status											
Metropolitan	9.4	80.2	469	9.4	5.5	1.8	40.8	364	9.4	8.4	5.87
Central City	3.7	68.7	384	11.6	6.5	.3	26.1	282	14.1	Q	13.81
Outside Central City	5.7	87.7	524	8.4	5.0	1.5	44.0	382	8.8	7.6	7.00
Nonmetropolitan	2.8	73.1	436	8.2	4.9	2.3	56.6	441	9.6	7.5	8.12
Climate Zone											
Under 2,000 CDD and--											
Over 7,000 HDD	2.0	80.8	467	6.1	3.5	.8	70.5	521	7.8	5.8	8.85
5,500 to 7,000 HDD	3.7	92.6	554	8.1	4.8	.5	67.6	546	7.6	6.1	8.09
4,000 to 5,499 HDD	5.3	75.7	434	11.1	6.4	.8	58.2	452	9.5	7.4	8.26
Under 4,000 HDD .....	.8	51.8	331	15.5	9.9	1.0	46.1	418	10.4	9.5	11.98
2,000 CDD or More and --											
Under 4,000 HDD .....	.3	Q	Q	11.2	8.0	1.1	22.6	215	14.0	13.4	23.23
Housing Structure by Status of Unit											
Single-Family Detached	7.2	87.0	521	8.0	4.8	2.9	55.8	446	8.9	7.1	5.70
Owned	6.4	89.4	535	7.9	4.7	2.4	58.1	468	8.6	6.9	5.66
Rented .....	.7	66.7	401	9.5	5.7	.5	44.6	342	10.5	8.0	16.36
Single-Family Attached .....	.7	94.7	588	9.0	5.6	NA	NA	NA	NA	NA	16.76
Owned .....	.6	97.1	607	9.0	5.6	NA	NA	NA	NA	NA	22.68
Building of 2 to 4 Units	1.5	74.1	445	11.2	6.7	NA	NA	NA	NA	NA	7.55
Owned .....	.4	97.3	586	9.2	5.5	NA	NA	NA	NA	NA	18.72
Rented	1.1	64.9	389	12.8	7.7	NA	NA	NA	NA	NA	8.31
Building of 5 or More Units	2.0	56.6	269	15.4	7.3	NA	NA	NA	NA	NA	7.50
Owned .....	.2	51.7	248	14.7	7.1	NA	NA	NA	NA	NA	30.94
Rented	1.9	57.0	270	15.5	7.4	NA	NA	NA	NA	NA	8.32
Mobile Home .....	.8	55.1	350	13.8	8.8	1.2	34.9	315	11.9	10.8	10.81
Owned .....	.6	50.7	324	12.2	7.8	1.0	36.1	328	11.6	10.5	11.46
Rented .....	.2	69.6	435	20.0	12.5	.2	29.5	260	14.4	12.7	26.78
Measured Heated Area of Residence (square feet)											
Fewer than 600	1.3	58.3	311	22.8	12.2	.4	41.1	368	22.1	19.7	11.00
600 to 999	3.0	57.6	329	13.9	7.9	1.4	33.5	291	12.5	10.8	6.58
1,000 to 1,599	2.8	71.3	429	11.4	6.9	1.3	57.3	456	10.5	8.4	6.70
1,600 to 1,999	1.5	83.3	501	8.9	5.3	.5	44.2	386	6.9	6.0	9.60
2,000 to 2,399	1.2	93.5	565	7.6	4.6	.2	60.0	576	7.3	7.0	14.62
2,400 to 2,999	1.4	94.9	558	6.0	3.5	.2	76.8	572	5.8	4.3	8.34
3,000 or More	1.1	136.5	801	5.9	3.5	.2	105.5	700	5.6	3.7	11.99

See footnotes at end of table.

Table 30. Space-Heating Fuel Oil, Kerosene and Liquefied Petroleum Gas Consumption and Expenditures per Household by Main Heating Fuel, 1987 (Continued)

Household Characteristics	Fuel Oil or Kerosene as Main Heating Fuel					Liquefied Petroleum Gas as Main Heating Fuel					RSE Row Factors
	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		
				Consumption (Btu/hdd*sqft)	Expenditures (cents/hdd* 1000 sqft)				Consumption (Btu/hdd*sqft)	Expenditures (cents/hdd* 1000 sqft)	
RSE Column Factors	1.346	0.663	0.709	0.716	0.743	2.217	1.086	1.039	0.997	1.191	
Year of Construction											
1939 or Before	4.7	89.0	524	9.9	5.9	0.8	51.4	353	10.7	7.4	7.94
1940 to 1949	1.4	74.4	425	9.9	5.7	.4	57.4	517	11.1	10.0	11.02
1950 to 1959	2.2	81.3	483	8.9	5.3	.6	55.8	506	11.5	10.5	10.16
1960 to 1969	1.9	67.4	384	9.4	5.4	.5	48.1	383	7.1	5.6	11.40
1970 to 1974 .....	.8	60.6	367	9.1	5.5	.6	50.8	443	10.4	9.1	10.63
1975 to 1979 .....	.8	75.2	458	5.7	3.5	.6	48.0	389	10.3	8.4	11.63
1980 to 1984 .....	.3	45.0	258	4.8	2.7	.4	31.5	242	6.4	4.9	18.17
1985 or After	Q	Q	Q	Q	Q	.2	50.2	468	7.1	6.6	16.33
1987 Family Income											
Less than \$5,000 .....	.7	58.6	334	14.0	8.0	.6	37.1	331	14.5	12.9	15.00
\$5,000 to \$9,999	1.7	72.5	421	11.9	6.9	.6	47.8	418	10.8	9.4	10.53
\$10,000 to \$14,999	1.8	72.9	428	10.3	6.0	1.0	48.4	375	10.7	8.6	9.67
\$15,000 to \$19,999	1.2	76.1	454	9.9	5.9	.4	47.4	384	8.7	7.1	10.06
\$20,000 to \$24,999	1.3	65.9	391	8.0	4.7	.4	56.4	436	7.7	6.0	11.03
\$25,000 to \$34,999	2.3	74.1	430	8.6	5.0	.6	54.9	453	8.3	6.8	9.22
\$35,000 to \$49,999	1.6	89.5	524	7.7	4.5	.3	51.3	400	7.0	5.5	10.18
\$50,000 or More	1.6	107.8	642	7.9	4.7	.2	75.1	595	8.4	6.6	12.54
Below 100 Percent of Poverty Line											
.....	1.3	57.6	329	11.8	6.8	1.0	42.0	342	13.3	10.8	10.02
Below 125 Percent of Poverty Line											
.....	2.3	62.8	362	11.7	6.7	1.3	45.7	383	12.9	10.8	8.26
Race of Householder											
White	10.4	78.7	464	8.5	5.0	3.6	51.1	421	9.1	7.5	4.84
Black	1.4	82.7	480	15.3	8.9	.4	32.9	289	13.1	11.6	11.30
Other .....	.4	57.9	304	11.7	6.2	Q	Q	Q	Q	Q	10.54
Householder of Hispanic Descent											
Yes .....	.7	68.8	374	9.9	5.4	Q	Q	Q	Q	Q	10.49
No	11.5	79.2	467	9.1	5.3	4.0	49.5	407	9.4	7.7	4.69
Age of Householder											
Under 25 Years .....	.5	67.1	400	12.6	7.5	.2	33.1	267	8.2	6.6	16.02
25 to 34 Years	2.5	68.4	396	9.1	5.3	.8	48.1	391	8.9	7.3	7.69
35 to 44 Years	2.5	75.2	443	7.8	4.6	.5	50.4	361	10.2	7.3	7.64
45 to 59 Years	2.3	88.2	526	8.7	5.2	1.1	49.1	412	9.8	8.2	7.52
60 Years and Over	4.4	82.8	483	9.9	5.8	1.6	52.4	443	9.5	8.0	7.66
Household Size											
1 Person	2.9	67.9	390	12.1	6.9	1.0	50.5	430	13.0	11.1	9.28
2 Persons	4.1	82.9	485	8.7	5.1	1.4	45.1	372	8.9	7.3	6.82
3 Persons	2.2	79.6	481	9.0	5.4	.7	47.9	403	9.2	7.8	8.51
4 Persons	1.9	82.6	482	7.9	4.6	.6	63.5	496	8.3	6.5	8.31
5 Persons .....	.8	73.9	444	7.9	4.7	.2	47.2	366	6.7	5.2	14.31
6 or More Persons .....	.4	95.4	558	8.6	5.0	.2	47.5	364	9.1	7.0	22.21
Fuel Oil or Kerosene Paid by Household											
Yes	9.2	83.8	505	8.3	5.0	4.1	49.6	407	9.5	7.8	4.74
Budget Plan	1.4	106.1	647	8.5	5.2	NA	NA	NA	NA	NA	8.03
No Budget Plan	7.8	79.8	479	8.3	5.0	4.1	49.6	407	9.5	7.8	5.05
No	3.0	62.5	328	14.0	7.4	NA	NA	NA	NA	NA	6.62

See footnotes at end of table.

Table 30. Space-Heating Fuel Oil, Kerosene and Liquefied Petroleum Gas Consumption and Expenditures per Household by Main Heating Fuel, 1987 (Continued)

Household Characteristics	Fuel Oil or Kerosene as Main Heating Fuel					Liquefied Petroleum Gas as Main Heating Fuel					RSE Row Factors
	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Heating Intensity		
				Consumption (Btu/hdd*sqf)	Expenditures (cents/hdd*1000 sqf)				Consumption (Btu/hdd*sqf)	Expenditures (cents/hdd*1000 sqf)	
RSE Column Factors	1.346	0.663	0.709	0.716	0.743	2.217	1.086	1.039	0.997	1.191	
Main Heating Equipment Using Fuel Oil											
Steam or Hot Water system	6.3	87.6	504	9.9	5.7	NA	NA	NA	NA	NA	5.99
Central Warm Air Furnace	4.0	76.4	452	7.6	4.5	NA	NA	NA	NA	NA	6.80
Other	1.8	51.7	334	10.3	6.7	4.1	49.6	407	9.5	7.8	7.53
Main Heating Equipment Using LPG											
Central Warm Air Furnace	NA	NA	NA	NA	NA	2.4	56.5	453	8.9	7.1	4.95
Room Heater/Other	NA	NA	NA	NA	NA	1.7	39.9	342	10.6	9.1	8.78
Secondary Heating Fuel (more than one may be used)											
Yes	5.0	81.8	486	7.8	4.6	2.3	50.7	431	8.8	7.5	5.98
Wood	2.7	90.6	540	6.6	3.9	1.0	60.1	493	7.5	6.1	7.74
Electricity	1.7	75.4	450	10.0	6.0	1.1	44.7	393	9.3	8.2	10.30
Natural Gas .....	.3	57.3	318	10.7	6.0	NA	NA	NA	NA	NA	16.49
Fuel Oil/Kerosene .....	.8	84.4	501	8.2	4.9	.4	35.8	322	11.3	10.2	14.72
Other .....	.2	101.3	588	10.0	5.8	NA	NA	NA	NA	NA	29.02
No	7.2	76.4	444	10.5	6.1	1.9	48.3	379	10.5	8.2	6.06

NA Data not available.

□ Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • Btu/hdd*sqf and cents/hdd*1000 sqf are the Btu or cents per heating degree-day and square foot of the housing unit. They are values that have been adjusted for the effects of the weather and size of the residence. See Appendix C for a comparison of the two methods used to calculate the values. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, D, G of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 31. Water-Heating Consumption and Expenditures per Household, 1987

Household Characteristics	Main Water-Heating Fuel									RSE Row Factors
	Natural Gas			Electricity			Liquefied Petroleum Gas			
	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	
RSE Column Factors:	1,041	0,405	0,482	1,348	0,514	0,543	3,972	1,793	1,838	
Total U.S. Households	49.2	22.2	122	32.0	9.8	201	3.0	18.5	163	3.12
Census Region and Division										
Northeast	9.0	23.7	157	4.5	9.3	225	.3	16.6	206	8.74
New England	1.4	24.3	169	1.2	9.1	226	.2	18.4	200	10.48
Middle Atlantic	7.6	23.6	154	3.3	9.4	225	Q	Q	Q	10.82
Midwest	15.2	21.5	107	5.8	10.3	211	1.1	19.5	149	5.85
East North Central	10.9	22.1	111	4.2	10.8	221	.6	20.3	169	8.03
West North Central	4.3	20.2	95	1.6	9.0	185	.4	18.2	120	6.88
South	12.6	21.1	116	16.7	9.8	200	1.2	17.9	156	5.81
South Atlantic	4.6	21.0	138	10.1	9.6	209	.5	16.7	181	7.49
East South Central	1.8	21.3	105	4.1	10.4	180	.2	17.1	154	8.79
West South Central	6.2	21.0	102	2.6	9.3	198	Q	19.7	127	14.47
West	12.4	23.2	121	4.9	9.8	170	.5	18.9	188	5.99
Mountain	3.2	22.6	107	1.0	9.2	171	Q	20.1	132	11.13
Pacific	9.2	23.4	126	3.9	10.0	169	.4	18.4	210	6.68
Metropolitan Status										
Metropolitan	42.8	22.3	123	20.5	9.5	198	1.4	19.5	178	3.86
Central City	20.1	22.0	121	7.0	8.8	179	.3	17.3	195	6.33
Outside Central City	22.8	22.7	125	13.5	9.9	209	1.2	20.0	174	4.63
Nonmetropolitan	6.4	21.6	110	11.4	10.3	206	1.6	17.6	150	5.66
Climate Zone										
Under 2,000 CDD and--										
Over 7,000 HDD	3.2	21.1	105	4.1	9.8	201	.7	19.4	161	8.88
5,500 to 7,000 HDD	17.2	22.8	118	6.2	10.5	210	.5	18.2	169	6.60
4,000 to 5,499 HDD	10.5	22.3	136	7.9	9.7	187	.5	17.7	135	7.61
Under 4,000 HDD	10.6	23.5	129	6.3	10.2	209	.7	21.2	177	6.92
2,000 CDD or More and --										
Under 4,000 HDD	7.8	19.6	108	7.5	9.1	202	.6	15.3	168	9.31
Housing Structure by Status of Unit										
Single-Family Detached	29.0	24.5	132	20.3	10.6	215	2.5	19.0	167	3.63
Owned	25.0	24.2	130	17.6	10.5	212	2.0	19.9	174	3.93
Rented	4.1	26.8	141	2.7	11.4	232	.5	15.8	143	7.19
Single-Family Attached	3.2	20.7	126	1.9	8.6	179	NA	NA	NA	15.35
Owned	2.4	21.2	132	1.3	8.2	171	NA	NA	NA	18.40
Rented .....	.8	19.4	108	.6	9.4	193	NA	NA	NA	24.08
Building of 2 to 4 Units	7.1	20.1	116	2.2	8.2	167	Q	Q	Q	7.98
Owned	1.4	20.1	121	.3	7.7	158	Q	Q	Q	19.15
Rented	5.7	20.1	114	1.9	8.3	168	NA	NA	NA	8.89
Building of 5 or More Units	8.7	17.0	94	4.2	7.1	151	Q	Q	Q	8.23
Owned .....	.6	15.6	92	.2	6.4	147	NA	NA	NA	34.16
Rented	8.2	17.1	95	4.0	7.2	152	Q	Q	Q	8.39
Mobile Home	1.2	20.7	105	3.4	10.2	215	.5	16.2	143	8.56
Owned	1.0	21.4	108	2.8	10.2	212	.4	15.8	134	9.62
Rented .....	.2	17.4	89	.6	10.3	228	Q	Q	Q	19.33
Measured Heated Area of Residence (square feet)										
Fewer than 600	4.4	18.5	102	2.5	8.2	186	.3	12.2	141	8.45
600 to 999	13.1	19.6	107	8.5	8.9	186	.9	16.1	148	4.97
1,000 to 1,599	12.5	22.5	122	10.7	9.9	199	1.0	21.3	169	4.83
1,600 to 1,999	6.3	22.9	128	4.1	9.9	197	.3	17.9	159	6.21
2,000 to 2,399	5.3	25.3	138	2.4	11.0	227	.2	22.8	216	8.25
2,400 to 2,999	4.6	25.7	140	2.2	11.2	229	.1	18.6	190	8.43
3,000 or More	3.0	25.9	143	1.5	12.6	251	.2	23.5	185	9.31

See footnotes at end of table.

Table 31. Water-Heating Consumption and Expenditures per Household, 1987 (Continued)

Household Characteristics	Main Water-Heating Fuel									RSE Row Factors
	Natural Gas			Electricity			Liquefied Petroleum Gas			
	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	Number of Households (million)	Consumption (million Btu)	Expenditures (dollars)	
	RSE Column Factors:	1.041	0.405	0.482	1.348	0.514	0.543	3.972	1.793		1.838
Year of Construction										
1939 or Before	13.2	22.1	126	5.6	9.7	206	0.7	16.5	155	5.80
1940 to 1949	4.8	21.9	123	2.5	10.0	202	.3	22.0	221	7.80
1950 to 1959	7.9	23.3	125	3.6	9.8	199	.3	19.3	186	5.78
1960 to 1969	10.1	21.9	122	4.6	9.7	195	.4	14.5	127	6.50
1970 to 1974	5.3	22.6	118	3.6	10.3	208	.3	18.3	171	7.62
1975 to 1979	4.2	20.7	104	5.3	10.0	201	.5	23.1	178	9.46
1980 to 1984	2.6	21.6	115	4.1	9.6	195	.4	17.1	133	9.91
1985 or After	1.1	26.1	138	2.6	9.4	201	Q	Q	Q	12.73
1987 Family Income										
Less than \$5,000	3.3	20.1	109	2.1	8.3	178	.4	13.7	140	9.15
\$5,000 to \$9,999	6.2	20.0	108	3.9	9.4	191	.5	17.0	145	7.26
\$10,000 to \$14,999	6.6	20.9	114	4.8	9.1	190	.5	19.6	158	6.67
\$15,000 to \$19,999	4.7	21.0	114	3.5	9.0	186	.3	20.2	169	6.32
\$20,000 to \$24,999	4.5	20.7	108	3.4	10.5	209	.3	17.9	151	6.57
\$25,000 to \$34,999	8.6	21.8	121	6.0	9.6	197	.5	19.3	186	5.54
\$35,000 to \$49,999	7.3	24.7	135	4.7	11.0	222	.3	21.0	179	7.14
\$50,000 or More	8.1	25.6	144	3.6	11.0	227	.2	21.9	205	7.99
Below 100 Percent of Poverty Line										
.....	6.3	24.0	132	4.0	10.1	212	.8	18.6	156	7.12
Below 125 Percent of Poverty Line										
.....	9.8	22.8	125	6.3	10.0	209	1.1	19.0	166	5.73
Race of Householder										
White	40.2	21.6	116	28.7	9.7	197	2.6	18.0	158	3.28
Black	7.1	26.1	154	2.7	11.2	239	.3	17.7	184	8.69
Other	1.9	22.1	119	.6	9.0	204	Q	28.6	217	14.77
Householder of Hispanic Descent										
Yes	3.2	22.7	125	1.2	10.5	250	Q	Q	Q	10.98
No	46.1	22.2	121	30.8	9.8	199	2.9	18.2	162	3.21
Age of Householder										
Under 25 Years	3.6	20.3	109	2.6	9.2	192	Q	Q	Q	8.97
25 to 34 Years	12.1	23.1	125	7.5	10.3	213	.6	20.3	170	5.03
35 to 44 Years	9.6	25.6	136	6.4	10.9	224	.6	22.0	179	5.07
45 to 59 Years	10.2	24.0	133	6.8	10.2	208	.7	16.7	152	4.87
60 Years and Over	13.8	18.4	103	8.6	8.4	171	1.0	16.5	161	5.20
Household Size										
1 Person	12.3	14.1	75	6.9	6.1	125	.5	13.5	130	5.66
2 Persons	15.8	19.8	108	11.9	8.8	182	1.1	15.9	150	3.88
3 Persons	8.3	24.9	137	5.7	11.5	232	.4	16.4	140	5.23
4 Persons	7.5	29.6	162	4.7	12.6	261	.6	25.0	203	5.08
5 Persons	3.6	32.2	180	1.9	14.3	292	.2	23.7	196	7.77
6 or More Persons	1.8	37.0	209	1.0	16.0	334	.2	26.1	225	8.92

NA Data not available.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates. • Electricity Consumption is based on site electricity. No adjustment is made for primary fuels consumed to produce electricity. • To obtain a Relative Standard Error (RSE) percentage for any table cell, multiply the cell's corresponding column and row factors. • Because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, D, E, F of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).

Table 32. Air-Conditioning Electricity Consumption and Expenditures per Household, Summer 1987

Household Characteristics	Number of Households that use Electric Air Conditioning Equipment (million)	Air Conditioning		Air-Conditioning Intensity				RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (Btu/cdd*square foot)		Expenditures (cents/cdd*1000 square feet)		
				Central Air Conditioners	Room Air Conditioners	Central Air Conditioners	Room Air Conditioners	
RSE Column Factors:	1.102	0.912	0.920	0.967	1.072	0.923	1.132	
Total U.S. Households	57.1	7.6	170	3.1	3.1	6.7	7.5	2.25
Census Region and Division								
Northeast	10.3	3.8	110	3.0	3.1	8.4	9.5	4.89
New England	1.8	2.7	69	3.7	3.8	9.3	10.2	10.17
Middle Atlantic	8.5	4.0	119	3.0	2.9	8.3	9.4	5.41
Midwest	15.0	5.7	137	3.1	3.1	7.5	7.7	3.95
East North Central	9.9	5.0	126	3.1	3.3	7.7	8.4	5.28
West North Central	5.1	7.2	159	3.3	2.8	7.2	6.4	5.70
South	25.3	10.9	226	3.4	3.3	6.9	6.9	3.12
South Atlantic	12.3	9.9	217	3.1	2.9	6.8	6.4	5.08
East South Central	5.1	10.3	180	3.8	3.5	6.6	6.3	5.03
West South Central	7.8	12.7	268	3.6	3.7	7.4	8.2	6.03
West	6.5	5.3	125	2.4	2.7	5.7	5.8	7.13
Mountain	1.5	7.4	176	2.1	1.8	4.9	4.5	11.95
Pacific	4.9	4.7	109	2.7	3.0	6.5	6.4	8.38
Metropolitan Status								
Metropolitan	45.5	7.7	176	3.0	3.1	6.7	7.7	2.50
Central City	17.8	7.2	162	3.3	3.1	7.0	7.9	4.18
Outside Central City	27.7	8.0	184	2.9	3.1	6.5	7.5	3.17
Nonmetropolitan	11.6	7.3	149	3.4	3.4	6.9	7.1	4.74
Climate Zone								
Under 2,000 CDD and--								
Over 7,000 HDD	3.3	3.7	77	3.0	3.5	6.2	7.2	8.25
5,500 to 7,000 HDD	14.8	4.5	115	3.1	3.1	7.9	8.1	3.95
4,000 to 5,499 HDD	14.8	6.7	152	3.4	3.1	7.2	8.1	4.41
Under 4,000 HDD	10.6	7.2	153	3.3	3.6	6.9	7.9	5.29
2,000 CDD or More and --								
Under 4,000 HDD	13.5	13.3	287	3.3	2.9	7.0	6.5	4.79
Housing Structure by Status of Unit								
Single-Family Detached	35.1	9.0	199	2.8	2.9	6.2	6.6	2.77
Owned	31.6	9.2	203	2.8	2.8	6.2	6.4	2.84
Rented	3.5	7.4	164	3.2	3.6	6.8	8.1	8.77
Single-Family Attached	3.8	6.4	154	2.8	2.8	6.3	8.2	9.52
Owned	2.7	5.6	141	2.3	2.8	5.5	8.5	9.53
Rented	1.1	8.3	185	4.1	2.9	8.9	7.7	20.53
Building of 2 to 4 Units	4.8	5.1	123	4.5	2.9	9.4	8.5	9.64
Owned	1.2	4.3	127	3.0	2.0	7.5	6.6	20.95
Rented	3.6	5.3	122	5.1	3.6	10.1	10.2	10.67
Building of 5 or More Units	10.3	5.0	115	4.5	3.8	9.8	10.0	7.27
Owned .....	.8	4.8	130	3.1	3.5	7.5	12.0	21.72
Rented	9.4	5.0	114	4.8	3.9	10.4	10.0	7.21
Mobile Home	3.1	5.6	121	5.2	5.3	11.3	11.1	8.89
Owned	2.7	5.7	122	5.5	5.2	12.0	11.0	10.16
Rented .....	.5	5.2	112	Q	5.5	Q	12.0	12.84
Measured Heated Area of Residence (square feet)								
Fewer than 600	3.6	4.5	106	5.8	4.7	12.5	11.7	10.71
600 to 999	14.8	5.4	122	4.8	4.1	10.3	9.8	4.80
1,000 to 1,599	16.2	7.9	174	3.5	3.3	7.5	7.5	3.38
1,600 to 1,999	7.7	8.7	195	3.2	2.7	7.0	6.7	4.92
2,000 to 2,399	5.9	8.6	196	2.8	2.7	6.2	6.9	6.40
2,400 to 2,999	4.9	9.2	207	2.8	2.6	6.3	6.6	6.21
3,000 or More	3.9	11.6	264	2.6	2.0	5.8	5.1	6.88

See footnotes at end of table.

Table 32. Air-Conditioning Electricity Consumption and Expenditures per Household, Summer 1987 (Continued)

Household Characteristics	Number of Households that use Electric Air Conditioning Equipment (million)	Air Conditioning			Air-Conditioning Intensity			RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (Btu/cdd*square foot)		Expenditures (cents/cdd*1000 square feet)		
				Central Air Conditioners	Room Air Conditioners	Central Air Conditioners	Room Air Conditioners	
RSE Column Factors:	1,102	0,912	0,920	0,967	1,072	0,923	1,132	
Year of Construction								
1939 or Before	10.0	4.9	118	3.3	2.8	7.6	7.2	5.13
1940 to 1949	4.6	6.8	148	3.6	3.1	7.5	7.2	7.10
1950 to 1959	8.1	7.6	175	3.3	3.0	7.4	7.2	5.65
1960 to 1969	11.3	8.4	185	3.0	3.5	6.4	8.4	5.50
1970 to 1974	6.9	7.6	168	3.4	3.7	7.4	8.5	7.31
1975 to 1979	7.8	9.9	218	3.0	3.8	6.6	8.3	6.74
1980 to 1984	5.5	8.1	175	2.9	3.0	6.3	6.6	7.45
1985 or After	3.0	7.9	177	2.5	2.6	5.5	5.3	13.96
1987 Family Income								
Less than \$5,000	2.9	5.3	117	4.1	3.3	8.9	7.5	8.27
\$5,000 to \$9,999	5.8	5.5	120	3.3	3.1	7.0	7.0	6.94
\$10,000 to \$14,999	7.1	5.9	130	3.3	3.4	7.1	7.9	5.42
\$15,000 to \$19,999	5.5	5.9	131	2.9	3.2	6.3	7.3	7.57
\$20,000 to \$24,999	5.5	7.4	165	3.4	3.4	7.3	8.0	6.30
\$25,000 to \$34,999	10.9	8.1	178	3.2	3.3	6.9	8.0	4.88
\$35,000 to \$49,999	9.6	8.8	197	3.1	3.0	6.7	7.3	5.14
\$50,000 or More	9.7	10.0	294	2.8	3.0	6.5	8.3	4.88
Below 100 Percent of Poverty Line	5.3	6.0	131	3.8	3.6	8.3	8.1	6.03
Below 125 Percent of Poverty Line	8.8	5.9	130	3.8	3.4	8.1	7.7	5.26
Race of Householder								
White	49.5	7.6	170	3.0	3.0	6.6	7.3	2.31
Black	6.2	8.5	184	3.8	3.6	8.0	8.4	6.86
Other	1.3	5.0	118	2.6	4.7	5.7	12.2	14.47
Householder of Hispanic Descent								
Yes	2.8	8.0	197	3.5	3.7	8.4	9.4	10.15
No	54.3	7.6	169	3.0	3.1	6.6	7.5	2.32
Age of Householder								
Under 25 Years	4.0	6.0	130	3.7	3.5	7.8	8.0	8.30
25 to 34 Years	13.6	7.2	182	3.3	3.5	7.3	8.3	4.44
35 to 44 Years	11.7	8.3	186	3.0	3.4	6.6	8.0	4.06
45 to 59 Years	12.1	9.2	203	3.2	3.1	6.8	7.6	4.35
60 Years and Over	15.7	6.5	150	2.7	2.7	6.2	6.6	4.31
Household Size								
1 Person	12.9	4.7	106	2.8	2.7	6.1	6.8	4.59
2 Persons	20.3	7.5	168	2.8	2.8	6.2	6.7	3.53
3 Persons	9.9	8.7	195	3.1	4.0	6.9	9.4	4.89
4 Persons	8.9	9.7	215	3.3	3.1	7.3	7.4	4.59
5 Persons	3.6	10.1	226	3.6	4.0	7.8	9.5	6.09
6 or More Persons	1.5	8.1	194	3.4	3.0	7.9	7.7	11.14
All Electricity Paid by Household								
Yes	53.7	7.7	174	3.0	3.1	6.6	7.4	2.33
Budget Plan	1.0	9.6	193	3.0	2.2	6.0	4.7	14.58
No Budget Plan	52.7	7.7	173	3.0	3.1	6.6	7.5	2.34
No	3.4	5.5	114	5.5	3.9	10.8	8.7	9.82
All-Electric Home								
Yes	12.1	9.7	203	3.1	3.0	6.4	6.0	5.64
No	44.9	7.0	161	3.1	3.2	7.0	7.7	2.79

See footnotes at end of table.

Table 32. Air-Conditioning Electricity Consumption and Expenditures per Household, Summer 1987 (Continued)

Household Characteristics	Number of Households that use Electric Air Conditioning Equipment (million)	Air Conditioning		Air-Conditioning Intensity				RSE Row Factors
		Consumption (million Btu)	Expenditures (dollars)	Consumption (Btu/cdd*square foot)		Expenditures (cents/cdd*1000 square feet)		
				Central Air Conditioners	Room Air Conditioners	Central Air Conditioners	Room Air Conditioners	
RSE Column Factors:	1.102	0.912	0.920	0.967	1.072	0.923	1.132	
Number of Rooms Air Conditioned								
One	6.4	1.7	45	Q	4.7	Q	12.3	5.76
Two to Four	9.0	3.7	89	3.8	3.5	8.7	8.4	6.32
Five or More	1.4	7.3	179	3.0	2.5	7.2	6.3	11.34
Entire House	40.3	9.4	207	3.0	2.7	6.7	6.3	2.66
Type of Air Conditioning Equipment								
Central Air	30.1	10.8	237	3.1	NA	6.7	NA	2.52
Window Unit	26.9	4.0	95	NA	3.1	NA	7.5	2.87
One	18.4	3.2	75	NA	3.5	NA	8.2	3.66
Two or more	8.6	5.6	138	NA	2.7	NA	6.6	3.91
Frequency of Air Conditioning Use								
Frequently Used	31.9	10.7	236	3.4	3.9	7.4	9.0	2.68
Seldom Used	20.1	3.5	86	1.9	2.3	4.5	5.9	3.24
Other/or Did Not Use	5.0	3.9	87	2.2	1.7	4.9	4.0	13.95
Has Evaporative Cooler								
Yes .....	.6	3.0	67	.9	1.5	1.9	3.5	23.42
No	56.5	7.6	171	3.1	3.2	6.8	7.5	2.26

NA Data not available.

Q Data withheld either because the RSE was greater than 50 percent or fewer than 10 households were sampled.

Notes: • End-use values are statistical estimates based on the 1987 RECS. • See Appendix B for methodology of end-use estimates.

• Btu/cdd*square foot and cents/cdd*1000 square feet are the Btu or cents per cooling degree-day and square foot of the housing unit. They are values that have been adjusted for the effects of the weather and size of the residence. See Appendix C for a description of the method used to calculate the values. • Electricity Consumption is based on site electricity. No adjustment is made for primary fuels consumed to produce electricity. • To obtain a Relative Standard Error (RSE) Percentage for any table cell, multiply the cell's corresponding column and row factors. • Because the small amount of natural gas that is used for air conditioning is omitted and because of rounding, data may not sum to totals. • See "Glossary" for definition of terms used in this report.

Source: Energy Information Administration, Office of Energy Markets and End Use Division, Forms EIA-457 A, B, C, E of the 1987 Residential Energy Consumption Survey (for specific titles of forms, see Appendix D).





Appendix A

How the Survey Was Conducted





Appendix A

How the Survey Was Conducted

Introduction

The Residential Energy Consumption Survey (RECS) was designed by the Energy Information Administration (EIA) to provide information concerning energy consumption within the residential sector. The RECS is conducted in two major parts: the Household Survey and the Fuel Supplier Survey. The Household Survey collects information concerning the housing unit through personal interviews with a representative national sample of households. In the Fuel Supplier Survey, data concerning actual energy consumption are obtained from billing records maintained by the household's fuel suppliers. These data are collected via questionnaires mailed to all the suppliers for the households in the Household Survey. Copies of all the data collection forms for the Household Survey and the adjunct Rental Agent Survey, and the Fuel Supplier Survey are reproduced in Appendix D, "Survey Forms."

This report provides national data based on the results from the Fuel Supplier Survey. A later report *Household Energy Consumption and Expenditures 1987, Part 2: Regional Data* will present the results of the Fuel Supplier Survey by Census regions and divisions. A previous report, *Housing Characteristics 1987*, presented data based on results from the Household Survey.

This appendix contains sections providing detailed information for the Sample Design, Household Survey and its adjunct Rental Agent Survey, Supplemental Data Collection for the Family Support Administration, Fuel Supplier Survey, Confidentiality of the Data, Data Preparation for the Report and Public Use Tape Preparation.

Sample Design

The universe for the RECS includes all housing units occupied as the primary residence in the 50 States and the District of Columbia. The sample of households used as the basis for the 1987 estimates was selected by using a probability sampling design developed especially for the RECS. The current sample design was used for the first time for the 1980 RECS and was revised prior to the 1984 survey.

Multistage Area Probability Sample

In both the original and revised sample designs, the total land area of the 50 States and District of Columbia was divided into approximately 1,800 Primary Sampling Units (PSU's) on the basis of Metropolitan Statistical Areas (MSA's), county and independent city boundary lines, and population characteristics.⁶

Specific objectives of the 1984 sample revisions were to update the information for U.S. counties used in sample selection, to maximize the overlap of specific PSU's selected in 1980 and 1984, and to minimize the restructuring of the sample within PSU's that continued in the revised design. The 1980 design included a requirement for a minimum level of precision of estimates for the 9 geographically defined Census divisions and the 10 Federal regions. The requirement for Census divisions was retained for the 1984 design, but the requirement for Federal regions was dropped. In all other respects, the design of sample revisions was based

⁶Boundary definitions for counties, independent cities, and equivalent units were generally those used by the Census of Population and Housing, 1970 and 1980, for the original and revised designs, respectively. There were 3,141 such units in the 1970 Census and 3,135 in the 1980 Census. Prior to 1983, MSA's were referred to as Standard Metropolitan Statistical Areas. The number of PSU's created for the 1980 and 1984 RECS sample designs were, respectively, 1,782 and 1,799. Additional detail on RECS sample design can be found in "The 1987 RECS Sample Design Procedures Manual," prepared by the Response Analysis Corporation.

Table A1. Sources of Data for 1987 RECS Sample Design

Data Components	Source of Data Used in 1980 Design	Source of New Data Used in 1984 Revisions
Population estimates for counties and equivalent units	July 1978 estimates of the Bureau of the Census	1980 Census of Population
Metropolitan statistical area (MSA) definitions	Lists published by Office of Management and Budget (OMB). Current as of early 1980, with some modifications based on estimates of population changes	OMB definitions published June 27, 1983
Principal home heating fuel	1970 Census of Housing	1980 Census of Housing

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

on a continuation of the general plan used for the 1980, 1981, and 1982 RECS. Three principal sources of information were used to update the data base used for sample revisions: population estimates, MSA definitions, and principal heating fuel (Table A1).

Stratification of PSU's in both the original and revised designs was based on the nine geographically defined Census divisions, metropolitan or nonmetropolitan definitions of PSU's, and to the extent feasible, on dominant space-heating fuel and weather conditions. PSU's in the original design were grouped into 131 strata and in the revised design into 129 strata (Figure A1).

Some PSU's comprising all or part of large metropolitan areas were large enough in population to be a stratum by themselves; PSU's of this type are called Self-

Representing (SR) because the sample from each PSU represents only that PSU. In other strata, one PSU was selected from among two or more PSU's in the stratum. Each of the PSU's selected from these strata is called Non-Self-Representing (NSR) because each PSU also represents the nonselected PSU's in its stratum. The revised design included 129 strata, of which 32 were SR PSU's and 97 were NSR.

Although both PSU's and strata were often defined somewhat differently in the two designs, the specific procedures used to make probability selections of PSU's for the revised design produced a high degree of overlap in the actual PSU's selected. Of the 129 PSU's in the revised design, 111 continued in the sample from the original design and 18 were newly selected.

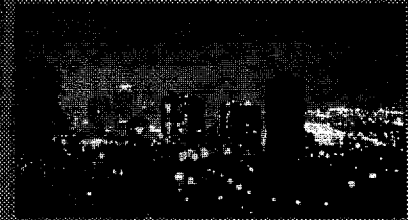


These single-family attached housing units are examples of housing structures sampled in the RECS.

Figure A1. Multistage Area Probability Sample Activities

Primary Sampling Units

(PSU). Large metropolitan areas or groups of counties containing small cities and rural areas. The United States was divided into PSUs from which a sample of PSUs was selected.



Minor Civil Divisions

(MCD). Cities, towns, townships, other civil divisions and Census County Divisions. The sampled PSU's were divided into MCD's. One or more MCD was selected from each sampled PSU.



Secondary Sampling Units

(SSU). Block Groups, Enumeration Districts, and/or Census Tracts. The sampled MCD's were divided into SSU's. One or more SSU was selected from each sampled MCD.



Segments

Neighborhoods of housing units. The sampled SSU's were divided into segments. One segment was selected from each sampled SSU. A list was prepared of all housing units in each sampled segment.



Ultimate Clusters

Groups of housing units. An ultimate cluster of approximately 5 housing units was selected from the list of housing units for each sampled segment. The housing units in the ultimate clusters were selected to be used for the RECS.



Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

A number of intermediate probability sampling stages producing successively finer geographic detail, preceded the final selection of RECS households in the 1987 sample.

- *Minor Civil Divisions (MCD)* such as cities, towns, and other Census units were selected within each PSU. Within the MCD's, Secondary Sampling Units consisting of census tracts, block groups, or enumeration districts (ED's) were selected. In the RECS design, 1,516 units are selected at this secondary level (tracts or ED's). These tracts and ED's continue in the RECS sample for a number of surveys. Rough field counts in tracts and ED's form the basis for selection of listing segments of 25 or more housing units, with well-defined geographic boundaries.
- A *listing segment* is selected from each tract or ED. Detailed field listings are created for selected segments by field workers who visit the area and identify each housing unit by street address, apartment number, or other obvious features.
- A *penultimate cluster* of 25 or fewer housing units is selected from each *listing segment*. The *ultimate cluster* to be contacted for interviews (averaging about 5 housing units for the 1987 RECS) is systematically selected from the penultimate cluster, and these housing units constitute the assignments given to interviewers.

Longitudinal Sample Design

A plan for rotation of sample units from an earlier RECS, first used in the 1982 RECS, was continued in 1987. The primary objective of this rotation plan was to observe changes in a sample of the same housing units over the period between two RECS data-collection cycles. To accomplish this objective in an efficient way and to set the stage for continuity in the RECS series, systematic random procedures were used to divide the total set of 1,516 tracts and ED's into four subsamples, designated in Table A2 as C, D, E, and F.

In the 1987 RECS, Groups C and D were the returning rotation groups in which procedures were designed to interview a sample of the same housing units that had been in the sample in the preceding 1984 RECS. This half of the sample had used the revised design for the 1984 RECS.

Groups E and F constitute the new rotation groups in which housing units were included in the RECS sample for the first time in 1987. Selection of housing units in the new rotation groups was based on the revised sample design used for the first time for this half of the 1987 RECS.

Procedures for updating the sample for new construction and for other changes in the housing unit stock were incorporated in sampling operations so that each rotation group, as well as the total RECS sample, is a probability sample of the population covered by the survey.

Returning Rotation Groups C and D

The general plan for these sample units (758 of the total of 1,516) was to conduct interviews in the same housing units that had been contacted 3 years earlier—including housing units that had been vacant, as well as noninterviews (refusals, not-at-homes, etc.), and completed units—plus a supplemental sample of housing units in sample clusters believed to include large proportions of low-income households.

Before contacting households for the 1987 RECS, interviewers made visits to sample segments to check 1984 housing unit listings for missed units and to update listings for new construction, demolition, and conversion of structures from one use to another. Newly constructed or converted units, and those missed in the 1984 listings, were sampled at the 1987 RECS sampling rate.

Rotation Groups E and F

The 758 sample units (at the census tract or ED level) in these rotation groups included 615 that continued in the sample from the original design and 143 newly

Table A2. Overview of RECS Sample Operations

Rotation Group	1982	1984	1987	1990
C	R	S ^a	R	N
D	R	N ^a	R	S
E	S	R	N ^a	R
F	N	R	S ^a	R

^a Revised sample used for the first time for these rotation groups; new tracts/ED's were selected in sample units that did not continue from the original sample.

R = Housing units return from preceding survey.

S = Selected housing units from the same penultimate clusters as had been used in the preceding survey.

N = Selected new listing segments.

selected units. In the 143 newly selected units, up-to-date field counts and detailed listings of housing units formed the basis for selection of a listing segment and a cluster of 25 housing units from the listing segment.

In the 615 tracts and ED's that continued in the sample, the first step was to perform a new construction update procedure based on a canvass, primarily by telephone, of local sources of information (such as building-permit-issuing agencies, zoning boards, and tax offices). The objective was to determine whether significant new construction—defined as groups of 25 or more housing units—had occurred within the tracts or ED's since 1982. In the canvass, significant new construction was found in census tracts and ED's in approximately 205 of the 615 units. New field counts were made and new segments were selected based on the new measures of size.

In census tracts and ED's in which significant new construction (clusters of 25 or more new housing units) was not found, procedures diverged in Rotation Groups E and F. In Rotation Group F, 1984 RECS housing unit listings were checked and updated (for such things as missed units, new construction) before the start of field contacts for interviews. This step in Rotation Group F was identical to the listing checks carried out for Rotation Groups C and D. However, housing units for the 1987 RECS sample were selected from among those *not* selected in the earlier RECS. In Rotation Group E, a new listing segment was selected for the 1987 RECS.

Supplemental Sample

A feature of the 1987 survey (continuing from previous RECS) was a supplemental sample of households designed to be merged with the main RECS sample and meet special analytical needs of the Office of Family Assistance, Family Support Administration (FSA). The supplemental sample comprised some 1,258 (17.5 percent) of the total sample of 7,183 occupied housing

units. See section "Supplemental Data Collection for the Family Support Administration" (FSA) later in this Appendix.

The plan for the supplemental sample included procedures to "oversample" households below poverty level, particularly those using electricity, fuel oil, or kerosene as the main space-heating fuel. The number of households in the population using these fuels (as the main space-heating fuel) is smaller than the number using natural gas. Consequently, the number of sample households (in the main sample) using electricity, fuel oil, or kerosene is smaller than the number using natural gas. The analytical needs of FSA require an increased sample size for households below poverty level, particularly those using electricity, fuel oil, or kerosene as the main space-heating fuel. Thus, procedures were designed to increase the sample size for households of these types to the extent feasible.

As a first step in selection of the supplemental sample, interviewers were instructed to rate the general income level of households in the listing segment based on their observations of housing units in the segment and their general knowledge of the area (after completing their listing of housing units in the segment). Interviewers placed each listing segment into one of four groups: Highest 25 percent (well-off or wealthy), upper middle, lower middle, or lowest 25 percent (poor or near-poor). Whenever possible, listing segments that were rated on income were also rated on main home-heating fuel in the sample segment.

The actual selection of supplemental units was accomplished by increasing sampling rates in listing segments that interviewers judged to include large proportions of poor or near-poor households and, in some cases, lower-middle income segments were included. Relative sampling rates were established for groups of housing units as shown in Table A3.

An additional aspect of the selection of supplemental units was a ceiling on the actual sampling rate that applied to any given sample unit. The ceiling was equal to the highest overall sampling rate used in any Census division in the 1987 RECS sample. Thus, in some cases

Table A3. Relative Sampling Rates Based on Income Rating and Main Home-Heating Fuels

Main Home-Heating Fuel	Income Rating		
	Upper-Middle or Highest	Lower-Middle	Poor or Near-Poor
Electricity or Fuel Oil/Kerosene	1.0	1.3	2.5
All Other Fuels	1.0	1.0	2.2

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

the relative sampling rates shown in Table A3 were adjusted downward so that the overall sampling rate for housing units did not exceed the ceiling rate for the 1987 RECS.

A relative sampling rate of 1.0 in Table A3 means that the overall sampling rate applied to households in a sample cluster is the rate established for the main sample. Relative sampling rates higher than 1.0 were used for households in the "oversampled" groups shown in Table A3. (For example, a relative sampling rate of 1.3 means that households in the group were sampled at a rate of 30 percent higher than the rate established for the main sample.) An estimated 1,258 additional households (that is, households selected as a result of the supplemental sampling process) were selected in 510 segments, and 1,108 interviews were completed in these households (including both personal and mailed questionnaires).⁷

The outcome of the oversampling procedure is summarized in Table A4. Some 30.7 percent of completed interviews in the supplemental sample were with households below the poverty level, compared with 13.0 percent of completed interviews in the main sample. The corresponding figures for 125 percent of poverty level were 43.3 percent and 20.4 percent of supplemental sample and main sample interviews, respectively.

Household Survey

Data Collection Procedures

The original sample consisted of 8,232 units, of which some 225 either were not used for dwelling purposes or were not habitable. Of the 8,007 habitable housing units, 824 were ineligible for this study due to a current vacancy or seasonal occupancy (the units were not the primary residence for the occupants). Personal interviews were conducted at 5,856 of the 7,183 eligible units, for a response rate of 81.5 percent. Subsequently, mail questionnaires were sent to 1,153 of the 1,327 households that had not participated in personal interviews. Completed questionnaires were returned by 373 of these households, or 32.4 percent of those mailed. Of the total eligible households, responses were received from 86.7 percent (or 6,229 households).

Approximately three-quarters of the personal interviews were completed in September and October 1987; 94 percent were completed by the end of December 1987. Interviewing continued until February 1988 in a few sample locations in which low response rates were

Table A4. Poverty Status in 1987 and Home-Heating Fuel in 1987 RECS Main and Supplemental Samples^a

Poverty Status and Home Heating Fuel	Basic Sample Households ^a		Supplemental Sample Households ^a	
	Number	Percent	Number	Percent
All Households	5,121	100.0	1,108	100.0
Below Poverty Level	665	13.0	340	30.7
Electricity	108	2.1	59	5.3
Fuel Oil/Kerosene	75	1.5	46	4.2
Other Fuels	482	9.4	235	21.2
Not Below Poverty Level ...	4,456	87.0	768	69.3
Below 125 Percent of Poverty Level	1,043	20.4	480	43.3
Electricity	159	3.1	81	7.3
Fuel Oil/Kerosene	135	2.7	70	6.3
Other Fuels	749	14.6	329	29.7
Not Below 125 Percent of Poverty Level	4,078	79.6	628	56.7

^a Households are classified according to the poverty status of the family or nonfamily householder. The actual reference period for income reported in the 1987 RECS was the 12 months preceding the RECS interview; the interview date for most households was within the final calendar quarter of 1987.

Notes: • Table shows unweighted numbers and percentages of completed units. • See "Glossary" for the definition of poverty.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

⁷The estimated numbers of basic sample interviews were derived by multiplying the number of household units in each ultimate cluster by the ratio: Sampling rate for basic sample / Sampling rate for total (basic + supplemental) sample. For example, the ratio above for a sample segment rated "lower-middle" for income level and "electricity or fuel oil/kerosene" as main home-heating fuel, in general, was equal to 1/1.3. The number of units in the supplemental sample was then equal to the total number of units in the ultimate cluster minus the estimated number in the basic sample.

experienced. Most of the 373 completed mail questionnaires were received in February and March 1988. In keeping with past practice in the RECS survey, November was regarded as the rough midpoint for data-collection activity. Thus, November 1987 was the date for determining the independent estimates of the size of the universe of households used in the ratio estimation of survey results. Detailed results of the Household Survey were published in *Housing Characteristics 1987*, DOE/EIA-0314(87), published May 1989.

The Interview

The average personal interview lasted 56 minutes, with 85 percent of the interviews lasting between 30 and 75 minutes. The interview with the householder (or spouse) covered structural features of the house related to energy, such as insulation, doors, and windows; the heating and cooling systems, with the fuels used in these systems; use of wood fuel; energy conservation improvements; household appliances; household vehicles; receipt of government assistance for the cost of heating; and demographic data on household members. The questionnaire is reproduced in Appendix D, "Survey Forms."

At the end of the interview, respondents were asked to sign an authorization form allowing the interviewing contractor to obtain records of energy consumption from the housing unit's energy supplier(s). At this time, the interviewer also measured the dimensions of the housing unit. (See "Estimates of Housing Unit Size" at the end of the Household Survey section, for further details on the measurement of housing units.)

The Interviewers

A total of 293 interviewers completed one or more personal interviews for this study. As shown in Table A5, 131 interviewers (45 percent) had completed interviews on a prior RECS. The remainder were conducting their first RECS, but had interviewing experience either with other survey research organizations, or with the U.S. Bureau of the Census.

Two-day regional training meetings were held in 5 locations around the country in August 1987. These meetings were attended by 248 of the interviewers (85 percent). Each session was led by a group of trainers who had attended a 2-day workshop in Princeton, New Jersey and were monitored by Department of Energy staff. The 2-day training session for interviewers covered general interviewing techniques, background of the Residential Energy Consumption Surveys, a question by question review of the household questionnaire, ways to measure the respondents' homes, the accurate recording of the Vehicle Identification Number (VIN), and administrative requirements. The 45 interviewers who were not able to attend a regional training meeting were trained either on the telephone by one of the trainers or in person by a field supervisor.

All interviewers were required to complete a practice interview and quiz on the questionnaire and sampling procedures. These materials were reviewed by the contractor's central office staff. The basic training document for both the regional meetings and other training was a 132-page manual, *Instructions for Interviewers, 1987 Residential Energy Consumption Survey*.

Interviewers were paid on an hourly basis for their work on RECS, including time for home study, attendance at training sessions, review of completed interviews, actual interviewing time, and travel time to and from training sessions and sample clusters. Interviewers were also reimbursed at standard mileage rates for use of personal vehicles and other travel expenses. Interviewers working in locations believed to present a hazard to their safety were compensated for use of an escort. Each interviewer conducted an average of 20 interviews. Nineteen interviewers each completed fewer than six interviews; the average for this group of 19 interviewers was 3.5 completed interviews. Seven interviewers completed 50 or more interviews; the average for this group of interviewers was 61.1 completed interviews. Twenty percent of the personal interviews were verified by telephone or mail to ensure that interviews were conducted as intended.

Table A5. Experience and Training of 1987 RECS Interviewers

Experience on Prior RECS	Training for This RECS ^a	Number of Interviewers
Yes	Regional training meeting	116
Yes	Other training	15
No	Regional training meeting	132
No	Other training	30
		293

^a All interviewers completed a practice interview and quiz.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

Rental-Agent Survey

The Rental-Agent Survey is an adjunct to the Household Survey to verify information from household respondents in rental units on fuels and main heating equipment used. Telephone interviews were carried out with rental agents and landlords of RECS households living in multiunit dwellings whose occupants did not directly pay to utility companies or fuel suppliers for one or more household fuels.

The interviews with rental agents or their representatives were conducted in the spring of 1988. Altogether, 303 rental agents were interviewed. These interviews covered 856 households in 401 buildings. The 856 households were 89.1 percent of the total of 961 households living in multiunit buildings who had one or more fuels included in their rent.

Comparisons were made between rental agents' and household respondents' reports on main heating fuel, main heating equipment, supplemental heating fuel, water-heating fuel, and air-conditioning fuel. Each discrepancy was individually examined. Changes were made in the household record whenever it was judged that the rental agent was more knowledgeable than the household respondent on specific fuels and/or equipment.

Editors generally followed the guideline that the rental agent was the more knowledgeable person when the landlord paid for the fuel and the fuel was used as the main home-heating, water-heating, or air-conditioning fuel, or when the rental agent's description of the main heating equipment differed from that of the household respondent. The respondent was generally considered the more knowledgeable person for the definition of supplemental heating fuel, as the supplemental heating fuel was more likely to be under the household's control, even in multiunit dwellings. The changes in the household records that resulted from these inquiries are given in Table A6.

Minimizing Nonresponse

In an effort to maximize the validity of the survey data, a multiwave, multicontact approach was employed. Before the initial contacts, a letter was sent to each household from the Director of the Office of Energy Markets and End Use, briefly describing the purposes and stressing the importance of the survey. Beginning in September 1987, interviewers made up to seven or more callbacks at different times of the day throughout the week in an effort to minimize the number of uncontacted households. The interviewers also queried neighbors regarding the most opportune times to contact the prospective respondent. By the end of the first wave, 225 addresses were found to be nonresidential and an additional 760 were found to be ineligible (Table A7). Some 5,075 personal interviews were completed, leaving 2,172 nonrespondents in this wave.

A second wave was initiated in an effort to contact households that were not available during the first wave and to attempt to convince selected first-wave refusals to reconsider. A new set of letters preceded the renewed effort and, in most cases, the sampled housing units were assigned to a different interviewer. Again, up to seven or more attempts were made to contact the prospective respondents. At the end of this wave, an additional 60 addresses were found to be ineligible. As a result of the second wave, an additional 717 interviews were completed, leaving 1,395 nonrespondents.

A third wave was initiated in an effort to reach nonrespondents in a number of locations that had low completion rates. Four addresses were found to be ineligible and an additional 64 personal interviews were completed in the third wave.

In a final attempt to reduce nonresponse, an abbreviated version of the questionnaire (adapted for self-administration) was mailed to most of the remaining

Table A6. Changes Made in Household Records on the Basis of Information from Rental Agents

Type of Changes Made in Household Records	Fuel Paid by Rental Agent	Number with Any Changes Made	Percentage with Changes Made
All Households in Rental-Agent Survey	856	358	42
Main Heating Fuel	671	62	9
Main Heating Equipment	(*)	206	31
Supplementary Heating Fuel	(*)	29	4
Water-Heating Fuel	811	120	15
Air-Conditioning Fuel	154	61	40

* For the 671 households whose rental agent paid for the main heating fuel, responses of rental agents and household respondents were compared.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

Table A7. Interviews Completed by Stage

	Personal Interviews			Status After Third Wave	Mail Questionnaire	Final Status
	First Wave	Second Wave	Third Wave			
Total Listed Units	8,232	2,172	1,395	8,232	1,327	8,232
Nonhousing Units						
Business, Other	58	0	0	58	--	58
Not Habitable	92	0	0	92	--	92
Nonhousing Unit	75	0	0	75	--	75
Subtotal	225			225		225
Housing Units	8,007	2,172	1,395	8,007	1,327	8,007
Ineligible Units						
Vacant	646	53	4	703	--	703
Seasonal Vacant	114	7	0	121	--	121
Subtotal	760	60	4	824		824
Eligible Units	7,247	2,112	1,391	7,183	1,327	7,183
Not Completed—Personal Interview						
No One Home	715	361	65	220	--	220
Eligible Respondent Not Home	78	25	6	32	--	32
Refused	1,231	614	58	* 1,004	--	1,004
Illness	17	5	0	9	--	9
Language Barrier	28	7	0	14	--	14
Wrong Respondent or Unit	5	0	0	3	--	3
Not Contacted ^b	50	377	1,198	21	--	21
Other	48	6	0	24	--	24
Subtotal	2,172	1,395	1,327	1,327		1,327
Not Completed—Mail Questionnaire						
Unusable Address	--	--	--	--	41	41
Post Master Return	--	--	--	--	85	85
Returned Blank	--	--	--	--	18	18
Returned Unusable	--	--	--	--	1	1
Not Returned	--	--	--	--	676	676
Other Not Mailed	--	--	--	--	133	133
Subtotal					954	954
Total Interviews Completed	5,075	717	64	5,856	373	6,229

* A household that refused an interview during any one of the three waves was classified as a "refusal" for the final status even though no one was at home in the second or third wave.

^b Includes households that moved after initial contact.

-- Data not applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

nonrespondents. As a result of this effort, 373 additional households responded. After three waves of personal interview attempts and the mailed questionnaire, 954 households or 13.3 percent of all eligible housing units had not responded.

These efforts were successful in accomplishing the following improvements in response:

- Approximately 82 percent of the households were contacted and agreed to be interviewed personally. An additional 5 percent of the sample households completed and returned mailed questionnaires.
- Of the 6,229 responses, 81.5 percent were obtained during the first wave of contacts; 11.5 percent

were obtained during the second wave; and 1.0 percent resulted from third-wave contacts. Some 6.0 percent were responses to the mailed questionnaire.

- Of all households that participated in the personal interviews, 31.8 percent required only one visit in the first wave and 71.0 percent were completed with no more than two first-wave callbacks.
- A total of 366 personal interviews were completed in the second and third waves with respondents who had previously refused to participate, representing 6.3 percent of all completed personal interviews. In addition, of the 373 mailed questionnaires that were completed and returned, 286 were from households that previously refused to participate.

Response Rates and Household Characteristics

This section of the report compares various response and nonresponse rates across Census region, location type, and housing structure type. These rates are reported in Table A8.

Several patterns are clear from Table A8. First, personal interviews enjoyed the most success in the South Region (84.0 percent), in non-MSA areas (85.6 percent), and among residents of single family or mobile homes (82.3 percent). Conversely, the interviewers had their lowest success rates in the Northeast Region (79.0 percent), metropolitan areas (central city) (79.8 percent), and in buildings with five or more residential units (79.4 percent). When looking at the categories comprising these groupings it is important to remember that their characteristics are not necessarily independent. Rather, they are very likely to overlap; for example, large apartment buildings are concentrated in metropolitan areas.

The total response-rate patterns with regard to highest and lowest rates generally are not affected by adding the mailed-questionnaire responses; however, the overall range from highest to lowest decreases by one to two percentage points. The response to the mail ques-

tionnaire tended to be higher in areas where the refusal rate to the personal interview was the highest.

Overall response rates are approximately four percentage points higher for new rotation groups (households not contacted for an earlier RECS) than for returning rotation groups. Conversely, refusal rates are approximately four percentage points higher for the returning rotation groups that had been contacted in an earlier RECS or companion survey, Residential Transportation Energy Consumption Survey (RTECS). These findings replicate results for earlier RECS.

Data Editing

Completed interviews were mailed by the interviewers to the survey contractor headquarters. The first step in the review process was to verify the accuracy of the basic identifying information. Next, the questionnaires were manually reviewed by two editors to ensure completeness and the logical consistency of selected patterns of responses, and to prepare the questionnaires for translation into machine-readable form. Key punching of the data was 100 percent verified. Finally, the data were machine edited to further ensure completeness, logical consistency, and the legitimacy of coded values. The computer editing utilized a proprietary software package called EDITOR II.

Table A8. Response Rates for Region, Location, Type of Structure, and Rotation Groups
(Percentage of Eligible Housing Units)

Characteristic	Response Rates			Personal Interview Nonresponse Rates	
	Personal Interview	Mail Questionnaire	Total Response	Refuse	Unable to Contact
Total	81.5	5.2	86.7	14.0	4.5
Census Region					
Northeast	79.0	5.7	84.7	16.3	4.7
Midwest	80.7	5.9	86.6	15.1	4.2
South	84.0	4.2	88.2	11.7	4.3
West	81.8	5.1	86.9	13.3	4.9
Location Type					
MSA--Central City	79.8	5.2	85.0	14.4	5.8
MSA--Outside Central City	80.4	6.0	86.4	15.6	4.0
Non-MSA	85.6	4.1	89.7	10.9	3.5
Structure Type					
Single-Family or Mobile Home	82.3	5.4	87.7	14.5	3.2
Buildings with Two to Four Units ..	80.1	3.9	84.0	12.4	7.5
Buildings with Five or More Units .	79.4	5.4	84.8	13.0	7.6
Sample Rotation Group					
Returning Rotation Group	79.5	5.2	84.7	16.3	4.2
New Rotation Group	83.5	5.1	88.6	11.7	4.8

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

The contractor attempted to resolve inconsistencies or ambiguities in the data internally, by reference to other parts of the questionnaire. When these efforts failed to resolve an important problem, particularly those involving heating fuels or heating equipment and/or relationships between questionnaire responses, the contractor made a followup contact with the rental agent or a telephone contact with a member of the household in question. Telephone contacts with a household member were completed with approximately 1 percent of households during the course of data editing for this survey.

Survey Estimates

All the statistics published in this report are estimates of population values, such as the total amount of energy consumed in the residential sector. These estimates are based on a randomly chosen subset of the entire population of households. The universe includes all households in the 50 States and the District of Columbia, including households on military installations. The definition of "households" is the same as that used by the U.S. Bureau of the Census. At the time of this RECS, November 1987, the universe was estimated to contain 90,537,000 households, based on the Current Population Survey (CPS) estimates of the population.

There are two major types of nonresponse--for an entire sampled household (unit nonresponse), or for a particular item of interest from a responding household (item nonresponse). The next two sections provide details on the procedures followed for each type of imputation. A third section deals with a special category of item nonresponse--the size of housing units in square feet.

Adjustments for Unit Nonresponse

Weight adjustment was the method used to reduce unit nonresponse bias in the survey statistics. Weights were calculated for each sample household. The household weight reflected the selection probability for that household and additional adjustments. These adjustments included correcting for potential biases arising from the failure to list all housing units in the sample area and to contact all sample housing units. Contacts were not successful with 13.3 percent of the eligible units.

The adjustment for these noninterviews was designed to spread the effects of nonresponse over the interviewed sample of households in the final cluster. The noninterview weight adjustment is equal to the number

of households in the ultimate cluster (interviews plus noninterviews) divided by the number of interviews. When the weight adjustment computed in this way was greater than 2.0, however, that part of the noninterview adjustment that exceeded 2.0 was spread over the remaining ultimate clusters in the PSU.

The failure to list all housing units in the field-listing task is a common problem in surveys of this type. The result is an undercount of housing units in the sample area and, hence, an underestimate of the number of households in the universe. The undercount in the 1987 RECS is in the range of 8 to 10 percent. This problem is treated in two ways in the RECS. One treatment occurs during the interviewing process. The second treatment occurs in the estimation process. During the interviewing stage, unlisted housing units or households are discovered by querying the household where interviews are conducted to determine if other households are present in the unit. In addition, the interviewer is instructed to conduct an interview at all housing units contained in the geographical area between the interviewed household and the next listed address. This tactic reduces the number of missed households but does not completely eliminate the noncoverage problem.

The noncoverage problem is also treated by using ratio estimation to adjust selected estimates of household counts to official population values. Ratio adjustment took place in two stages for the 1987 RECS. The first stage adjustment was computed from information for PSU's in NSR strata only. A separate factor was created for each of 20 cells (four regions classified by five home heating-fuel categories). The implementation of this factor reduced somewhat the amount of variance caused by the sampling of PSU's. The first-stage adjustment for Cell "c" is given by:

$$R_{1c} = N_c / M_c$$

where N_c is the total number of households (1980 Census population) in Cell c for all PSU's in RECS NSR strata (including those PSU's not selected for RECS). M_c is an estimate of N_c obtained from the 1980 Census data for the NSR PSU's that were selected for the 1987 RECS. In particular, M_c is given by the sum (over all NSR PSU's selected for RECS) of the product of the PSU sampling weight and the number of households in Cell c (1980 Census population) for the PSU.

For all observations in NSR PSU's, the household weights (adjusted for nonresponse) were multiplied by R_{1c} where c is the cell in which the observation falls.

The second-stage factor adjusted the weights (after the nonresponse adjustment and the first-stage adjustment) from the survey so that the sum of the weights in the

12 categories shown in Table A9 will equal the CPS estimates for the population in the 12 categories. The second-stage adjustment for Category k is given by:

$$R_{2k} = H_k / G_k$$

where H_k is the CPS estimate of the number of households in Category k, and G_k is the sum of the RECS households weights before the second-stage ratio adjustment (after nonresponse adjustment and the first-stage adjustment) over all households in Category k. H_k is based on a linear interpolation of values for each of the 12 cells between CPS estimates for March 1987 and March 1988.

For all observations, the households weights (adjusted for nonresponse and the first-stage adjustment) were multiplied by R_{2k} where k is the category in which the observation falls. This second-stage factor reduced both the between-PSU variance and the within-PSU variance.

The third stage in the weight adjustments was similar to the second stage. The only difference was that instead of the 12 categories used in the second stage, the following 3 categories were used:

- One-person households, male householder,
- One-person households, female householder,
- All other households.

The purpose of this third stage was to reduce possible bias in the RECS sample due to undercoverage of one-person households, particularly those comprised of a single male.

The fourth and final stage in the weight adjustments was exactly like the second stage. The final household weights will (for each of the categories in Table A9) sum to the control totals shown in that table.

Adjustments for Item Nonresponse

Item nonresponse occurs when respondents do not know the answer or refuse to answer a question, or when an interviewer does not ask a question or does not record an answer. Imputations were made for nonresponse on about two-thirds of the items for which some nonresponse occurs, including most items to be used for making national estimates. Items for which national estimates are made, but for which imputations were not made, include questions on the presence, type, and amount of attic and floor insulation; thermostat settings; and the presence of wall insulation. For these items, no variables existed where correlations with the missing item were strong enough upon which to base an imputation procedure.

Hot-deck imputation was the method used most frequently. This procedure requires sorting the file of households by variables related to the missing item. A household is then selected that has the same value for the related variables, and this "donor" household supplies the value for the variable that is missing in the "donee" household.

Less frequently used imputation methods included regression estimates, random selection from the known values of a variable, and deductive and allocation procedures. Regression procedures were used to impute the total square footage of the housing unit when actual measurements were missing. Discussion of the regression procedure and other imputations involved in the square footage estimates is found in the following section "Estimates of Housing Unit Size."

The random selection procedure was used primarily to assign dates (month and/or year) when those responses were missing, and to impute for missing numbers that were conditional on other numbers (e.g., number of storm windows, conditional on total number of windows).

Deductive procedures were used primarily for missing information on fuels used for specific purposes and methods of payment for fuel uses. The amount of missing data on these items was generally quite small; other

Table A9. Population Estimates Used as Controls in Ratio Estimates

Census Region	Thousand Households			
	MSA—Central City	MSA—Outside Central City	Non-MSA	Total
Northeast	6,653	10,173	2,223	19,049
Midwest	6,700	9,112	6,447	22,259
South	9,426	12,710	8,769	30,905
West	6,868	8,607	2,849	18,324
Total United States	29,647	40,602	20,288	90,537

Note: See "Glossary" for definition of MSA and Non-MSA.

Source: Estimates derived from the March 1987 and March 1988 Current Population Surveys, U.S. Bureau of the Census.

available information in the questionnaire, or from related data sources (utility bills and rental agent survey), provided reasonably conclusive assignments for the missing data.

Allocation procedures involved the use of explicit rules to assign values in place of missing information on relationship to householder, and age and sex of persons in household, based on the configuration of known information on these variables for other household members.

The numbers of questionnaire items for which various types of imputation procedures were used are shown below.

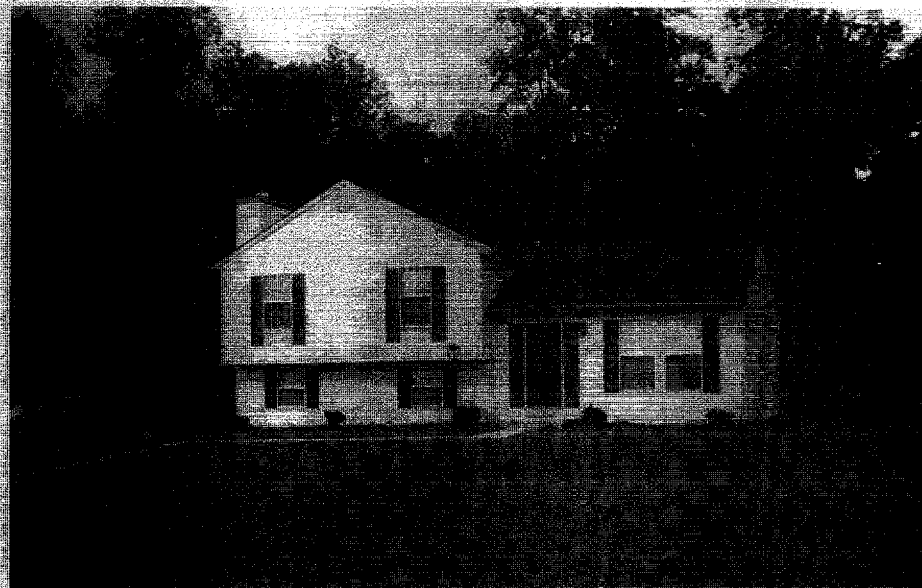
Imputation Method	Number of Questionnaire Items
Not Imputed	150
Imputed	272
Hot-deck	116
Random	62
Deductive	59
Allocation	35
Total*	422

*Excludes 45 items for which missing values, if any, are determined by explicit editing rules in the initial stages of questionnaire editing.

Table A10 shows the most frequently imputed items, the number of cases requiring imputation, and the method used.

The amount of item imputations for the 373 mailed questionnaires was considerable since the mailed questionnaire contained only a small subset of questions from the household interview. For the mailed questionnaire, a modified hot-deck imputation method was used. A hot-deck matrix was created for both mailed questionnaire and personal-interview households using Census region, type of housing unit structure, space-heating fuel, hot-water fuel, and presence and type of air conditioning. Whenever possible, a donor personal-interview household was chosen for each mailed-questionnaire household from the same cell of the hot-deck matrix. For 95 percent of the mailed questionnaires, donors matched on all hot-deck variables.

Because each cell of the matrix usually contained several possible donors, a donor was chosen from the cell on the basis of how closely it matched the mailed-questionnaire household on a number of additional variables. These variables were: income, number of household members, number of household vehicles, age of householder, tenure, number of rooms, model year of newest vehicle, and household structure (married couple, other). Except for information on household vehicles, which was taken directly from the mailed questionnaire, the entire set of responses from the donor household was imputed to the mailed-questionnaire household. This means that all responses for mailed-questionnaire households are imputed except for weather data, fuel-consumption data acquired from the household's fuel suppliers, the geographic location of the mailed-questionnaire household, information on household vehicles, and those items in the hot-deck imputation process for which an exact match was obtained.



This single-family detached housing unit is an example of some of the housing structures included in the RECS.

Table A10. Items Most Frequently Imputed

Imputed Item	Cases Imputed	Percentage of Total Sample ^a (5,856)	Method of Imputing	Question Number on Questionnaire
1987 Family Income	665	11	Hot-deck	109
Main Fuel Same as in November 1984	472	8	Hot-deck	9
Year House Was Built	454	8	Hot-deck	3
Availability of Natural Gas	354	7	Hot-deck	122
Roof or Ceiling Insulation Added Since September 1985	211	4	Hot-deck	60
Insulation Added Between House and Basement or Crawl Space Since September 1985	166	3	Hot-deck	66a
Lower Rent Due to Government Aid	162	3	Hot-deck	119
Storm Doors for Non-sliding Doors Added Since September 1985	135	2	Random	48b
Storm Windows Added Since September 1985	126	2	Random	52
Warm Air Forced Through Ducts	107	2	Hot-deck	14
Heating System Broken Last Winter	104	2	Hot-deck	25a
Basement or Crawl Space Heated	95	2	Hot-deck	170
Square Feet of Housing Unit	71	1	(b)	--
No Heat from Landlord Last Winter	65	1	Hot-deck	24a
Ran Out of Bulk Fuel Last Winter	64	1	Hot-deck	23a
Marital Status of Householder	64	1	Hot-deck	103
Utility Shut Off Fuel Last Winter	62	1	Hot-deck	22a
Month Caulking Was Added	60	1	Random	67e
Age of Householder	60	1	Allocation	96
Government Assistance in Paying Cooling Costs ..	57	1	Hot-deck	111b
Government Assistance for Other Energy Costs ..	57	1	Hot-deck	111c
Condominium or Cooperative	57	1	Hot-deck	116
Government Provided Other Energy Device	55	1	Hot-deck	110h
Government Assistance in Paying Heating Costs ..	55	1	Hot-deck	111a
Hot Water Equipment Heat Water for Other Units ..	52	1	Hot-deck	37
Age of Second Household Member	52	1	Allocation	96
Government Provided Furnace Tuneup	52	1	Hot-deck	110g
Month Storm Windows Were Added	51	1	Random	53
Caulking Added Since September 1985	51	1	Hot-deck	66e
Month Weather Stripping Was Added	51	1	Random	67f
Government Provided Furnace Repairs	51	1	Hot-deck	110f
Employment Status of Third Household Member ..	50	1	Hot-deck	96
Government Repaired Broken Windows or Doors ..	50	1	Hot-deck	110c

^a Mailed questionnaires are not included in the percentage. To account for these, add five percentage points to the percentage points given.

^b See section on "Estimates of Housing Unit Size."

— Data not available.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

Estimates of Housing Unit Size

Interviewers for the 1987 RECS were given a retractable 50-foot metal tape measure to ascertain the dimensions of housing units. The instructions were to measure the "area enclosed from the weather." This included garages attached to the house, attics either heated or finished, and basements enclosed from the weather (see "Square Feet" in "Glossary" for further definition). Interviewers indicated on a rough-drawn diagram of the floor plan which areas were heated and unheated and recorded the dimensions of the heated areas and the unheated areas. This finer breakdown into heated and unheated areas more closely measures the floorspace of the housing unit that places the demand on the heating system and, therefore, is the figure that may prove to be more useful in analyzing residential energy consumption. All measurements were rounded to the nearest foot by the interviewer or in the editing process. Interviewers were given an option of measuring the home from the inside, taking into account the thickness of inside walls, or from the outside.

Interviewers were instructed to measure all housing units including units in the returning Rotation Groups C and D, even if there exists complete measurements taken in the 1984 RECS. (See Longitudinal Sample section earlier in this Appendix for a discussion of Rotation Groups.) The subsample of households in Rotation Groups C and D with complete measurements in 1984 and 1987 will serve as the basis for further methodological analyses of differences between 1984 RECS and 1987 RECS measurements. (See Appendix C, "Quality of the Data" for a brief comparison of the two measurements.)

Interviewers attempted to measure the size of all 5,856 housing units where personal interviews were conducted. In 5,785 cases, usable measurements were acquired or were available from data collected during the 1984 RECS. In 71 cases, the measurements either were not usable or were not made. Although most cases contained the basic information, some imputa-

tions were required to produce a final set of three square footage amounts for each housing unit:

HOMEAREA = total square footage of floorspace enclosed from the weather

HEATED = total square footage of heated floorspace

UNHEATED = HOMEAREA - HEATED = total square footage of unheated floorspace

Table A11 indicates the number of cases with missing data. The imputations required standardizing all measurements to outside measurements when the measurement was made from inside the home, characterizing a measurement as inside or outside when this was unknown, apportioning the total space between heated and unheated when this proportion was unknown or partially known, and estimating the total square footage when the measurements were not made or not usable.

The following 3 sections describe the procedures followed for each of the three major categories of data. The final section provides a comparison of the measurements from the 1984 and 1987 RECS.

Treatment of Housing Units with Complete Measurements

As shown in Table A11, 4,272 homes had complete dimensions for all enclosed areas and information on which areas are heated and which areas are unheated.

The only adjustment required for these cases was to scale up the measurements for the 1,794 homes that were measured on the inside. The inside measurements were standardized to outside dimensions. The scaling factor was determined for each housing unit as a function of the floorspace of the first floor, the total floorspace of the home, and the housing unit type. The formula for the scale factor (SCALE) is given below:

$$\begin{aligned} \text{SCALE} = & 1.0955 \\ & - .00004359 \times \text{FSFF} \\ & + .000021795 \times \text{TFS} \\ & - .07875 \times \text{IMH} \\ & + .02745 \times \text{ISAH} \end{aligned}$$

Where:

FSFF is the floorspace of the first floor,

TFS is total floorspace of the home,

IMH is the indicator variable for the mobile home and,

ISAH is the indicator variable for the single family attached home.

The above equation indicated that the scale factor varies by the floorspace of the first floor, the total floorspace, and the type of dwelling. In particular, the scale factor is reduced when the dwelling is a mobile

Table A11. Completeness of Data on Square Footage of Housing Units

Amount of Information Collected	Number of Households	Percent
Complete Set of Dimensions	4,272	73
Outside Measurement of Home	2,478	42
Inside Measurements of Home	1,794	31
Partial Information		
Information available on heated and unheated areas.		
Unknown whether dimensions are for inside or outside of home	1,213	21
Total floorspace known but information on heated and unheated areas is missing. Also may be unknown whether dimensions are for inside or outside of home	157	3
Basement dimensions missing	62	1
Complete set of dimensions for all floors except basement. Basement total floorspace known, but information on heated and unheated areas for basement is missing	65	1
Values for heated and unheated were taken from 1984 RECS data	16	0
All dimensions missing or unusable	71	1
Total	5,856	100

Note: The floorspace for the 373 households responding by mail was imputed through a hot-deck procedure. These mail questionnaires are not included in this table.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-457A, 1987 Residential Energy Consumption Survey.

home and is increased when the dwelling is a single-family attached home. For dwellings with only one floor, the scale factor decreases as the floorspace increases. For dwellings with more than one floor, the scale factor decreases as the floorspace of the first floor increases. The scale factor increases as the floorspace of the remaining floors increases.

These scale factors, which increased the inside measurements, ranged from 1.01 to 1.17. Ninety percent of the scale factors were between 1.067 and 1.130. If the equation resulted in a scale factor of less than 1.0, the scale factor was set equal to 1.01. There was no upper bound placed on the scale factor.

The equation was developed in the following manner: Regression prediction equations were developed independently for homes measured from the inside and homes measured from the outside. Both equations were used to generate estimates of floorspace for homes measured from the inside. The relationship between the ratio of predicted "outside" to "inside" floorspace, the actual inside floorspace for the first floor, the actual inside total floorspace for these homes, and the housing type were used in fitting the regression equation for the scale factor.

Treatment of Housing Units with Some Missing Data

The 1,213 cases lacking information as to whether the measurements were inside or outside, or a combination of inside and outside, were treated as though measurements were outside. This was because average predictions based on regression equations using homes measured outside matched average totals for this group very closely, while predictions based on regression equations using homes measured inside were seriously biased on the low side.

The 157 cases lacking information on the ratio of heated to unheated space borrowed that ratio from housing units with complete data, on a PSU-by-PSU basis. For most of these cases, information was also lacking as to whether the measurements were inside or outside, and measurements were again assumed to be outside. In 7 of these 157 cases, the measurements were known to be inside measurements and scale factors were used to increase the floorspace estimates.

For the 62 cases with missing basement dimensions, the basement floorspace was imputed by using a simple regression based on the floorspace of the first floor. The heated and unheated areas were determined or imputed and then added to known totals for the remaining floors. In 20 of these 62 cases, the measurements for the remaining floors were known to be inside measurements and scale factors were used to increase the floorspace estimates.

There were 65 cases in which the ratio of heated to unheated space for the basement was unknown. This

ratio was imputed by using an appropriate empirical distribution of heated to unheated ratios. Three such distributions were used: one for single-family homes with basements only; one for homes with a basement plus crawl space and/or slab; and one for basements of homes in buildings with two to four units. In 11 of these 65 cases, the measurements were known to be inside measurements and scale factors were used to increase the floorspace estimates.

Treatment of Housing Units with No Usable Measurements

A regression equation was used for the 71 cases with no usable data. After HOMEAREA had been imputed by using the regression equation, the ratio of heated to unheated space was imputed using the same procedures described above for housing units for which that ratio was missing.

The prediction equations for outside dimensions were used in the imputations because regression equations based on cases with inside measurements did not yield fits that were substantially better. This procedure eliminated the need to scale up these estimates to outside dimensions.

Supplemental Data Collection for the Family Support Administration

Portions of the 1987 RECS data set and analyses are based on a supplemental data collection carried out by telephone in mid-1988. The primary purpose of this followup activity was to collect additional information of interest to the Family Support Administration on government assistance to low-income households for use in program administration of the Low-Income Home Energy Assistance Program (LIHEAP).

The supplemental data collection was carried out entirely by telephone in May 1988. Telephone contacts for this purpose were combined, whenever possible, with the midyear contact for the 1988 RTECS. Information was collected on government assistance to low-income households to pay heating costs for the period from October 1, 1987 to March 31, 1988.

A household was eligible for the supplemental survey if: the income question in the 1987 RECS was not answered; the income of the family was less than \$30,000 and less than 175 percent of the federal LIHEAP eligibility guideline; the income of the family was less than 125 percent of the federal LIHEAP eligibility guideline; or if the household reported receiving LIHEAP or public assistance during the 1987 RECS.

interview. Of the 3,831 households included in this group, 2,385 (62.3 percent) followup interviews were completed. Nonrespondents included households with no phones, households that could not be reached or refused to be interviewed, and households that could not be reached or refused earlier RTECS contacts.

Fuel-Supplier Survey

The overall objective of the fuel-supplier survey was to provide data on which to estimate the annual fuel consumption and expenditures of sample households. Five fuels were covered in the supplier survey—electricity, natural gas, fuel oil, kerosene, and LPG.⁸ For each of the fuels, the goal was to obtain complete consumption records from January 1, 1987 through December 31, 1988.

Toward the end of the household interview, each household reported for each use of the fuel whether or not the fuel was paid for by the household, included in rent, or paid another way. For the households that paid directly, the respondent was asked for the names, addresses, and telephone numbers of the fuel companies supplying the household; these respondents were also asked to sign a form, authorizing the contractor to collect consumption data from the suppliers.

Altogether, the fuel-supplier survey included initial contact attempts with 1,025 companies. The number of companies in the survey supplying each fuel and the

total number of households supplied are shown in Table A12.

Data Collection Procedures

Data-collection procedures for electricity and natural gas companies included at least the following steps:

- An initial letter from the Director of the Office of Energy Markets and End Use, addressed to the president or other official in the company, outlining the general nature of the request for participation. Enclosures in the letter included a printed statement, "About the Residential Energy Consumption Survey," specimen copies of reporting and authorization forms, and a postage-paid postcard with a checklist of available publications and data tapes.
- A telephone contact to determine the name of the person to whose attention the survey materials should be sent.
- The mailing of survey materials to the person named as contact person.
- A followup-telephone contact a few days later to answer questions or discuss survey procedures as necessary.
- Completed forms or copies of records returned by mail.
- A letter from the survey contractor thanking the company for its effort.

Table A12. Companies in Fuel-Supplier Survey and Number of Households Supplied

Fuel Supplier	Number of Companies ^a	Number of Households with Companies Identified
Electricity	266	5,345
Natural Gas	138	3,068
Fuel Oil or Kerosene	440	636
Kerosene	72	98
LPG	205	440

^a The total number of companies in the survey was 1,025—41 supplied both electricity and natural gas; 14 supplied fuel oil and LPG; 28 supplied fuel oil and kerosene; 3 supplied LPG and kerosene; and 5 supplied LPG, fuel oil, and kerosene.

Notes: • The fuel-oil figure excludes 24 households with suppliers unknown and 9 households whose estimates of fuel-oil quantities were based mainly on cash-and-carry purchases. • The kerosene figure excludes 7 households with suppliers unknown and 206 households whose estimates of kerosene quantities were cash-and-carry purchases. • The LPG figure excludes 9 households with suppliers unknown. • Households were asked for names of their "fuel oil or kerosene" suppliers. • For those households using both fuels and more than one supplier, it was not possible to determine which fuel was purchased from a given supplier until data were received.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

⁸Households using LPG only for outdoor cooking grills were not included in the LPG data collection; LPG used by these households is excluded from consumption and expenditures estimates. Data on usage of wood fuel were reported by the household, since it was not practical to collect these data from suppliers as is done with the major home fuels. Unless otherwise noted, consumption of wood is not included in the tables for this report.

The personal contacts established at an early point largely precluded mailings of materials to an inappropriate person and the delays that might develop from such mailings.

Procedures for fuel oil or kerosene and LPG dealers were the same as for electric and natural gas companies up through and including the mailing of survey materials to the company person named as the contact. These companies, however, most often had only one or two households for which information was to be supplied, and data collection was generally completed by telephone. A pretest of the procedure conducted earlier had indicated a somewhat greater likelihood that companies would respond by telephone than as a result of a request to complete and return the forms by mail.⁹ Companies that chose to return the forms by mail, however, were not discouraged from doing so.

After the company returned the information, additional contact with companies and households was sometimes required to identify the correct record in the company files.

Data-Collection Dates

The first set of advance letters was mailed to utility companies in late January 1988. The cutoff date for receipt of usable information was October 30, 1988.

Nonresponse Statistics

The proportion of households that did not sign authorization forms (access to records denied) was in the range of 1 to 9 percent for the five fuels. Most households that signed authorization forms did so at the time of the personal interview or at the time of completing the mailed questionnaire. To maximize the number of households with records, however, a followup request was mailed to those who did not sign a form at the time of the personal interview. About 19 percent of this group returned signed forms in response to the mail request and, therefore, were included in the fuel-supplier survey.

Table A13 shows that factors affecting nonresponse are somewhat different for fuel oil, kerosene, and LPG than they are for electricity and natural gas. The most frequent reasons for nonresponse for households using

fuel oil, kerosene, or LPG were that the company was unknown or not contacted and that the dealer could not identify the customer. A number of factors contribute to this nonresponse. First, many customers purchase fuel from a number of dealers on a cash and carry basis. Second, some customers use several different fuel suppliers and pay cash for deliveries. In both cases, few records are kept and efforts to get consumption records for households rarely are successful.

Refusal of companies to participate in the survey was not a significant factor.

Some additional factors related to the quality of fuel records are discussed in the following section on data processing and imputations.

Data Processing

The energy consumption and expenditure statistics presented in this report are based on the individual annual consumption and expenditures amounts for each household. Individual consumption and expenditure amounts are calculated for each household for each of five fuels (electricity, natural gas, fuel oil, kerosene, and LPG). None of the households that participated in the 1987 RECS used all five fuels, but the majority of the households did use two or more fuels. When possible, the annual consumption and expenditure amounts were calculated using data obtained from the fuel-supplier survey.

The fuel-supplier survey was conducted for households that paid their own fuel bills directly to the supplier and signed a waiver to authorize access to their billing records. These limitations meant that imputations of fuel consumption and expenditures were required for households whose fuel bills were included in the rent and for households that did not permit access to their records.

Imputations were also required for households when the supplier survey failed to produce usable billing records and when the household did not provide usable estimates of the annual consumption and expenditures. The billing records for a given fuel and a given household were considered missing (and hence nonusable) if: (1) the supplier refused to participate, (2) the supplier did not keep records, (3) the supplier could not find the households records, (4) the information provided by the household was insufficient to locate the supplier, or (5) the supplier was no longer in business.

⁹The test is described in *RECS: Consumption and Expenditures - April 1980 Through March 1981, Part 1: National Data*, DOE/EIA-0321/1 (Washington, D.C., September 1982), Appendix A, "How the Survey Was Conducted."

Table A13. Energy-Consumption Records and Missing Data for Survey Households Using Electricity, Natural Gas, Fuel Oil, Kerosene, or LPG
(Percentage of Households Using the Fuel)

Survey Households	Electricity	Natural Gas	Fuel Oil	Kerosene	LPG
Total Households Using the Fuel (Sample Number).....	100.0 (6,228)	100.0 (3,991)	100.0 (952)	100.0 (414)	100.0 (543)
Usable Records Received from Fuel Supplier ^a	82.8	73.4	55.4	11.4	63.5
Quantity Estimated by Household ^b	(^d)	(^d)	0.3	57.7	0.4
Unusable Records Received from Fuel Supplier.....	0.9	1.9	7.0	2.7	8.7
Household Pays Supplier Directly—No Record Available for the Household.....	8.8	7.9	13.0	28.0	21.9
Household Not Identified in Company Records.....	2.1	1.3	3.4	1.7	5.9
Company Refused to Participate.....	(^d)	(^d)	(^d)	(^d)	(^d)
Company Unknown or Not Contacted.....	(^d)	0.3	3.3	25.3	7.2
Authorization Form Not Signed.....	6.7	6.3	6.3	1.0	8.8
Fuel Used Included in Rent or Paid in Other Way ^c	7.5	16.8	24.3	0.2	5.5

^a Data were unusable for electricity and natural gas if the records covered less than 5 months and included seasonal use (heating or cooling) or if the records covered less than 2 months. Data were unusable for fuel oil, kerosene, and LPG if the record covered less than 1 year.

^b Households in this group are those that purchased kerosene primarily on a cash-and-carry basis. These households supplied estimated purchases of kerosene during the household interview. In addition, if a household indicated that it had the ability to use LPG, fuel oil, or kerosene - but planned no purchases during 1987 - the household was assigned zero consumption.

^c These data exclude households that payed for some, but not all, uses of a fuel.

^d Represents or rounds to zero.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

Available but nonusable billing records occurred when; (1) the household recently moved into the dwelling unit; (2) the amount of the bill that could be attributed to the housing unit was unknown; or (3) the billing records did not cover the entire amount used by the household. The households were asked to provide estimates of consumption and expenditures for fuel oil, kerosene, and LPG only.

Annualization

The consumption and expenditure data that were obtained from the suppliers did not list the annual amounts. Instead, the supplier provided the billing records (when available). These records listed the amount purchased, the cost of the purchase and the date of purchase. For natural gas and electricity, the amount purchased was usually equivalent to the amount consumed. The major exception occurred when the supplier had estimated the bill for the billing period. For fuel oil, kerosene, and LPG, the fuel purchased in 1987 may be consumed in 1988 instead of 1987. Conversely, the fuel consumed in 1987 may have been purchased in 1986. The procedures that were used to calculate the annual consumption and expenditure amounts for electricity and natural gas were designed to avoid estimated bills when possible. The an-

nual consumption and expenditure amounts for fuel oil, kerosene, and LPG reflected the amounts purchased. No attempt was made to distinguish between the amount purchased and the amount consumed for fuel oil, kerosene, and LPG. See Appendix C, "Quality of the Data" for more details on the annualization of consumption and expenditures.

Usable Records

Table A13 shows the percentage of cases where usable and nonusable records were obtained by fuel. For example, out of a total of 6,229 households that participated in the 1987 RECS, 6,228 used electricity. For 82.8 percent of these cases, the electric utilities provided usable billing records. On the other hand, 414 sample households used kerosene. For 11.4 percent, the kerosene supplier provided usable kerosene billing data.

Households lacking consumption records because they do not pay fuel bills directly to fuel suppliers occur most frequently among users of natural gas and fuel oil (see Table A13). These households are 16.8 percent of users of natural gas and 24.3 percent of users of fuel oil.

Imputations

Not all the fuel records that were collected in the fuel-supplier survey could be used. For example, some records covered too few months and other records were incomplete. The extent of these nonusable records is shown in Table A13. The problem of nonusable records is small for the metered fuels (electricity and natural gas) since the partial-year records of electricity and natural gas were considered usable. For fuel oil, kerosene, and LPG, the problem of nonusable records was more serious, since 7.0 percent of fuel oil, 2.7 percent of kerosene, and 8.7 percent of LPG records were nonusable. Partial-year records for these fuels were not acceptable.¹⁰ See Appendix C, "Quality of the Data", for more details on imputation for supplier records.

A variety of information from household respondents as well as from suppliers was reviewed and used as a basis for declaring a fuel oil, kerosene, or LPG record complete or incomplete. Questionnaire information from respondents includes the number of suppliers and an estimate of the annual number of deliveries. Suppliers provided dates of onset and termination of service to the household.

Consumption

Households with nonusable records, as described earlier, and households with no records had their annual energy consumption imputed using nonlinear regression techniques. The equations were developed using RECS sample households that had approximately a full year of acceptable data. Separate regression equations were developed for the five fuels: electricity, natural gas, fuel oil, kerosene, and LPG. These equations are described in Appendix B, "End-Use Estimation Methodology."

The strategy for imputing consumption varied across fuels for two reasons. First, fuels differ in the number of ways they can be used. Electricity, for example, is used for a large number of appliances, water heating, space heating, and space cooling. Kerosene, on the other hand, is used almost exclusively for space heating. As a result, the equation for electricity includes a larger number of terms to represent all of the possible end uses. Second, the number of sample cases also influenced the analysis strategy. For the electric and natural gas equations, there were a large number of sample cases, allowing for the inclusion of a greater number of factors. For example, the electricity equations included a variable for the price of electricity.

A final adjustment was made to all imputed fuel quantities. To maintain the variance structure of the unimputed fuel-consumption data, an error term was added to the predicted fuel consumption rather than imputing a single value for all households with equivalent values for all independent variables in the regression equation. This allowed estimates for sampling error to be calculated without separating imputed from unimputed data.

Expenditures

Fuel expenditures were imputed by applying a cost factor to the imputed consumption. The cost factor for electricity and natural gas was derived from the fuel-consumption records of households in the same neighborhood or geographic area as the household that had missing data. The cost factor for fuel oil and kerosene, and LPG was based on regression fits for cost versus quantity for all fuel users.

Standard Electricity Price

A standard electricity price, defined as the potential cost to the customer of 1,000 kWh on a monthly basis was determined for each RECS household. An average price of electricity could be calculated for each RECS household that used electricity in their home. The average price equals the annual electricity expenditures divided by the total annual electricity consumption in kWh. This average price may vary between customers for the same utility, because if the utility has a decreasing block rate structure, the average price will decrease as the amount of electricity consumed increases. The standard electricity price was used to avoid this affect of the block rate structure.

There were two major sources for data on standard electricity prices: the EIA publication *Typical Electric Bills*, January 1, 1987, DOE/EIA-0040(87) published January 1988 was used for households that were located in communities with a population of 2,500 or more and were served by a investor-owned or a municipal-owned electric utility. Data from the Department of Agriculture was used for households that were served by a Rural Electric Co-operative that had borrowed money from the Rural Electrification Administration. The few utilities that were not listed in one of these two reports and who were supplying electricity to 1987 RECS households were contacted directly to obtain a standard electricity price.

The standard electricity price was attached to each 1987 RECS household record. Each household had a

¹⁰The number of households with partial-year records, as a proportion of total households using the fuel, is 9.2 percent for electricity and 6.2 percent for natural gas.

different random error added to the price before it was attached to the household record. The random error was used to protect the confidentiality of the household.

Data Preparation for Report

Prior to the final data tape, a preliminary data tape was delivered to the EIA in January 1989. EIA data analysts reviewed and processed the data to prepare it for the final data tape. Crosstabulations were run to check for internal consistency and verified with data from previous RECS. Generally inconsistencies were resolved by the survey contractor. The publication *Housing Characteristics 1987* DOE/EIA-0314(87) was produced using the data from the January 1989 data tape.

A final edited data tape of household survey data and energy supplier survey data was delivered to the EIA in May 1989. When comparisons were made between the estimates of the January 1989 data tape and the May 1989 data tape, small differences were found in the number of households using a particular fuel for space heating, water heating, and cooking. None of the differences between the published numbers in the *Housing Characteristics 1987* and this report exceeded 0.1 million households.

The May 1989 data were compared using two different software programs, Table Producing Language (TPL) and Statistical Analysis System (SAS). Statistical tables

of aggregated data were produced and analyzed. This report text was based on these tables.

Confidentiality of Information

The EIA does not receive or take possession of the names or addresses of individual respondents or any other individually identifiable energy data that could be linked with information describing the household. All identifiable information is maintained by the survey contractor. Additionally, all household records that are placed on the public use tape are masked for further confidentiality protection.

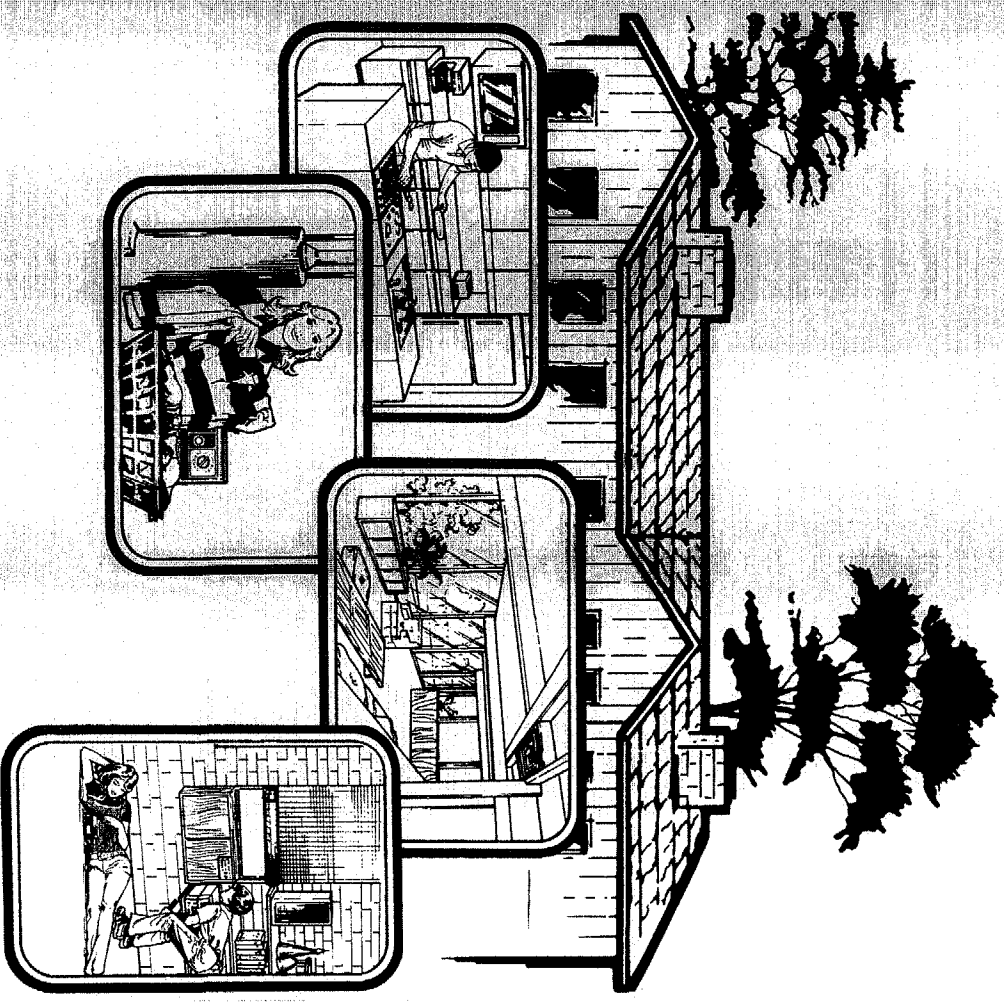
Public Use Tape Preparation

Following the publication of the statistical reports for the RECS and the statistical report for the RTECS, further work is performed on the basic survey data at the microlevel to prepare the final data tape for release to the public. This tape contains both the housing characteristics and energy supplier data for the RECS and the household vehicle data for the RTECS. Measures were taken to mask the data to insure that the identity of the individual respondents is kept confidential. At the culmination of these procedures, a final data tape is released to the public through the National Technical Information Service (NTIS). (See Appendix G for information on how to order these tapes.)



Appendix B

End-Use Estimation Methodology





Appendix B

End-Use Estimation Methodology

Introduction

For each household that responded to the 1987 RECS, the annual amount of energy used for four end-use categories (space heating, water heating, air conditioning, and general appliance usage) was estimated. The end-use estimates were produced for each of the five main fuels: electricity, natural gas, fuel oil, kerosene, and liquefied petroleum gas (LPG). The end-use amounts were not based on data produced by placing meters on individual appliances, rather the end-use amounts were obtained by estimating for each household the proportion of the total annual consumption for each fuel that can be attributed to each of the end-use categories.

For each fuel, the proportion of the annual consumption that can be attributed to each of the end-use categories was estimated by use of a regression equation. The regression equations used to estimate the proportions were the same equations that were used to impute energy consumption when the billing data were missing or were inadequate. A separate equation was developed for each of the five main fuels. In each equation, the dependent variable was the annual energy consumption for the 1987 calendar year.

For electricity and natural gas, the basic equation was:

$$\begin{aligned} \text{Total Consumption} = & \text{Space-Heating Component} \\ & + \text{Water-Heating Component} \\ & + \text{Air-Conditioning Component} \\ & + \text{General Appliance Component.} \end{aligned}$$

For fuel oil, kerosene, and LPG, the basic equation was the same as above except there was no air-conditioning component.

Space-Heating Component

For all fuels, the space-heating component was defined as all energy used to generate heat by space-heating equipment. The equipment could be the main space-heating equipment or secondary space-heating equipment. Hence, for all fuels, a household could have had a positive amount of energy assigned to the space-heating component even if the fuel was not used as the main space-heating fuel. For electricity, in the 1987 RECS, the electricity associated with the operation of fans in any central forced-air heating equipment was assigned to the electricity appliance component and not to the space-heating component. This differed from the previous RECS where the electricity used to run fans for central forced-air heating systems was assigned to the space-heating component. The change was implemented so that the households that did not use electricity as a space-heating fuel (main fuel or a secondary fuel) by definition did not have positive amounts of electricity assigned to the space-heating component.

Water-Heating Component

The component for water heating was defined as all energy used to heat water for hot running water, as well as water heated at point sources (such as stoves or auxiliary water-heating equipment) for bathing, cleaning and other noncooking applications of hot water. Energy used at point sources to heat water for cooking and hot drinks was considered part of the general appliance component. Energy used to heat water for a swimming pool was also considered as part of the general appliance component.

Air-Conditioning Component

The electricity air-conditioning component was defined as all electricity associated with (1) electric air-conditioning equipment and (2) fans in any central air-conditioning equipment including natural gas air-conditioning equipment. The regression equation used with the 1987 RECS for electricity did not contain specific terms for whole-house fans, ceiling fans, window fans, and evaporative (swamp) coolers. Because the terms were only marginally significant, they were not used in the final regression. Hence, the consumption of electricity to operate these fans and evaporative coolers was not assigned to the air-conditioning component; it was included in the appliance component. This differs from the previous RECS where the regression equation for electricity included in the air-conditioning component a term for evaporative coolers, whole-house fans, ceiling fans, and window fans. As a result, in the 1984 RECS, the consumption of electricity to operate these types of coolers and fans was assigned to the air-conditioning component. Consequently, in the 1984 RECS, there existed households that did not have air-conditioning equipment, yet these households had positive amounts assigned to their air-conditioning component.

Another change in the air-conditioning component was that for the 1987 RECS, the households that reported that they had air-conditioning equipment but did not use the equipment, were assigned a value of zero for their electricity air-conditioning component. In the 1984 RECS, these households were assigned positive values for their electricity air-conditioning component.

The natural gas air-conditioning component was defined as all natural gas used to operate natural gas air-conditioning equipment. There was no air-conditioning component for fuel oil, kerosene, or LPG.

Appliance Component

The general appliance component consisted of all energy not used specifically for any of the other end uses. This component included energy associated with refrigerators, freezers, lights, clothes dryers, cooking equipment, fans, evaporative coolers, and home entertainment equipment such as televisions, stereos, video cassette recorders, electronic games, and computers. In many households, the general appliance component for electricity equaled the total electricity consumption.

The appliance component for fuel oil was zero except for 9 households that used fuel oil for some end use other than space heating and water heating. Of these 9 households, 7 households used fuel oil for heating a swimming pool. Similarly, the appliance component for kerosene was zero except for 6 households that used kerosene for some end use other than space heating and water heating. One of these 6 households used kerosene as the main cooking fuel.

Energy used in general appliances during the winter will frequently help heat the housing unit. This secondary effect of the appliance consumption was not included in the estimation of the space-heating component. In addition, during the summer, energy used in general appliances may add to the load on the air-conditioning system. This was not included in the air-conditioning component.

Nonlinear Regression Technique

The regression results were used to produce end-use estimates for the individual components for each household and each fuel. The end-use estimates were normalized so that the sum of the end-use estimates was equal to the actual or imputed yearly consumption for each fuel used by the household. As a result, the regression results were used only to estimate the proportion of energy used by each end use.

The individual household end-use estimates were used to estimate averages and totals for end-use consumption over selected household categories. The results are presented in the text and in the tables in the "Detailed Statistics" section of this report.

The nonlinear equations that were used in the end-use estimation procedure are described below. Care should be taken in interpreting the individual coefficients in the equations. For instance, the natural gas equations did not contain any variables that used natural gas prices directly. On the other hand, many variables were correlated with price. Additionally, many variables that were used in the equations were highly correlated with other variables. As a result, the value of a coefficient may reflect the effect of the characteristics that were highly correlated with the variable corresponding to the coefficient.¹¹

An example of this type of positive correlation was the presence of a swimming pool and higher income. The coefficients in the electricity regression equation corresponding to variables involving swimming pools may have reflected the consumption of other appliances that were not contained in the equation and that were highly correlated with income.

The general form for the regression equations uses the following notation:

$$YCOM = SPHTCOM + WTHTCOM + AIRCCOM + APPLCOM,$$

where:

- YCOM was the estimated annual consumption,
- SPHTCOM was the estimated space-heating component,
- WTHTCOM was the estimated water-heating component,
- AIRCCOM was the estimated air-conditioning component, and
- APPLCOM was the estimated appliance component.

The actual annual consumption was called Y. The unit of measure for Y and YCOM was thousands of Btu. This unit of measure was used for all fuels.

The error term was as follows:

$$e_1 = Y - YCOM.$$

Unfortunately, the variance of e_1 tended to increase as YCOM increased. Furthermore, the distribution of e_1 was skewed in the positive direction. These two facts violate the assumptions associated with linear least-squares regression. On the other hand, if

$$e_2 = \log(Y) - \log(YCOM),$$

¹¹For a more detailed discussion of the end-use estimation procedures and the correlation of variables, see the *National Interim Energy Consumption Survey: Exploring the Variability in Energy Consumption*, DOE/EIA-072 (Washington, D.C., July 1981); the *National Interim Energy Consumption Survey: Exploring the Variability in Energy Consumption - A Supplement*, DOE/EIA-0272/S (Washington, D.C., October 1981); and *Residential Energy Consumption Survey: Regression Analysis of Energy Consumption by End Use*, DOE/EIA-0431 (Washington, D.C., October 1983).

then the distribution of e_2 was closer to being normally distributed with a constant variance. Hence, it was decided to fit YCOM by using a nonlinear least-squares regression procedure that minimizes the sum of e_2 squared.

For each fuel, the dependent variable was the consumption in thousands of Btu. The set of independent variables was not the same for all fuels.

The components consisted of sums or products of terms that themselves may again have been sums or products of the independent variables. The overall structure may seem complex at first glance, but there was a common structure. In general, the components consisted of an overall term multiplied by various adjustments. This format allowed the components to be adjusted by many factors. The relative size of the adjustments was easy to determine.

The disadvantage of the format was that it yields a basic equation that was intrinsically nonlinear. As a result, standard multivariate linear regression techniques could not be used to estimate the parameters. A nonlinear technique was used. The parameters were estimated by using the nonlinear regression procedure (PROC NLIN) contained in the statistical computer package, SAS.¹²

The equations are discussed below. All coefficients were obtained from the nonlinear regression equation unless otherwise noted. Natural gas is discussed first because the results of the natural gas regression were used to formulate independent variables for the other fuels.¹³

Natural Gas Regression Equations

The regression equations for natural gas were as follows:

$$\text{SPHTCOM} = (\text{NGMAINHT} + \text{NGSECHEAT}) * \text{NGWHSADJ} * \text{NGTOTADJ1} * \text{NGTOTADJ2},$$

$$\text{WTHTCOM} = \text{NGWATERHT} * \text{NGWHSADJ} * \text{NGTOTADJ1} * \text{NGTOTADJ2}$$

$$\text{AIRCCOM} = \text{NGAIRCON} * \text{NGTOTADJ1} * \text{NGTOTADJ2},$$

and

$$\text{APPLCOM} = \text{NGAPPL} * \text{NGTOTADJ1} * \text{NGTOTADJ2}.$$

Adjustment Factors

The terms NGTOTADJ1 and NGTOTADJ2 were adjustments that were applied to all of the natural gas components. NGTOTADJ1 adjusted for the demographic characteristics of the household. NGTOTADJ2 adjusted for the geographic location.

NGTOTADJ1 and NGTOTADJ2 were given by:

¹²Statistical Analysis System (SAS) Institute, (Cary, North Carolina).

¹³The terms used in the regression equations for all fuels are described in "Definitions of End-Use Variables" at the end of this appendix.

$$\begin{aligned} \text{NGTOTADJ1} = & 1 + (0.19703 * \text{BLACK}) \\ & + (0.16014 * \text{BLACK} * \text{FEMLEAD}) \\ & + (0.10343 * \text{HIGHINCM}) \\ & + (0.06163 * \text{GOODINCM} * \text{HH50PLUS}) \end{aligned}$$

and

$$\begin{aligned} \text{NGTOTADJ2} = & 1 + (0.3772 * \text{ALASKA}) \\ & - (0.1393 * \text{WHRZNONE} * \text{WESTNC}). \end{aligned}$$

The term NGWHSHADJ was an adjustment that was applied to the space-heating and water-heating components for natural gas. NGWHSHADJ adjusted for the type of housing unit, age of the housing unit, and income of the household.

NGWHSHADJ was given by:

$$\begin{aligned} \text{NGWHSHADJ} = & 1 - (0.1996 * (\text{APTUNIT} + \text{SFATTWOS})) \\ & + (0.1581 * \text{POORHSLD} * \text{OLDHOME}) \end{aligned}$$

Space-Heating Component

The term NGMAINHT represented the use of natural gas as the main space-heating fuel. The term NGSECHEAT represented the use of natural gas as a secondary space-heating fuel.

NGMAINHT and NGSECHEAT were given by:

$$\begin{aligned} \text{NGMAINHT} = & \text{NGMHEAT} * \text{NGHTHDD} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \text{NGHTADJ6} \end{aligned}$$

and

$$\text{NGSECHEAT} = \text{NGSHEAT} * \text{NGSECHDD} * \text{NGSECHADJ1} * \text{NGSECHADJ2}.$$

The terms in NGMAINHT can be described as follows. NGMHEAT was an indicator variable that equaled one if natural gas was used as the main space-heating fuel. NGHTHDD was a function of heating degree-days. NGHTSZ was a function of the size of the housing unit. The remaining terms adjusted the space-heating component for the insulation characteristics of the housing unit, the type of main space-heating equipment, the amount of secondary space-heating, the age of the housing unit, the thermostat setting, and the presence of older household members.

NGHTHDD, NGHTSZ, NGHTADJ1, NGHTADJ2, NGHTADJ3, NGHTADJ4, NGHTADJ5, and NGHTADJ6 were given by:

$$\begin{aligned} \text{NGHTHDD} = & (0.02320 * \text{HDD60}) \\ & + (2.743 * \text{SQRTHD60}), \end{aligned}$$

$$\begin{aligned}
 \text{NGHTSZ} &= (0.02483 * \text{HEATED}) \\
 &+ (40 * \text{LOGHTSF}) \\
 &+ (1.169 * \text{NUMROOMS} * \text{NUMROOMS}) \\
 &+ (4.522 * \text{NUMBATHR} * \text{NUMBATHR}) \\
 &+ (4.204 * \text{NDRSAWS}),
 \end{aligned}$$

$$\begin{aligned}
 \text{NGHTADJ1} &= 1 - (0.16475 * \text{BASEHEAT}) \\
 &+ (0.11762 * (\text{PCTNOSTM}/100)) \\
 &- (0.08611 * \text{SF1SCSLB}) \\
 &- (0.06843 * \text{FULWAINS}),
 \end{aligned}$$

$$\begin{aligned}
 \text{NGHTADJ2} &= 1 - (0.4272 * \text{COOKSTVH}) \\
 &- (0.1260 * \text{SPHEATER}) \\
 &- (0.1703 * \text{SPHEATER} * (\text{MHTC6795} + \text{MHTC66MN})),
 \end{aligned}$$

$$\begin{aligned}
 \text{NGHTADJ3} &= 1 - (0.2975 * \text{MHTC66MN}) \\
 &- (0.1620 * \text{MHTC6795}),
 \end{aligned}$$

$$\begin{aligned}
 \text{NGHTADJ4} &= 1 + (0.21602 * \text{OLDHOME}) \\
 &+ (0.06996 * \text{MD4059HM}) \\
 &- (0.23824 * \text{MD80PLUS}),
 \end{aligned}$$

$$\text{NGHTADJ5} = 1 + (0.07037 * \text{TEMPINDX}),$$

and

$$\text{NGHTADJ6} = 1 + (0.1353 * \text{HVAD80PL}).$$

The terms in NGSECHEAT can be described as follows. NGSHEAT was an indicator variable that equaled one if natural gas was a secondary, but not the main space-heating fuel. NGSECHDD was a function of heating degree-days. NGSECHADJ1 was a term that adjusted for the type of equipment used for secondary heating. NGSECHADJ2 was a term that adjusted for the percentage of the heating load that was provided by the main space-heating fuel.

NGSECHDD, NGSECHADJ1, and NGSECHADJ2 were given by:

$$\text{NGSECHDD} = 391.6 * \text{SQRTHD60},$$

$$\text{NGSECHADJ1} = 1 - (0.4835 * \text{SECNGCKS}),$$

and

$$\text{NGSECHADJ2} = 1 + (0.4577 * (\text{MHTC66MN} + \text{MHTC6795})).$$

Water-Heating Component

The term NGWATERHT represented the use of natural gas for water heating. NGWATERHT was given by:

$$\text{NGWATERHT} = \text{NGWHSIZE} * \text{NGWATADJ1} * \text{NGWATADJ2}.$$

The terms in NGWATERHT can be described as follows. NGWHSIZE expressed the consumption of energy for water heating as a function of the square root of the number of household members and the square root of the number of teenage household members. NGWATADJ1 was a term that adjusted NGWATERHT for the situation in which natural gas was only a secondary water-heating fuel or the household did not have hot running water. NGWATADJ2 was a term that adjusted NGWATERHT for the climate. NGWATADJ2 decreases as the number of cooling degree-days increases. Households in warmer climates should use less energy for water heating because the ground water should be warmer. NGWHSIZE, NGWATADJ1, and NGWATADJ2 were given by:

$$\begin{aligned} \text{NGWHSIZE} = & (15,598 * \text{SQRTNHMM}) \\ & + (1,651 * \text{SQRTTEEN}), \end{aligned}$$

$$\begin{aligned} \text{NGWATADJ1} = & \text{NGWTHT} * \text{HVHTRUNW} \\ & + 0.6231 * (\text{NGSWTHT} + (\text{NGWTHT} * (1 - \text{HVHTRUNW}))), \end{aligned}$$

and

$$\text{NGWATADJ2} = 1 - (0.09455 * (\text{CDD65}/1000)).$$

Air-Conditioning Component

Relatively, few households used natural gas to operate air-conditioning equipment. Hence, the natural gas air-conditioning component was nonzero for only a few observations in the 1987 RECS. The experience gained in fitting the electricity air-conditioning component was used in determining the variable ACINDEX. In particular, this variable resembled the term ELACADJ3 in the electricity air-conditioning component. The natural gas air-conditioning component was given by:

$$\text{NGAIRCON} = 95.70 * \text{NGCACRMS} * \text{SQRTCD65} * \text{ACINDEX}.$$

Appliance Component

The appliance component for natural gas contained terms that accounted for the use of natural gas for cooking, outdoor lights, pool heating, and clothes drying. NGAPPL was given by:

$$\begin{aligned}
 \text{NGAPPL} = & (3,612 * \text{SQRTNHMM} * (\text{NGCOOK} + \text{NGSCOOK})) \\
 & + (2,379 * \text{NGLIGHT} * \text{NUMROOMS}) \\
 & + (23,125 * \text{NGPOOLHT}) \\
 & + (3,118 * \text{NGDRYER} * \text{SQRTNHMM}).
 \end{aligned}$$

Electricity Regression Equations

The regression equations that were developed for predicting the amount of electricity consumed for space heating, water heating, air conditioning, and appliance usage were as follow:

$$\text{SPHTCOM} = (\text{ELMAINHT} + \text{ELSECHEAT}) * \text{ELTOTADJ},$$

$$\text{WHTCOM} = \text{ELWATERHT} * \text{ELTOTADJ},$$

$$\text{AIRCCOM} = \text{ELAIRCON} * \text{ELAPACADJ} * \text{ELTOTADJ},$$

and

$$\text{APPLCOM} = \text{ELAPPLTOT} * \text{ELAPACADJ} * \text{ELTOTADJ}.$$

Adjustment Factors

The term ELTOTADJ was an adjustment that was applied to all electricity components. It adjusted all electricity components for the price of electricity. The term ELAPACADJ was an adjustment for the electricity appliance and electricity air-conditioning components. It adjusted the two components according to demographic characteristics. ELTOTADJ and ELAPACADJ were given by:

$$\text{ELTOTADJ} = 1 - (0.4607 * \text{LOGRELPC})$$

and

$$\begin{aligned}
 \text{ELAPACADJ} = & 1 + (0.08779 * \text{BLACK} * \text{FEMLEAD}) \\
 & + (0.1256 * \text{HIGHINCM}).
 \end{aligned}$$

Space-Heating Component

ELMAINHT and ELSECHEAT were subcomponents of the space-heating component. ELMAINHT represented the consumption of electricity for space heating when electricity was the main space-heating fuel. ELSECHEAT represented the consumption of electricity for space heating when electricity was only a secondary space-heating fuel. Both ELMAINHT and ELSECHEAT involve terms that were developed for the natural gas space-heating component. This was done for consistency and to take advantage of the results found while developing the natural gas equation. The number of observations where the main space-heating fuel was natural gas was much larger than the number where the main space-heating fuel was electricity. It was possible to estimate the coefficients for six adjustment terms using the natural gas data. The coefficients for the same terms could be estimated using the electricity data, but the smaller number of observations where electricity was the main space-heating fuel would mean

that the coefficients would not be as accurately estimated. It was decided to use the coefficients that were estimated using the natural gas data to calculate independent variables that were used in the electricity space-heating component.

ELSECHEAT and ELMAINHT were given by:

$$\text{ELSECHEAT} = 6.208 * \text{ELSHEAT} * \text{NGHTSZ}$$

and

$$\begin{aligned} \text{ELMAINHT} = & 0.3971 * \text{ELMHEAT} * \text{NGHTHDD} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWWSHADJ} * \text{ELMHADJ}. \end{aligned}$$

The terms in ELMAINHT can be described as follows. ELMHEAT was an indicator variable that equaled one if electricity was the main space-heating fuel. ELMHADJ was a term that adjusted for the type of electric space-heating equipment and the type of housing unit. The rest of the terms were adapted from the natural gas regression results.

ELMHADJ was given by:

$$\begin{aligned} \text{ELMHADJ} = & 1 - (0.1713 * \text{HEATPUMP}) \\ & - (0.2170 * \text{PORTELEC}), \\ & - (0.3890 * \text{LRGAPTBD}). \end{aligned}$$

Water-Heating Component

The term ELWATERHT represented the use of electricity for water heating. ELWATERHT was given by:

$$\begin{aligned} \text{ELWATERHT} = & 0.3890 * \text{NGWWSIZE} * \text{NGWWSHADJ} * \text{NGTOTADJ1} * \\ & \text{ELWATADJ1} * \text{ELWATADJ2}. \end{aligned}$$

The first three terms in ELWATERHT were adapted from the natural gas results. The first term (NGWWSIZE) expressed the consumption of energy for water heating as a function of the square root of the number of household members and the square root of the number of teenage household members. The second term (NGWWSHADJ) adjusted ELWATERHT for the type of housing unit. The third term (NGTOTADJ1) adjusted ELWATERHT for demographic variables. The fourth term (ELWATADJ1) adjusted ELWATERHT for the situation in which electricity was only a secondary water-heating fuel or the household did not have hot running water. The last term (ELWATADJ2) adjusted ELWATERHT for the climate. ELWATADJ1 and ELWATADJ2 were given by:

$$\begin{aligned} \text{ELWATADJ1} = & \text{ELWHEAT} * \text{HVHTRUNW} \\ & + 0.1152 * (\text{ELSWHEAT} + (\text{ELWHEAT} * (1 - \text{HVHTRUNW}))) \end{aligned}$$

and

$$\text{ELWATADJ2} = 1 - (0.09455 * (\text{CDD75}/1000)).$$

Note: The term ELWATADJ2 was originally intended to equal the term NGWATADJ2 used in the natural gas water-heating component. Inadvertently, cooling degree-days base 75 degrees (CDD75) was used in ELWATADJ2

instead of cooling degree-days base 65 degrees (CDD65), as was used in NGWATADJ2. As a result, the value of ELWATADJ2 was larger than or equal to the value of NGWATADJ2 for the same location.

Air-Conditioning Component

The term ELAIRCON represented the use of electricity for air conditioning. ELAIRCON was given by:

$$\text{ELAIRCON} = (1 - \text{USEACNOT}) * \text{ELACCDD} * \text{ELACSIZE} * \\ \text{ELACADJ1} * \text{ELACADJ2} * \text{ELACADJ3} * \\ \text{ELACADJ4} * \text{ELACADJ5}.$$

The terms in the electricity air-conditioning component were defined as follows. The term (1 - USEACNOT) equaled zero when the household reported that they did not use their air-conditioning equipment. In this case, the air-conditioning component was zero. The term (1-USEACNOT) equaled one when the household reported that they used their air-conditioning equipment. The term ELACCDD was a function of cooling degree-days. The term ELACSIZE was a function of the amount of floorspace that could be cooled, the number of rooms that could be cooled, and the number of household members. The terms ELACADJ1, ELACADJ2, ELACADJ3, ELACADJ4, and ELACADJ5 were terms that adjusted the air-conditioning component for the type of equipment, the age of the housing unit, the pattern of use of the equipment, the presence of a evaporative cooler (swamp cooler), and the presence of a heat pump.

ELACCDD, ELACSIZE, ELACADJ1, ELACADJ2, ELACADJ3, ELACADJ4, and ELACADJ5 were given by:

$$\text{ELACCDD} = (10.00 * \text{SQRTCD65}),$$

$$\text{ELACSIZE} = (0.1099 * \text{SQRTCOOL}) + (1.649 * \text{SQRTACRS} * \text{SQRTNHMM}),$$

$$\text{ELACADJ1} = 1 + (0.3881 * \text{HVCENTAC}),$$

$$\text{ELACADJ2} = 1 - (0.2037 * \text{MD80PLUS}),$$

$$\text{ELACADJ3} = 1 + (0.5365 * \text{USEACQBT}) + (1.345 * \text{USEACASL}),$$

$$\text{ELACADJ4} = 1 - (0.5917 * \text{HVSWMPCL}),$$

and

$$\text{ELACADJ5} = 1 - (0.1713 * \text{HEATPUMP}).$$

Appliance Component

The term ELAPPLTOT represented the use of electricity for all end uses except space heating, water heating, and air conditioning. ELAPPLTOT it given by:

$$\text{ELAPPLTOT} = ((\text{ELGENAPL} + \text{FRIGFRZZ}) * \text{ELAPPLADJ1} * \text{ELAPPLADJ2}) \\ + \text{ELCFAFAN}.$$

The subcomponent ELGENAPL in the electricity appliance component represented the amount of electricity consumed in all appliances except refrigerators, freezers, and appliances used for space heating, water heating, and air conditioning. In particular, lighting and many small appliances (such as room fans, toasters, and VCR's) were covered

by the terms in ELGENAPL involving the size of the dwelling and the number of household members. The use of electricity to operate refrigerators and freezers was represented by the terms in the subcomponent FRIGFRZZ. The use of electricity to run fans for central forced-air space-heating systems was represented by the subcomponent ELCFAFAN.

The terms ELAPPLADJ1 and ELAPPLADJ2 adjusted ELGENAPL and FRIGFRZZ for the age of the head of the household and the type of housing unit, ELAPPLADJ1 and ELAPPLADJ2 were given by:

$$\text{ELAPPLADJ1} = 1 + (0.12700 * \text{MIDDLEHH})$$

and

$$\begin{aligned} \text{ELAPPLADJ2} = & 1 - (0.10276 * \text{LRGAPTBD}) \\ & - (0.06514 * (\text{SFATTACH} + \text{SMLAPTBD})). \end{aligned}$$

ELGENAPL was given by:

$$\begin{aligned} \text{ELGENAPL} = & (895.9 * \text{NUMTVCLR}) \\ & + (3,894 * \text{HVPOOL}) \\ & + (6,046 * \text{HVHTPOOL}) \\ & + (3,000 * \text{ELPLHEAT}) \\ & + (4,046 * \text{HVWATBED}) \\ & + (1,496 * \text{WATPUMP}) \\ & + (1,256 * \text{ELCOOK} * \text{SQRTNHMM}) \\ & + (993.6 * \text{CLSWASHR} * \text{SQRTNHMM}) \\ & + (1,408 * \text{ELCLSDRY} * \text{SQRTNHMM}) \\ & + (1,105 * \text{DSHWASHR} * \text{SQRTNHMM}) \\ & + (999.1 * \text{NUMHSMEM}) \\ & + (599.7 * \text{NUMROOMS}) \\ & + (179.2 * \text{NUMBATHR} * \text{NUMBATHR}). \end{aligned}$$

FRIGFRZZ was given by:

$$\text{FRIGFRZZ} = \text{FRIGINDX} * \text{FRIGADJ}.$$

The term FRIGADJ adjusted FRIGINDX for the weather. The refrigerators and freezers located in dwellings in warmer areas were projected to consume more electricity than refrigerators and freezers in dwellings in colder areas.

FRIGINDX and FRIGADJ were given by:

$$\begin{aligned} \text{FRIGINDEX} &= (2,081 * \text{NUMFFRFG}) \\ &+ (2,660 * \text{HVNOFRFZ}) \\ &+ (820.1 * \text{NUMMURFG}) \\ &+ (2,034 * \text{HVMANUFZ}) \end{aligned}$$

$$\text{FRIGADJ} = 1 + (0.03643 * \text{SQRTCD75}).$$

ELCFAFAN was given by:

$$\text{ELCFAFAN} = 2.928 * (\text{CFAEQUIP} + \text{HEATPUMP}) * \text{NGHTHDD}.$$

Fuel Oil Regression Equations

Two sets of equations were used for fuel oil. The first set was developed using the respondents' estimates for the amount of fuel oil consumed by the households for a 12-month period and the estimates of the number of fuel oil deliveries for a 12-month period. The second set was developed without these estimates. Most of the respondents that paid for fuel oil directly gave estimates for these two quantities. If the housing unit was rented and the rent covered the fuel oil bills, then the respondents were not asked to estimate these quantities. The respondents' estimates were used to determine the value of three indicator variables. These variables were used in the first set of equations. HIGHEST was an indicator variable that equaled one if the respondent's estimate of the annual fuel oil usage was 1,000 or more gallons. LOWNDELV was an indicator variable that equaled one if the respondent's estimate of the number of fuel oil deliveries was zero or one. HGHNDELV was an indicator variable that equaled one if the respondent's estimate of the number of fuel oil deliveries was 10 or more.

For both fuel oil equations, the general form of the regression equations was as follows:

$$\text{SPHTCOM} = (\text{FOMAINHT} + \text{FOSECHEAT}) * \text{FOSHWHADJ},$$

$$\text{WTHTCOM} = \text{FOWATERHT} * \text{FOSHWHADJ},$$

and

$$\text{APPLCOM} = (23,000 * \text{FOPLHT}) + (135 * \text{FOOTHER}).$$

The use of fuel oil in air-conditioning equipment was extremely rare or nonexistent. No household sampled for the 1987 RECS used fuel oil to operate air-conditioning equipment. Therefore, no provision was made for a fuel oil air-conditioning component.

Adjustment Factors

The term FOSHWHADJ adjusted the space-heating and water-heating components. If the respondent estimates were available, then FOSHWHADJ adjusted the two components for the value of the estimates and for the type of the space-heating equipment. If the respondents' estimates were not available, then FOSHWHADJ adjusted the two components only for the type of space-heating equipment.

When the variables HIGHEST, LOWNDELV, and HGHNDELV were available, then FOSHWHADJ was given by:

$$\begin{aligned} \text{FOSHWHADJ} = & 1 + (0.1297 * \text{HIGHEST}) \\ & - (0.2574 * \text{LOWNDELV}) \\ & + (0.2575 * \text{HGHNDELV}) \\ & + (0.1771 * \text{FOMHEAT} * \text{RADEQUIP}). \end{aligned}$$

When the variables HIGHEST, LOWNDELV, and HGHNDELV were not available, then FOSHWHADJ was given by:

$$\text{FOSHWHADJ} = 1 + (0.2311 * \text{FOMHEAT} * \text{RADEQUIP}).$$

Space-Heating Component

FOMAINHT and FOSECHEAT were subcomponents of the space-heating component for fuel oil. FOMAINHT represented the consumption of fuel oil for space heating when fuel oil was the main space-heating fuel. FOSECHEAT represented the consumption of fuel oil for space heating when fuel oil was a secondary space-heating fuel and was not used as the main space-heating fuel. Both FOMAINHT and FOSECHEAT used terms that were developed using the natural gas data. The natural gas terms were used in the fuel oil space-heating component for the same reasons that natural gas terms were used in the electricity space-heating component. (See this appendix, Electricity Regression Equations, Space-Heating Component for details.)

When the variables HIGHEST, LOWNDELV, and HGHNDELV were available, then FOMAINHT and FOSECHEAT were given by:

$$\begin{aligned} \text{FOMAINHT} = & 65.13 * \text{FOMHEAT} * \text{LOGHDD60} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWHSHADJ} \end{aligned}$$

and

$$\text{FOSECHEAT} = 142.4 * \text{FOSHEAT} * \text{NGHTSZ}.$$

When the variables HIGHEST, LOWNDELV, and HGHNDELV were not available, then FOMAINHT and FOSECHEAT were given by:

$$\begin{aligned} \text{FOMAINHT} = & 65.67 * \text{FOMHEAT} * \text{LOGHDD60} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWHSHADJ} \end{aligned}$$

and

$$\text{FOSECHEAT} = 129.7 * \text{FOSHEAT} * \text{NGHTSZ}.$$

Water-Heating Component

When the variables HIGHEST, LOWNDELV, and HGHNDELV were available, then FOWATERHT was given by:

$$\text{FOWATERHT} = 1.147 * \text{NGWHSIZE} * \text{NGWATADJ2} * \text{NGWHSHADJ} * \\ \text{NGTOTADJ1} * \text{FOWATADJ}.$$

When the variables HIGHEST, LOWNDELV, and HGHNDELV were not available, then FOWATERHT was given by:

$$\text{FOWATERHT} = 1.229 * \text{NGWHSIZE} * \text{NGWATADJ2} * \text{NGWHSHADJ} * \\ \text{NGTOTADJ1} * \text{FOWATADJ}.$$

In both equations, the first four terms in FOWATERHT were adapted from the natural gas results. The first term (NGWHSIZE) expressed the consumption of energy for water heating as a function of the square root of the number of household members and the square root of the number of teenage household members. The second term (NGWATADJ2) adjusted FOWATERHT for climate. The third term (NGWHSHADJ) adjusted FOWATERHT for the type of housing unit. The fourth term (NGTOTADJ1) adjusted FOWATERHT for demographic variables.

FOWATADJ was an adjustment for the situation in which fuel oil was only a secondary water-heating fuel or the household did not have hot running water. The term FOWATADJ resembled the term NGWATADJ1 used in the natural gas water-heating component. FOWATADJ was as follows:

$$\text{FOWATADJ} = (\text{FOWTHT} * \text{HVHTRUNW}) \\ + 0.6231 * (\text{FOSWTHT} + (\text{FOWTHT} * (1 - \text{HVHTRUNW}))).$$

Very few households sampled for the 1987 RECS used fuel oil as a secondary water-heating fuel. As a result, the estimate for the coefficient in FOWATADJ would have had a large variance. It was decided to arbitrarily set the coefficient equal to 0.6231 (a value obtained from the natural gas results); the coefficient was not estimated by using the fuel oil data.

Appliance Component

Only 9 households sampled for the 1987 RECS used fuel oil for some end use other than space heating or water heating. In 7 of the 9 observations, fuel oil was used to heat a swimming pool. Because of the small number of observations, the coefficients in the equation for the fuel oil appliances component were not estimated using the fuel oil data. Instead the coefficient for FOPLHT was obtained from the natural gas results. The coefficient for FOOTHER represented the use of one gallon per year.

LPG Regression Equations

The regression equations for LPG were as follows:

$$\text{SPHTCOM} = \text{LPGMAINHT} + \text{LPGSECHT},$$

$$\text{WHTCOM} = \text{LPGWATHT},$$

and

$$\text{APPLCOM} = \text{LPGAPPL}.$$

The use of LPG in air-conditioning equipment was rare. Only 2 households sampled for the 1987 RECS had LPG air-conditioning equipment. Both of these households reported that they did not use their air-conditioning equipment. Therefore, no provision was made for a LPG air-conditioning component. On a national scale, the small amount of LPG that was used in air-conditioning equipment can be considered to be part of the LPG appliance component.

Space-Heating Component

LPGMAINHT represented the consumption of LPG for space heating when LPG was the main space-heating fuel. LPGSECHT represented the consumption of LPG for space heating when LPG was a secondary space-heating fuel but not the main space-heating fuel. The results of the natural gas regression were used to calculate the independent variable used in LPGMAINHT. LPGMAINHT and LPGSECHT were given by:

$$\begin{aligned} \text{LPGMAINHT} = & 0.8221 * \text{LPGMHEAT} * \text{NGHTHDD} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWHSHADJ} \end{aligned}$$

and

$$\text{LPGSECHT} = 281.8 * \text{LPGSHEAT} * \text{SQRTHD60}.$$

In the equation for LPGMAINHT, the term LPGMHEAT was an indicator variable that equaled one if LPG was the main space-heating fuel. In the equation for LPGSECHT, the term LPGSHEAT was an indicator variable that equaled one if LPG was a secondary, but not the main space-heating fuel.

Water-Heating Component

The terms in the LPG water-heating component were given by:

$$\begin{aligned} \text{LPGWATHT} = & 0.7446 * \text{NGWH SIZE} * \text{NGWATADJ2} * \text{NGWHSHADJ} * \\ & \text{NGTOTADJ1} * \text{LPGWATADJ}. \end{aligned}$$

Where

$$\text{LPGWATADJ} = (\text{LPGWTHT} * \text{HVHTRUNW}) \\ + 0.6231 (\text{LPGSWTHT} + \text{LPGWTHT} * (1 - \text{HVHTRUNW})).$$

LPGWATADJ was an adjustment for the situation in which LPG was only a secondary water-heating fuel or the household did not have hot running water. The term LPGWATADJ resembled the term NGWATADJ1 used in the natural gas water-heating component.

Very few households sampled for the 1987 RECS used LPG as a secondary water-heating fuel. As a result, any estimate for the coefficient for the variable LPGSWTHT would have had a large variance. It was decided to arbitrarily set the coefficient equal to 0.6231 (a value obtained from the natural gas results); the coefficient was not estimated by using the LPG data.

Appliance Component

The appliance component for LPG contained terms that accounted for the use of LPG for cooking, clothes drying, outdoor lights, and pool heating.

LPGAPPL was given by:

$$\text{LPGAPPL} = (3190 * \text{SQRTNHMM} * (\text{LPGCOOK} + \text{LPGSCOOK})) \\ + (606.8 * \text{LPGDRYER} * \text{SQRTNHMM}) \\ + (844.3 * \text{LPGLIGHT} * \text{NUMROOMS}) \\ + (20,037 * \text{LPGPLHT}).$$

Kerosene Regression Equations

The regression equations for kerosene were as follow:

$$\text{SPHTCOM} = \text{KERSECHEAT} + \text{KERMHTPORT} + \text{KERMHTFIX}, \\ \text{WTHTCOM} = \text{KERWATERHT},$$

and

$$\text{APPLCOM} = 540 * \text{KEROTHER}.$$

The use of kerosene in air-conditioning equipment was extremely rare or nonexistent. No household sampled for the 1987 RECS used kerosene to operate air-conditioning equipment. Therefore, no provision was made for a kerosene air-conditioning component.

Space-Heating Component

KERSECHEAT, KERMHTPORT, and KERMHTFIX were subcomponents of the space-heating component for kerosene. KERSECHEAT represented the consumption of kerosene for space heating when kerosene was a secondary

space-heating fuel but not the main space-heating fuel. KERMHTPORT represented the consumption of kerosene for space heating when kerosene was the main space-heating fuel and kerosene was used in portable kerosene heaters. KERMHTFIX represented the consumption of kerosene for space heating when kerosene was the main space-heating fuel and the main space-heating equipment was not a portable kerosene heater.

Two equations were used for the term KERSECHEAT. The first equation was developed using the respondent's estimate of the number of kerosene deliveries or purchases. The second equation did not use the estimates. When the estimates were available, the variable SQRTNMDL, was calculated. SQRTNMDL was the square root of the estimated number of kerosene deliveries or purchases.

When SQRTNMDL was available, KERSECHEAT was given by:

$$\text{KERSECHEAT} = 22.41 * \text{KERSHEAT} * \text{NGHTHDD} * \text{KERSHTADJ1} * \text{KERSHTADJ2} * \text{KERSHTADJ3}.$$

KERSHEAT was an indicator variable that equaled one if kerosene was a secondary but not the main space-heating fuel.

NGHTHDD was determined using the natural gas data. KERSHTADJ1, KERSHTADJ2, and KERSHTADJ3 were terms that adjusted KERSECHEAT. KERSHTADJ1 adjusted KERSECHEAT according to the main space-heating fuel, KERSHTADJ2 adjusted KERSECHEAT according to the amount of secondary heating that was used, and KERSHTADJ3 adjusted KERSECHEAT according to the way that kerosene was purchased and the square root of the estimated number of kerosene deliveries or purchases. KERSHTADJ1, KERSHTADJ2, and KERSHTADJ3 were given by:

$$\text{KERSHTADJ1} = 1 - (0.1613 * \text{NGMHEAT}),$$

$$\text{KERSHTADJ2} = 1 + (0.3911 * (\text{MHTC6795} + \text{MHTC66MN})),$$

and

$$\text{KERSHTADJ3} = 1 + (0.4930 * (\text{SQRTNMDL} - 2.794)) + (2.662 * (1 - \text{CHCYKERO})).$$

When SQRTNMDL was not available, KERSECHEAT was given by:

$$\text{KERSECHEAT} = 16.38 * \text{KERSHEAT} * \text{NGHTHDD} * \text{KERSHTADJ1} * \text{KERSHTADJ2}.$$

KERSHTADJ1 and KERSHTADJ2 were given by:

$$\text{KERSHTADJ1} = 1 - (0.3308 * \text{NGMHEAT}),$$

and

$$\text{KERSHTADJ2} = 1 + (1.348 * (\text{MHTC6795} + \text{MHTC66MN})).$$

KERMHTPORT was given by:

$$\begin{aligned} \text{KERMHTPORT} = & 0.5588 * \text{KERPORTHT} * \text{NGHTHDD} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWWSHADJ} * \text{KRPTHTADJ}. \end{aligned}$$

KERPORTHT was an indicator variable that equaled one if the main space-heating equipment was a portable kerosene heater. KRPTHTADJ was a term that adjusted KERMHTPORT for the use of portable electricity space heaters as a secondary source of space heat. The rest of the terms were adapted from the natural gas equation.

KRPTHTADJ was given by:

$$\text{KRPTHTADJ} = 1 - (0.4180 * \text{SECELPRT}).$$

KERMHTFIX was given by:

$$\begin{aligned} \text{KERMHTFIX} = & 0.7865 * \text{KERFIXMHT} * \text{NGHTHDD} * \text{NGHTSZ} * \text{NGHTADJ1} * \\ & \text{NGHTADJ2} * \text{NGHTADJ3} * \text{NGHTADJ4} * \text{NGHTADJ5} * \\ & \text{NGHTADJ6} * \text{NGTOTADJ1} * \text{NGWWSHADJ} * \text{KRFXHTADJ}. \end{aligned}$$

KERFIXMHT was an indicator variable that equaled one if the main space-heating equipment was not a portable kerosene heater. KRFXHTADJ was a variable that adjusted KERMHTFIX for the way that kerosene was purchased. The rest of the terms were adapted from the natural gas equation.

KRFXHTADJ was given by:

$$\text{KRFXHTADJ} = 1 - (0.4435 * \text{CHCYKERO}).$$

Water-Heating Component

Only four households that responded to the 1987 RECS, indicated that kerosene was used to heat water. Three of these households indicated that kerosene was the main water-heating fuel, the remaining household indicated that kerosene was a secondary water-heating fuel. The kerosene water-heating component for the household that indicated that kerosene was a secondary water-heating fuel was set equal to zero. The value of KERWATERHT for the other three households was given by:

$$\begin{aligned} \text{KERWATERHT} = & (0.7865 * \text{KERWTHT} * \text{KERFIXMHT} * \text{KRFXHTADJ} * \\ & \text{NGWWSIZE} * \text{NGWATADJ2} * \\ & \text{NGTOTADJ1} * \text{NGWWSHADJ}) \\ & + (0.5588 * \text{KERWTHT} * \text{KERPORTHT} * \text{KRPTHTADJ} * \\ & \text{NGWWSIZE} * \text{NGWATADJ2} * \\ & \text{NGTOTADJ1} * \text{NGWWSHADJ}). \end{aligned}$$

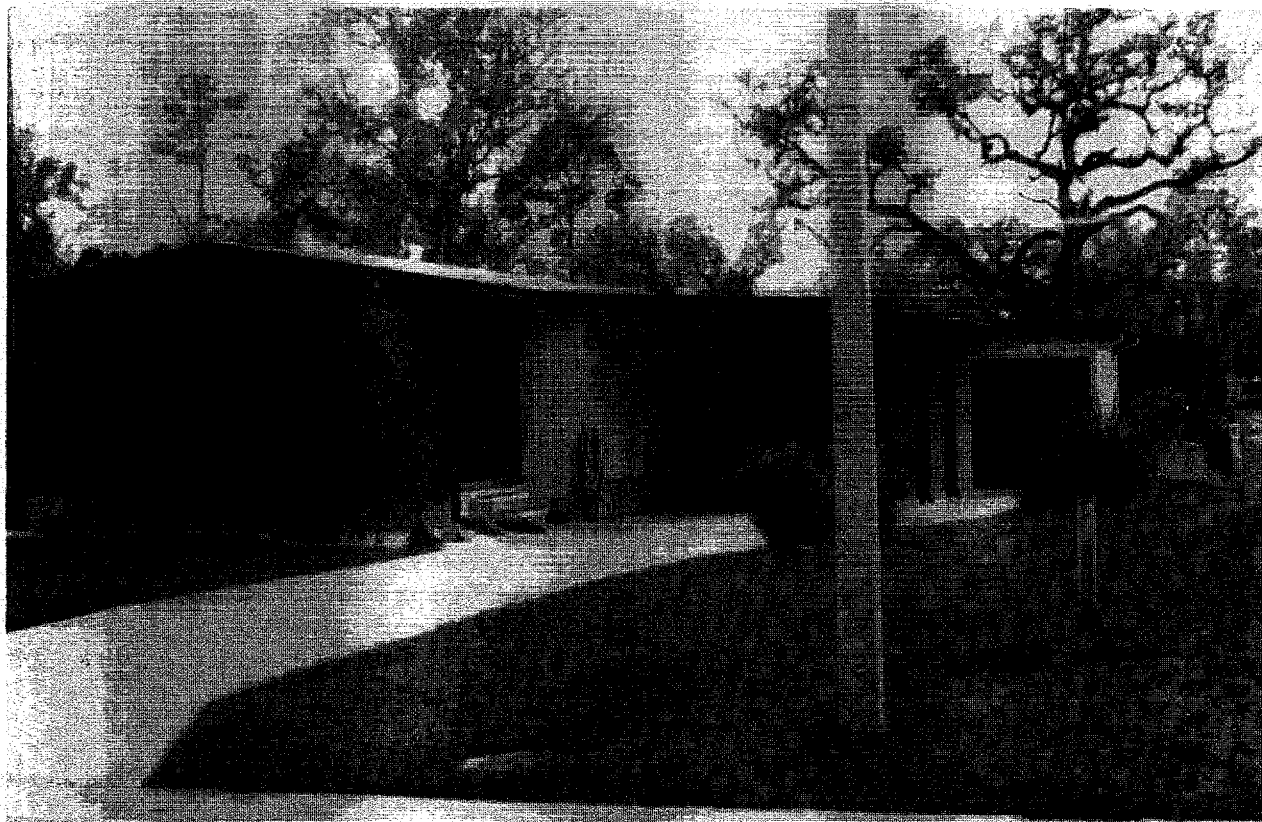
The value of the coefficients in KERWATERHT were constrained to match those in the kerosene space-heating component. KERWTHT was an indicator variable that equaled one if the main water-heating fuel was kerosene.

KERFIXMHT, KRFXHTADJ, KERPORTHT, and KRPTHTADJ were the same as the variables in the kerosene space-heating component. The rest of the variables in KERWATERHT were adapted from the natural gas water-heating component.

Appliance Component

The term KEROTHER in the appliance component is an indicator variable that equaled one if kerosene was used for some end use other than space heating or water heating.

Only 6 households sampled for the 1987 RECS used kerosene for some other end use other than space heating and water heating. These were the only cases where the appliances component for kerosene would be nonzero. The equation for the kerosene appliances component was not developed using least squares regression technique. The coefficient for the term KEROTHER (which equaled 540) was equal to the geometric mean of the kerosene consumption for households that did use kerosene but did not use kerosene for space heating or water heating. The coefficient (540) represents 4 gallons of kerosene.



This single-family detached housing unit is an example of some of the housing structures included in the RECS.

Definition of End-Use Variables

Many of the independent variables used in the regression equations were **indicator variables**. By definition, an indicator variable is set equal to one when a certain condition is met. Otherwise, the variable is set equal to zero.

The definition of the variables used in the end-use regression equations follows.

ACINDEX: Index used in natural gas air-conditioning component. The index was given by

$$\begin{aligned} \text{ACINDEX} = & 1 - (1.0 * \text{USEACNOT}) \\ & + (0.5 * \text{USEACQBT}) \\ & + (1.3 * \text{USEACASL}). \end{aligned}$$

AIRCCOM: Energy used for air-conditioning component.

ALASKA: An indicator variable that equaled one if the housing unit was located in Alaska.

APPLCOM: Energy used for appliance component.

APTUNIT: An indicator variable that equaled one if the housing unit was in a building that contained two or more housing units.

BASEHEAT: Variable describing the amount of heated floorspace in the basement. **BASEHEAT** was set equal to zero if the housing unit was located in an apartment building or if the housing unit was a single-family (attached, detached, or mobile home) housing unit that did not have a basement or had an unheated basement. **BASEHEAT** was set equal to one if the housing unit was a single-family housing unit with a completely heated basement. **BASEHEAT** was set equal to 0.5 if the housing unit was a single-family housing unit with a partially heated basement.

BLACK: An indicator variable that equaled one if the respondent indicated that the householder's primary ethnic background was black.

CDD65: Number of cooling degree-days (base 65 degrees Fahrenheit).

CDD75: Number of cooling degree-days (base 75 degrees Fahrenheit).

CFAEQUIP: An indicator variable that equaled one if the main space-heating equipment was a central forced-air system. Note: Heat pumps were not counted as a central forced-air system.

CHCYKERO: An indicator variable that equaled one if the household purchased kerosene on a cash-and-carry basis.

CLSWASHR: An indicator variable that equaled one if the household had an automatic clothes washer.

COOKSTVH: An indicator variable that equaled one if the main space-heating equipment was a cooking stove.

DSHWASHR: An indicator variable that equaled one if the household had an electric dishwasher.

ELACADJ1: A term that adjusted the electricity air-conditioning component for the presence of central air-conditioning equipment.

ELACADJ2: A term that adjusted the electricity air-conditioning component for the presence of a household member age 80 years or older.

ELACADJ3: A term that adjusted the electricity air-conditioning component for the reported amount of time the air-conditioning equipment was used.

ELACADJ4: A term that adjusted the electricity air-conditioning component for the presence of an evaporative (swamp) cooler.

ELACADJ5: A term that adjusted the electricity air-conditioning component for the presence of a heat pump.

ELACCDD: A term within the electricity air-conditioning component that was a function of cooling degree-days.

ELACSIZE: A term within the electricity air-conditioning component that was a function of the amount of floor-space that can be cooled, the number of rooms that can be cooled, and the number of household members.

ELAIRCON: A midlevel term within the electricity air-conditioning component.

ELAPACADJ: A term that adjusted the electricity appliance component and the air-conditioning component for demographic characteristics.

ELAPPLADJ1: A term that adjusted the electricity appliance component for the age of the head of the household.

ELAPPLADJ2: A term that adjusted the electricity appliance component for the type of the housing unit.

ELAPPLTOT: A midlevel term within the electricity appliance component.

ELCFAFAN: A term within the electricity appliance component that represented the electricity used to operate the fans in a central forced-air main space-heating system.

ELCLSDRY: An indicator variable that equaled one if the household had an electric clothes dryer.

ELCOOK: An indicator variable that equaled one if electricity was the main fuel used for cooking.

ELGENAPL: A term within the electricity appliance component that represented the amount of electricity consumed in all appliances except refrigerators, freezers, and appliances used for space heating, water heating, and air conditioning.

ELMAINHT: A term in the electricity space-heating component that accounted for the use of electricity as the main space-heating fuel.

ELMHADJ: A term that adjusted the electricity space-heating component for the type of equipment.

ELMHEAT: An indicator variable that equaled one if electricity was the main space-heating fuel.

ELPLHEAT: An indicator variable that equaled one if the household had an electrically heated swimming pool.

ELSECHEAT: A term in the electricity space-heating component that accounted for the use of electricity as a secondary space-heating fuel.

ELSHEAT: An indicator variable that equaled one if electricity was a secondary space-heating fuel and was not the main space-heating fuel.

ELSWHEAT: An indicator variable that equaled one if electricity was a secondary water-heating fuel and was not the main water-heating fuel.

ELTOTADJ: A term that adjusted all electricity components for the price of electricity.

ELWATADJ1: A term that adjusted the electricity water-heating component when electricity was only a secondary water-heating fuel or the housing unit did not have hot running water.

ELWATADJ2: A term that adjusted the electricity water-heating component for the climate.

ELWATERHT: A midlevel term within the electricity water-heating component.

ELWHEAT: An indicator variable that equaled one if electricity was the main water-heating fuel.

FEMLHEAD: An indicator variable that equaled one if the head of the household was a female.

FOMAINHT: A term in the fuel oil space-heating component that accounted for the use of fuel oil as the main space-heating fuel.

FOMHEAT: An indicator variable that equaled one if fuel oil was the main space-heating fuel.

FOOTHER: An indicator variable that equaled one if fuel oil was used for an end use other than space heating or water heating.

FOPLHT: An indicator variable that equaled one if the household had a fuel oil-heated swimming pool.

FOSECHEAT: A term within the fuel oil space-heating component that accounted for the use of fuel oil as a secondary space-heating fuel.

FOSHEAT: An indicator variable that equaled one if fuel oil was a secondary space-heating fuel and was not the main space-heating fuel.

FOSHWHADJ: A term that adjusted the fuel oil space-heating and water-heating components for the type of equipment.

FOSWHT: An indicator variable that equaled one if fuel oil was a secondary water-heating fuel and was not the main water-heating fuel.

FOWATADJ: A term that adjusted the fuel oil water-heating component when fuel oil was only a secondary water-heating fuel or the housing unit did not have hot running water.

FOWATERHT: A midlevel term within the fuel oil water-heating component.

FOWTHT: An indicator variable that equaled one if fuel oil was the main water-heating fuel.

FRIGADJ: A term that adjusted the refrigerator and freezer terms for cooling degree-days.

FRIGFRZZ: A term within the electricity appliance component that accounted for the use of electricity in refrigerators and freezers.

FRIGINDX: A term within the electricity appliance component that accounts for the number and type of refrigerators and the presence and type of freezers.

FULWAINS: A indicator variable that equaled one if the housing unit was a single-family housing unit (detached, attached, or mobile home), and the respondent reported that the housing unit had full attic and wall insulation.

GOODINCM: An indicator variable that equaled one if the household had an annual income greater than \$35,000.

HDD60: Number of heating degree-days (base 60 degrees Fahrenheit).

HEATED: Amount of heated floorspace (in square feet) in a housing unit.

HEATPUMP: An indicator variable that equaled one if the main space-heating equipment was a heat pump.

HGHNDELV: An indicator variable that equaled one if the respondent's estimate of the annual number of fuel oil deliveries was 10 or more.

HH50PLUS: An indicator variable that equaled one if the head of the household was age 50 years or older.

HIGHEST: An indicator variable that equaled one if the respondent's estimate of the annual fuel oil usage was 1,000 or more gallons.

HIGHINCM: An indicator variable that equaled one if the household had an annual income greater than \$75,000.

HVAD80PL: An indicator variable that equaled one if the household had a member age 80 years or older.

HVCENTAC: An indicator variable that equaled one if the household had a central air-conditioning system.

HVHTPOOL: An indicator variable that equaled one if the household had a heated swimming pool.

HVHTRUNW: An indicator variable that equaled one if the housing unit had hot running water.

HVMANUFZ: An indicator variable that equaled one if the household had a manual-defrost electric freezer.

HVNOFRFZ: An indicator variable that equaled one if the household had a frost-free or automatic-defrost electric freezer.

HVPOOL: An indicator variable that equaled one if the household had a swimming pool.

HVSWMPCL: An indicator variable that equaled one if the household had an evaporative (swamp) cooler.

HVWATBED: An indicator variable that equaled one if the household had one or more heated water beds.

KERFIXMHT: An indicator variable that equaled one if the main space-heating equipment was not a portable kerosene heater.

KERMHTFIX: A term within the kerosene space-heating component that represented the amount of kerosene consumed for space heating when kerosene was the main space-heating fuel, and the main space-heating equipment was not a portable kerosene heater.

KERMHTPORT: A term within the kerosene space-heating component that represented the amount of kerosene consumed for space heating when kerosene was the main space-heating fuel and the main space-heating equipment was a portable kerosene heater.

KEROTHER: An indicator variable that equaled one if kerosene was used for an end use other than space heating or water heating.

KERPORTHT: An indicator variable that equaled one if the main space-heating equipment was a portable kerosene heater.

KERSECHEAT: A term within the kerosene space-heating component that represented the amount of kerosene consumed for space heating when kerosene was used as a secondary space-heating fuel.

KERSHEAT: An indicator variable that equaled one if kerosene was a secondary space-heating fuel and was not the main space-heating fuel.

KERSHTADJ1: A term that adjusted the kerosene space-heating component downward when natural gas was used as the main space-heating fuel and kerosene was used as a secondary space-heating fuel.

KERSHTADJ2: A term that adjusted the kerosene space-heating component upward when kerosene was used as a secondary space-heating fuel, and the main space-heating fuel was reported by the respondent to provide "about three-fourths" or "closer to half" of the heat.

KERSHTADJ3: A term that adjusted the kerosene space-heating component according to the way that kerosene was purchased and the estimated number of kerosene deliveries or purchases. The term was only used when kerosene was a secondary space-heating fuel.

KERWATERHT: A midlevel term in the kerosene water-heating component.

KERWTHT: An indicator variable that equaled one if kerosene was the main water-heating fuel.

KRFXHTADJ: A term that adjusted the kerosene space-heating and water-heating components when kerosene was used as the main space-heating fuel and the main space-heating equipment was not a portable kerosene heater.

KRPTHHTADJ: A term that adjusted the kerosene space-heating and water-heating components when kerosene was used as the main space-heating fuel, the main space-heating equipment was a portable kerosene heater, and a portable electric space heater was used as a secondary source of space heat.

LOGHDD60: Log(base 10) of HDD60.

LOGHTSF: Log(base 10) of heated floorspace.

LOGRELPC: Log(base 10) of ((price of 1,000 kWh of electricity) / (\$75.00)).

LOWNDELV: An indicator variable that equaled one if the respondent's estimate of the number of fuel oil deliveries was zero or one.

LPGAPPL: A midlevel term within the LPG appliance component.

LPGCOOK: An indicator variable that equaled one if LPG was the main cooking fuel.

LPGDRYER: An indicator variable that equaled one if the household had a LPG clothes dryer.

LPGLIGHT: An indicator variable that equaled one if the household had a LPG outdoor light.

LPGMAINHT: A term in the LPG space-heating component that accounted for the use of LPG as the main space-heating fuel.

LPGMHEAT: An indicator variable that equaled one if LPG was the main space-heating fuel.

LPGPLHT: An indicator variable that equaled one if the household had a swimming pool heated with LPG.

LPGSCOOK: An indicator variable that equaled one if LPG was a secondary cooking fuel and was not the main cooking fuel.

LPGSECHT: A term within the LPG space-heating component representing the use of LPG as a secondary space-heating fuel.

LPGSHEAT: An indicator variable that equaled one if LPG was a secondary space-heating fuel and was not the main space-heating fuel.

LPGSWTHT: An indicator variable that equaled one if LPG was a secondary water-heating fuel and was not the main water-heating fuel.

LPGWATADJ: A term that adjusted the LPG water-heating component when LPG was only a secondary water-heating fuel, or the housing unit did not have hot running water.

LPGWATHT: A midlevel term within the LPG water-heating component.

LPGWTHT: An indicator variable that equaled one if LPG was the main water-heating fuel.

LRGAPTBD: An indicator variable that equaled one if the housing unit was located in a five or more unit apartment building.

MD4059HM: An indicator variable that equaled one if the housing unit was built between 1940 and 1959.

MD80PLUS: An indicator variable that equaled one if the housing unit was built in 1980 or later.

MHTC6795: An indicator variable that equaled one if the respondent reported that the main space-heating equipment contributed between 67 and 95 percent of the heat.

MHTC66MN: An indicator variable that equaled one if the respondent reported that the main space-heating system contributed less than two-thirds of the heat.

MIDDLEHH: An indicator variable that equaled one if the head of the household was between 40 and 59 years old.

NDRSAWS: Number of doors and windows in the housing unit.

NGAIRCON: A midlevel term within the natural gas air-conditioning component.

NGAPPL: A midlevel term within the natural gas appliance component.

NGCACRMS: Number of rooms cooled by a natural gas fueled central air-conditioning system.

NGCOOK: An indicator variable that equaled one if natural gas was the main cooking fuel.

NGDRYER: An indicator variable that equaled one if the household had a natural gas clothes dryer.

NGHTADJ1: A term that adjusted the natural gas space-heating component for the insulation characteristics of the housing unit.

NGHTADJ2: A term that adjusted the natural gas space-heating component for the type of space-heating equipment.

NGHTADJ3: A term that adjusted the natural gas space-heating component for the amount of space heating provided by secondary space-heating fuels.

NGHTADJ4: A term that adjusted the natural gas space-heating component for the age of the housing unit.

NGHTADJ5: A term that adjusted the natural gas space-heating component for the thermostat setting.

NGHTADJ6: A term that adjusted the natural gas space-heating component for the presence of a household member age 80 years or older.

NGTHDD: A term used in the natural gas space-heating component that was a function of the number of heating degree-days.

NGHTSZ: A term used in the natural gas space-heating component that was a function of the size of the housing unit.

NGLIGHT: An indicator variable that equaled one if the household had natural gas outdoor lights.

NGMAINHT: A term within the natural gas space-heating component that accounted for the use of natural gas as the main space-heating fuel.

NGMHEAT: An indicator variable that equaled one if natural gas was the main space-heating fuel.

NGPOOLHT: An indicator variable that equaled one if the household had a swimming pool heated by natural gas.

NGSCOOK: An indicator variable that equaled one if natural gas was a secondary cooking fuel and not the main cooking fuel.

NGSECHADJ1: A term that adjusted the natural gas space-heating component downward when natural gas was not the main space-heating fuel, natural gas was a secondary space-heating fuel, and a natural gas cooking stove was a type of secondary space-heating equipment.

NGSECHADJ2: A term that adjusted the natural gas space-heating component upward when natural gas was not the main space-heating fuel, natural gas was a secondary space-heating fuel, and the main space-heating fuel was reported by the respondents to provide "about three-fourths" or "closer to half" of the heat.

NGSECHDD: A term within the secondary space-heating portion of the natural gas space-heating component that was a function of heating degree-days.

NGSECHEAT: A term within the natural gas space-heating component that accounted for the use of natural gas as a secondary space-heating fuel.

NGSHEAT: An indicator variable that equaled one if natural gas was a secondary space-heating fuel and not the main space-heating fuel.

NGSWTHT: An indicator variable that equaled one if natural gas was a secondary water-heating fuel and not the main water-heating fuel.

NGTOTADJ1: A term that adjusted all natural gas components for demographic characteristics of the household.

NGTOTADJ2: A term that adjusted all natural gas components for geographic location.

NGWATADJ1: A term that adjusted the natural gas water-heating component when natural gas was only a secondary water-heating fuel, or the housing unit did not have hot running water.

NGWATADJ2: A term that adjusted the natural gas water-heating component for the climate.

NGWATERHT: A midlevel term used in the natural gas water-heating component.

NGWHSHADJ: A term used to adjust the natural gas space-heating and water-heating components for the type of housing unit, the age of the housing unit, and family income.

NGWHSIZE: A term within the natural gas water-heating component that was a function of the square root of the number of household members, and the square root of the number of teenage household members.

NGWTHT: An indicator variable that equaled one if natural gas was the main water-heating fuel.

NUMBATHR: Number of bathrooms in the housing unit.

NUMFFRFG: Number of frost-free or automatic-defrost electric refrigerators in the housing unit.

NUMHSMEM: Number of household members in the housing unit.

NUMMURFG: Number of manual-defrost refrigerators in the housing unit.

NUMROOMS: Number of rooms in the housing unit.

NUMTVCLR: Number of color television sets in the housing unit.

OLDHOME: An indicator variable that equaled one if the housing unit was built before 1940.

PCTNOSTM: The percentage of windows and doors that were not storm windows and doors.

POORHSLD: An indicator variable that equaled one if the household had an annual income of less than \$10,000 and the household did not own the housing unit in which they lived.

PORTELEC: An indicator variable that equaled one if the main space-heating equipment was a portable electric heater.

RADEQUIP: An indicator variable that equaled one if the main space-heating equipment used radiators, convectors, or hot water pipes to distribute the heat.

SECELPRT: An indicator variable that equaled one if a portable electric space heater was used as a secondary source of space heat.

SECNGCKS: An indicator variable that equaled one if a natural gas stove was used for secondary space heating.

SFATTACH: An indicator variable that equaled one if the housing unit was a single-family attached unit.

SFATTWOS: An indicator variable that equaled one if the housing unit was a single-family attached unit that was attached on two sides.

SF1SCSLB: An indicator variable that equaled one if the housing unit was a single-story, single-family housing unit (detached, attached, or mobile home) built on a concrete slab with no basement or crawl space.

SMLAPTBD: An indicator variable that equaled one if the housing unit was located in a 2 to 4 unit apartment building.

SPHEATER: An indicator variable that equaled one if the main space-heating equipment was a room or space heater.

SPHTCOM: Energy used for space-heating component.

SQRTACRS: Square root of the number of rooms that were air-conditioned.

SQRTCD65: Square root of the cooling degree-days base 65 degrees Fahrenheit (CDD65).

SQRTCD75: Square root of the cooling degree-days base 75 degrees Fahrenheit (CDD75).

SQRTCOOL: Square root of the cooled square footage.

SQRTHD60: Square root of the heating degree-days base 60 degrees Fahrenheit (HDD60).

SQRTNHMM: Square root of the number of household members.

SQRTNMDL: Square root of the respondent's estimate of the number of kerosene purchases made by the household.

SQRTTEEN: Square root of the number of teenagers (ages 13 to 19) in the household.

TEMPINDX: Indexes summarizing thermostat settings. The indexes are:

NT70PL, An indicator variable that equaled one if the thermostat setting during night sleeping hours was 70° Fahrenheit or higher.

HM70PL, An indicator variable that equaled one if the thermostat setting during the day when someone was home was 70° Fahrenheit or higher.

GN70PL, An indicator variable that equaled one if the thermostat setting when no one was home was 70° Fahrenheit or higher.

NT58MN, An indicator variable that equaled one if the thermostat setting during night sleeping hours was 58° Fahrenheit or less.

HM58MN, An indicator variable that equaled one if the thermostat setting during the day when someone was home was 58° Fahrenheit or less.

GN58MN, An indicator variable that equaled one if the thermostat setting when no one was home was 58° Fahrenheit or less.

$$\text{TEMPINDX} = \text{NT70PL} + \text{HM70PL} + \text{GN70PL} \\ - \text{NT58MN} - \text{HM58MN} - \text{GN58MN}.$$

USEACASL, USEACNOT, USEACQBT: Indicator variables that show the amount of air conditioning used. The respondents who stated they had air-conditioning equipment were asked, "Which of the statements on this exhibit best describes the way you used your air conditioner this summer?" The following indicator variables were set based on the respondent's response.

USEACASL equaled one if the respondent reported "Turned on just about all summer".

USEACNOT equaled one if the respondent reported "Did not use at all".

USEACQBT equaled one if the respondent reported "Turned on quite a bit".

WATPUMP: An indicator variable that equaled one if the household had an electric water-pump.

WESTNC: An indicator variable that equaled one if the housing unit was located in the West North Central Census division.

WHRZNONE: An indicator variable that equaled one if the housing unit was located in Weather Zone 1. Zone 1 was defined as areas where the average annual heating degree-days (base 65° F) were greater than 7,000.

WHTCOM: Energy used for water-heating component.

YCOM: Predicted annual energy consumption in thousands of Btu.



Appendix C

Quality of the Data

$$RSE(X/Y) = \sqrt{RSE^2(X) + RSE^2(Y)}$$



Appendix C

Quality of the Data

The quality of data collection and processing affects the accuracy of estimates based on the survey. All the statistics published in this report are estimates of population values, such as the total amount of electricity consumed in housing units. These estimates are based on observations from a randomly chosen subset of the entire population of occupied housing units. As a result, the estimates always differ from the true population values.

Differences that would be expected to occur in all possible samples, or in the average of all estimates from all possible samples, are known as systematic errors, biases, or nonsampling errors. The magnitude of nonsampling errors cannot be estimated from the sample data. For this reason, avoiding nonsampling errors at the outset is a primary objective of all stages of survey design. The sections that follow this introduction describe some of the sources of this nonsampling error, and how the survey is designed and conducted to minimize such errors.

Random differences between the survey estimates and the population value, which occur because of the particular sample that was selected by chance, are known as sampling errors. The average sampling error, averaged over all possible samples, would be zero. Although the sampling error is nonzero and unknown for the particular sample chosen, the sample design permits sampling errors to be estimated. The final section, "Sampling Error," describes how the magnitude of the sampling error is estimated and presented for statistics given in this report.

Nonsampling Error

Data from the 1987 Residential Energy Consumption Survey (RECS) are subject to many sources of nonsampling error and bias. Nonsampling error and bias are measures of variability due to the way the survey was conducted. They can include population undercoverage during sampling, response bias and variance, interviewer error, coding and/or keypunch-

ing error, and nonresponse bias. The wording and format of survey questionnaires, the procedures used to select and train interviewers, and the quality control built into the data collection, receipt, and processing operations were all designed to minimize these sources of error. (For discussion of these procedures, see Appendix A, "How the Survey Was Conducted.") In addition, response adjustments and ratio estimations were incorporated into the survey estimator to help reduce both sampling and nonsampling error. These procedures also are discussed in Appendix A, "How the Survey Was Conducted."

Noncovered Housing Units

Data are not collected for the following two types of housing units:

- Vacant housing units. These units may have minimal heating for protection from the weather and lighting for security. The American Housing Survey (AHS) conducted by the Bureau of the Census estimated that there were 6.1 million vacant, year-round housing units in 1985.
- Second homes for the owner's use. The AHS estimates there were 2.2 million homes "held for occasional use" in 1985.

These two types of units are not included in the RECS survey primarily because of the difficulty in acquiring data and limitations in the availability of funds for the RECS. The RECS data are collected by interviewing someone who knows the housing unit and who can sign an authorization form for release of fuel records from the fuel supplier. That type of person is less likely to be available for vacant or second homes than for primary residences.

Some effects of these omissions are an underestimation of the total number of residential housing units, the number of units in subcategories and the amount of energy consumed in the residential sector.

Sampling Unit Interview Error

The design of the 1987 RECS included a longitudinal panel. This panel is a subsample of the entire 1987 RECS sample. Unfortunately, the interviewers sometimes made mistakes and interviewed the occupants of the wrong housing unit. This usually occurred in rural areas where the housing units did not have a street address. In the cases where this occurred for the longitudinal panel, the 1987 RECS data set would indicate that the housing unit was also sampled for the 1984 RECS data set when, in fact, a different housing unit was interviewed. This occurred an undetermined number of times. But there is evidence that it occurred at least 15 times out of the 2,065 longitudinal housing units in the 1987 RECS. These 15 units were discovered in a limited check among the 40 housing units where the percent change in the square footage from the 1984 RECS to the 1987 RECS was the largest. A more extensive check performed for the 1984 RECS revealed that this type of mistake occurred at least 50 times out of the 1,830 longitudinal housing units in the 1984 RECS.

Quality Control and Performance Statistics

The RECS has begun collecting performance statistics on the data coding and editing phase of RECS work. Performance statistics are information about an ongoing process that provides feedback on how well the process is working. This information, first compiled for the 1984 RECS, provided useful input for decisions concerning the data collection and data editing procedures for the 1987 RECS. Several changes in the procedures were made for the 1987 RECS based on performance statistics from the 1984 RECS, including major changes in the keying verification and interviewer training procedures.

Keying errors that were not caught in the 1984 RECS were found to be more costly to correct at a later stage than if they were discovered and corrected in the initial data cleaning stage. Many of the keying errors were not initially detected because keying was verified only 25 percent of the time for some data items. To save costs in the later stage, all data items were 100 percent verified for the 1987 RECS.

For each interviewer that worked on the 1984 RECS, the number of errors was tabulated. Those interviewers who were also working on the 1987 RECS were given extra training in the areas where they had made errors

in their work on the 1984 RECS. Items with the largest number of errors also received special attention in the interviewer training for all interviewers.¹⁴

Quality of Specific Data Items

Square Feet of Floorspace

For each sampled dwelling, the square footage of the dwelling and the square footage of the heated floorspace is determined or estimated. (See "Estimates of Housing Unit Size" section in Appendix A, for a discussion of the square footage measurements.) Errors in the square footage of floorspace in a sampled dwelling can be made in several places. The interviewer can record incorrect measurements, forget to include some parts of the dwelling, include floorspace that is not part of the housing unit, or incorrectly label which areas are heated and which areas are not heated.

For housing units in the longitudinal panel, the interviewers attempted to obtain the square footage measurements during both the 1984 RECS and the 1987 RECS. An analysis of longitudinal housing units was made in order to study the order of the measurement error in the determination of the total square footage of a housing unit. All of the longitudinal housing units were used in the study with the following exceptions:

1. Housing units where it was determined that the wrong unit was interviewed for the 1984 RECS or the 1987 RECS.
2. Housing units where the square footage was imputed for either the 1984 RECS or the 1987 RECS.
3. Housing units where the respondents indicated that a change in the square footage was made between the two surveys.
4. Housing units whose occupants responded by mail for either the 1984 RECS or the 1987 RECS.

The results of the analysis showed a median percentage difference of 11 percent for total square feet (heated area plus unheated area). The percentage difference was the absolute value of the difference between the two measurements as a percentage of the average of the two measurements.

In addition to analyzing the housing units in the longitudinal panel, a comparison of the average total floorspace over all units in the samples was completed. This comparison revealed that the average total floorspace for the 1984 RECS was 1,672 square feet.

¹⁴For more information about RECS performance statistics, see Thomas B. Jabine, Review of Computer Edit and Update Performance Statistics for the Residential Energy Consumption Survey, report prepared for the Energy Information Administration, December 1987.

The average for the 1987 RECS was 1,733 square feet. This increase is statistically significant. The increase is most likely a result of improvements in the procedures used to obtain the square footage measurements and not a result of an actual increase in the average size of dwellings. In particular, the interviewers for the 1987 RECS were given special training on how to properly measure a housing unit. This training probably was the reason for the increase in the percentage of housing units (56 percent to 73 percent) where the square footage data could be based on a complete set of measurements. In addition, the quality of the measurements that were obtained most likely increased.

Type of Housing Unit

The type of the housing unit was determined by the interviewer without the help of the respondent. The amount of interviewer error made in determining the

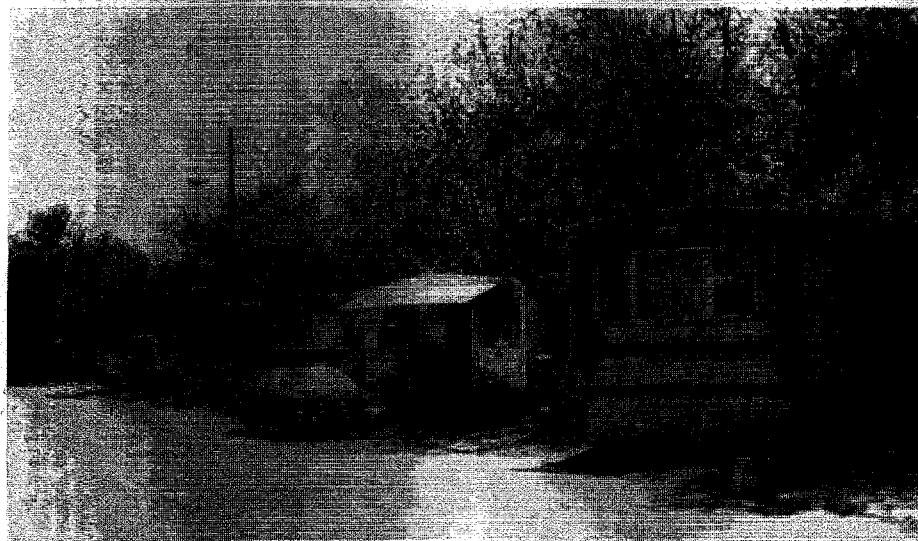
type of the housing unit can be studied using the housing units in the longitudinal panel. Table C1 presents a cross-tabulation of the 1984 RECS housing type and the 1987 RECS housing type for 2,049 longitudinal households. (The 15 cases where it was determined that different housing units were interviewed and the one case where the basement was converted to an apartment were not used in the table.)

Table C1 indicates that there are several areas where there is confusion among the interviewers on how to classify dwellings. The housing type that appears to cause the most confusion is "single-family attached" units. It is possible for some housing units to change type. This would occur if additional housing units are created in a building or if some residential space is converted to nonresidential usage. This occurrence is probably much smaller than the number of mistakes made by interviewers.

Table C1. Housing Type for Longitudinal Households

Housing Type as Reported in the 1984 RECS	Housing Type as Reported in the 1987 RECS				
	Mobile Home	Single-Family Detached	Single-Family Attached	Apartment Building 2-4 Units	Apartment Building 5+ Units
Mobile Home	115	9	0	0	0
Single-Family Detached	9	1,265	16	20	1
Single-Family Attached	0	28	53	14	2
Apartment Building 2-4 Units	0	10	21	209	10
Apartment Building 5+ Units	0	0	6	10	269

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1984 and 1987 Residential Energy Consumption Surveys.



These mobile homes are some examples of housing units sampled in the RECS.

Table C2. Estimates for 1987 Household Income from CPS and RECS
(Thousands of Households)

Income Category	Number of Households	
	1987 RECS (November 1987)	CPS Estimates (March 1988)
Total	90,537	91,066
Less than \$5,000	6,176	6,271
\$5,000 - \$9,999	11,489	10,446
\$10,000 - \$14,999	12,619	9,658
\$15,000 - \$19,999	9,014	9,136
\$20,000 - \$24,999	8,751	8,406
\$25,000 - \$29,999	7,926	7,647
\$30,000 - \$34,999	8,270	7,017
\$35,000 - \$39,999	5,626	6,198
\$40,000 - \$49,999	7,749	9,479
\$50,000 - \$74,999	8,677	11,109
\$75,000 or Over	4,238	5,700

Sources: • Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey. • U.S. Department of Commerce, Bureau of the Census, Current Population Survey.

Income

Underreporting of income is often a problem in surveys similar to the RECS. Underreporting may be exacerbated in the RECS, which measures income by only one question. In comparison, the Current Population Survey (CPS) collected by the Bureau of the Census measures income by several questions; income questions are asked separately for each source of income

and each household member. Table C2 presents a comparison of the CPS estimates with the RECS estimates.

The underreporting of income on the 1987 RECS relative to the CPS is evident in the upper income categories. The 1987 RECS gives an estimate of 26.3 million households with an income of \$35,000 or more while the CPS estimates the number is 32.5 million households.

Table C3. Definition of Poverty

Number of Persons Per Family	Below 100 Percent of Poverty		Below 125 Percent of Poverty	
	1987 RECS Income Range Less Than ^a	Census Threshold ^b	1987 RECS Income Range Less Than ^a	125 Percent Threshold ^b
1 and-				
Respondent 64 or Younger	\$6,000	\$5,909	\$7,500	\$7,386
Respondent 65 or Older	5,000	5,447	7,500	6,809
2 and-				
Householder 64 or Younger	7,500	7,641	10,000	9,551
Householder 65 or Older	7,500	6,872	9,000	8,590
3	9,000	9,056	11,000	11,320
4	11,000	11,611	15,000	14,514
5	14,000	13,737	17,500	17,171
6	15,000	15,509	20,000	19,386
7	17,500	17,649	22,500	22,061
8	20,000	19,515	25,000	24,394
9 or More	22,500	23,105	30,000	28,881

^a The income category that contained the Census threshold was taken as the upper limit in defining poverty when the Census threshold was equal to or above the midpoint of the income category. For example, since the threshold of \$5,447 was not above the midpoint of the category \$5,000 to \$5,999, the next lower income category was used.

^b Figures from the U.S. Bureau of the Census, **Money Income and Poverty Status of Families and Persons in the United States: 1987** (Advance Data from the March 1988 Current Population Survey) (Current Population Reports, Series P-60, No. 161, August 1988), Table A1, p.41.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

Poverty Status

The United States Bureau of the Census provides a threshold of poverty which is based on family income and the number of household members (Table C3). Households with incomes below the poverty threshold are defined as "Below 100 Percent of Poverty Line." Households with income below 125 percent of the poverty threshold are defined as "Below 125 Percent of Poverty Line."

Because the RECS income data were collected using categories of income, an exact match of Census thresholds could not be made. An additional source of error in the determination of poverty status is the nonsampling error in the reported income. The CPS estimate for households below 100 percent of poverty was 11,945,000 for March 1987. The 1987 RECS estimate was 11,768,000 households below 100 percent of poverty. The fact that the two estimates are very close together may be misleading. For example, the 1984 RECS estimate was 13,680,000 households below 100 percent of poverty, while the CPS estimate for 1984 was 11,887,000. The 1984 RECS report (Appendix C, "Quality of the Data.") incorrectly gave the CPS estimate as 13,886,000.

Gas Central Air Conditioning

Some respondents incorrectly report that they have gas air conditioners when, in reality, they have electric air conditioners. The majority of the households claiming to have natural gas or LPG central air conditioning may actually have electric systems. Three possible explanations for these errors are as follows: (1) respondents may have confused Freon with the fuel running the compressor, (2) the housing unit was in an apartment building and the occupants did not know the type of fuel used in the central air-conditioning system, and (3) households with gas central forced-air heating systems and electric central air-conditioning systems may have thought they were both gas systems. (This may be especially true if one thermostat controls both systems.) In the 1987 RECS, an estimated 1.7 million households initially reported that they had gas air conditioners. After checking again with the respondents and with the rental agents, or looking for a pattern in the natural gas utility bills that indicated increased usage during periods of demand for air conditioning, the estimated number of households that used gas air conditioners was reduced to 0.6 million. This estimate still may be too high.

New Homes

The RECS estimates of the number of homes constructed from 1985 through 1987 that use gas (natural gas or LPG) as the main heating fuel do not seem to agree with the U.S. Bureau of Census estimates pub-

lished in *Characteristics of New Housing: 1987*, U.S. Department of Housing and Urban Development. The RECS data indicate that 30.7 percent of homes (excluding mobile homes), constructed from 1985 through 1987 are heated with natural gas and 2.6 percent are heated with LPG. Census data indicate that 43.2 percent of new homes are heated with gas (natural gas or LPG). Data on heating fuels of newly constructed mobile homes are not available from Census data. The Census data covers all units completed any time during 1985 through 1987. The RECS data count units that were occupied as of the time the interview was attempted, which may be as early as September 1987. Hence, all units that were first occupied during the last part of 1987 may not be covered by RECS. The Census estimates are based on units completed but, not necessarily occupied, and even if the units are occupied, they may not be the primary residence. The RECS estimates are based on occupied units that are the primary residence of the occupants. The Census data give the fuel for the main heating equipment that was installed in the home. The RECS data give the fuel that the occupants indicate is the main space-heating fuel. Furthermore, after being occupied, the residents sometimes change the main heating fuel by installing wood stoves or portable heaters.

Weather (Degree-Days)

Degree-days were assigned to housing units for the 1987 RECS from individual weather stations, as opposed to previous RECS surveys, where the degree-day data were from clusters of weather stations (a cluster of weather stations were those contained within an individual NOAA weather division. See the "Glossary" for the definition of NOAA division.) This change in the methodology from the cluster method to the station method will provide more accurate weather data for some households. The problem with using data from a cluster of weather stations is that some clusters contained a high variability in temperatures recorded among stations within the cluster. By selecting an appropriate, nearby weather station, it is believed that the difference between the temperatures actually experienced by a household and the temperature assigned to that household could be minimized. In selecting an appropriate, nearby weather station, distance was the major consideration but intervening mountain ranges and presence of bodies of water were also taken into account.

This change has made it more difficult to assess trends in degree-days when comparing the 1987 RECS with previous RECS. To assess the effect of this change, both methods were used to affix weather data to households for the 1984 RECS. The results from comparing the two methods indicate that, in general, at the national level, the change to individual weather stations has decreased the number of heating degree-days and increased the number of cooling degree-days (Table C4). The difference is particularly large in the West, where

Table C4. Comparison of Heating Degree-Days Using Cluster Method Versus Station Method, April 1984 Through March 1985

Census Division	Million Households	Heating Degree-Days			Cooling Degree-Days		
		Cluster Method	Station Method	Percent Difference	Cluster Method	Station Method	Percent Difference
United States	86.328	4,686	4,518	-3.6	1,153	1,293	12.1
New England	4.269	6,398	6,331	-1.0	524	621	18.4
Middle Atlantic	14.029	5,663	5,460	-3.6	683	822	20.3
East North Central	15.203	6,524	6,427	-1.5	685	777	13.4
West North Central	6.414	6,619	6,499	-1.8	976	1,076	10.2
South Atlantic	14.777	2,951	2,979	0.9	1,768	1,819	2.8
East South Central	5.784	3,651	3,512	-3.8	1,433	1,583	10.5
West South Central	8.764	2,443	2,444	0.1	2,361	2,431	2.9
Mountain	4.512	5,728	5,158	-10.0	1,102	1,550	40.6
Pacific	12.577	3,508	3,019	-13.9	873	1,148	31.5

Note: The cluster method uses weather data from the set of weather stations in a NOAA weather division. The station method uses weather data from an individual weather station.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1984 Residential Energy Consumption Survey.

the Mountain Division and the Pacific Division had changes that were much larger than the changes at the national level. One reason for the large differences in the Pacific Division is that stations in California were clustered together on the basis of drainage areas, thus combining weather stations from mountainous areas with lowland areas. The reader may use degree-day data to make comparisons among subgroups within the 1987 RECS, but should avoid comparing degree-day data from the 1987 RECS with degree-day data from previous RECS.

In the 1987 RECS, when electricity was adjusted to include the amount of energy used to produce the electricity, the total average amount of energy used by a household was 161.7 million Btu. This contrasts with 100.8 million Btu when the 'site' value of electricity is used. If the 'adjusted' value of electricity is used, the proportion of energy used for space heating is 38 percent and the proportion used for appliances is 38 percent. As reported in this report, when the 'site' value of electricity is used, the proportion of energy used for space heating is 54 percent and the proportion of energy used for appliances is 23 percent.

Adjusted Electricity

If the energy derived from the fossil fuels used to generate electricity is taken into account, then the totals in this report underrepresent the amount of energy consumed in the residential sector. It is estimated that approximately 3 Btu of fossil fuels are needed to generate and deliver 1 Btu of electricity to a housing unit. In this report, the total amount of energy used is obtained by adding the Btu value of fossil fuels consumed by households to the Btu value of electricity delivered to households. The difference between the Btu value of fossil fuels used to produce electricity and the Btu value of electricity delivered to households is excluded. The total amount of energy consumed would reflect this difference if the 'site' value of electricity is multiplied by 3 to yield the 'adjusted' value of electricity and the 'adjusted' value of electricity is used to calculate the total energy consumed.

Space-Heating Intensity

The heating intensity is used to display the amount of energy used for space heating when the weather and size of housing unit have been standardized. There are two procedures to calculate the heating intensity for a category of households. Procedure 1 calculates the average value of the amount of energy used for space heating by households in the category, average heated floorspace of the housing units occupied by the households in the category, and the average number of heating degree-days experienced by the households in the category. The heating intensity then equals the average amount of energy divided by the average heated floorspace and by the average number of heating degree-days. Procedure 2 calculates an individual heating intensity for all households in the category. The heating intensity for the category is the average over

all households in the category of the individual heating intensities.

This report used Procedure 1 for calculating heating intensities. (See "Space-Heating Intensity" in the "Energy Consumption Patterns" section of this report for details of Procedure 1.) Procedure 2 is outlined below:

For each household that heated their home let HHHEATINT be the household heating intensity. Then

$$HHHEATINT = \frac{BTUSPH}{(HDD \times HEATED)}$$

Where:

BTUSPH = the number of Btu of energy used for space heating,

HDD = the annual heating degree-days (base 65 degrees Fahrenheit) experienced by the household (if the annual heating degree-days equaled 0 then set HDD equal to 1),

and

HEATED = the heated floorspace of the housing unit.

If a household did not heat their home then set HHHEATINT equal to 0. The heating intensity for a category of households equals the average value of HHHEATINT over all households in the category.

Analogous definitions can be used to calculate the household heating intensity for specific fuels using Procedure 2. For example, the heating intensity for households that use natural gas as the main space-heating fuel is the average value of the household natural gas heating intensity over all households that use natural gas as the main space-heating fuel.

The two procedures will usually give a different value for the heating intensity. For the 1987 RECS, the procedure used in this report (Procedure 1) gives a natural gas heating intensity for households that use natural gas as the main space-heating fuel equal to 10.0 Btu per heating degree-days and per square foot. Procedure 2 gives a heating intensity equal to 12.6 Btu per heating degree-days and per square foot.

Procedure 2 usually gives a larger value for the heating intensity because the distribution of the household intensities is skewed in the positive direction. The households with the large values for the heating intensity tended to either live in small units or be located in

warm climates and, hence experience a small number of heating degree-days. In either case, the consumption of energy for space heating will tend to be smaller than average, but the decrease in the energy consumption will be less than the decrease in the amount of heated floorspace or the decrease in the number of heating degree-days.

Heating intensities for the *Residential Energy Consumption Survey: Consumption and Expenditures April 1984 Through March 1985, Part 2: Regional Data* were calculated using Procedure 2. No comparison was made between the heating intensities reported for the 1984 RECS and those reported for the 1987 RECS because of the change in the procedure that was used to calculate the intensity.

Air-Conditioning Intensity

The air-conditioning intensity is used to display the amount of energy used for air conditioning when the weather and amount of cooled floorspace have been standardized. Analogous to heating intensity, there are two different procedures that can be used to calculate the air-conditioning intensity. In this report, the air-conditioning intensity is calculated using a procedure that corresponds to Procedure 1 for calculating the heating intensity. In particular, the air-conditioning intensity equals the average consumption of energy used for air conditioning divided by the average value for cooling degree-days (base 65 degrees Fahrenheit) and divided by the average number of cooled square feet. For individual housing units, the amount of cooled floorspace is not estimated from measurements of the cooled floorspace in the housing unit. Instead, the cooled square footage is given by the following formula:

$$COOLED = HOMEAREA \times \left(\frac{NROOMSAC}{NROOMS} \right)$$

Where:

HOMEAREA = total floorspace of the housing unit,

NROOMS = number of rooms in the housing unit,

and

NROOMSAC = number of rooms in the housing unit that can be air-conditioned during the summer.

Annualization of Energy Consumption and Expenditure Data

Usable Data

Two steps were used to determine the annual consumption and expenditure amounts for electricity and natural gas. The first step was to determine if there was a sufficient amount of accurate billing data to calculate the annual consumption and expenditure amounts. The second step was to use predetermined annualization procedures to calculate an annual amount if the the billing data were adequate. If the billing data were missing or were not usable, the annual amounts were imputed using regression estimates.

For fuel oil, kerosene, and LPG, there was an additional step in determining the annual amounts. As with electricity and natural gas, if supplier data were available and usable, the annual amounts were based on the supplier data. If the supplier data were not available or not usable, then the next step was to determine if the respondent provided usable estimates of the annual amounts. If these estimates were available and usable, they were used. If both the billing data and respondent estimates were missing or not usable, the annual amounts were imputed using regression estimates.

Comparison with 1984 RECS

The proportion of households with usable fuel-consumption records was higher in 1987 than it was in 1984. The difference is 3 percentage points for electricity, 3 for natural gas, 5 for LPG, 12 for fuel oil, and 2 for kerosene.

For electricity and natural gas, three factors contributed to the increase. First, new procedures for annualizing records made it possible to use more fuel records, including those that were for relatively short periods and those where the household did not pay for all uses of the fuel. Second, data were collected for households who paid for utility bills that included another household. Third, refusal conversion techniques resulted in the elimination of supplier nonresponse.

For fuel oil and LPG, three factors contributed to the increase. First, the number of households with fuel included in rent declined. Second, data were used for households who pay for utility bills that included another household. Third, a greater number of usable bills were collected.

For kerosene, collection of household estimates during the household interview decreased the number of imputations.

Table C5 shows the availability of consumption records by the type of housing structure. Usable records were most often obtained for single-family units, more often for electricity (90.0 percent of the units) and natural gas (89.2 percent) than for fuel oil (75.1 percent), kerosene (71.8 percent) or LPG (67.3 percent). The problems inherent in collecting data for the storage fuels were described earlier: multiple suppliers, "cash-and-carry" customers, companies supplying purchase data instead of usage data, and economic instability of the supplying companies.

Most of the consumption and expenditure data for large apartment buildings, especially natural gas and fuel oil, are imputed data. Usable records were obtained for only 25.4 percent of the apartments in large buildings that used natural gas and none of those using fuel oil. Liquefied petroleum gas and kerosene are infrequently used in large apartment buildings. Electricity data for these apartments were obtained in 61.5 percent of the cases.

The reason data on consumption and expenditures are so often imputed for multiunit structures is that energy use is not directly metered for individual apartments. A master meter registers the usage for a number of units in the building. Under these circumstances, there is no way to measure the consumption of individual apartments directly.

Other segments of the data for which the lack of usable records may lead to an imputation bias include natural gas and fuel oil for apartments in smaller buildings (two to four units per building), and fuel oil and LPG used in mobile homes. Usable records in these segments were obtained for between 38.6 percent and 62.5 percent of the households.

Annualization of Energy Bills: Electricity and Natural Gas

The utilities provide the electricity and natural gas billing records, which typically cover a period of approximately 30 days. The bills were used to calculate the annual consumption and expenditure amounts.

The utility bills that were obtained from the electricity and natural gas utilities never exactly matched the optimal consumption period defined as January 1, 1987, through January 1, 1988. In addition, the vast majority of the households did not have a set of utility bills that covered exactly 365 days for a period that was close to the 1987 calendar year. As a result, an algorithm was developed that chooses which set of bills to use to compute the annual consumption and expenditures.

Table C5. Energy-Consumption Records and Missing Data for Surveyed Households, by Fuels Used and Type of Housing Structure (Percent of Households)

Type of Fuel Used	Total Households Using the Fuel	Mobile Home	Single-Family	Two to Four Units	Five or More Units
Electricity (Sample Number)	100.0 (6,228)	100.0 (365)	100.0 (4,087)	100.0 (775)	100.0 (1,001)
Usable Record	82.8	81.9	90.0	72.4	61.5
Unusable Record ^a	0.9	1.1	0.5	1.0	2.5
Records Not Available	8.8	8.2	8.2	11.5	9.2
Fuel Used Is Included In Rent or Paid in Other Ways ^b	7.5	8.8	1.2	15.1	26.8
Natural Gas (Sample Number)	100.0 (3,991)	100.0 (142)	100.0 (2,538)	100.0 (614)	100.0 (697)
Usable Record	73.4	73.9	89.2	62.5	25.4
Unusable Record ^a	1.9	4.9	1.6	2.4	1.9
Records Not Available	7.9	6.3	7.8	11.9	5.0
Fuel Used Is Included In Rent or Paid in Other Ways ^b	16.8	14.9	1.3	23.1	67.7
Fuel Oil (Sample Number)	100.0 (952)	100.0 (35)	100.0 (611)	100.0 (132)	100.0 (174)
Usable Record	55.7	57.1	75.1	38.6	(^c)
Unusable Record ^a	7.1	14.3	9.0	6.1	(^c)
Records Not Available	12.9	28.6	15.5	12.9	0.6
Fuel Used Is Included In Rent or Paid in Other Ways ^b	24.3	(^c)	.3	42.4	99.4
Kerosene (Sample Number)	100.0 (414)	100.0 (64)	100.0 (323)	100.0 (19)	100.0 (8)
Usable Record	69.1	59.4	71.8	68.4	(3)
Unusable Record ^a	2.7	7.8	1.9	(^c)	(^c)
Records Not Available	28.0	32.8	26.3	31.6	(4)
Fuel Used Is Included In Rent or Paid in Other Ways ^b	0.2	(^c)	(^c)	(^c)	(1)
LPG (Sample Number)	100.0 (543)	100.0 (128)	100.0 (407)	100.0 (4)	100.0 (4)
Usable Record	63.9	56.3	67.3	(1)	(^c)
Unusable Record ^a	8.7	14.1	7.1	(^c)	(^c)
Records Not Available	21.9	16.4	23.1	(2)	(2)
Fuel Used Is Included In Rent or Paid in Other Ways ^b	5.5	13.3	2.5	(1)	(2)

^a Data were unusable for electricity and natural gas if the records covered less than 5 months and included seasonal use (heating or cooling) or if the records covered less than 2 months. Data were unusable for fuel oil, kerosene, and LPG if the record covered less than 1 year.

^b These data exclude households that paid for some, but not all, uses of a fuel.

^c Represents or rounds to zero.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, 1987 Residential Energy Consumption Survey.

The algorithm used the period covered by the bills and the presence of estimated bills in determining which set of bills to use. The algorithm balanced the desire for a set of utility bills that cover exactly 365 days, the desire for a set that begins near January 1, 1987, and ends near January 1, 1988, and the desire to avoid estimated bills.

The annualization procedure used (1) the sum of the consumption amounts and the sum of the expenditures for the set of chosen bills; and (2) the ratio of a preliminary regression estimate of energy consumption for a 365-day period to a preliminary regression estimate of energy consumption for the period covered by the set of chosen bills. The annual consumption was the sum

of the consumption amounts times the ratio. The annual expenditures was the sum of the expenditures times the ratio.

The preliminary regression estimates of consumption were based on a preliminary regression equation that was developed using data from the 1984 RECS. This preliminary regression equation had the following constraints: (1) If fuel was not used for space heating or air conditioning, the preliminary regression equation did not involve degree-days. (In this case, the ratio equals 365 divided by the number of days covered by the set of bills.) (2) If the fuel is used for space heating, the equation was a linear function of the number of heating degree-days. (3) If the fuel is used for air con-

ditioning, the equation was a linear function of the number of cooling degree-days.

A minimum number of days of utility bills was required for the annualization procedure to be used. The number of days was dependent on the end uses for which the fuel was used. If electricity was not used for space heating or air conditioning, and if 60 or more days of utility data were available, the annualization procedure was used. If electricity was used for space heating or air conditioning, the minimum number of days was 146. The same minimum number of days was also used for natural gas. In the cases where the utility bills did not cover the minimum number of days, the annual amount was imputed using a regression equation that was developed using the observations from the 1987 RECS where the utility data were usable. These regression equations are presented in Appendix B, "End-Use Estimation Methodology."

Annualization of Energy Bills: Fuel Oil, Kerosene, and LPG

Unlike metered types of energy (electricity and natural gas), fuel oil, kerosene, and LPG are purchased at discrete times. Hence, the supplier data for these fuels will reflect the amount purchased and the date purchased, but not the exact amount consumed for a given period of time.

Under optimal conditions, all of the fuel suppliers identified by the household would be able to supply the billing records of all the purchases for the 1987 calendar year. If the assumption is made that the amount purchased equals the amount consumed then the annual consumption and expenditures could be obtained by summing the amount purchased and the amount paid over all purchases that occurred during the 1987 calendar year. This was done whenever the fuel suppliers provided adequate data.

In some instances, the fuel suppliers provided purchase records that covered a 12-month period other than the 1987 calendar year. In these instances, the annual consumption and expenditures were set equal to the sum of the data obtained from the fuel purchase records for the available 12-month period. In most of these cases, the household had moved into the housing unit during 1987. Consequently, fuel purchase records would not exist for the full 1987 calendar year.

Kerosene used in portable heaters is usually purchased in small amounts on a cash-and-carry basis. Hence, the supplier would rarely have records that indicate the amount purchased and the amount paid for the purchase. Households that used kerosene were asked to provide an estimate of the amount and the cost of kerosene that they purchased during the past 12 months. When no supplier data for kerosene were available, the household estimate was used. Household estimates

were also used for fuel oil and LPG, but much less frequently.

If the supplier data for fuel oil, kerosene, or LPG were not usable and the respondent estimates were not usable, the annual consumption and expenditure amounts were imputed using regression equations that were developed from the 1987 RECS observations where the supplier data were usable. These regression equations are presented in Appendix B, "End-Use Estimation Methodology."

Adjustments to Annual Amounts

For a small percentage of households, the annual consumption and expenditures were reduced in response to respondent-supplied information about the proportion of the fuel used for nonhousehold purposes such as drying grain, operating a commercial welding shop, or the use in another household. This adjustment was made to the consumption and expenditures for 3 percent of the households using electricity, 2 percent using LPG, 2 percent using natural gas, and 2 percent using fuel oil or kerosene. The aggregate weighted amount of energy consumption removed was 43 trillion Btu of electricity, 24 trillion Btu of natural gas, 6 trillion Btu of LPG, 3 trillion Btu of fuel oil and kerosene.

Date Chosen for Population Calculations

The weights for the respondents were adjusted so that the sum of the weights over all respondents equaled 90.537 million. (See Appendix A, "Survey Estimation" section.) This is the estimate of the number of households as of November 1987. It was obtained by interpolating between the March 1987 and March 1988 CPS estimates. (The March 1987 CPS estimates equaled 89.479 million and the March 1988 CPS estimates equaled 91.066 million.) Using the same linear estimation procedure the estimate for the number of households as of January 1987 equals 89.214 million and the number as of December 1987 equals 90.669 million.

November 1987 was chosen as the date to estimate the number of households because it was approximately the midpoint of the period in which the majority of the personal interviews were conducted, and it was consistent with the procedures for previous RECS. The use of this date to estimate the population size means that the estimated number of households with various characteristics will be an estimate of the number as of November 1987 (a date close to the actual interview date for most of the respondents).

The use of November 1987 CPS estimates of the number of households will be bias of the estimates of the total annual consumption and the total annual expenditures in a positive direction. This is because the an-

nual consumption for all respondents was estimated as if all of the households were in existence for the full year, when, in reality, some of the households did not exist at the start of the year. As noted above, the estimated number of households increased from 89.214 million in January 1987 to 90.669 million in December 1987. An alternative would have been to use 89.941 million (the average of the January and December estimates) as the control total for the national number of households.

The November estimate of the number of households (90.537 million) is .66 percent larger than the average of the January and December estimates (89.941 million). This is approximately the amount that the total national energy consumption was overestimated because of the use of November as the date to estimate the number of households. On the other hand, the per household energy consumption and expenditures statistics were not affected by a change in the control total.

Previous RECS estimated the consumption from April through March. Using interpolation, the CPS estimate of the number of households as of April 1987 equals 89.611 million. The March 1988 CPS estimate of the number of households equals 91.066 million. The average of these two estimates equals 90.339 million. The November 1987 CPS estimate (90.537 million) is .22 percent larger than 90.339 million. One effect of changing to the calendar year is to increase the bias of the total consumption estimates (based upon the estimated population count) from .22 percent to .66 percent.

Sampling Error

The form of the sampling error that is presented here is the relative standard error (RSE). The RSE is also known as the coefficient of variation. For a given survey statistic, Y , the relative standard error, $RSE(Y)$, is given by:

$$RSE(Y) = (S_Y / Y) \times 100.$$

Thus the standard error of Y is given by:

$$S_Y = RSE(Y) \times Y / 100.$$

This section provides an explanation and example of the procedures used to calculate approximate RSE's for each statistic shown in the "Detailed Statistics" of this report. This section also includes a discussion of the derivation of the procedures used to calculate the approximate RSE's. It also includes an explanation of the procedures used to calculate the RSE's for ratios.

Balanced Half-Sample Replication

For some surveys, a convenient algebraic formula for computing variances can be obtained. However, the RECS used a multistage area sample design of such complexity (see Appendix A, "How the Survey Was Conducted") that it is virtually impossible to construct an exact algebraic expression for estimating variances. Instead, the method used to estimate sampling variances for this survey was balanced half-sample replication. This numerical method involves pairing primary sampling units (PSU's) in strata so that differences between the members of each pair can be used to build an estimate of sampling variance. The strata were collapsed to 85 new strata to achieve this pairing of PSU's. Of these 85 strata, 44 consisted of two non-self-representing PSU's belonging to the same Census Divisions, with one PSU constituting each member of a pair. Of the remaining 41, 32 strata were each composed of one self-representing PSU; 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. There was no between-PSU component of variance for self-representing PSU's. The 9 remaining strata consisted of a non-self-representing PSU that was treated as if it were a self-representing PSU. These 9 unmatched non-self-representing PSU's were not matched due to a desire to match within the 9 Census divisions and the desire to treat Alaska and Hawaii as 2 separate and unique strata.

Half-sample replication involved repeatedly drawing pair members from the 85 strata. Each replication was called a "half-sample" because only one member of the pair within each of the 85 strata was selected. For each half-sample, the sampling weights were ratio adjusted upward. The result of the adjustment is that the sum of the weights for each of the 12 cells (four Census regions by three types of Metropolitan Statistical Areas (MSA)) equals the appropriate control total. (See Appendix A, "How the Survey Was Conducted," Table A9.) 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 85 pairs, it is possible to produce a total of $2^{85} = 3.9 \times 10^{25}$ unique half-samples. Although desirable for good variance estimation, a large number of half-samples would be computationally infeasible. However, the method of balanced half-sample replication allows a small number of half-samples (approximately equal to the number of strata) to produce estimates of variance that are identical to estimates based on all possible unique half-samples for linear survey statistics. The use of ratio adjustments in RECS means that even a statistic giving the number of households in a category is not a linear statistic. For nonlinear survey statistics, the variance estimate computed using the method of balanced half-samples is approximately

equal to the variance estimate computed using all possible half-samples. With this balancing method, each half-sample is constructed by using an orthogonal matrix to control the selection of pair members from strata. For the RECS, 128 balanced half-samples were used in variance estimation.

The variances are estimated from the half-sample statistic in the following way. Let Y' be a survey estimate of the population value Y (for example, the total amount of electricity consumed in housing units). Then, the estimated variance of Y' is given by:

$$S_{Y'}^2 = (1/128) \sum_{i=1}^{128} (Y'_i - Y')^2,$$

where Y'_i is the i th half-sample estimate of Y . The standard error of Y' is given by:

$$S_{Y'} = \sqrt{S_{Y'}^2}.$$

The same procedure was used to estimate the variance of the number of housing units that have a certain characteristic. (For example, the number of housing units where the main space-heating fuel is natural gas.)

As mentioned previously in this section, and in Appendix A, "How the Survey Was Conducted," the national total number of households is not estimated from the survey results. The household weights are ratio adjusted so that the total weighted number of households equals the number obtained from the CPS. The same is true for the total number of households in the 12 cells mentioned in this section (four Census regions by three types of MSA designations). The variance estimation procedure used for RECS assumes that the CPS numbers are exact and are not subject to error. Any error in the CPS results can be considered as a bias in the RECS results and not as part of the sampling error for RECS. The weights for each half-sample are also constructed such that the national total and the total for the 12 cells match the CPS numbers. As a result, the half-sample estimate for the RSE of the national total of the number of households and the RSE's

for the totals in the 12 cells will always be zero. Also the half-sample estimate of the RSE will be close to zero whenever the statistic involved is a household count that is close to a control total. Examples of this are the national total for the number of households that use electricity and the number of households that have not received assistance for weatherization of their residence.

Row and Column Factors

The method of presenting the RSE's of a statistic in this report utilizes row and column factors. The row and column factors can be used to calculate an approximate RSE for each statistic.

To estimate the RSE of a statistic in the i th row and j th column of a particular table, the approximation $RSEA(i, j)$ for the original half-sample estimate $RSE(i, j)$ is given by the formula.

$$RSEA(i, j) = R(i) C(j)$$

where:

$R(i)$ is the RSE row factor given in the last column of the row i and,

$C(j)$ is the RSE column factor given at the top of column j .

The following example illustrates this procedure.

Using the third column of the table (Figure C1) labeled "Electricity" and the second row labeled "Northeast" gives an estimate of \$27.78 for the average cost of 1 million Btu of electricity in the Northeast Census Region. The RSE row factor is $R(2) = 1.76$. The RSE column factor is $C(3) = 0.661$. The approximate RSE for the estimate is, therefore,

$$RSEA(2, 3) = (1.76) (.661) = 1.16 \text{ percent}$$

Figure C1. Use of RSE Row and Column Factors

Table 22. Household Average Energy Prices, 1987
(Dollars per Million Btu)

Household Characteristics	Average Energy Prices					RSE Row Factors
	All Fuels	Natural Gas	Electricity	Fuel Oil or Kerosene	Liquefied Petroleum Gas	
RSE Column Factors:	0.825	0.783	0.661	0.907	2.583	
Total U.S. Households	10.71	5.41	22.34	5.85	8.91	1.37
Census Region and Division						
Northeast	10.26	6.45	27.78	5.79	13.24	1.76
New England	10.09	6.75	26.16	5.91	11.93	2.00
Middle Atlantic	10.30	6.40	28.24	5.74	14.48	2.29
Midwest	9.18	4.93	23.09	5.97	7.58	2.18
East North Central	9.17	5.01	23.77	6.01	8.18	2.47
West North Central	9.19	4.69	21.60	5.74	6.52	3.38
South	12.82	5.53	20.61	6.29	9.56	2.75
South Atlantic	13.93	6.50	21.57	6.24	11.15	2.99
East South Central	11.79	4.92	17.50	6.53	9.14	2.87
West South Central	11.77	4.81	21.31	Q	6.96	5.92
West	10.53	5.05	20.76	6.11	9.30	4.92
Mountain	9.12	4.54	21.26	5.54	6.41	10.95
Pacific	11.21	5.34	20.58	6.27	11.35	4.49
Metropolitan Status						
Metropolitan	10.62	5.47	23.03	5.85	9.72	1.57
Central City	9.89	5.48	23.25	5.57	11.57	2.67
Outside Central City	11.14	5.47	22.91	6.00	9.45	1.85
Nonmetropolitan	11.06	5.10	20.27	6.04	8.34	2.45

R (Northeast) = 1.76
C (Electricity) = 0.661

Approximate RSE (Average Electricity Price in Northeast)
= (1.76) * (0.661)
= 1.16 percent

Approximate Standard Error (Average Electricity Price in Northeast)
= (1.16/100) * (27.78)
= 0.32 Dollars per Million Btu

Approximate 2 Standard Errors (95 percent Confidence interval)
= (1.96) * (0.32)
= 0.63 Dollars per Million Btu

Therefore, with 95 percent confidence, the average electricity price in the Northeast is between 27.15 and 28.41 dollars per million Btu (27.78 ± 0.63).

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, the 1987 Residential Energy Consumption Survey.

The row and column factors are determined from a two-factor analysis of the table of RSE's on the basis of the equation,

$$\log RSEA(i, j) = m + a(i) + b(j).$$

The least squares estimates for this equation are given by:

$$m = \overline{(\log RSE)}$$

$$a(i) = \overline{(\log RSE)}_i - \overline{(\log RSE)}$$

$$b(j) = \overline{(\log RSE)}_j - \overline{(\log RSE)}$$

where:

$\overline{(\log RSE)}$ is the mean of log RSE (i, j) over all rows i and columns j ,

$\overline{(\log RSE)}_i$ is the mean over all columns j for a particular row i , and

$\overline{(\log RSE)}_j$ is the mean over all rows i for a particular column j .

The row and column RSE factors are then computed as:

$$R(i) = \text{antilog}(m + a(i)) = \text{antilog}(\overline{(\log RSE)}_i)$$

$$C(j) = \text{antilog } b(j) = \text{antilog}(\overline{(\log RSE)}_j - \overline{(\log RSE)})$$

The RSE row factor, $R(i)$, is the geometric mean of the RSE's in row i . The RSE column factor, $C(j)$, is an adjustment factor with geometric mean equal to 1.0.¹⁵

The estimation procedure used to obtain the row and column factors does not use RSE's that are less than 1.0 percent or greater than 50.0 percent. In addition, if the statistic for a cell is not listed for any reason, the RSE for that cell is not used in the procedure. This convention is used because the product of the row and column factors frequently is an inaccurate estimate for

these RSE's. Using these cells in the calculation of the row and column factors may result in factors that give inaccurate RSE estimates for other cells.

Whenever a household count is a control total, its RSE is zero. An example is the cell in the first row and first column of Table 7. This cell contains an estimate of the national total of households as of November 1987. Because the RSE is zero, this cell was not used in the procedure used to determine the row and column factors. The RSE as estimated by the row-column calculations will overestimate the RSE for this cell and all other cells that contain control totals.

Determination of the Relative Standard Error for Ratios

The following equation provides an approximate RSE for ratios not presented in the tables. (A more accurate procedure for the case where the ratio involves two household counts where the numerator is a subset of the denominator is presented in *Housing Characteristics 1987 Appendix C*.)

$$RSE(X/Y) = \sqrt{[RSE(X)]^2 + [RSE(Y)]^2}$$

The following example illustrates this equation. The average price of natural gas in the Northeast is 6.45 dollars per million Btu (See Table 22). The average price of LPG in the Northeast is 13.24 dollars per million Btu. This gives an estimate of $13.24/6.45 = 2.05$ as the ratio of the LPG price to the natural gas price in the Northeast. The approximate RSE (as determined by row-column method) for the LPG price was 4.55 percent. The approximate RSE for the natural gas price was 1.38 percent. An estimate of the RSE of the ratio is:

$$RSE(X/Y) = \sqrt{(4.55)^2 + (1.38)^2} = 4.75.$$

The half-width for the 95 percent confidence interval is:

$$1.96 \times .0475 \times 2.05 = .19.$$

The confidence interval for the ratio is 2.05 (± 0.19).

¹⁵For detailed discussions of the accuracy of the RSE approximation, the procedure for estimating confidence intervals, and the statistical tests of hypotheses, see *Nonresidential Buildings Energy Consumption Survey: Commercial Buildings, Consumption and Expenditures, 1983*. DOE/EIA-0318(83). (Washington, D.C., October 1986).

Determination of the Standard Error of the Difference Between Two Statistics

The procedure used to compute the standard error of the difference between two statistics follows:

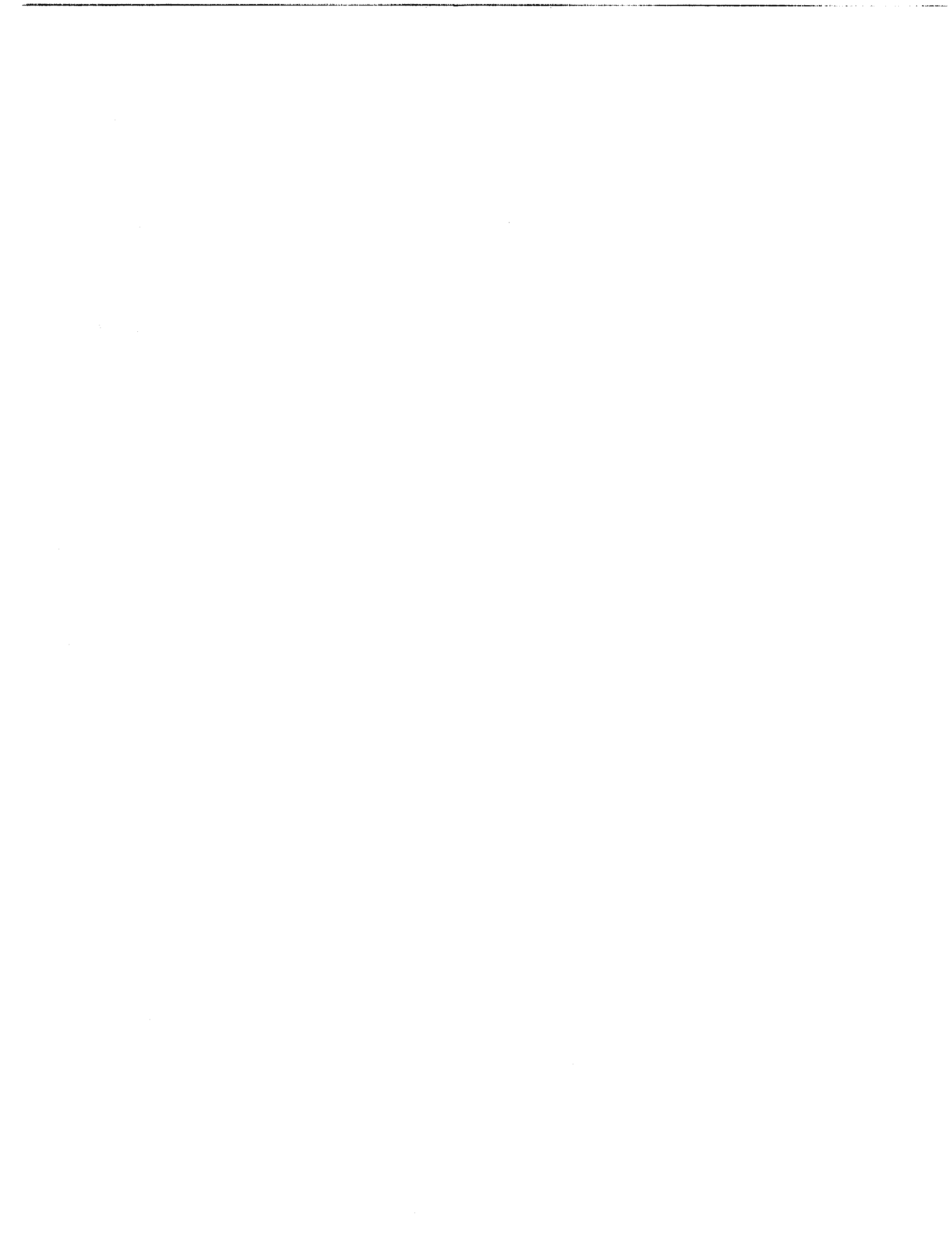
$$SE_{x_1-x_2} = \sqrt{SE_{x_1}^2 + SE_{x_2}^2}$$

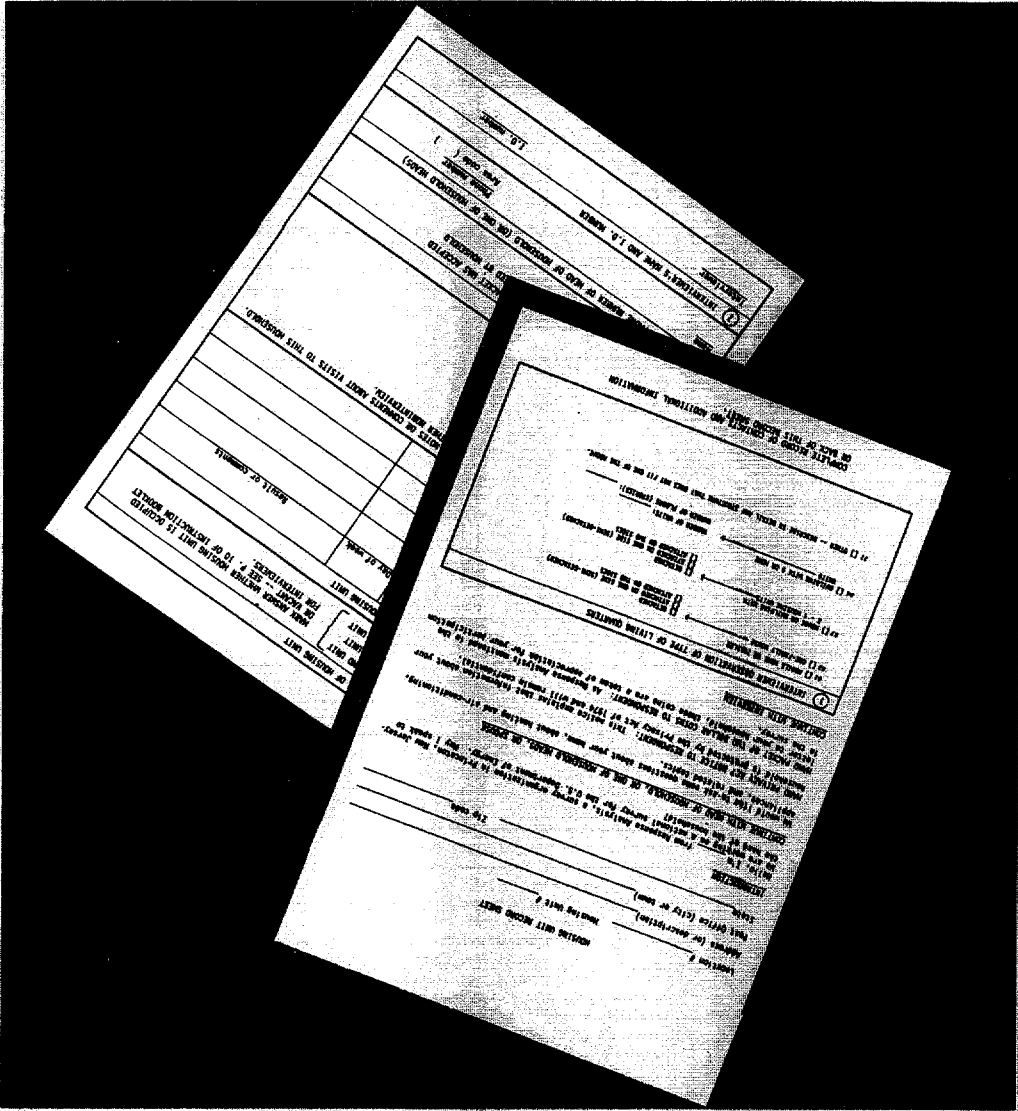
This procedure assumes the two statistics are not correlated. Using the above example, the standard error of the average LPG price in the Northeast is 0.60 dollars per million Btu. (The RSE is 4.55 percent.) The standard error of the average natural gas price in the

Northeast is 0.09 dollars per million Btu. (The RSE is 1.38 percent.) The difference between the average prices is 6.79 dollars per million Btu. The standard error of this difference is:

$$SE_{x_1-x_2} = \sqrt{(0.60)^2 + (0.09)^2} = 0.61$$

If 1.96 times the standard error is greater than the difference between the statistics the difference is not statistically significant. In this example, 1.96 times the standard error equals 1.20 dollars per million Btu, while the difference equals 6.79 dollars per million Btu. Therefore, it can be said that there is a statistically significant difference between the average price of LPG and average price of natural gas in the Northeast Census Region.





Survey Forms

Appendix D



Appendix D

Survey Forms

This appendix contains copies of the following data collection forms used in the 1987 Residential Energy Consumption Survey (RECS). Forms EIA-457A through C were used in the housing portion of the RECS. Forms EIA-457D through G were mailed to energy suppliers.

- EIA-457A Housing Unit Record Sheet (actual form was pink).
- EIA-457B Household Questionnaire (actual form had a blue cover).
- EIA-457C Rental Agent Form (actual form was white).
- EIA-457D Liquefied Petroleum Gas (actual form was blue).
- EIA-457E Electricity Usage (actual form was yellow).
- EIA-457F Utility Gas Usage (actual form was pink).
- EIA-457G Fuel Oil or Kerosene (actual form was green).

1987 Residential Energy Consumption Survey

HOUSING UNIT RECORD SHEET

Address (or description) _____

Post Office (city or town) _____ State _____ Zip _____

INTRODUCTION

Hello I'm _____ from Response Analysis, a survey organization in Princeton, New Jersey. We are working on a national survey for the U.S. Department of Energy. May I speak to the head of household, that is, the person in whose name the home is owned or rented?

CONTINUE WITH HOUSEHOLDER, ONE OF HOUSEHOLDERS, OR SPOUSE/PARTNER.

We would like to ask some questions about your home, about heating and air-conditioning, household vehicles, and related topics.

HAND PRIVACY ACT NOTICE TO RESPONDENT. This notice explains that information about your household is protected by the Privacy Act of 1974 and will remain confidential.

CONTINUE WITH INTERVIEW

① INTERVIEWER OBSERVATION OF TYPE OF LIVING QUARTERS

MARK BOX BELOW:

11 MOBILE HOME OR TRAILER

21 ONE-FAMILY HOUSE--DETACHED

22 ONE-FAMILY HOUSE--ATTACHED ON ONE SIDE (SEMI-DETACHED)

23 ONE-FAMILY HOUSE--ATTACHED ON TWO SIDES

31 HOUSE OR BUILDING WITH 2-4 HOUSING UNITS--DETACHED

32 HOUSE OR BUILDING WITH 2-4 HOUSING UNITS--ATTACHED ON ONE SIDE (SEMI-DETACHED)

33 HOUSE OR BUILDING WITH 2-4 HOUSING UNITS--ATTACHED ON TWO SIDES

41 BUILDING WITH 5 OR MORE HOUSING UNITS

MARK ANSWERS:

NUMBER OF HOUSING UNITS: _____

NUMBER OF FLOORS (STORIES): _____

51 OTHER--DESCRIBE IN DETAIL ANY STRUCTURE THAT DOES NOT FIT ONE OF ABOVE. (INCLUDE NUMBER OF UNITS AND FLOORS)

COMPLETE RECORD OF CONTACTS AND ADDITIONAL INFORMATION ON BACK OF THIS RECORD SHEET.

2 TYPE OF OCCUPANCY OF HOUSING UNIT

- 1 YEAR-ROUND UNIT
- 2 SEASONAL UNIT
- 3 MIGRATORY UNIT

MARK ANSWER WHETHER HOUSING UNIT IS OCCUPIED OR VACANT -- SEE P. 2-18 OF INSTRUCTIONS FOR INTERVIEWERS.

3 RECORD OF VISITS TO HOUSING UNIT

Visit number	Time of day (include AM or PM)	Date	Day of Week	Result or Comments

4 USE THIS SPACE FOR ADDITIONAL NOTES OR COMMENTS ABOUT VISITS TO THIS HOUSEHOLD. DESCRIBE FULLY IF REFUSAL OR OTHER NONINTERVIEW.

5 NAME AND PHONE NUMBER OF HOUSEHOLDER (OR ONE OF HOUSEHOLDERS)

Name _____ Phone number _____
Area Code ()

6 INTERVIEWER'S NAME AND I.D. NUMBER

Interviewer _____ I.D. number _____

Form Approved
OMB No. 1905-0092. EIA 457B
(Expires May 31, 1990.)

This survey is voluntary and authorized under the Federal Energy Administration Act of 1974 (Public Law 93-275) as amended. Information about specific households will be kept strictly confidential. The data will be summarized within large groupings for statistical purposes.

1987 Residential Energy Consumption Survey



Energy Information Administration
U.S. Department of Energy

Location # _____

111-116

Housing Unit # _____

117-118

TIME INTERVIEW STARTED AM
 PM

1. In what year did your family move into this (house/apartment)?

- | | | |
|--------------------|------------------|------------|
| 01 [] Before 1940 | 07 [] 1980-1983 | |
| 02 [] 1940-1949 | 08 [] 1984 | 121- |
| 03 [] 1950-1959 | 09 [] 1985 | 122 |
| 04 [] 1960-1969 | 10 [] 1986 | |
| 05 [] 1970-1974 | 11 [] 1987 | --ASK Q. 2 |
| 06 [] 1975-1979 | 12 [] 1988 | |

IF "1985" OR LATER, ASK:

2. In which month did you move in? (SPECIFY MONTH AND ENTER LAST DIGIT OF YEAR.)

MONTH: 123-124
YEAR: 198

3. In what year was this (house/building) built? Just your estimate.

- | | | |
|--------------------|------------------|------|
| 01 [] BEFORE 1940 | 07 [] 1980-1983 | |
| 02 [] 1940-1949 | 08 [] 1984 | |
| 03 [] 1950-1959 | 09 [] 1985 | 125- |
| 04 [] 1960-1969 | 10 [] 1986 | 126 |
| 05 [] 1970-1974 | 11 [] 1987 | |
| 06 [] 1975-1979 | 12 [] 1988 | |

4. Altogether (counting all areas that are used as year-round living space), how many rooms do you have in your living quarters? Do not count bathrooms, unheated porches, foyers, or hallways. (SEE INSTRUCTION BELOW.)

NUMBER OF ROOMS: 127-128

5. How many complete bathrooms and how many half-bathrooms do you have? (A complete bathroom is a room with a flush toilet, bathtub or shower, and a sink/washbasin with running water. A half-bath has at least a flush toilet or bathtub or shower, but does not have all the facilities for a complete bathroom.)

NUMBER OF COMPLETE BATHROOMS: NUMBER OF HALF BATHROOMS:
[] NONE [] NONE
129 130

INTERVIEWER INSTRUCTIONS:

Q. 4 --- Generally count any room as long as it is a comfortable place to rest, read, study, etc., year-round.

Do not count laundry rooms, unfinished attics or basements, open porches, or unfinished space used for storage.

HAND RESPONDENT EXHIBIT 6/7/10

6. What is the main fuel used for heating your home? (SEE INSTRUCTIONS BELOW.)	Q. 6 MAIN FUEL (MARK ONLY ONE)	Q. 7 MARK ALL THAT APPLY	131- 132
GAS FROM UNDERGROUND PIPES SERVING THE NEIGHBORHOOD	01 <input type="checkbox"/>	<input type="checkbox"/>	133
LPG GAS (BOTTLED OR TANK GAS)	02 <input type="checkbox"/>	<input type="checkbox"/>	134
FUEL OIL	03 <input type="checkbox"/>	<input type="checkbox"/>	135
KEROSENE OR COAL OIL	04 <input type="checkbox"/>	<input type="checkbox"/>	136
ELECTRICITY	05 <input type="checkbox"/>	<input type="checkbox"/>	137
COAL OR COKE	06 <input type="checkbox"/>	<input type="checkbox"/>	138
WOOD	07 <input type="checkbox"/>	<input type="checkbox"/>	139
SOLAR COLLECTORS	08 <input type="checkbox"/>	<input type="checkbox"/>	140
OTHER (SPECIFY): _____	21 <input type="checkbox"/>	<input type="checkbox"/>	141
DON'T KNOW	96 <input type="checkbox"/>	<input type="checkbox"/>	142
NO HEATING FUEL USED -- TAKE BACK EXHIBIT 6/7/10; SKIP TO Q. 32.	00 <input type="checkbox"/>		
NO ADDITIONAL FUEL -- SKIP TO Q. 9		<input type="checkbox"/>	143

7. What other fuels, if any, are used to heat your home -- including those that are used to provide heat just occasionally? ↑

MARK ALL THAT APPLY _____
(IF NONE, MARK "NO ADDITIONAL FUEL")

IF ONE OR MORE ADDITIONAL FUELS MENTIONED IN Q. 7, ASK:

8. Does your main heating fuel -- (FUEL NAMED IN Q. 6) -- provide almost all of the heat for your home, about three-fourths, or closer to half of the heat for your home?
- 1 ALMOST ALL (MORE THAN 95%)
 - 2 ABOUT THREE-FOURTHS (67-94%) 144
 - 3 CLOSER TO HALF (66% OR LESS)

INTERVIEWER INSTRUCTIONS:

Q. 6 -- If two or more heating fuels are used, the main heating fuel is the one that provides most of the heat for the home.

Q. 6-7 -- If household recently converted to a different fuel, or is in the process of conversion, mark answer for fuel(s) in use during January of 1987.

9. In November of 1984 was the main fuel used to heat this (house/apartment) the same as it is now?

- 1 [] YES -- SKIP TO Q. 12 145
 0 [] NO -- ASK Q. 10
 5 [] NO FUEL USED IN 1984--SKIP TO Q. 12
 6 [] DON'T KNOW -- SKIP TO Q. 12

IF "NO," ASK:

10. What was the main fuel used to heat this (house/apartment) in November of 1984?

- 01 [] GAS FROM UNDERGROUND PIPES
 SERVING THE NEIGHBORHOOD
 02 [] LPG GAS (BOTTLED OR TANK GAS)
 03 [] FUEL OIL
 04 [] KEROSENE OR COAL OIL 146-
 05 [] ELECTRICITY 147
 06 [] COAL OR COKE
 07 [] WOOD
 08 [] SOLAR COLLECTORS
 21 [] OTHER (SPECIFY): _____

 95 [] NO FUEL USED
 96 [] DON'T KNOW

11. In what month and year was the main heating fuel changed?

MONTH: _____ 148-149
 YEAR: 198 _____ 150-151

TURN TO EXHIBIT 12/13

	Q.12 MAIN EQUIPMENT (MARK ONLY ONE)	Q. 13 MARK ALL THAT APPLY	152- 153
12. What is the main heating equipment used with your main heating fuel?			
HOT WATER PIPES RUNNING THROUGH A SLAB FLOOR (RADIANT HEATING) . . .	01 []	[]	154
STEAM OR HOT WATER SYSTEM WITH RADIATORS OR CONVECTORS	02 []	[]	155
CENTRAL WARM-AIR FURNACE WITH DUCTS TO INDIVIDUAL ROOMS (DO NOT COUNT HEAT PUMP HERE).	03 []	[]	156
HEAT PUMP.	04 []	[]	157
BUILT-IN ELECTRIC UNITS (PERMANENTLY INSTALLED IN WALL, CEILING, OR BASEBOARD).	05 []	[]	158
FLOOR, WALL, OR PIPELESS FURNACE	06 []	[]	159
ROOM HEATER BURNING GAS, OIL, KEROSENE (NOT PORTABLE).	07 []	[]	160
HEATING STOVE BURNING WOOD, COAL, COKE	08 []	[]	161
FIREPLACE(S)	09 []	[]	162
PORTABLE ELECTRIC HEATER(S).	10 []	[]	163
PORTABLE KEROSENE HEATER(S).	11 []	[]	164
COOKING STOVE, RANGE, OR OVEN (USED TO HEAT HOME, AS WELL AS FOR COOKING)	12 []	[]	165
OTHER (SPECIFY): _____	22 []	[]	166
DON'T KNOW	96 []	[]	167
NO ADDITIONAL EQUIPMENT		[]	168

13. What other types of equipment, if any, are used to heat your home -- including those that are used to provide heat just occasionally? MARK ALL THAT APPLY _____ (IF NONE, MARK "NO ADDITIONAL EQUIPMENT".) ↑

TAKE BACK EXHIBIT 12/13

IF "CENTRAL WARM-AIR FURNACE" MENTIONED IN Q. 12 OR Q. 13, ASK:

14. For the central warm-air furnace, is the warm air forced through the ducts by a fan?	1 [] YES	169
	0 [] NO	
	6 [] DON'T KNOW	

IF "HEATING STOVE BURNING WOOD, COAL, COKE" MENTIONED IN Q. 12 OR Q. 13, ASK:

15. Is the heating stove airtight?	1 [] YES	170
	0 [] NO	
	6 [] DON'T KNOW	

IF SINGLE FAMILY HOME OR MOBILE HOME, ASK Q. 16. OTHERWISE SKIP TO Q. 17

16. How old is your main heating equipment, just approximately? (INTERVIEWER: PROBE FOR BEST GUESS.)		
1 [] LESS THAN 2 YEARS OLD	4 [] 10-14 YEARS OLD	171
2 [] 2-4 YEARS OLD	5 [] 15 YEARS OLD OR OLDER	
3 [] 5-9 YEARS OLD	6 [] DON'T KNOW	

IF 2 OR MORE HOUSING UNITS IN BUILDING, ASK Q. 17. OTHERWISE SKIP TO Q. 18

17. Does the main equipment for heating your home also heat one or more other apartments, households or businesses?	0 [] NO, HOME HEATING EQUIPMENT IS FOR RESPONDENT'S HOME ONLY	172
	1 [] YES, HOME HEATING EQUIPMENT IS FOR ONE OR MORE OTHER APARTMENTS, HOUSES, OR BUSINESSES	
	6 [] DON'T KNOW	

18. At what temperature do you usually keep your home during the day in the wintertime when someone is at home? (SEE INSTRUCTION BELOW.)
- DEGREES 173-
FAHRENHEIT: 174
 HEAT TURNED OFF
19. At what temperature do you usually keep your home during the day in the wintertime when no one is at home? (SEE INSTRUCTION BELOW.)
- DEGREES 175-
FAHRENHEIT: 176
 HEAT TURNED OFF
20. At what temperature do you usually keep your home during sleeping hours in the wintertime? (SEE INSTRUCTION BELOW.)
- DEGREES 177-
FAHRENHEIT: 178
 HEAT TURNED OFF

HAND RESPONDENT EXHIBIT 21

21. Please look at this list and tell me the ways, if any, you use to adjust the temperature in your home during the heating season. (MARK ALL THAT APPLY.) 207-208:02
- | | |
|--|-----|
| THERMOSTAT FOR MAIN HEATING EQUIPMENT | 211 |
| THERMOSTAT FOR SUPPLEMENTAL HEATING EQUIPMENT | 212 |
| OPENING AND CLOSING WINDOWS OR DOORS | 213 |
| OPENING AND CLOSING HOT AIR VENTS | 214 |
| TURN HEATER ON OR OFF (UP OR DOWN) | 215 |
| TURN RADIATORS OR CONVECTORS ON OR OFF | 216 |
| ADJUST DRAFT OR AMOUNT OF FUEL FOR WOOD OR COAL FIRE | 217 |
| USE COOKING STOVE, OVEN, OR RANGE TO HEAT HOME | 218 |
| OTHER (SPECIFY): _____ | 219 |
| NO WAY TO ADJUST THE TEMPERATURE | 220 |

INTERVIEWER INSTRUCTIONS:

Q. 18-20 -- If respondent keeps different sections of the house at different temperatures, we want to know the temperature in the part of the house where the people are. If, for example, the heat is turned off upstairs during the day because the family is downstairs, we want the downstairs temperature.

If the respondent doesn't know temperature, but does know thermostat setting, record thermostat setting. Otherwise, probe for best estimate.

TURN TO EXHIBIT 22/25

22. During the last winter -- from October 1986 to April 1987 -- was there any period of 2 hours or more when you wanted to use your main source of heat but could not use it for any of these reasons?

(INTERVIEWER: READ AND MARK "YES" OR "NO" FOR EACH ITEM. SEE INSTRUCTION BELOW IF RESPONDENT REPORTS LIVING AT ANOTHER ADDRESS DURING ALL OR PART OF THE OCTOBER 1986 TO APRIL 1987 PERIOD.)

22a. A utility company shut off either your heating fuel or electricity needed to run your heating system 1 [] YES 0 [] NO -- GO TO Q. 23a 221

IF "YES," ON Q. 22a, ASK:

22b. Was this because you forgot to pay, you could not pay, or was there some other reason? (CHOOSE MOST IMPORTANT REASON IF MORE THAN ONE APPLIES.) 1 [] FORGOT TO PAY 222
 2 [] COULD NOT PAY
 5 [] OTHER: (SPECIFY): _____

22c. Thinking of all the times you were without heat because your fuel or electricity was shut off, altogether about how many hours or days were you without heat? [] HOURS _____ OR [] DAYS _____ 223-225

23a. You ran out of coal, wood, fuel oil or other bulk fuel 1 [] YES 0 [] NO -- GO TO Q. 24a 226

IF "YES," ON Q. 23a, ASK:

23b. Was this because you forgot to pay for or order fuel, because you could not pay for the fuel, or was there some other reason? (CHOOSE MOST IMPORTANT REASON IF MORE THAN ONE APPLIES.) 1 [] FORGOT TO PAY 227
 2 [] COULD NOT PAY
 5 [] OTHER: (SPECIFY): _____

23c. Thinking of all the times you were without heat because you ran out of coal, fuel oil, or other bulk fuel, altogether about how many hours or days were you without heat? [] HOURS _____ OR [] DAYS _____ 228-230

24a. Your landlord did not provide heat 1 [] YES 0 [] NO -- GO TO Q. 25a 231

IF "YES," ON Q. 24a, ASK:

24b. Did the landlord fail to provide heat because you forgot to pay the rent, because you could not pay the rent, or was there some other reason? (CHOOSE MOST IMPORTANT REASON IF MORE THAN ONE APPLIES.) 1 [] FORGOT TO PAY 232
 2 [] COULD NOT PAY
 5 [] OTHER: (SPECIFY): _____

24c. Thinking of all the times you were without heat because the landlord did not provide heat, altogether about how many hours or days were you without heat? [] HOURS _____ OR [] DAYS _____ 233-235

25a. Your heating system was broken 1 [] YES 0 [] NO -- GO TO Q. 26a. 236

IF "YES," ON Q. 25a, ASK:

25b. Did you have to delay repairing or replacing your heating system because you could not pay for the repair or replacement? 1 [] YES 0 [] NO 237

25c. Thinking of all the times you were without heat because your heating system was broken, altogether about how many hours or days were you without heat? [] HOURS _____ OR [] DAYS _____ 238-240

INTERVIEWER INSTRUCTIONS:
 All questions on this page -- Assure the respondent that these questions apply to all permanent residences of the household from October 1986 to April 1987.

IF "YES," TO 22a OR 23a OR 24a OR 25a, ASK:

- 26a. How many different times were you without your main source of heat during the last winter -- from October 1986 to April 1987? TIMES WITHOUT MAIN SOURCE OF HEAT: 241-242
- 26b. During the time your home was without your main source of heat, were you able to heat your home in some other way? 243
 - 1 YES
 - 2 NO -- SKIP TO Q. 27
 - 5 OTHER (SPECIFY: _____)

IF "YES," OR "OTHER," TO 26b, ASK:

- 26c. How were you able to heat your home? (INTERVIEWER. WRITE DOWN WHATEVER RESPONDENT REPORTS.) 244-245
246-247

- 27. Has any wood been burned in your home in the past 12 months? 248
 - 1 YES
 - 0 NO -- SKIP TO Q. 32

IF "YES" HAND RESPONDENT EXHIBIT 28, AND ASK:

- 28. This exhibit illustrates about one cord of wood. Did your household burn less than this amount, or about this amount or more? 249
 - 1 LESS THAN ONE CORD -- ASK Q. 29
 - 2 ONE CORD OR MORE -- SKIP TO Q. 30

IF "LESS THAN ONE CORD," ON Q. 28, TURN TO EXHIBIT 29 AND ASK:

- 29. Which of these is most nearly the amount of wood burned in your household in the past 12 months? 250
 - 1 A FEW LOGS OR SCRAPS OF WOOD
 - 2 1/4 TO 1/3 OF A CORD
 - 3 1/2 CORD (ABOUT ONE PICK-UP TRUCK OF WOOD)
 - 4 OVER 1/2 CORD BUT LESS THAN A FULL CORD

TAKE BACK EXHIBIT 29; SKIP TO Q. 31

IF "ONE CORD OR MORE" ON Q. 28, TURN TO EXHIBIT 30 AND ASK:

- 30. This exhibit shows wood piles of different sizes. Just using these as general reference points, about how many cords of wood did you burn in your household in the past 12 months? (SEE INSTRUCTION BELOW.) 251-253

NUMBER OF CORDS:

TAKE BACK EXHIBIT 30; ASK Q. 31

- 31. Did you purchase any wood to burn in your home in the last 12 months? 254
 - 1 YES
 - 0 NO

INTERVIEWER INSTRUCTIONS:

Q. 30 -- Exhibit 30 is intended only for general reference. Probe for respondent's best estimate of number of cords burned -- this, of course, will ordinarily be a number different from the specific quantities shown on the exhibit. Record answer to nearest cord, or cord plus fraction, as given by respondent (for example: 1, 1-1/2, 4, 10, 12, and so on).

HAND RESPONDENT EXHIBIT 32/34

32. Which fuel is used most for heating water (other than just for cooking purposes)?

- 01 [] GAS FROM UNDERGROUND PIPES
SERVING THE NEIGHBORHOOD
- 02 [] LPG GAS (BOTTLED OR TANK GAS)
- 03 [] FUEL OIL
- 04 [] KEROSENE OR COAL OIL
- 05 [] ELECTRICITY 255-
- 06 [] COAL OR COKE 256
- 07 [] WOOD
- 08 [] SOLAR COLLECTORS
- 21 [] OTHER (SPECIFY): _____
-
- 00 [] NO FUEL USED -- TAKE BACK EXHIBIT
32/34 SKIP TO Q. 38
- 96 [] DON'T KNOW

33. In addition to your main fuel, do you use any other fuel for heating water (other than just for cooking purposes)?

- 1 [] YES 257
- 0 [] NO -- TAKE BACK EXHIBIT 32/34
SKIP TO Q. 35

IF "YES," ASK:

34. What is the additional fuel?

- 01 [] GAS FROM UNDERGROUND PIPES
SERVING THE NEIGHBORHOOD
- 02 [] LPG GAS (BOTTLED OR TANK GAS)
- 03 [] FUEL OIL
- 04 [] KEROSENE OR COAL OIL 258-
- 05 [] ELECTRICITY 259
- 06 [] COAL OR COKE
- 07 [] WOOD
- 08 [] SOLAR COLLECTORS
- 21 [] OTHER (SPECIFY): _____
-
- 96 [] DON'T KNOW

TAKE BACK EXHIBIT 32/34

35. Do you have hot running water in your home?

- 1 [] YES 260
- 0 [] NO

IF ONE-FAMILY HOUSE OR MOBILE HOME, ASK:

36. About how old is your water heater, just approximately? (INTERVIEWER: PROBE FOR BEST GUESS.)

- 1 LESS THAN 2 YEARS
- 2 2 - 4 YEARS
- 3 5 - 9 YEARS
- 4 10 - 14 YEARS
- 5 15 YEARS OR MORE
- 6 DON'T KNOW
- 0 DO NOT HAVE A HOT WATER HEATER

261

IF 2 OR MORE UNITS IN BUILDING, ASK Q. 37. OTHERWISE SKIP TO Q. 38.

37. Does the equipment for heating water for your home also heat water for one or more other apartments, houses, or businesses?

- 0 NO, HOT WATER EQUIPMENT IS FOR RESPONDENT'S HOME ONLY
- 1 YES, HOT WATER EQUIPMENT HEATS WATER FOR ONE OR MORE OTHER APARTMENTS, HOUSES, OR BUSINESSES
- 6 DON'T KNOW

262

38. Do you have air-conditioning equipment, either a central system or individual window or wall units? (MARK ALL THAT APPLY.)
- YES, CENTRAL SYSTEM 263
- YES, INDIVIDUAL (WINDOW/WALL) UNITS 264
- NO -- SKIP TO Q. 45

IF "INDIVIDUAL (WINDOW/WALL) UNITS" ON Q. 38, ASK:

39. How many individual window or wall units do you have? NUMBER OF UNITS: 265-266

IF "CENTRAL SYSTEM" ON Q. 38, ASK:

40. Does the central air-conditioning system use electricity, gas from underground pipes, or LPG?
- 3 ELECTRICITY 267
- 1 GAS FROM UNDERGROUND PIPES SERVING THE NEIGHBORHOOD
- 2 LPG GAS (BOTTLED OR TANK GAS)
- 6 DON'T KNOW

IF 2 OR MORE HOUSING UNITS IN BUILDING, ASK Q. 41, OTHERWISE SKIP TO Q. 42

41. Does the air-conditioning equipment that cools your home also cool other apartments, houses, or businesses?
- 0 NO, A/C IS FOR RESPONDENT'S HOME ONLY
- 1 YES, A/C COOLS ONE OR MORE OTHER APARTMENTS, HOUSES, OR BUSINESSES
- 6 DON'T KNOW 268

42. How many rooms in your (house/apartment) can be cooled by your air conditioning? Do not count bathrooms, hallways, foyers, or enclosed porches. NUMBER OF ROOMS: 269-270
- 95 ENTIRE HOUSE OR APARTMENT

HAND RESPONDENT EXHIBIT 43

43. Which of the statements on this exhibit best describes the way you used your air conditioner(s) last summer? (MARK ONLY ONE.)
- 0 DID NOT USE AT ALL 271
- 1 TURNED ON ONLY A FEW DAYS OR NIGHTS WHEN REALLY NEEDED
- 2 TURNED ON QUITE A BIT
- 3 TURNED ON JUST ABOUT ALL SUMMER
- 5 OTHER (SPECIFY): _____

TAKE BACK EXHIBIT 43

44. When you are using your air conditioning, about what temperature do you usually keep the cooled area? (SEE INSTRUCTION BELOW.) DEGREES FAHRENHEIT: 272-273

INTERVIEWER INSTRUCTIONS:

Q. 44 -- If respondent keeps different sections of the house at different temperatures, we want to know the temperature in the part of the house where the people are. If, for example, the air conditioning is turned off upstairs during the day because the family is downstairs, we want the downstairs temperature.

If the respondent doesn't know temperature, but does know thermostat setting, record thermostat setting. Otherwise, probe for best estimate.

307-308:03

45. How many doors do you have in your home that go from a heated area to the outside or to an unheated area? (SEE INSTRUCTION BELOW.)

NUMBER OF DOORS:

311-312

NONE -- SKIP TO Q. 50

HAND RESPONDENT EXHIBIT 46

46. Please look at this exhibit of different kinds of doors. How many of each of these types of doors do you have?

Q. 46 NUMBER OF DOORS	Q. 47 NUMBER WITH STORM DOOR OR INSULATING GLASS	Q. 48 NUMBER OF STORM/ INSULATING DOORS PUT IN SINCE SEPT. 1, 1985	Q. 49
a. Sliding glass doors <input type="checkbox"/> NONE 313	 <input type="checkbox"/> NONE 314	 <input type="checkbox"/> NONE 315	MONTH: _____ YEAR: 198 _____ <input type="checkbox"/> IN PROCESS 316-319
b. Other doors to the outside <input type="checkbox"/> NONE 320	 <input type="checkbox"/> NONE 321	 <input type="checkbox"/> NONE 322	MONTH: _____ YEAR: 198 _____ <input type="checkbox"/> IN PROCESS 323-326

TAKE BACK EXHIBIT 46

FOR EACH TYPE OF DOOR FOR WHICH ANSWER IS "ONE OR MORE," ASK:

47. (Does/How many of) the door(s) have (a storm door/storm doors) or insulating glass?

FOR EACH TYPE OF STORM DOOR OR DOOR WITH INSULATING GLASS, ASK:

48. How many of the (storm/insulated glass) doors were put in your home since September 1, 1985?

IF ONE OR MORE, ASK:

49. In what month and year (was it/were they) installed?

INTERVIEWER INSTRUCTIONS:

Q. 45-46 -- Count each pair of sliding glass doors as one door. Include doors that go to an unheated porch or garage. Do not include doors to a heated hallway in an apartment building, doors that are permanently sealed shut, or doors to an unheated attic or basement.

Q. 48 -- Count as "In Process" any work started but not yet completed. Do not count work done before this household moved in.

50. How many windows do you have in your home? Please include basement, attic, garage, and porch windows only if these areas are heated. (SEE INSTRUCTION BELOW.)

Q. 50 NUMBER OF WINDOWS	Q. 51 NUMBER WITH STORM WINDOWS OR INSULATING GLASS	Q. 52 NUMBER STORM WINDOWS PUT IN SINCE SEPT. 1, 1985	Q. 53
_____	_____	_____	MONTH: _____ YEAR: 198 _____
<input type="checkbox"/> NONE 327-328	<input type="checkbox"/> NONE 329-330	<input type="checkbox"/> NONE 331-332	<input type="checkbox"/> IN PROCESS 333-336

51. How many of the windows have storm windows or insulating glass? (SEE INSTRUCTION BELOW.) _____

IF ONE OR MORE WINDOWS WITH STORM WINDOWS OR INSULATING GLASS, ASK:

52. How many of the storm windows or windows with insulating glass were put in your home since September 1, 1985? _____

IF ONE OR MORE ASK:

53. In what month and year were they put in? _____

IF THE NUMBER OF WINDOWS IN Q. 50 IS GREATER THAN THE NUMBER OF WINDOWS WITH STORM WINDOWS OR INSULATING GLASS IN Q. 51, ASK:

337

54. You have mentioned that one or more of your windows does not have a storm window or insulating glass. For any of these windows without storm windows or insulating glass, do you use insulating drapes, plastic sheets or other protection?

1 YES
0 NO -- SKIP TO Q. 56

IF "YES," ASK:

55. Thinking now only of your windows without storm windows or insulating glass, about how many windows have insulating drapes, plastic sheets or other protection?

NUMBER WITH PROTECTION:

338-339

INTERVIEWER INSTRUCTIONS:

Q. 50 -- Each window that opens separately should be counted as one window. Also count windows that are fixed in place. Do not include windows (glass panels) in doors.

Q. 51 -- Windows made of double glass and other types of insulating glass count the same as storm windows.

Q. 52 -- Count as "In Process" any work started but not yet completed. Do not count work done before this household moved in.

IF ONE-FAMILY HOUSE OR MOBILE HOME, ASK Q. 56ff. IF 2 OR MORE UNITS IN BUILDING, SKIP TO Q. 86 ON PAGE 13.

56. Do you have roof or ceiling insulation in your home?
- 1 YES
 - 0 NO -- SKIP TO Q. 62 340
 - 6 DON'T KNOW -- SKIP TO Q. 62

IF "YES," HAND RESPONDENT EXHIBIT 57 AND ASK:

57. About how much of the roof or ceiling area is insulated?
- 0 VERY LITTLE (LESS THAN 5%)
 - 1 1/4 (5 - 33%)
 - 2 1/2 (34 - 66%) 342
 - 3 3/4 (67 - 95%)
 - 4 ALL (96 - 100%)

TURN TO EXHIBIT 58

58. This exhibit shows different kinds of insulation. Please tell me whether or not you have each one in your roof or ceiling area.

a. BATT/BLANKET	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 342	_____ INCHES [] DON'T KNOW 343-344
b. LOOSE PARTICLES/ LOOSE FILL	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 345	_____ INCHES [] DON'T KNOW 346-347
c. FIRM FOAM/ FIRM PLASTIC	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 348	_____ INCHES [] DON'T KNOW 349-350
d. SPRAYED-IN FOAM	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 352	_____ INCHES [] DON'T KNOW 352-353
e. OTHER (SPECIFY): _____ _____	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 354	_____ INCHES [] DON'T KNOW 355-356

FOR EACH "YES," ASK:

59. About how many inches of (INSULATION TYPE) do you have in your roof or ceiling area? ↑

TAKE BACK EXHIBIT 58

60. Was any of the roof or ceiling insulation added or installed in your home since September 1, 1985?

- INTERVIEWER: COUNT AS "IN PROCESS" ANY WORK STARTED BUT NOT YET COMPLETED. DO NOT COUNT ANY CHANGES MADE BEFORE THIS HOUSEHOLD MOVED IN.
- 1 YES 357
 - 0 NO -- SKIP TO Q. 62
 - 2 IN PROCESS -- SKIP TO Q. 62

IF "YES," ASK:

61. In what month and year was the work completed?
- MONTH: _____
- YEAR: 198 _____ 358-362
- [] IN PROCESS

CONTINUE IF ONE-FAMILY HOUSE OR MOBILE HOME. IF 2 OR MORE UNITS IN BUILDING, SKIP TO Q. 86

62. Do you have insulation in all, some, or none of the outside walls of your home? 1 ALL 362
 2 SOME
 0 NONE -- SKIP TO Q. 65
 6 DON'T KNOW -- SKIP TO Q. 65

IF "ALL" OR "SOME," ASK:

63. Was any of the insulation in the outside walls added or installed in your home since September 1, 1985? 1 YES 363
 0 NO -- SKIP TO Q. 65
 2 IN PROCESS -- SKIP TO Q. 65
 (SEE INSTRUCTION AT BOTTOM OF FACING PAGE.)

IF "YES," ASK:

64. In what month and year was the work completed? MONTH: _____ 364-367
 YEAR: 198
 IN PROCESS
 (SEE INSTRUCTION AT BOTTOM OF FACING PAGE.)

HAND RESPONDENT EXHIBIT 65

65. Please look at this list and as I read each item, tell me which, if any, you have in your home:

	Q. 65 HAVE SOME IN HOME	Q. 66 INSTALLED SINCE SEPTEMBER 1, 1985	Q. 67 MONTH/YEAR INSTALLED	
a. Insulation in the basement or crawl space below the floor of your home	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 368	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 369	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 370-373	
b. Insulation around heating and/or cooling ducts	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 374	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 375	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 376-379	
c. Insulation around the hot water and/or cooling pipes	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 411	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 412	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 413-416	407-408: 04
d. Insulation around the hot water heater	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 417	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 418	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 419-422	
e. Caulking	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 423	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 424	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 425-428	
f. Weather stripping around any windows or doors to the outside	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 6 <input type="checkbox"/> DON'T KNOW 429	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 430	MONTH: _____ YEAR: 198 <input type="checkbox"/> IN PROCESS 431-434	

FOR EACH "YES" ON Q. 65, ASK:

66. Was any of the -- (SPECIFIED ITEM) -- added or installed since September 1, 1985? (SEE INSTRUCTION AT BOTTOM OF FACING PAGE.)

IF "YES, ADDED OR INSTALLED SINCE SEPTEMBER 1, 1985", ASK:

67. In what month and year was the work completed? (SEE INSTRUCTION AT BOTTOM OF FACING PAGE.)

CONTINUE IF ONE-FAMILY HOUSE OR MOBILE HOME. IF 2 OR MORE UNITS IN BUILDING, SKIP TO Q. 86

TURN TO EXHIBIT 68

68. Please look at this list and as I read each item tell me which, if any, have been added or installed in your home since September 1, 1985. (SEE INSTRUCTION AT BOTTOM OF PAGE.)

	Q. 68	Q. 69
a. An automatic set-back or clock thermostat	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 435	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 436-439
b. Flame retention head burner for furnace (fuel oil)	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 440	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 441-444
c. Automatic flue door (vent damper)	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 445	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 446-449
d. Electrical or mechanical furnace ignition system (spark ignition)	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 450	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 451-454
e. Closeable shutters, insulating drapes, reflective film	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 455	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 456-459
f. Plastic sheets (over windows or other openings)	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 460	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 461-464
g. Heat pump	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 465	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 466-469
h. Wood-burning stove	1 <input type="checkbox"/> YES 0 <input type="checkbox"/> NO 2 <input type="checkbox"/> IN PROCESS 470	MONTH: _____ YEAR: 198_____ <input type="checkbox"/> IN PROCESS 471-474

FOR EACH "YES," ASK:

69. In what month and year was the work completed?
(SEE INSTRUCTION BELOW.)

TAKE BACK EXHIBIT 68

INTERVIEWER INSTRUCTIONS:

Was item added or installed since September 1, 1985 (Q. 63,66,68) -- Mark "Yes," "No," or "In Process" for each item. Count as "In Process" any work started but not yet completed. Do not count any changes made before this household moved in.

Month/year installed (Q. 64,67,69)-- If household has done item more than once, write down the most recent date.

CONTINUE IF ONE-FAMILY HOUSE OR MOBILE HOME. IF 2 OR MORE UNITS IN BUILDING, SKIP TO Q.86

511-513

70. Do you have a heated swimming pool, hot tub or jacuzzi? (DO NOT COUNT A CHILDREN'S WADING POOL AS A SWIMMING POOL.)
- | | | | | | | |
|----------------------|---|--------------------------|-----|---|--------------------------|----|
| HEATED SWIMMING POOL | 1 | <input type="checkbox"/> | YES | 0 | <input type="checkbox"/> | NO |
| HOT TUB | 1 | <input type="checkbox"/> | YES | 0 | <input type="checkbox"/> | NO |
| JACUZZI | 1 | <input type="checkbox"/> | YES | 0 | <input type="checkbox"/> | NO |

IF "YES" ON HEATED SWIMMING POOL, HOT TUB OR JACUZZI, ASK:

HAND RESPONDENT EXHIBIT 71

71. What fuel is used to heat the water? (IF MORE THAN ONE FUEL IS USED, CHECK FUEL USED MOST.)
- | | | | |
|----|--------------------------|---|-------------|
| 01 | <input type="checkbox"/> | GAS FROM UNDERGROUND PIPES SERVING THE NEIGHBORHOOD | |
| 02 | <input type="checkbox"/> | LPG GAS (BOTTLED OR TANK GAS) | |
| 03 | <input type="checkbox"/> | FUEL OIL | |
| 04 | <input type="checkbox"/> | KEROSENE OR COAL OIL | |
| 05 | <input type="checkbox"/> | ELECTRICITY | 514-
515 |
| 06 | <input type="checkbox"/> | COAL OR COKE | |
| 07 | <input type="checkbox"/> | WOOD | |
| 08 | <input type="checkbox"/> | SOLAR COLLECTORS | |
| 21 | <input type="checkbox"/> | OTHER (SPECIFY): _____ | |
| 96 | <input type="checkbox"/> | DON'T KNOW | |

TAKE BACK EXHIBIT 71

INTERVIEWER:

THIS IS A BLANK PAGE.

THERE ARE NO QUESTIONS 72-85.

GO TO NEXT PAGE.

These next questions are about household appliances.

86. Do you have a refrigerator in your home that you use regularly or occasionally? 1 YES 657
 0 NO -- SKIP TO Q. 89

IF "YES," ASK:

87. Do you have one refrigerator or more than one that is presently in use? (How many altogether?) 1 ONE 658
 2 TWO
 3 THREE OR MORE

ASK ABOUT EACH REFRIGERATOR -- FIRST ASK ABOUT REFRIGERATOR USED MOST: (SEE INSTRUCTION BELOW.)

HAND RESPONDENT EXHIBIT 88

88. Which of these best describes your refrigerator? (MARK ONE)
- Freezer section (or ice cube section) must be defrosted periodically
 - Freezer section defrosts automatically after frost builds up (catch pan must be emptied)
 - Full frost-free (frost does not build up)
 - No working freezer section

REFRIGERATOR #1	REFRIGERATOR #2
659	660
1 <input type="checkbox"/>	1 <input type="checkbox"/>
2 <input type="checkbox"/>	2 <input type="checkbox"/>
3 <input type="checkbox"/>	3 <input type="checkbox"/>
4 <input type="checkbox"/>	4 <input type="checkbox"/>

TAKE BACK EXHIBIT 88

INTERVIEWER INSTRUCTIONS:
 Q. 88 -- If respondent has more than two refrigerators, ask about two used most.

HAND RESPONDENT EXHIBIT 89

89. Thinking of all the different kinds of cooking done here, including cooking in the oven, on a range, and with small appliances, which fuel is used most?

- 01 GAS FROM UNDERGROUND PIPES SERVING THE NEIGHBORHOOD
 02 LPG GAS (BOTTLED OR TANK GAS)
 03 FUEL OIL
 04 KEROSENE OR COAL OIL
 05 ELECTRICITY
 06 COAL OR COKE
 07 WOOD
 21 OTHER (SPECIFY): _____
- 00 NO COOKING DONE -- SKIP TO Q. 91

661-
662

TURN TO EXHIBIT 90

90. Which of these are used for cooking here in your (house/apartment)?

- ELECTRIC STOVE-TOP OR ELECTRIC BURNERS 1 YES 0 NO 663
 GAS STOVE-TOP OR GAS BURNERS 1 YES 0 NO 664
 MICROWAVE OVEN 1 YES 0 NO 665
 ELECTRIC OVEN OTHER THAN MICROWAVE 1 YES 0 NO 666
 GAS OVEN 1 YES 0 NO 667
 OUTDOOR GAS GRILL (USING GAS FROM UNDERGROUND PIPES) 1 YES 0 NO 668
 OUTDOOR GAS GRILL (USING LPG-BOTTLED OR TANK GAS) 1 YES 0 NO 669

TURN TO EXHIBIT 91

91. Please look at this list and, as I read each item, tell me which of these you use here in your (house/apartment)? (INTERVIEWER: READ AND MARK "YES" or "NO" FOR EACH ITEM).

AUTOMATIC CLOTHES WASHER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	670
WRINGER WASHING MACHINE (ELECTRIC)	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	671
ELECTRIC DISHWASHER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	672
ELECTRIC CLOTHES DRYER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	673
GAS CLOTHES DRYER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	674
OUTDOOR GAS LIGHT	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	675
ELECTRIC DEHUMIDIFIER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	676
ELECTRIC HUMIDIFIER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	677
EVAPORATIVE COOLER (SWAMP COOLER)	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	678
"WHOLE HOUSE" COOLING FAN (IN ATTIC OR ENTRANCE TO ATTIC)	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	679
WINDOW OR CEILING FAN	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	680
ELECTRIC BLANKET	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	707-708, 07 711
WATER BED WITH HEATER	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	712
FROST FREE FREEZER (SEPARATE APPLIANCE FROM REFRIGERATOR)	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	713
MANUAL DEFROST FREEZER (SEPARATE APPLIANCE FROM REFRIGERATOR)	1	<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	714
BLACK AND WHITE TELEVISION SET		<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	NUMBER: <input type="text"/> 715
COLOR TELEVISION SET		<input type="checkbox"/>	YES	0	<input type="checkbox"/>	NO	NUMBER: <input type="text"/> 716

IF "YES," FOR BLACK AND WHITE TV SET, ASK:

92. How many black and white television sets do you use here in your home? _____

IF "YES," FOR COLOR TV SET, ASK:

93. How many color television sets do you use here in your home? _____

TAKE BACK EXHIBIT 91. HAND RESPONDENT EXHIBIT 94.

94. Do you have any other kinds of equipment that use a lot of energy that we have not mentioned? 1 YES 717
0 NO

IF "YES" ON Q. 94, ASK:

95. Please describe the equipment and how you use it.

TAKE BACK EXHIBIT 94

718-720

96. Now I have some questions about the people who live here. Please tell me who they are, just in relation to (HOUSEHOLDER). I would also like to know their ages on their last birthdays. Please begin with (HOUSEHOLDER). (SEE INSTRUCTIONS BELOW.)

PERSON NUMBER	WHO IS RESPONDENT?	RELATIONSHIP TO HOUSEHOLDER	SEX		AGE	Q. 101 - EMPLOYMENT (AGE 14+)			
			FEMALE	MALE		FULL TIME	PART TIME	NOT EMPLOYED	
1		HOUSEHOLDER	1[]	2[]		1[]	2[]	0[]	721-727
2			1[]	2[]		1[]	2[]	0[]	731-737
3			1[]	2[]		1[]	2[]	0[]	741-747
4			1[]	2[]		1[]	2[]	0[]	751-757
5			1[]	2[]		1[]	2[]	0[]	761-767
6			1[]	2[]		1[]	2[]	0[]	771-777
7			1[]	2[]		1[]	2[]	0[]	807-808:08 811-817
8			1[]	2[]		1[]	2[]	0[]	821-827
9			1[]	2[]		1[]	2[]	0[]	831-837
10			1[]	2[]		1[]	2[]	0[]	841-847
11			1[]	2[]		1[]	2[]	0[]	851-857
12			1[]	2[]		1[]	2[]	0[]	861-867

I have listed (READ RELATIONSHIPS FROM Q. 96 ABOVE). Have I missed

- 97. Any babies or small children? [] YES (ADD TO LISTING)
[] NO
- 98. Any lodgers, boarders, or persons in your employ who live here? [] YES (ADD TO LISTING)
[] NO
- 99. Anyone who usually lives here but is away traveling or in the hospital? (SEE INSTRUCTION BELOW.) [] YES (ADD TO LISTING)
[] NO
- 100. Anyone else staying here who does not have a regular residence elsewhere? [] YES (ADD TO LISTING)
[] NO

FOR OFFICE USE ONLY:

 868-869

FOR EACH PERSON AGED 14 YEARS OR OLDER, ASK:

101. Is he/she employed full-time (30 hours or more per week), part-time, or not employed? _____

INTERVIEWER INSTRUCTIONS:

In general, the householder is the person (or one of the persons) in whose name the home is owned or rented.

For questions on this and the following pages, where the term "HOUSEHOLDER" is inserted, use the appropriate designation -- you, your husband, wife, partner -- depending on who is the householder and whom you are interviewing.

Q. 96 -- Be sure to list relationships, not names. Include members of a second family that share the housing unit. Check box to indicate which household member is the respondent.

Q. 99 -- Persons who are normally members of the household but who are now living away from home (e.g., college students or members of the Armed Forces) should not be listed.

102. Does another family share your home with you? 1 YES (SEE INSTRUCTION BELOW.)
0 NO 870

INTERVIEWER: MARK ANSWER. ASK, IF NECESSARY.		
<u>HOUSEHOLDER'S MARITAL STATUS</u>	103. Which of the following best describes (HOUSEHOLDER): now married, widowed, divorced or separated, or never married?	1 <input type="checkbox"/> NOW MARRIED 2 <input type="checkbox"/> WIDOWED 871 3 <input type="checkbox"/> DIVORCED OR SEPARATED 4 <input type="checkbox"/> NEVER MARRIED

HAND RESPONDENT EXHIBIT 104

104. Which of the groups on this exhibit best describes (HOUSEHOLDER)? 1 WHITE 872
2 BLACK OR NEGRO
3 AMERICAN INDIAN, ALASKAN NATIVE
4 ASIAN, PACIFIC ISLANDER
5 OTHER (SPECIFY): _____

TAKE BACK EXHIBIT 104

105. Is (HOUSEHOLDER) of Spanish or Hispanic origin or descent? 1 YES 873
0 NO

INTERVIEWER INSTRUCTIONS:

Q. 102 -- If answer is "YES," check whether the additional family (or unrelated individual) has a separate room or apartment that is defined by our rules as separate living quarters. Separate living quarters are those in which the occupants (1) live and eat separately from other persons in building, and (2) have direct access from outside the building or through a common hall.

Separate living quarters should be listed separately on your housing unit address list for this location. See sampling instructions as to whether an additional interview should be completed.

If the second family's space does meet the rules for separate living quarters, that space should be excluded from the information obtained in this interview. Go back over this interview to make corrections if necessary.

If the second family's space does not meet the definition of separate living quarters, be sure that the members of the second family are included in the list of household members in Q. 96

I have just a few questions for background statistical purposes.

106. What is the highest grade (or year) (HOUSEHOLDER) attended in school?
- | | |
|------------------------------|-----------------|
| 00 [] NEVER ATTENDED SCHOOL | |
| 01 [] FIRST | 07 [] SEVENTH |
| 02 [] SECOND | 08 [] EIGHTH |
| 03 [] THIRD | 09 [] NINTH |
| 04 [] FOURTH | 10 [] TENTH |
| 05 [] FIFTH | 11 [] ELEVENTH |
| 06 [] SIXTH | 12 [] TWELFTH |
- 874-875

COLLEGE (ACADEMIC YEARS)

- | | |
|-----------|-------------------|
| 13 [] C1 | 16 [] C4 |
| 14 [] C2 | 17 [] C5 |
| 15 [] C3 | 18 [] C6 OR MORE |

107. Did (HOUSEHOLDER) finish that grade (or year)?
- | | |
|-----------|-----|
| 1 [] YES | |
| 0 [] NO | 876 |

HAND RESPONDENT EXHIBIT 108

108. In the past 12 months, did you or any member of your family living here receive any income or benefits from: (INTERVIEWER: READ AND MARK "YES" OR "NO" FOR EACH ITEM.)
- 907-908:09

- | | | | |
|--|-----------|----------|-----|
| a. Wages or salaries | 1 [] YES | 0 [] NO | 911 |
| b. Self-employment from business or farm. | 1 [] YES | 0 [] NO | 912 |
| c. Aid to Families with Dependent Children (AFDC). | 1 [] YES | 0 [] NO | 913 |
| d. Supplemental Security Income (SSI) | 1 [] YES | 0 [] NO | 914 |
| e. General Assistance or other public assistance | 1 [] YES | 0 [] NO | 915 |
| f. Food Stamps. | 1 [] YES | 0 [] NO | 916 |
| g. Social Security or Railroad Retirement | 1 [] YES | 0 [] NO | 917 |
| h. Unemployment compensation | 1 [] YES | 0 [] NO | 918 |

TURN TO EXHIBIT 109

109. Now let's look at this list of income groups. Please tell me which group letter best describes the total combined income in the last 12 months of all members of your family living here, from all sources -- wages, dividends, Social Security, and so forth -- before taxes and deductions. (Family includes all related persons living in this household.)

CIRCLE LETTER FOR INCOME GROUP

919-920

- | | | |
|--------------------------|--------------------------|--|
| 01 A LESS THAN \$ 3,000 | 10 I \$11,000 - \$12,499 | 19 Q \$27,500 - \$29,999 |
| 02 B \$ 3,000 - \$ 3,999 | 12 J \$12,500 - \$13,999 | 20 R \$30,000 - \$32,499 |
| 03 C \$ 4,000 - \$ 4,999 | 13 K \$14,000 - \$14,999 | 21 S \$32,500 - \$34,999 |
| 04 D \$ 5,000 - \$ 5,999 | 14 L \$15,000 - \$17,499 | 22 T \$35,000 - \$39,999 |
| 05 E \$ 6,000 - \$ 7,499 | 15 M \$17,500 - \$19,999 | 23 U \$40,000 - \$49,999 |
| 07 F \$ 7,500 - \$ 8,999 | 16 N \$20,000 - \$22,499 | 24 V \$50,000 - \$74,999 |
| 08 G \$ 9,000 - \$ 9,999 | 17 O \$22,500 - \$24,999 | 25 W \$75,000 OR OVER |
| 09 H \$10,000 - \$10,999 | 18 P \$25,000 - \$27,499 | |
| | | 96 <input type="checkbox"/> DON'T KNOW |
| | | 97 <input type="checkbox"/> REFUSED |

TAKE BACK EXHIBIT 109

IF ANSWER TO Q. 109 IS GROUP R THROUGH W (INCOME \$30,000 OR OVER), SKIP TO Q. 115 ON PAGE 26.
 IF ANSWER TO Q. 109 IS GROUP A THROUGH Q (INCOME UNDER \$30,000), "DON'T KNOW", OR "REFUSED", CONTINUE WITH Q. 110.

HAND RESPONDENT EXHIBIT 110

110. Between October 1, 1986, and September 30, 1987, did your household receive any of the following services free or at reduced cost from the federal, state, or local government? (INTERVIEWER: READ AND MARK "YES" OR "NO" FOR EACH ITEM.)

- a. Insulation in the attic, outside wall, or basement/crawl space below the floor of the house 1 YES 0 NO 921
- b. Insulation around the hot water heater. 1 YES 0 NO 922
- c. Repair of broken windows or doors to keep out the cold or hot weather 1 YES 0 NO 923
- d. Weather stripping or caulking around any windows or doors to the outside 1 YES 0 NO 924
- e. Storm doors or windows added. 1 YES 0 NO 925
- f. Repair of broken furnace 1 YES 0 NO 926
- g. Furnace tuneup and/or modifications 1 YES 0 NO 927
- h. Other home energy-saving devices (Specify): _____ 1 YES 0 NO 928

TURN TO EXHIBIT 111

111. The government has a home energy assistance program that helps pay heating and cooling costs. This assistance can be received directly by the household or it can be paid directly to the electric or gas company or fuel dealer.

Between October 1, 1986 and September 30, 1987 did your household receive government energy assistance (either directly or through the utility company or fuel dealer) for any of the following: (INTERVIEWER: READ AND MARK "YES" OR "NO" FOR EACH ITEM).

- 111a. Help in paying home heating costs 1 YES 0 NO 929
- 111b. Help in paying home cooling costs 1 YES 0 NO 930
- 111c. Help in paying other home energy costs. 1 YES 0 NO 931

IF "YES" ON Q. 111c, ASK:

112. Please describe this other assistance.

IF "YES" ON Q. 111a (ASSISTANCE TO HELP PAY HOME HEATING COSTS), TURN TO EXHIBIT 113 AND ASK:

113. Were heating assistance payments made in the form of checks, coupons, or vouchers sent to this household or were the payments sent directly to the utility company or fuel dealer? (INTERVIEWER: READ AND MARK "YES" OR "NO" FOR EACH ITEM).

- a. Check to household 1 YES 0 NO 932
- b. Coupon/voucher to household. 1 YES 0 NO 933
- c. Assistance sent directly to electric or gas company, or fuel dealer 1 YES 0 NO 934

114. Altogether, how much government energy assistance to help pay heating costs has been provided directly to this household and/or provided on behalf of this household to a utility company or fuel dealer, between October 1, 1986 and September 30, 1987? (PROBE FOR BEST ESTIMATE).

NUMBER OF DOLLARS \$ _____ .00

935-938

TAKE BACK EXHIBITS

ASK EVERYONE

115. Do you or members of your household own your home or do you rent?

- 1 OWN (BUYING) 939
 2 RENT -- SKIP TO Q. 118
 3 OCCUPIED WITHOUT
 PAYMENT OF RENT -- SKIP TO Q. 120

IF "OWN (BUYING)," ASK:

116. Is this (house/apartment) part of a condominium or cooperative?

- 1 YES, CONDOMINIUM 940
 2 YES, COOPERATIVE] ---- SKIP TO
 Q. 120
 0 NO

INTERVIEWER: THERE IS NO QUESTION 117

IF "RENT," ASK:

118. Is this residence in a public housing project -- that is, is it owned by a local housing authority?

- 1 YES -- SKIP TO Q. 120
 0 NO 945
 6 DON'T KNOW

IF "NO" OR "DON'T KNOW," ASK:

119. Are you paying lower rent because the federal, state, or local government is paying part of the cost?


- 1 YES
 0 NO 946
 6 DON'T KNOW

HAND RESPONDENT EXHIBIT 120

120. We may have covered some of these points before, but just to be sure, please look at this exhibit and tell me whether these fuels are used for these purposes in your household.

	USED	NOT USED	PAID BY HOUSEHOLD	INCLUDED IN RENT	OTHER (SPECIFY)	
ELECTRICITY						
a. FOR HOT WATER	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	947-948
b. FOR HEATING YOUR HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	949-950
c. FOR AIR-CONDITIONING (CENTRAL OR WINDOW/WALL UNITS)	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	951-952
d. FOR COOKING	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	953-954
e. FOR LIGHTING AND OTHER APPLIANCES	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	955-956
GAS FROM UNDERGROUND PIPES SERVING YOUR NEIGHBORHOOD						
f. FOR HOT WATER	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	957-958
g. FOR HEATING YOUR HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	959-960
h. FOR CENTRAL AIR-CONDITIONING	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	961-962
i. FOR COOKING INSIDE HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	963-964
j. FOR COOKING ON OUTDOOR GRILL	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	965-966
k. FOR OTHER APPLIANCES (INCLUDE OUTSIDE GAS LIGHT HERE)	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	967-968
LPG GAS (BOTTLED OR TANK GAS)						
l. FOR HOT WATER	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	969-970
m. FOR HEATING YOUR HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	971-972
n. FOR CENTRAL AIR-CONDITIONING	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	973-974
o. FOR COOKING INSIDE HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	975-976
p. FOR COOKING ON OUTDOOR GRILL	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	977-978
q. FOR OTHER APPLIANCES (INCLUDE OUTSIDE GAS LIGHT HERE)	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	979-980
FUEL OIL						
r. FOR HOT WATER	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1007-1008:10 1011-1012
s. FOR HEATING YOUR HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1013-1014
t. FOR COOKING AND OTHER USES	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1015-1016
KEROSENE						
u. FOR HOT WATER	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1017-1018
v. FOR HEATING YOUR HOME	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1019-1020
w. FOR COOKING AND OTHER USES	1 <input type="checkbox"/>	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	5 <input type="checkbox"/>	1021-1022

FOR EACH USE OF EACH FUEL, ASK:

121. Is that paid for by your household, included in your rent, or do you get it some other way? 

TAKE BACK EXHIBIT 120

IF GAS FROM UNDERGROUND PIPES IS NOT USED, ASK Q. 122. OTHERWISE, SKIP TO INSTRUCTION AT TOP OF NEXT PAGE.

122. Is gas from underground pipes available in this neighborhood?

1 YES
 0 NO
 6 DON'T KNOW

1023

INTERVIEWER: IF USE OF ANY FUEL IS "PAID BY HOUSEHOLD" IN QUESTIONS ON PRECEDING PAGE, CONTINUE BELOW. OTHERWISE, SKIP TO INSTRUCTION FOR Q. 147 ON PAGE 35.

1024

123. A budget plan is a plan under which the utility company or fuel dealer and household agree that the household will pay the same amount for fuel each month for a number of months. Is your household on a budget plan for the main fuel used to heat your home?
- 1 YES
0 NO

(INTERVIEWER: THERE IS NO QUESTION 124.)

TURN TO EXHIBIT 125/126

125. Do any of your household fuel bills include costs of fuel used for purposes other than for your own living quarters, such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?
- 1 YES 1030
0 NO -- TAKE BACK EXHIBIT 125/126 --
SKIP TO INSTRUCTIONS FOR Q. 133 ON PAGE 30.

IF "YES," ASK:

126. For which of the purposes listed on the exhibit are costs of fuel included in your household fuel bills?
(INTERVIEWER: MARK ALL THAT APPLY.)

- FARM BUILDINGS OR MACHINERY 1031
 THE HOUSE OR APARTMENT OF ANOTHER HOUSEHOLD 1032
 A BUSINESS OR OFFICE 1033
 OTHER PURPOSES (SPECIFY): _____ 1034
- _____

IF "YES" ON Q. 125, CONTINUE BELOW

127. Which fuel bills include costs of fuel used for purposes other than your own living quarters? (MARK AS MANY AS APPLY.)

- ELECTRICITY 1035
 GAS FROM UNDERGROUND PIPES 1036
 LPG GAS (BOTTLED OR TANK GAS) 1037
 FUEL OIL 1038
 KEROSENE 1039

TURN TO EXHIBIT 128/132

IF "ELECTRICITY" ON Q. 127, ASK:

128. Over the period of a year, about how much of your household's electricity bill is used for non-household uses such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?

- 0 VERY LITTLE (LESS THAN 5%)
 1 1/4 (5 - 33%)
 2 1/2 (34 - 66%) 1040
 3 3/4 (67 - 95%)

IF "GAS FROM UNDERGROUND PIPES" ON Q. 127, ASK:

129. Over the period of a year, about how much of your household's gas bill is used for non-household uses such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?

- 0 VERY LITTLE (LESS THAN 5%)
 1 1/4 (5 - 33%)
 2 1/2 (34 - 66%) 1041
 3 3/4 (67 - 95%)

IF "LPG GAS" ON Q. 127, ASK:

130. Over the period of a year, about how much of your household's LPG bill is used for non-household uses such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?

- 0 VERY LITTLE (LESS THAN 5%)
 1 1/4 (5 - 33%)
 2 1/2 (34 - 66%) 1042
 3 3/4 (67 - 95%)

IF "FUEL OIL" ON Q. 127, ASK:

131. Over the period of a year, about how much of your household's fuel oil bill is used for non-household uses such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?

- 0 VERY LITTLE (LESS THAN 5%)
 1 1/4 (5 - 33%)
 2 1/2 (34 - 66%) 1043
 3 3/4 (67 - 95%)

IF "KEROSENE" ON Q. 127, ASK:

132. Over the period of a year, about how much of your household's kerosene bill is used for non-household uses, such as farm buildings or machinery, the house or apartment of another household, a business or office, or anything else?

- 0 VERY LITTLE (LESS THAN 5%)
 1 1/4 (5 - 33%)
 2 1/2 (34 - 66%) 1044
 3 3/4 (67 - 95%)

TAKE BACK EXHIBIT 128/132

IF HOUSEHOLD USES AND PAYS FOR LPG GAS (SEE QUESTIONS 120-121 PARTS 1-q), ASK Q. 133ff., OTHERWISE, SKIP TO INSTRUCTION FOR Q. 136.

133. About how many deliveries of LPG does your household usually get in a year?

NUMBER OF DELIVERIES: 1045-1046

94 CASH AND CARRY, PICK UP AT STORE

95 LIVED HERE LESS THAN 1 YEAR

134. Did you buy LPG for this (house/apartment) in the past 12 months from one company or from more than one company?

1 ONE COMPANY 1047

2 MORE THAN ONE COMPANY

IF "MORE THAN ONE COMPANY," ASK:

135. How many different companies?

2 TWO

3 THREE 1048

4 FOUR OR MORE

IF HOUSEHOLD USES AND PAYS FOR FUEL OIL (SEE QUESTIONS 120-121 PARTS r-t), ASK Q. 136, OTHERWISE, SKIP TO INSTRUCTION FOR Q. 140.

136. About how many deliveries of fuel oil does your household usually get in a year?

NUMBER OF DELIVERIES: 1049-1050

94 CASH AND CARRY, PICK UP AT STORE

95 LIVED HERE LESS THAN 1 YEAR

137. Did you buy fuel oil for this (house/apartment) in the past 12 months from one company or from more than one company?

1 ONE COMPANY 1051

2 MORE THAN ONE COMPANY

IF "MORE THAN ONE," ASK:

138. How many different companies?

2 TWO

3 THREE 1052

4 FOUR OR MORE

HAND RESPONDENT EXHIBIT 139

139. About how much fuel oil does household use in a year -- which of these groups would it be, just approximately? PROBE FOR BEST ESTIMATE.

1 LESS THAN 100 GALLONS PER YEAR

2 100-499 GALLONS PER YEAR

3 500-999 GALLONS PER YEAR 1053

4 1000 OR MORE GALLONS PER YEAR

TAKE BACK EXHIBIT 139

IF HOUSEHOLD USES AND PAYS FOR KEROSENE (SEE QUESTIONS 120-121 PARTS u-w), ASK Q. 140ff. OTHERWISE, SKIP TO INSTRUCTION FOR Q. 144.

140. During the past 12 months, did you have kerosene delivered to your home, did you buy it and bring it home, or did you get kerosene both ways? (MARK ALL THAT APPLY).
- 1 DELIVERED -- GO TO Q. 140a
 - 2 BOUGHT AND BROUGHT HOME -- GO TO Q. 140b
 - 0 NO KEROSENE DELIVERED OR BOUGHT IN PAST 12 MONTHS -- SKIP TO INSTRUCTION FOR Q. 144

IF "DELIVERED," ASK:

- 140a. How many different companies or stores delivered kerosene to your home in the past 12 months?
- 1 ONE
 - 2 TWO
 - 3 THREE
 - 4 FOUR OR MORE

IF "BOUGHT AND BROUGHT HOME," ASK:

- 140b. About how much per gallon did you pay for kerosene, on the average?
- IF "DON'T KNOW," PROBE: About how much did you pay in total each time you bought kerosene?
- PRICE PER GALLON: \$ _____
- [] DON'T KNOW
- PAYMENT: \$ _____

141. How many times in the past 12 months did you (have kerosene delivered/buy kerosene)?
- TOTAL NUMBER OF DELIVERIES/PURCHASES FOR PAST 12 MONTHS: [] DON'T KNOW

IF TOTAL NUMBER GIVEN ON Q. 141, ASK:

142. On the average, about how many gallons of kerosene did you (have delivered/buy) each time?
- NUMBER OF GALLONS: [] DON'T KNOW

IF "DON'T KNOW" ON Q. 141, ASK:

143. Altogether, about how many gallons of kerosene did you (have delivered/buy) during the past 12 months?
- NUMBER OF GALLONS: [] DON'T KNOW

IF "DON'T KNOW" ON Q. 143, HAND RESPONDENT EXHIBIT 143.

- 143a. Using this card, can you tell me which group best describes the amount of kerosene your household used in the past 12 months? PROBE FOR BEST ESTIMATE.
- 1 LESS THAN 25 GALLONS
 - 2 25 - 49 GALLONS
 - 3 50 - 99 GALLONS
 - 4 100 - 499 GALLONS
 - 5 500 - 999 GALLONS
 - 6 1,000 OR MORE GALLONS

TAKE BACK EXHIBIT 143

CONTINUE IF ANY ELECTRIC, GAS (FROM UNDERGROUND PIPES OR LPG), FUEL OIL, OR KEROSENE BILLS ARE PAID BY HOUSEHOLD. OTHERWISE, SKIP TO INSTRUCTION FOR Q. 147.

144. In addition to the types of fuel you use, we are interested in the quantities used and in the amount that people pay for electricity, gas, fuel oil, or kerosene in different parts of the United States.

I have a form that would authorize the companies that supply your household to provide that information to Response Analysis Corporation. The authorization applies to the period from September 1986 through December 1990.

Since this study is being done nationwide, it will give a good picture of the differences in fuel cost and usage all over the country. The information is needed to help establish important national energy policies.

INTERVIEWER: REMOVE THE AUTHORIZATION FORM FROM THE QUESTIONNAIRE AND HAND TO RESPONDENT. EITHER YOU OR RESPONDENT SHOULD FILL IN THE NAME(S) OF COMPANIES. IF MORE THAN ONE LPG OR FUEL OIL OR KEROSENE COMPANY HAS BEEN USED SINCE SEPTEMBER 1, 1986, FILL IN ADDITIONAL COMPANY NAMES ON OTHER SIDE OF FORM. PLEASE PRINT.

2 AUTHORIZATION FORM SIGNED

0 AUTHORIZATION FORM NOT SIGNED -- INTERVIEWER, EXPLAIN BELOW: 1059

IF AUTHORIZATION FORM IS SIGNED, ASK Q. 145ff, OTHERWISE, SKIP TO INSTRUCTION FOR Q. 147

145. Do your fuel bills come addressed to (NAME OF SIGNATURE ON AUTHORIZATION FORM), or are they in another name? 2 SAME NAME -- SKIP TO Q. 146 1060
2 ANOTHER NAME

IF BILL IS IN ANOTHER NAME, ASK:

145a. What is that name and address:

BILLING NAME: _____

STREET ADDRESS: _____

CITY AND STATE: _____

ZIP CODE: _____

146. Would it be possible for you to give me your customer number at your electric/gas company? This number is on your bills from the company.

ELECTRIC COMPANY -- CUSTOMER NUMBER: _____ 1061

NOT AVAILABLE/REFUSED

GAS (FROM UNDERGROUND PIPES) --
CUSTOMER NUMBER: _____ 1062

NOT AVAILABLE/REFUSED

INTERVIEWER

THE AUTHORIZATION FORM IS TO BE FILLED
OUT AT THIS POINT IN THE INTERVIEW. USE
THE SEPARATE FORM THAT IS INSERTED IN THE
QUESTIONNAIRE.

IF HOUSEHOLD HAS ONE OR MORE FUELS "INCLUDED IN RENT" OR "OTHER" (SEE Q. 121), ASK Q. 147 OTHERWISE, SKIP TO Q. 148.

147. We may be needing some additional information about fuels used in this building (house). May I have the name of the person or company to whom you pay rent or who is responsible for paying the fuel bills for this building (house)?

1063

NAME: _____
 TELEPHONE NUMBER: (AREA CODE: _____) _____
 STREET ADDRESS: _____
 CITY OR TOWN/STATE/ZIP CODE: _____

ASK EVERYONE

148. For interview verification purposes, may I have your name, phone number, and mailing address please?

RESPONDENT'S NAME: _____
 TELEPHONE NUMBER: (AREA CODE: _____) _____
 STREET ADDRESS: _____
 CITY OR TOWN/STATE/ZIP CODE: _____

IF APARTMENT, MOBILE HOME/TRAILER COMPLEX AND THE NAME OF THE COMPLEX IS NOT INCLUDED IN THE ADDRESS ABOVE, ASK:

149. Does this (building/development/complex/park) have a name? YES
 NO

IF "YES," ASK:

150. What is the name?

NAME: _____

ASK EVERYONE

Now some questions about cars.

151. How many members of your household can drive a car?

NUMBER OF DRIVERS: 525-526
 NONE

HAND RESPONDENT EXHIBIT 152

152. Do you or other members of your household own or have the regular use of any cars, trucks, vans, or similar vehicles? (DO NOT INCLUDE MOTORCYCLES OR MOPEDS. SEE INSTRUCTION BELOW.)

1 YES 527
 0 NO -- TAKE BACK EXHIBIT 152 AND SKIP TO Q. 165

IF "YES," ASK:

153. How many do you have?

NUMBER OF VEHICLES: 528-529

ASK ABOUT EACH VEHICLE.

154. Which type(s) do you have? (SEE INSTRUCTION BELOW.)

607-608:06

	VEHICLE NUMBER			
	1	2	3	4
STANDARD PASSENGER CAR	01 <input type="checkbox"/> 530-531	01 <input type="checkbox"/> 553-554	01 <input type="checkbox"/> 611-612	01 <input type="checkbox"/> 634-635
2-SEAT CAR	02 <input type="checkbox"/>	02 <input type="checkbox"/>	02 <input type="checkbox"/>	02 <input type="checkbox"/>
STATION WAGON	03 <input type="checkbox"/>	03 <input type="checkbox"/>	03 <input type="checkbox"/>	03 <input type="checkbox"/>
LARGE VAN	04 <input type="checkbox"/>	04 <input type="checkbox"/>	04 <input type="checkbox"/>	04 <input type="checkbox"/>
MINI VAN	05 <input type="checkbox"/>	05 <input type="checkbox"/>	05 <input type="checkbox"/>	05 <input type="checkbox"/>
PICKUP TRUCK	06 <input type="checkbox"/>	06 <input type="checkbox"/>	06 <input type="checkbox"/>	06 <input type="checkbox"/>
JEEP OR SIMILAR VEHICLE	07 <input type="checkbox"/>	07 <input type="checkbox"/>	07 <input type="checkbox"/>	07 <input type="checkbox"/>
OTHER (SPECIFY:)	21 <input type="checkbox"/>	21 <input type="checkbox"/>	21 <input type="checkbox"/>	21 <input type="checkbox"/>

TAKE BACK EXHIBIT 152

155. Please tell me the make and model name (of each one). (SEE INSTRUCTION BELOW.)

MAKE

532-533 555-556 613-614 636-637

MODEL NAME

534-535 557-558 615-616 638-639

156. What is the model year (of each one)? (ENTER LAST 2 DIGITS OF MODEL YEAR)

MODEL YEAR

19 19 19 19

INTERVIEWER INSTRUCTIONS:

- Q. 152 -- "Regular use" means keeping the vehicle at home.
- Q. 154 -- If household has more than four vehicles, mark answers for the four vehicles used most.
- Q. 155 -- A model name may consist of several parts -- be sure to get the complete model name. Here are some examples, where the complete model name is in parentheses: Ford (Galaxie), Chevrolet (V10 Suburban), GMC (V15 Jimmy), Toyota (2WD Cargo Van). If respondent does not know the model name of a truck, probe for size (1/2 ton, 3/4 ton, etc.)

CONTINUE IF ONE OR MORE VEHICLES ON Q. 153; OTHERWISE SKIP TO Q. 165

ASK Q'S. 157-164 FIRST ABOUT FIRST VEHICLE, THEN SECOND VEHICLE, THIRD, AND FOURTH; REPEAT MAKE AND MODEL OF EACH VEHICLE.

USE COLUMNS FOR VEHICLE NUMBERS CORRESPONDING TO THOSE ON PRECEDING PAGE

These next questions are about your (MAKE & MODEL 1/ MAKE & MODEL 2/ MAKE & MODEL 3/ MAKE & MODEL 4.)

157. Did you get this vehicle within the past 12 months or did you have it before that?

WITHIN PAST 12 MONTHS
ASK Q. 158

HAD IT MORE THAN 12 MONTHS
SKIP TO Q. 160

IF "WITHIN PAST 12 MONTHS," ASK:

158. In what month and year did you get it?

MONTH

YEAR

159. Approximately how many miles has it been driven since you have had it?

MILES

DON'T KNOW

IF "HAD IT MORE THAN 12 MONTHS" ON Q. 157, ASK:

160. Approximately how many miles was it driven during the past 12 months?

MILES

DON'T KNOW

161. I would like to obtain the odometer reading and Vehicle Identification Number for this vehicle -- directly from the vehicle. Is the vehicle available right now so that we may get this information?

YES

CHECK HERE AND ASK Q. 164

NO

GO TO NEXT PAGE AND ASK Q's 162-163

VEHICLE NUMBER			
1	2	3	4
538	561	619	642
1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>
539-542	562-565	620-623	643-646
198	198	198	198
543-547	566-570	624-628	647-651
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
548-552	571-575	629-633	652-656
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

INSPECT EACH VEHICLE MARKED "YES" ON Q. 161 AFTER YOU COMPLETE HOUSE MEASUREMENTS IN Q's 180-184.

IF "NO" ON Q. 161 (THIS CAR IS NOT AVAILABLE) ASK Q. 162. IF "YES" ON Q. 161, ASK Q. 157 FOR NEXT VEHICLE; IF NO OTHER VEHICLES, SKIP TO Q. 165.

162. Do you know approximately what the odometer reading is for this vehicle?

HAND RESPONDENT EXHIBIT 163.

163. I would still like to record the Vehicle Identification Number for this vehicle. Do you know what a Vehicle Identification Number is? (IF DON'T KNOW, EXPLAIN VIN.) What is the Vehicle Identification Number for this vehicle? (SEE INSTRUCTIONS BELOW.)

INTERVIEWER: REPORT HERE IF VIN REFUSED FOR ONE OR MORE VEHICLES. EXPLAIN RESPONDENT REACTION OR REASON FOR REFUSING VIN.

V	1	Make _____ Model _____	
		[] ₁ ODOMETER KNOWN _____ (ESTIMATED ODOMETER READING) _____	1353-1358
E	1	[] ₀ ODOMETER NOT KNOWN	
		VIN: _____	1360
H	1	[] ₁ VIN OBTAINED [] ₈ VIN NOT OBTAINED [] ₇ VIN REFUSED	1378 1380
I	2	Make _____ Model _____	
		[] ₂ ODOMETER KNOWN _____ (ESTIMATED ODOMETER READING) _____	1411-1416
C	2	[] ₀ ODOMETER NOT KNOWN	
		VIN: _____	1418
L	2	[] ₁ VIN OBTAINED [] ₈ VIN NOT OBTAINED [] ₇ VIN REFUSED	1436 1438
N	3	Make _____ Model _____	
		[] ₁ ODOMETER KNOWN _____ (ESTIMATED ODOMETER READING) _____	1440-1445
U	3	[] ₀ ODOMETER NOT KNOWN	
		VIN: _____	1447
M	3	[] ₁ VIN OBTAINED [] ₈ VIN NOT OBTAINED [] ₇ VIN REFUSED	1465 1467
B	4	Make _____ Model _____	
		[] ₂ ODOMETER KNOWN _____ (ESTIMATED ODOMETER READING) _____	1618-1621
E	4	[] ₀ ODOMETER NOT KNOWN	
		VIN: _____	1625
R	4	[] ₁ VIN OBTAINED [] ₈ VIN NOT OBTAINED [] ₇ VIN REFUSED	1643 1645

INTERVIEWER INSTRUCTIONS:

Q. 163 -- Explain what the VIN is if respondent does not know.

If respondent questions need for VIN, say:

"The VIN is a set of codes assigned to a vehicle at the factory that, when decoded, describes several of the vehicle's characteristics. These characteristics may then be used to calculate an estimated miles per gallon for that specific type of vehicle."

Review the exhibit card of possible VIN locations. Record the VIN and verify for correctness.

RECORD VEHICLE INSPECTION(S) BELOW.

IF "YES" ON Q. 161, SKIP THIS PAGE (Q. 164) FOR NOW. ASK Q. 157 FOR NEXT VEHICLE (IF NO OTHER VEHICLES, SKIP TO Q. 165). AFTER COMPLETING Qs. 165-179 AND THE MEASUREMENT PROCEDURE IN Qs. 180-184, INSPECT ALL VEHICLES MARKED "YES" ON Q. 161. RECORD VEHICLE INSPECTION(S) BELOW.

164. (SEE INSTRUCTIONS BELOW.)

V 1 E	Make _____ Model _____	
	<input type="checkbox"/> ODOMETER OBTAINED _____ (ODOMETER READING FROM VEHICLE) _____	1353-1358
	<input type="checkbox"/> ODOMETER NOT OBTAINED	
	<input type="checkbox"/> ODOMETER REFUSED	
	VIN: _____	
H I C L E	Make _____ Model _____	
	<input type="checkbox"/> ODOMETER OBTAINED _____ (ODOMETER READING FROM VEHICLE) _____	1411-1416
	<input type="checkbox"/> ODOMETER NOT OBTAINED	
	<input type="checkbox"/> ODOMETER REFUSED	
	VIN: _____	
N U M B E R	Make _____ Model _____	
	<input type="checkbox"/> ODOMETER OBTAINED _____ (ODOMETER READING FROM VEHICLE) _____	1440-1445
	<input type="checkbox"/> ODOMETER NOT OBTAINED	
	<input type="checkbox"/> ODOMETER REFUSED	
	VIN: _____	
R	Make _____ Model _____	
	<input type="checkbox"/> ODOMETER OBTAINED _____ (ODOMETER READING FROM VEHICLE) _____	1618-1623
	<input type="checkbox"/> ODOMETER NOT OBTAINED	
	<input type="checkbox"/> ODOMETER REFUSED	
	VIN: _____	

INTERVIEWER: REPORT HERE IF VIN REFUSED FOR ONE OR MORE VEHICLES. EXPLAIN RESPONDENT REACTION OR REASON FOR REFUSING VIN.

INTERVIEWER INSTRUCTIONS:

Q. 164 -- If respondent questions need for VIN, say:
 "The VIN is a set of codes assigned to a vehicle at the factory that, when decoded, describes several of the vehicle's characteristics. These characteristics may then be used to calculate an estimated miles per gallon for that specific type of vehicle."

Record VIN from the vehicle itself whenever possible. If VIN cannot be found on the vehicle, show Exhibit 163 (VIN LOCATIONS CARD), and attempt to secure VIN from one of these document sources.

165. INTERVIEWER: MARK TYPE OF HOUSING UNIT

- 1 MOBILE HOME OR TRAILER -- 1064-
SKIP TO Q. 169 1065
- 2 ONE-FAMILY HOUSE
- | | |
|--|--|
| 1 <input type="checkbox"/> ONE STORY | } IF ONE-FAMILY
HOUSE, MARK STYLE
BASED ON GENERAL
APPEARANCE FROM
OUTSIDE |
| 2 <input type="checkbox"/> TWO STORY | |
| 3 <input type="checkbox"/> THREE STORY | |
| 4 <input type="checkbox"/> SPLIT-LEVEL | |
- 5 OTHER (SPECIFY): _____
- 3 HOUSE OR BUILDING WITH 2 TO 4 UNITS --
SKIP TO Q. 172
- 4 APARTMENT BUILDING OR OTHER
STRUCTURE WITH 5 OR MORE UNITS --
SKIP TO Q. 175

CONTINUE IF ONE-FAMILY HOUSE

166. Do you have a garage attached to your living space or under your house?

- 1 YES
- 0 NO -- SKIP TO Q. 169 1066

IF "YES" ON Q. 166, ASK:

167. Can the garage be heated during the winter months?

- 1 YES
- 0 NO -- SKIP TO Q. 169 1067

IF "YES" ON Q. 167, HAND RESPONDENT EXHIBIT 168 AND ASK:

168. How frequently is the garage heated during the winter months?

- 4 ALWAYS
- 3 USUALLY
- 2 OCCASIONALLY 1068
- 1 ALMOST NEVER
- 0 NEVER
- 5 OTHER (SPECIFY): _____

TAKE BACK EXHIBIT 168

CONTINUE WITH Q. 169 ON NEXT PAGE

IF ONE-FAMILY HOUSE OR MOBILE HOME, ASK Q. 169.

HAND RESPONDENT EXHIBIT 169

169. Does your home have a basement, an enclosed crawl space, a crawl space open to the outside, a concrete slab, or a combination of these?

- | | | | |
|---|--------------------------|------------------------------------|------|
| 1 | <input type="checkbox"/> | BASEMENT | 1069 |
| 2 | <input type="checkbox"/> | CRAWL SPACE -- ENCLOSED | |
| 3 | <input type="checkbox"/> | CRAWL SPACE -- OPEN TO THE OUTSIDE | |
| 4 | <input type="checkbox"/> | CONCRETE SLAB -- SKIP TO Q. 175 | |
| 5 | <input type="checkbox"/> | COMBINATION (MARK ALL THAT APPLY.) | |
| | <input type="checkbox"/> | BASEMENT | 1070 |
| | <input type="checkbox"/> | CRAWL SPACE -- ENCLOSED | 1071 |
| | <input type="checkbox"/> | CRAWL SPACE -- OPEN TO THE OUTSIDE | 1072 |
| | <input type="checkbox"/> | CONCRETE SLAB | 1073 |

TAKE BACK EXHIBIT 169

IF "BASEMENT," "CRAWL SPACE," OR "COMBINATION," ASK:

170. About how much of the basement or crawl space would you say is warm enough to sit, work or play in during the winter months -- all, part, or none?

- | | | | |
|---|--------------------------|-----------------------|------|
| 1 | <input type="checkbox"/> | ALL -- SKIP TO Q. 175 | |
| 2 | <input type="checkbox"/> | PART | 1074 |
| 0 | <input type="checkbox"/> | NONE | |

IF "PART," OR "NONE," HAND RESPONDENT EXHIBIT 171 AND ASK:

171. About how much of the floor area above the unheated basement or crawl space is insulated?

- | | | | |
|---|--------------------------|----------------------------------|------|
| 0 | <input type="checkbox"/> | NONE, VERY LITTLE (LESS THAN 5%) | |
| 1 | <input type="checkbox"/> | 1/4 (5 - 33%) | |
| 2 | <input type="checkbox"/> | 1/2 (34 - 66%) | |
| 3 | <input type="checkbox"/> | 3/4 (67 - 95%) | 1075 |
| 4 | <input type="checkbox"/> | ALL (96 - 100%) | |
| 6 | <input type="checkbox"/> | DON'T KNOW | |

TAKE BACK EXHIBIT 171 -- SKIP TO Q. 175

IF THIS IS A BUILDING WITH 2 TO 4 HOUSING UNITS, ASK Q. 172 OTHERWISE, SKIP TO Q. 175.

172. Does this building have a basement? 1 [] YES 1076
0 [] NO -- SKIP TO Q. 175

IF "YES," ASK:

173. Is any part of the basement for the exclusive or primary use of your household? 1 [] YES 1077
0 [] NO -- SKIP TO Q. 175

IF "YES," ASK:

174. Thinking of the basement space used by your household -- about how much of that space is warm enough to sit, work or play in during the winter months -- all, part, or none? 1 [] ALL 1078
2 [] PART
0 [] NONE

ASK EVERYONE

HAND RESPONDENT EXHIBIT 175

175. Since September 1984, have any of the kinds of things listed on this exhibit been done to your home -- that is, anything that has either increased or decreased the total number of square feet of space, or that has changed the number of square feet of heated space?

1107-
1108:11

1 YES
0 NO -- SKIP TO Q. 180

1111

IF "YES", ON Q. 175, ASK:

176. Did the total number of square feet of space increase, decrease, or remain the same?

1112

1 INCREASED
2 DECREASED
3 REMAINED THE SAME

177. Did the amount of heated space increase, decrease, or remain the same?

1113

1 INCREASED
2 DECREASED
3 REMAINED THE SAME

178. Please give me a description of the work that was done.

1114-
1115

179. In what month and year was the work completed?

MONTH: _____
YEAR: 198 _____
 IN PROCESS

1116-
1119

TAKE BACK EXHIBIT 175

180. So far, we've been talking about things in your household that affect your energy use. What we need also is a measure of your year-round living space.

With your permission, I would like to measure your home. I can do it from the inside or the outside. With your home, I think it would be most accurate to do it on the (inside/outside).

INTERVIEWER INSTRUCTIONS:

In general, measure all parts of the housing unit enclosed from the weather.

Basements or cellars

Include basements or cellars in one-family houses.

Include basement space in buildings with 2 to 4 housing units, if it is for the exclusive or primary use of household for this interview. See Q. 173.

Exclude basements and cellars in buildings with 5 or more units.

Exclude crawl spaces.

Attics

Include attics if heated or finished.

Exclude attics if unheated and also unfinished.

Garages, sheds, or barns

Include garages if attached to house and enclosed from the weather.

Exclude garages, sheds, or barns if not attached to house or if open to the weather.

Porches

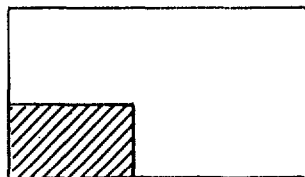
Include porches if enclosed from the weather.

Exclude porches if open to the weather.

Buildings with 2 or more housing units: Measure only the space used by household for this interview (do not measure the entire building).

Unheated areas: Within the housing unit that you measure, indicate unheated area(s) in the diagrams with lines. Give dimensions of unheated area(s).

Indicate unheated areas this way →



USE BACKS OF MEASUREMENT PAGES FOR ADDITIONAL SPACE AS NEEDED, FOR SKETCHES AND MEASUREMENTS.

RECORD MEASUREMENTS ON DIAGRAM TO NEAREST FOOT

START HERE

if this household has a basement or cellar (see instruction on facing page for basements and cellars)

BASEMENT MEASUREMENTS <input type="checkbox"/> FULL BASEMENT <input type="checkbox"/> HALF BASEMENT	
RECTANGULAR SHAPE	DRAW DIAGRAM, IF OTHER THAN RECTANGULAR

INTERVIEWER: HAVE YOU MARKED WITH LINES AND GIVEN DIMENSIONS OF UNHEATED AREAS IN DIAGRAM ABOVE?

START HERE

if this household does not have a basement or cellar

FIRST STORY MEASUREMENTS <input type="checkbox"/> FULL STORY <input type="checkbox"/> HALF STORY	
RECTANGULAR SHAPE	DRAW DIAGRAM, IF OTHER THAN RECTANGULAR

INTERVIEWER: HAVE YOU MARKED WITH LINES AND GIVEN DIMENSIONS OF UNHEATED AREAS IN DIAGRAM ABOVE?

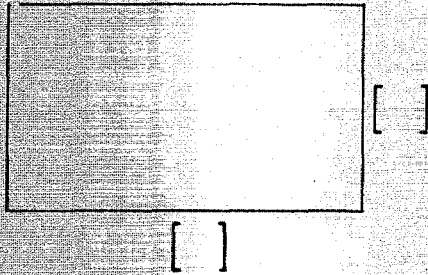
CONTINUE ON PAGE 47 FOR SECOND AND THIRD STORIES

FOR OFFICE USE ONLY

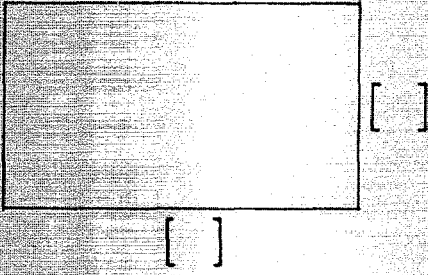
	Fir Codes			Unit A			Unit B			Unit C			Unit D			# of Units
	1120	21	22	23	24-25	26-27	28	29-30	31-32	33	34-35	36-37	38	39-40	41-42		43
B																
1	1144	45	46	47	48-49	50-51	52	53-54	55-56	57	58-59	60-61	62	63-64	65-66	67

IF NO SECOND OR THIRD STORY TO MEASURE, GO TO Q. 181

RECORD MEASUREMENTS ON DIAGRAM TO NEAREST FOOT

SECOND STORY MEASUREMENTS <input type="checkbox"/> FULL STORY <input type="checkbox"/> HALF STORY	
RECTANGULAR SHAPE 	DRAW DIAGRAM, IF OTHER THAN RECTANGULAR

INTERVIEWER: HAVE YOU MARKED WITH LINES AND GIVEN DIMENSIONS OF UNHEATED AREAS IN DIAGRAM ABOVE?

THIRD STORY MEASUREMENTS <input type="checkbox"/> FULL STORY <input type="checkbox"/> HALF STORY	
RECTANGULAR SHAPE 	DRAW DIAGRAM, IF OTHER THAN RECTANGULAR

INTERVIEWER: HAVE YOU MARKED WITH LINES AND GIVEN DIMENSIONS OF UNHEATED AREAS IN DIAGRAM ABOVE?

FOR OFFICE USE ONLY

1207-1208:12

	Flr Codes			Unit A			Unit B			Unit C			Unit D			# of Units
	69	70	71	72-73	74-75	76	77-78	79-80	1211	12-13	14-15	16	17-18	19-20	21	
2																
3	1222	23	24	25	26-27	28-29	30	31-32	33-34	35	36-37	38-39	40	41-42	43-44	45

Heated	Unheated	DK Htd/Unhtd
1246-1250	1251-1255	1256-1259

181. One part of my task is to mark on my diagram any parts of your home that are not heated during the heating season.

TELL RESPONDENT WHAT PARTS OF HOME, IF ANY, YOU HAVE MARKED AS NOT HEATED DURING HEATING SEASON, THEN ASK:

Is that correct -- have I missed any unheated areas?

REVISE SKETCHES AS NECESSARY;
THEN MARK APPROPRIATE BOX AT
RIGHT.

0 NO UNHEATED AREAS 1260

1 ALL UNHEATED AREAS HAVE BEEN
MARKED WITH LINES



2 ENTIRE UNIT IS UNHEATED (NO
HEATING EQUIPMENT)

INTERVIEWER INSTRUCTIONS:

DOUBLE-CHECK BASEMENTS AND GARAGES

- If the respondent reported an unheated basement (Q. 170 or 174), is it shaded in the drawing?
- If the respondent reported an unheated attached garage (Q. 167), is it shaded in the drawing?

182. INTERVIEWER: MARK BOX TO INDICATE HOW MEASUREMENTS WERE OBTAINED FOR (HOUSE/APARTMENT).

INTERVIEWER INSTRUCTIONS:

DOUBLE-CHECK MEASUREMENTS OBTAINED FROM PLANS OR FROM RESPONDENT ESTIMATES.

ESTIMATES SHOULD INCLUDE:

- Basements
- Attached garages
- Finished or heated attics
- Enclosed porches

ESTIMATES SHOULD EXCLUDE:

- Detached garages
- Attics that are unfinished and unheated
- Porches that are not permanently enclosed
- Areas under construction

01 MEASURED INSIDE

02 MEASURED OUTSIDE 1261-

03 COMBINATION OF INSIDE AND
OUTSIDE MEASUREMENTS 1262

04 RESPONDENT GAVE TOTAL
SQUARE FEET FROM PLAN

05 RESPONDENT'S ESTIMATES

21 OTHER MEASUREMENT
PROCEDURE (SPECIFY): _____

TURN PAGE TO COMPLETE INTERVIEW

FOR OFFICE
USE ONLY

FL	LQT

1263-1265

INTERVIEWER REPORT ON MEASUREMENT OF YEAR-ROUND LIVING SPACE

183. WHAT PROBLEMS, IF ANY, DID YOU HAVE IN MEASURING THIS (HOUSE/APARTMENT)?

184. WHAT EFFECT, IF ANY, DID THESE PROBLEMS HAVE ON THE ACCURACY OF YOUR MEASUREMENTS?

-----> PLEASE REMEMBER TO INSPECT
VEHICLES FOR VIN NUMBERS

		1266-1268	
TIME INTERVIEW COMPLETED:	_____ AM _____ PM	LENGTH OF INTERVIEW:	_____ MINUTES
INTERVIEWER'S SIGNATURE	_____	DATE:	_____
INTERVIEWER'S I.D. #:	_____		
		1269-1274	



U.S. DEPARTMENT OF ENERGY SURVEY

Authorization Form for Residential Energy Consumption Survey

I hereby give permission to the company (companies) below to provide information to Response Analysis Corporation (or other designee of the U.S. Department of Energy) for confidential use in connection with their survey for the U.S. Department of Energy.

This authorization covers use of fuels (electricity, natural gas or LPG, fuel oil or kerosene) by my household from September 1, 1986 through December 31, 1990.

- 1) the total amount of fuels used by my household.
- 2) the total price charged for fuels by my household.

Companies are authorized to provide this information by monthly periods or by delivery date, whichever applies.

A photocopy of this authorization may be accepted with the same authority as the original.

Signature: _____

Date: _____

PLEASE PRINT

YOUR NAME		
ADDRESS		APT. NO.
CITY OR POST OFFICE	STATE	ZIP CODE
TELEPHONE		
AREA CODE: _____	NUMBER: _____	

PLEASE COMPLETE ONE BLOCK BELOW FOR EACH FUEL USED BY YOUR HOUSEHOLD (IF MORE THAN ONE SUPPLIER OF A PARTICULAR FUEL USE THE OTHER SIDE OF THIS SHEET)

ELECTRICITY →

PRINT FULL NAME OF ELECTRIC COMPANY	
LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE	
TELEPHONE	
AREA CODE: _____	NUMBER: _____

GAS →

from underground pipes
or LPG (bottled or tank gas)

PRINT FULL NAME OF GAS COMPANY	
LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE	
TELEPHONE	
AREA CODE: _____	NUMBER: _____

FUEL OIL →

or KEROSENE

PRINT FULL NAME OF OIL COMPANY	
LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE	
TELEPHONE	
AREA CODE: _____	NUMBER: _____

GAS
LPG (bottled
or tank gas)

SECOND GAS COMPANY

<i>PRINT FULL NAME OF GAS COMPANY</i>
<i>LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE</i>
<i>TELEPHONE</i> AREA CODE: _____ NUMBER: _____

THIRD GAS COMPANY

<i>PRINT FULL NAME OF GAS COMPANY</i>
<i>LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE</i>
<i>TELEPHONE</i> AREA CODE: _____ NUMBER: _____

FUEL OIL
or KEROSENE

SECOND FUEL OIL/KEROSENE COMPANY

<i>PRINT FULL NAME OF OIL COMPANY</i>
<i>LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE</i>
<i>TELEPHONE</i> AREA CODE: _____ NUMBER: _____

THIRD FUEL OIL/KEROSENE COMPANY

<i>PRINT FULL NAME OF OIL COMPANY</i>
<i>LOCATION OF COMPANY (IF KNOWN) - CITY AND STATE</i>
<i>TELEPHONE</i> AREA CODE: _____ NUMBER: _____

F 4905-06

OMB No. 1905-0092
Expires 5-31-90
EIA-457C

1987 RESIDENTIAL ENERGY CONSUMPTION SURVEY
RENTAL AGENTS, LANDLORDS, AND APARTMENT MANAGERS

Time Started	
	AM
	PM

Hello, This is _____ from Response Analysis Corporation in Princeton, NJ. I'm calling about the Department of Energy study on residential energy uses that we wrote you about. Your answers are strictly confidential.

IF LETTER NOT RECEIVED: We will send you another copy and call back in a few days.

01-04

VERIFY ADDRESS ON CONTROL CARD.

05

1. I would like to get a brief description of the building at (GIVE ADDRESS, NOT NAME) as it was as of November 1987.

06-7

07-08

10-15

16-17

18-19

2. Was there a group of five or more housing units in the same building, a group of two to four units in the same building, a single unit in a building by itself, or would you describe it in some other way?

5 OR MORE UNITS IN BUILDING -- ASK Q. 3a and Q. 3b

2 TO 4 UNITS IN BUILDING -- ASK Q. 3a

SINGLE UNIT IN BUILDING BY ITSELF -- NO INTERVIEW ON THIS UNIT: CHECK FOR OTHER UNITS ON CONTROL CARD.

OTHER (DESCRIBE) _____

22

IF "2-4 UNITS" OR "5 OR MORE UNITS", ASK:

3a. How many residential units were in the building?

NUMBER OF UNITS: _____

23-25

IF "5 OR MORE UNITS," ASK:

3b. How many floors (stories) were in the building?

NUMBER OF FLOORS: _____

26-27

4. About when was the (house/building) built? (IF NOT KNOWN, ASK FOR "BEST ESTIMATE.")

01 BEFORE 1940

07 1980 - 1983

28-29

02 1940 - 1949

08 1984

03 1950 - 1959

09 1985

04 1960 - 1969

10 1986

05 1970 - 1974

11 1987

06 1975 - 1979

12 1988

5. These next questions are about (IDENTIFY SPECIFIC HOUSING UNIT). As of November 1987, what was the main fuel used for home heating?

- 01 [] GAS FROM UNDERGROUND PIPES SERVING THE NEIGHBORHOOD -- SKIP TO Q. 7 30-31
- 02 [] LP GAS (BOTTLED OR TANK GAS) -- SKIP TO Q. 7
- 03 [] FUEL OIL -- SKIP TO Q. 7
- 04 [] KEROSENE OR COAL OIL -- SKIP TO Q. 7
- 05 [] ELECTRICITY -- GO TO Q. 6
- 06 [] COAL OR COKE -- SKIP TO Q. 8
- 07 [] WOOD -- SKIP TO Q. 8
- 08 [] SOLAR COLLECTORS -- SKIP TO Q. 10
- 22 [] OTHER (SPECIFY): _____ SKIP TO Q. 9
- 00 [] NO SPACE HEATING FUEL USED -- SKIP TO Q. 12

IF ELECTRICITY USED FOR HOME HEATING, ASK:

6. What was the main heating equipment? Was it built-in electric units, heat pump, central warm-air furnace, portable heaters, or what?

- 05 [] BUILT-IN ELECTRIC UNITS
- 04 [] HEAT PUMP(S)
- 03 [] CENTRAL WARM AIR-FURNACE (WITH DUCTS)
- 10 [] PORTABLE HEATERS
- 22 [] OTHER (SPECIFY): _____

SKIP TO Q. 9

IF UNDERGROUND GAS, LP GAS, FUEL OIL, KEROSENE OR COAL OIL USED FOR HOME HEATING, ASK:

32-33

7. What was the main heating equipment? Was it radiant heating (hot water running through a slab floor), steam or hot water system with radiators, a central warm-air furnace, a floor, wall or pipeless furnace, room heaters, or what?

- 01 [] HOT WATER PIPES IN SLAB FLOOR (RADIANT HEATING)
- 02 [] STEAM OR HOT WATER SYSTEM WITH RADIATORS OR CONVECTORS
- 03 [] CENTRAL WARM-AIR FURNACE (WITH DUCTS)
- 06 [] FLOOR, WALL, OR PIPELESS FURNACE
- 07 [] ROOM HEATERS BURNING GAS, OIL, KEROSENE (NON-PORTABLE)
- 21 [] PORTABLE KEROSENE HEATER(S)
- 12 [] COOKING STOVE, RANGE, OR OVEN (USED TO HEAT HOME, AS WELL AS FOR COOKING)
- 21 [] OTHER (SPECIFY): _____

SKIP TO Q. 9

IF WOOD, COAL, OR COKE USED FOR HOME HEATING, ASK:

8. What was the main heating equipment? Was it a steam or hot water system with radiators, a heating stove, a fireplace, or what?

- 02 [] STEAM OR HOT WATER SYSTEM WITH RADIATORS OR CONVECTORS
- 08 [] HEATING STOVE
- 09 [] FIREPLACE(S)
- 22 [] OTHER (SPECIFY): _____

9. As of November 1987, was the main heating fuel paid for by the tenant or by the landlord?

- 1 [] TENANT
- 2 [] LANDLORD
- 5 [] OTHER (SPECIFY): _____

34

10. You say that (SEE Q. 5) was the main fuel used for home heating. Was any other fuel used for heating at this apartment?
- 1 [] YES
0 [] NO -- SKIP TO Q. 12 35

IF "YES," ASK:

11. What was the other fuel used?
- 01 [] GAS FROM UNDERGROUND PIPES
02 [] LP GAS (BOTTLED OR TANK GAS)
03 [] FUEL OIL
04 [] KEROSENE OR COAL OIL
05 [] ELECTRICITY 36-37
06 [] COAL OR COKE
07 [] WOOD
08 [] SOLAR COLLECTORS
21 [] OTHER (SPECIFY): _____
12. As of November 1987, what was the main fuel used for heating water?
- 01 [] GAS FROM UNDERGROUND PIPES
02 [] LP GAS (BOTTLED OR TANK GAS)
03 [] FUEL OIL
04 [] KEROSENE OR COAL OIL
05 [] ELECTRICITY 38-39
06 [] COAL OR COKE
07 [] WOOD
08 [] SOLAR COLLECTORS
21 [] OTHER (SPECIFY): _____
00 [] NO WATER HEATING FUEL -- SKIP TO Q. 14
13. Was the main water heating fuel paid for by the tenant or by the landlord?
- 1 [] TENANT
2 [] LANDLORD 40
5 [] OTHER (SPECIFY): _____
14. As of November 1987, what was the main fuel used for cooking?
- 01 [] GAS FROM UNDERGROUND PIPES
02 [] LP GAS (BOTTLED OR TANK GAS)
03 [] FUEL OIL
04 [] KEROSENE OR COAL OIL
05 [] ELECTRICITY 42-42
06 [] COAL OR COKE
07 [] WOOD
21 [] OTHER (SPECIFY): _____
00 [] NO COOKING EQUIPMENT -- SKIP TO Q. 16
15. Was the main cooking fuel paid for by the tenant or by the landlord?
- 1 [] TENANT
2 [] LANDLORD 43
5 [] OTHER (SPECIFY): _____

16. Last summer (1987), did the (apartment/other unit) have air conditioning, either from a central system for the whole building or housing unit, or from individual window or wall units? (MARK ALL THAT APPLY.)
- YES, CENTRAL SYSTEM -- ASK Qs. 17 & 18 44
 - YES, INDIVIDUAL (WINDOW/WALL) UNITS -- SKIP TO Q. 19 45
 - NO -- SKIP TO Q. 20

IF CENTRAL SYSTEM AIR CONDITIONING, ASK:

17. Did the central air-conditioning system use gas from underground pipes, LPG, or electricity?
- 1 GAS FROM UNDERGROUND PIPES
 - 2 LP GAS (BOTTLED OR TANK GAS) 46
 - 3 ELECTRICITY
18. Was the air-conditioning fuel paid for by the tenant or by the landlord?
- 1 TENANT
 - 2 LANDLORD
 - 5 OTHER (SPECIFY): _____ 47

IF WINDOW AIR CONDITIONING, ASK:

19. Was the air conditioning paid for by the tenant or the landlord?
- 1 TENANT
 - 2 LANDLORD
 - 5 OTHER (SPECIFY): _____ 48
20. Was electricity for lighting within the apartment paid for by the tenant or by the landlord?
- 1 TENANT
 - 2 LANDLORD
 - 5 OTHER (SPECIFY): _____ 49

IF OTHER UNITS ARE ON CONTROL CARD LIST, ASK ABOUT NEXT UNIT WITH NEXT QUESTIONNAIRE.

IF NOT --

Thank you very much for your time and help. We may be in touch with you again. Have a nice day!

NAME OF PERSON INTERVIEWED: _____

TITLE OR RELATION TO RENTAL AGENT: _____

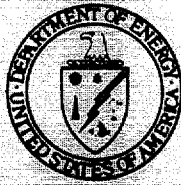
INTERVIEWER: _____

TIME COMPLETED: _____ AM PM

DATE COMPLETED: _____ 51-54

LENGTH OF INTERVIEW: _____ MINUTES 56-57

OMB NO. 1905-0092
(Expires 5/31/90)
EIA-457D
F4918-13



U.S. DEPARTMENT OF ENERGY
1987 RESIDENTIAL ENERGY CONSUMPTION SURVEY

Conducted by
RESPONSE ANALYSIS CORPORATION
377 Wall Street
P.O. Box 158
Princeton, New Jersey 08542

LIQUEFIED PETROLEUM GAS (LP-GAS)

These data will be combined with similar data throughout the country to show the use of LP-Gas in U.S. homes. Information about specific households will be kept strictly confidential.

This research is being conducted by Response Analysis Corporation under U.S. Department of Energy Contract Number DE-AC01-85EI19693. This survey is mandatory as authorized by the Federal Energy Administration Act of 1974 (Public Law 93-275), as amended. Late filing, failure to keep records, or failure otherwise to comply with these instructions may result in criminal fines, civil penalties, and other sanctions as provided by law.

HOUSEHOLD:

If you have any questions, please call collect to Ms. Arlene Shipley at (609) 921-3333.

LIQUEFIED PETROLEUM GAS USAGE

Please provide information on all deliveries to this household from October 1, 1986 to the present date. If information is available only for a shorter period, just report deliveries for that shorter period.

	<u>Column 1</u>	<u>Column 2</u> Fuel Sold Was:	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>
Del. #	Date of Delivery	Propane P Butane B Other O (Circle one)	Quantity Delivered	Price per Unit	Total Dollar Amount*
1		P B O			
2		P B O			
3		P B O			
4		P B O			
5		P B O			
6		P B O			
7		P B O			
8		P B O			
9		P B O			
10		P B O			
11		P B O			
12		P B O			
13		P B O			
14		P B O			
15		P B O			
16		P B O			
17		P B O			
18		P B O			

PLEASE CONTINUE ON PAGE 4 IF NECESSARY.

*Please include state and local sales taxes, where applicable. Exclude merchandise, repairs, or service charges.

LIQUEFIED PETROLEUM GAS (LPG)

1. If "Other" has been circled for type of fuel in Column 2 (page 2 or page 4), please specify what fuel was sold: _____

2. Please mark unit of measure for deliveries reported on page 2.
 POUNDS CUBIC METERS
 GALLONS DECITHERMS
 CUBIC FEET OTHER (Please specify): _____

3. What is the capacity of this household's storage tank(s)?
 Capacity is _____ and is measured in number of:
 POUNDS
 GALLONS
 OTHER UNIT (Please specify): _____

4. Were you supplying this household on October 1, 1986?
 YES NO → IF "NO," approximately when did this household become a customer of your company?
 APPROXIMATE DATE _____
 DON'T KNOW
 NEVER A CUSTOMER

5. Is this household currently your customer?
 YES NO → IF "NO," approximately when did this household stop being a customer of your company?
 APPROXIMATE DATE _____
 DON'T KNOW
 NEVER A CUSTOMER

6. The information reported here is from:
 COMPANY RECORDS
 AN ESTIMATE MADE BY A COMPANY REPRESENTATIVE
 INFORMATION SECURED FROM THE CUSTOMER

7. This information has been supplied by:
 _____ (Name) _____ (Company) _____ (Telephone) _____ (Date)

FOR OFFICE USE ONLY																	
CARD 7-8	FUEL 9	BEGINNING DATE			ENDING DATE			CR? 23	REASON					CR/E 30	TANK 31-34	UNITS 37	TPRs 35-39
		21-26	27-32	33-38	17-22	23-28	29-34		24	25	26	27	28					29
40	3																
FIRST COMPANY 41-45		PRs 46-47	FT 48	DC 49	SECOND COMPANY 51-55			PRs 56-57	FT 58	DC 59	THIRD COMPANY 61-65			PRs 66-67	FT 68	DC 69	SUPPLIERS 71-72

LIQUEFIED PETROLEUM GAS (LPG)

	<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>
		Fuel Sold Was:			
		Propane P Butane B Other O			
Del. #	Date of Delivery	(Circle one)	Quantity Delivered	Price per Unit	Total Dollar Amount*
19		P B O			
20		P B O			
21		P B O			
22		P B O			
23		P B O			
24		P B O			
25		P B O			
26		P B O			
27		P B O			
28		P B O			
29		P B O			
30		P B O			

*Please include state and local sales taxes, where applicable. Exclude merchandise, repairs, or service charges.

PLEASE USE THIS SPACE FOR ANY ADDITIONAL NOTES THAT YOU WISH TO MAKE TO EXPLAIN ENTRIES ON THIS FORM.

PLEASE CHECK THAT THE QUESTIONS ON PAGE THREE HAVE BEEN ANSWERED.



**U.S. DEPARTMENT OF ENERGY
1987 RESIDENTIAL ENERGY CONSUMPTION SURVEY**

OMB No. 1905-0092
(Expires 5/31/90)
EIA-457E
F4918-10

Conducted by
RESPONSE ANALYSIS CORPORATION
P.O. Box 158, Princeton, New Jersey 08542
Mandatory under Public Law 93-275 as amended

HOUSEHOLD:

If the customer account number is not shown, please enter it.

If you have any questions, please call collect to Ms. Arlene Shipley (609) 921-3333.

CUSTOMER
ACCOUNT #:

Information about specific households will be kept strictly confidential.

ELECTRICITY USAGE FROM DECEMBER 1, 1986 TO THE PRESENT							
Time Period	Consumption Period		Number of kWh Used	(Circle One)			Total Dollar* Amount
	Beginning Date	Ending Date		kWh are: A - Actual E - Estimates R - Read by Customer			
1				A	E	R	
2				A	E	R	
3				A	E	R	
4				A	E	R	
5				A	E	R	
6				A	E	R	
7				A	E	R	
8				A	E	R	
9				A	E	R	
10				A	E	R	
11				A	E	R	
12				A	E	R	
13				A	E	R	
14				A	E	R	
15				A	E	R	
16				A	E	R	
17				A	E	R	
18				A	E	R	

*Please include state and local taxes. Exclude merchandise, repair, and service charges. If the household is on the budget plan, do not provide the budgeted bill; provide instead the dollar amount that is the cost of the actual consumption in the period.

Form completed by: _____ (Name) _____ (Telephone Number) _____ (Date)



**U.S. DEPARTMENT OF ENERGY
1987 RESIDENTIAL ENERGY CONSUMPTION SURVEY**

Conducted by
RESPONSE ANALYSIS CORPORATION
P.O. Box 158, Princeton, New Jersey 08542
Mandatory under Public Law 93-275 as amended.

OMB NO. 1905-0092
(Expires 5/31/90)
EIA-457F
F4918-11

HOUSEHOLD:

If the customer account number is not shown, please enter it.

If you have any questions, please call collect to Ms. Arlene Shipley (609) 921-3333.

CUSTOMER
ACCOUNT #:

Information about specific households will be kept strictly confidential.

UTILITY GAS USAGE FROM DECEMBER 1, 1986 TO THE PRESENT							
Time Period	Consumption Period		Quantity Used*	(Circle One) Quantities are: A - Actual E - Estimates R - Read by Customer			Total Dollar* Amount
	Beginning Date	Ending Date		A	E	R	
1				A	E	R	
2				A	E	R	
3				A	E	R	
4				A	E	R	
5				A	E	R	
6				A	E	R	
7				A	E	R	
8				A	E	R	
9				A	E	R	
10				A	E	R	
11				A	E	R	
12				A	E	R	
13				A	E	R	
14				A	E	R	
15				A	E	R	
16				A	E	R	
17				A	E	R	
18				A	E	R	

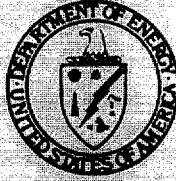
*The quantity used is expressed in terms of: (Mark one)

- Therms
- Cubic Feet
- Hundreds of Cubic Feet (CCF)
- Thousands of Cubic Feet (MCF)
- Other (Please specify): _____

**Please include state and local taxes. Exclude merchandise, repairs, and service charges. If the household is on the budget plan, do not provide the budgeted bill; provide instead the dollar amount that is the cost of the actual consumption in the period.

Form completed by: _____ (Name) _____ (Telephone Number) _____ (Date)

OMB NO. 1905-0092
(Expires 5/31/90)
EIA-457G
F4918-12



U.S. DEPARTMENT OF ENERGY
1987 RESIDENTIAL ENERGY CONSUMPTION SURVEY

Conducted by
RESPONSE ANALYSIS CORPORATION
377 Wall Street
P.O. Box 158
Princeton, New Jersey 08542

FUEL OIL OR KEROSENE

These data will be combined with similar data throughout the country to show the use of fuel oil or kerosene in U.S. homes. Information about specific households will be kept strictly confidential.

This research is being conducted by Response Analysis Corporation under U.S. Department of Energy Contract Number DE-AC01-85EI19693. This survey is mandatory as authorized by the Federal Energy Administration Act of 1974 (Public Law 93-275), as amended. Late filing, failure to keep records, or failure otherwise to comply with these instructions may result in criminal fines, civil penalties, and other sanctions as provided by law.

HOUSEHOLD:

If you have any questions, please call collect to Ms. Arlene Shipley at (609) 921-3333.

FUEL OIL AND KEROSENE USAGE

Please provide information on all deliveries to this household from October 1, 1986 to the present date. If information is available only for a shorter period, just report deliveries for that shorter period.

Del. #	Column 1	Column 2	Column 3	Column 4	Column 5
	Date of Delivery	Fuel Sold Was: Fuel oil #1 (1) Fuel oil #2 (2) Kerosene (K) Other (O) (Circle one)	Gallons Delivered	Price per Gallon	Total Dollar Amount*
1		1 2 K O			
2		1 2 K O			
3		1 2 K O			
4		1 2 K O			
5		1 2 K O			
6		1 2 K O			
7		1 2 K O			
8		1 2 K O			
9		1 2 K O			
10		1 2 K O			
11		1 2 K O			
12		1 2 K O			
13		1 2 K O			
14		1 2 K O			
15		1 2 K O			
16		1 2 K O			
17		1 2 K O			
18		1 2 K O			

PLEASE CONTINUE ON PAGE 4 IF NECESSARY.

*Please include state and local sales taxes, where applicable. Exclude merchandise, repairs, or service charges.

FUEL OIL AND KEROSENE

1. If "Other" has been circled for type of fuel in Column 2 (page 2 or page 4), please specify what fuel was sold:

2. What is the capacity of this household's storage tank? CAPACITY: _____ GALLONS

3. Was this household your customer as of October 1, 1986?

YES NO

IF "NO," approximately when did this household become a customer of your company?

APPROXIMATE DATE: _____

DON'T KNOW

NEVER A CUSTOMER

4. Is this household currently your customer?

YES NO

IF "NO," approximately when did this household stop being a customer of your company?

APPROXIMATE DATE: _____

DON'T KNOW

NEVER A CUSTOMER

5. The information presented here is from:

COMPANY RECORDS

AN ESTIMATE MADE BY A COMPANY REPRESENTATIVE

INFORMATION SECURED FROM THE CUSTOMER

6. This information has been supplied by:

(Name)

(Company)

(Telephone)

(Date)

FOR OFFICE USE ONLY																	
CARD	FUEL	BEGINNING DATE			ENDING DATE			CR?	REASON				CR/E	TANK	TPRs		
7-8	9	11-16			17-22			23	24	25	26	27	28	29	30	31-34	38-39
60	4																
FIRST COMPANY		PRs	FT	DC	SECOND COMPANY			PRs	FT	DC	THIRD COMPANY			PRs	FT	DC	SUPPLIERS
41-45		46-47	48	49	51-55			56-57	58	59	61-65			66-67	68	69	71-72

FUEL OIL AND KEROSENE

Del. #	Column 1	Column 2	Column 3	Column 4	Column 5
	Date of Delivery	Fuel Sold Was: Fuel oil #1 (1) Fuel oil #2 (2) Kerosene (K) Other (0) (Circle one)	Gallons Delivered	Price per Gallon	Total Dollar Amount*
19		1 2 K 0			
20		1 2 K 0			
21		1 2 K 0			
22		1 2 K 0			
23		1 2 K 0			
24		1 2 K 0			
25		1 2 K 0			
26		1 2 K 0			
27		1 2 K 0			
28		1 2 K 0			
29		1 2 K 0			
30		1 2 K 0			

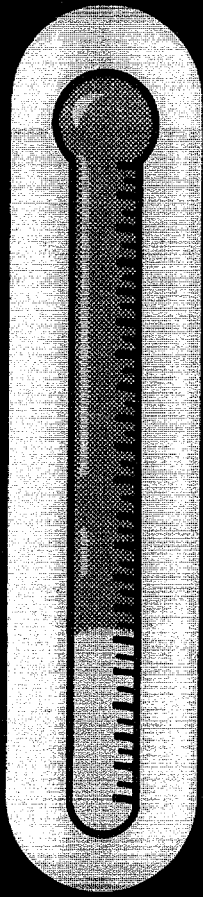
*Please include state and local sales taxes, where applicable. Exclude merchandise, repairs, or service charges.

PLEASE USE THIS SPACE FOR ANY ADDITIONAL NOTES THAT YOU WISH TO MAKE TO EXPLAIN ENTRIES ON THIS FORM.

PLEASE CHECK THAT THE QUESTIONS ON PAGE THREE HAVE BEEN ANSWERED.

**U.S. Climate
Zone Map**

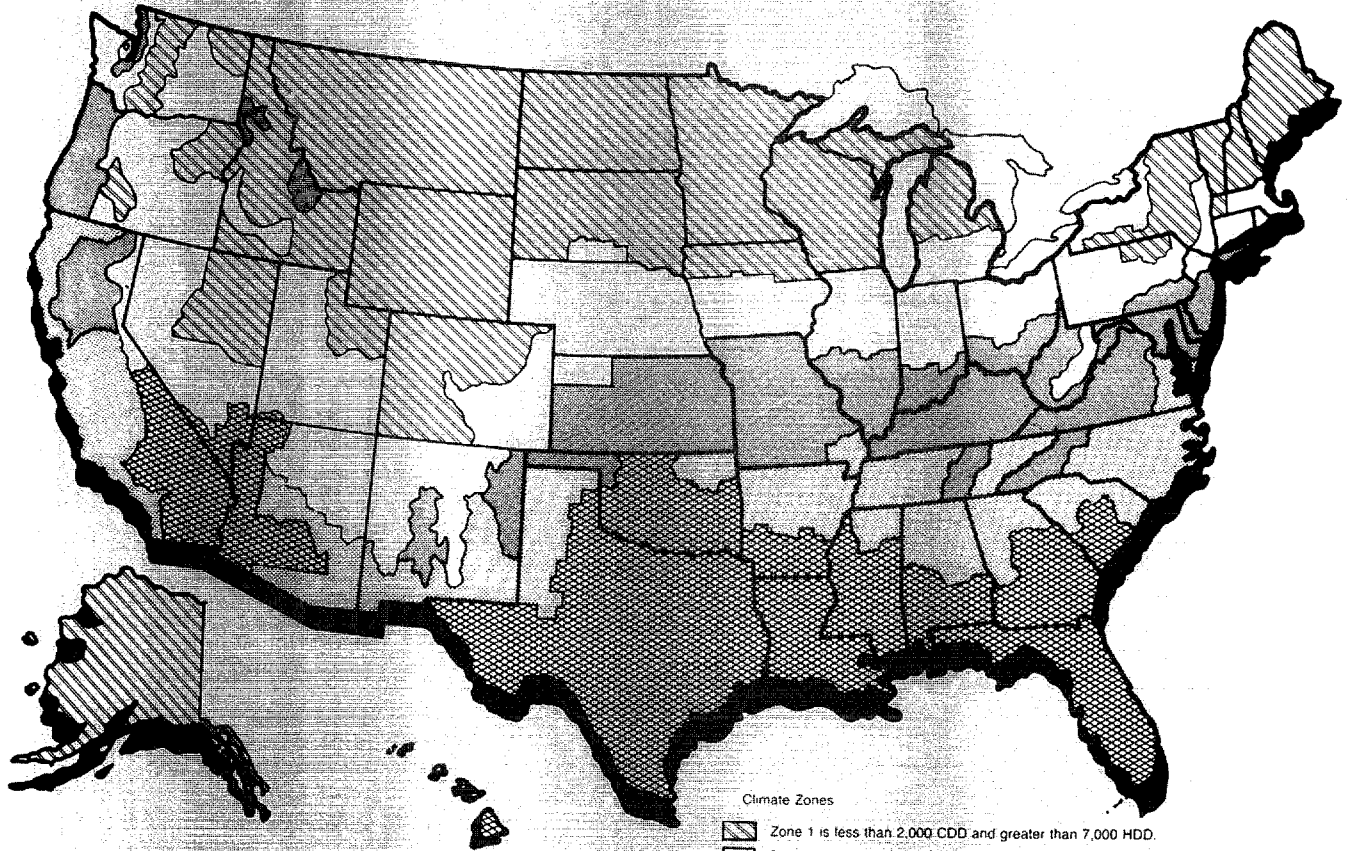
Appendix E










Appendix E

U.S. Climate Zone Map



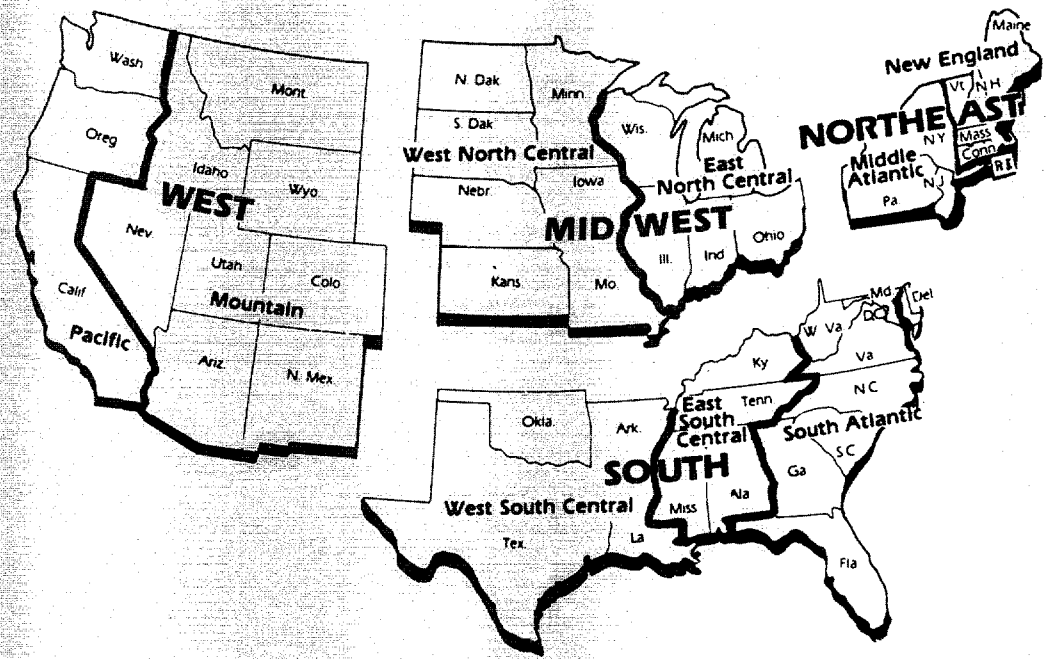
Climate Zones

-  Zone 1 is less than 2,000 CDD and greater than 7,000 HDD.
-  Zone 2 is less than 2,000 CDD and 5,500-7,000 HDD.
-  Zone 3 is less than 2,000 CDD and 4,000-5,499 HDD.
-  Zone 4 is less than 2,000 CDD and less than 4,000 HDD.
-  Zone 5 is 2,000 CDD or more and less than 4,000 HDD.



Appendix F

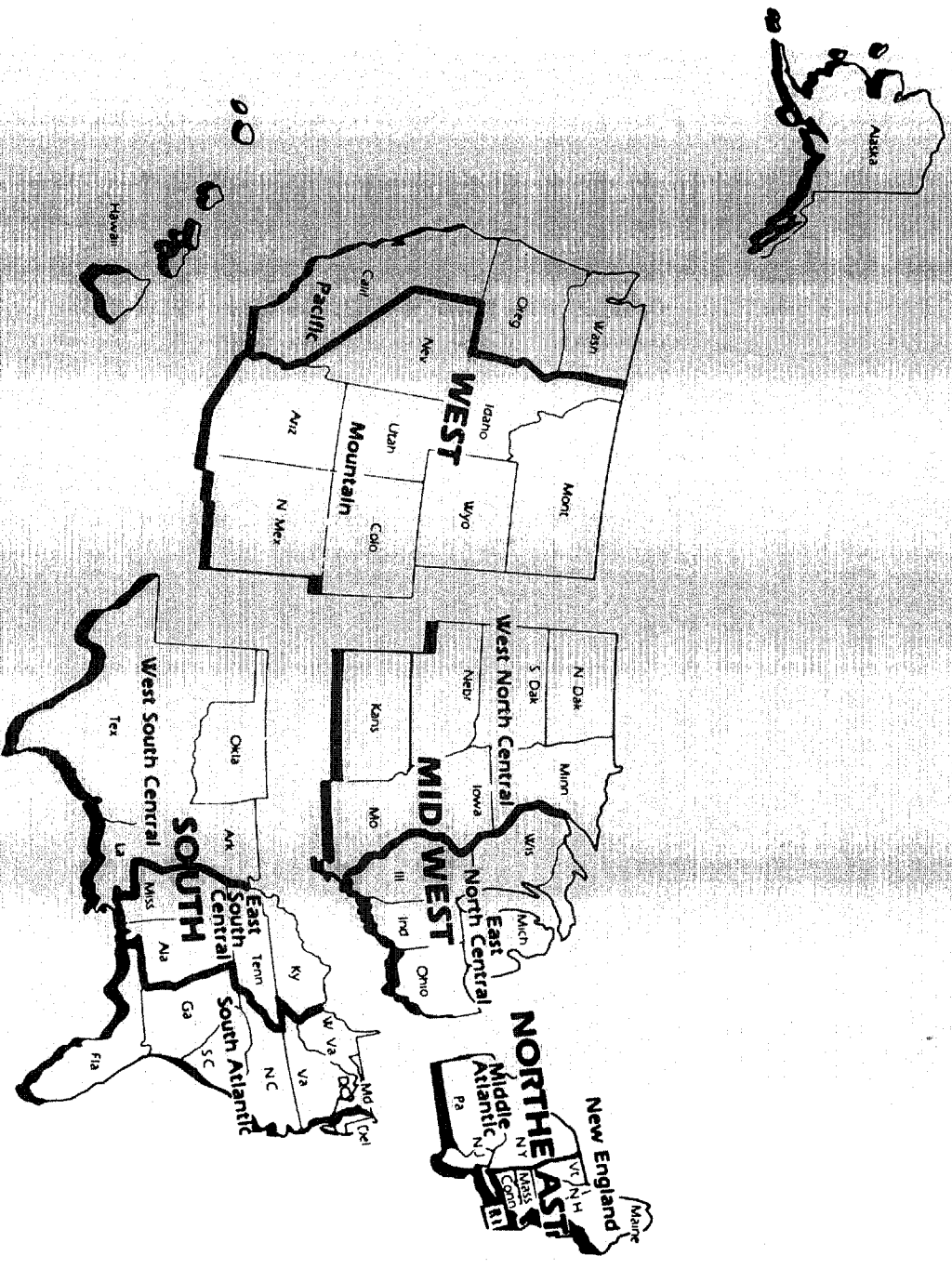
U.S. Census Regions and Divisions





Appendix F

U.S. Census Regions and Divisions





Appendix G

Related EIA Publications on Energy Consumption





Appendix G

Related EIA Publications on Energy Consumption

These publications are available from the National Energy Information Center or the Superintendent of Documents. See the inside cover of this report on how to obtain copies of these publications. Please note that the prices quoted are subject to change.

In addition to the reports listed below, public use data tapes for the residential, residential transportation and commercial sectors are available from the National Technical Information Service (NTIS). To obtain information on how to order tapes, you may call NTIS at 703/487-4807.

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.).

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.).

Residential Sector

Housing Characteristics

Housing Characteristics 1987; May 1989, DOE/EIA-0314(87), GPO Stock No. 061-003-00619-1, \$13.00.

Residential Energy Consumption Survey: Housing Characteristics 1984; October 1986, DOE/EIA-0314(84), GPO Stock No. 061-003-00499-7, \$12.00.

Residential Energy Consumption Survey: Housing Characteristics, 1982; August 1984, DOE/EIA-0314(82), GPO Stock No. 061-003-00393-1, \$7.00.

Residential Energy Consumption Survey: Housing Characteristics, 1981; August 1983, DOE/EIA-0314(81), GPO Stock No. 061-003-00330-3, \$6.50.

Residential Energy Consumption Survey: Housing Characteristics, 1980; June 1982, DOE/EIA-0314, GPO Stock No. 061-003-00256-1, \$11.00.

Residential Energy Consumption Survey: Characteristics of the Housing Stock and Households, 1978; February 1980, DOE/EIA-0207/2, GPO Stock No. 061-003-00093-2, \$4.25.

Consumption and Expenditures

Household Energy Consumption and Expenditures 1987, Part 1: National Data; October 1989, DOE/EIA-0321/1(87).

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 Through March 1985, Part 1: National Data; March 1987, DOE/EIA-0321/1(84), GPO Stock No. 061-003-00519-5, \$9.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 Through March 1985, Part 2: Regional Data; May 1987, DOE/EIA-0321/2(84), GPO Stock No. 061-003-00528-4, \$17.00.

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: 1979-1980 Consumption and Expenditures, Part II: Regional Data; May 1981, DOE/EIA-0262/2, GPO Stock No. 061-003-00189-1, \$8.50.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1978 Through March 1979; July 1980, DOE/EIA-0207/5, GPO Stock No. 061-003-00131-9, \$7.50.

Single-Family Households: Fuel Oil Inventories and Expenditures: National Interim Energy Consumption Survey; December 1979, DOE/EIA-0207/1, GPO Stock No. 061-003-00075-4, \$3.50.

Other Publications on the Residential Sector

End-Use Consumption of Residential Energy (Article), pp. vii-xiv, *Monthly Energy Review*, July 1987, DOE/EIA-0035(87/07).

Residential Energy Consumption Survey: Trends in Consumption and Expenditures 1978-1984 June 1987, DOE/EIA-0482, GPO Stock No. 061-003-00535-7, \$12.00.

Residential Conservation Measures; July 1986, SR/EEUD/86/01 (no GPO Stock No.).

An Economic Evaluation of Energy Conservation and Renewable Energy Tax Credits; October 1985, Service Report (no GPO Stock No.).

Residential Energy Consumption and Expenditures by End Use for 1978, 1980, and 1981; December 1984, DOE/EIA-0458, GPO Stock No. 061-003-00415-6, \$4.50.

Weatherization Program Evaluation, SR-EEUD-84-1; August 1984 (available from the Office of the Assistant Secretary for Conservation and Renewable Energy, Department of Energy).

Residential Energy Consumption Survey: Regression Analysis of Energy Consumption by End Use; October 1983, DOE/EIA-0431, GPO Stock No. 061-003-00347-8, \$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 Transportation Sector

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles 1985; April 1987, DOE/EIA-0464(85), GPO Stock No. 061-003-00521-7, \$8.50.

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles, 1983; January 1985, DOE/EIA-0464(83), GPO Stock No. 061-003-00420-2, \$4.50.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, Supplement: January 1981 to September 1981; February 1983, DOE/EIA-0328, GPO Stock No. 061-003-00297-8, \$4.75.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, June 1979 to December 1980; April 1982, DOE/EIA-0319 (no GPO Stock No.).

Commercial Sector

Characteristics of Buildings

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1986; September 1988, DOE/EIA-0246(86), GPO Stock No. 061-003-00580-2, \$16.00.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; July 1985, DOE/EIA-0246(83), GPO Stock No. 061-003-00439-3, \$7.50.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; A Supplemental Reference, DOE/EIA-M008, \$22.95. Available from the National Technical Information Service (NTIS), Order No. DE-85015581.

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: Commercial Buildings Consumption and Expenditures 1986; May 1989, DOE/EIA-0318(86), GPO Stock No. 061-003-00613-2, \$19.00.

Nonresidential Buildings Energy Consumption Survey: Commercial Buildings, Consumption and Expenditures 1983; September 1986, DOE/EIA-0318(83), GPO Stock No. 061-003-00496-2, \$13.00.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 1: Natural Gas and Electricity; March 1983, DOE/EIA-0318/1, GPO Stock No. 061-003-00298-6, \$9.50.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 2: Steam, Coal, Fuel Oil, LPG, and Total Fuels; December 1983, DOE/EIA-0318(79)/2, GPO Stock No. 061-003-00366-4, \$6.00.

Industrial Sector

Manufacturing Energy Consumption Survey: Fuel Switching Capability, 1985; December 1988, DOE/EIA-0515(85), GPO Stock No. 061-003-00601-9, \$3.50.

Manufacturing Energy Consumption Survey: Methodological Report, 1985; November 1988, DOE/EIA-0514(85), GPO Stock No. 061-003-00595-1, \$6.00.

Manufacturing Energy Consumption Survey: Consumption of Energy, 1985; November 1988, DOE/EIA-0512(85), GPO Stock No. 061-003-00594-2, \$6.00.

Report on the 1980 Manufacturing Industries' Energy Consumption Study and Survey of Large Combustors; February 1983, DOE/EIA-0358, GPO Stock No. 061-003-00293-5, \$5.00.

Industrial Energy Consumption, "Survey of Large Combustors: Report on Alternate Fuel-Burning Capabilities of Large Boilers in 1979"; February 1982, DOE/EIA-0304, GPO Stock No. 061-003-0233-1, \$2.50.

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

Cross-Sector

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

Planned Publications for 1989

Household Energy Consumption and Expenditures 1987, Part 2: Regional Data; planned for Nov. 1989.

Household Vehicles Energy Consumption 1988; planned for Dec. 1989.

Manufacturing Energy Consumption Survey: Energy Efficiency in Manufacturing, 1985; planned for Dec. 1989.

Public Use Tapes

Residential and Residential Transportation Sectors

Residential Energy Consumption Survey: 1984 and Residential Transportation Energy Consumption Survey, 1985; Order No. PB87-186540/HAA.

Residential Energy Consumption Survey: 1982 and Residential Transportation Energy Consumption Survey, 1983; Order No. PB85-221760/HAA.

Residential Energy Consumption Survey: Housing Characteristics, 1981; Consumption and Expenditures, 1981-1982; Monthly Billing Data; Order No. PB84-120476/HAA.

Residential Energy Consumption Survey: Consumption and Expenditures, 1980-1981; Monthly Billing Data; Order No. PB84-166230/HAA.

Residential Energy Consumption Survey: Housing Characteristics, Annualized Consumption and Expenditures, 1980-1981; Order No. PB83-199554/HAA.

Residential Energy Consumption Survey: Household Transportation Panel Monthly Gas Purchases and Vehicle and Household Characteristics, 6/79-9/81; Order No. PB84-162452/HAA.

Residential Energy Consumption Survey: Household Screener Survey, 1979-1980; Order No. PB82-114877/HAA.

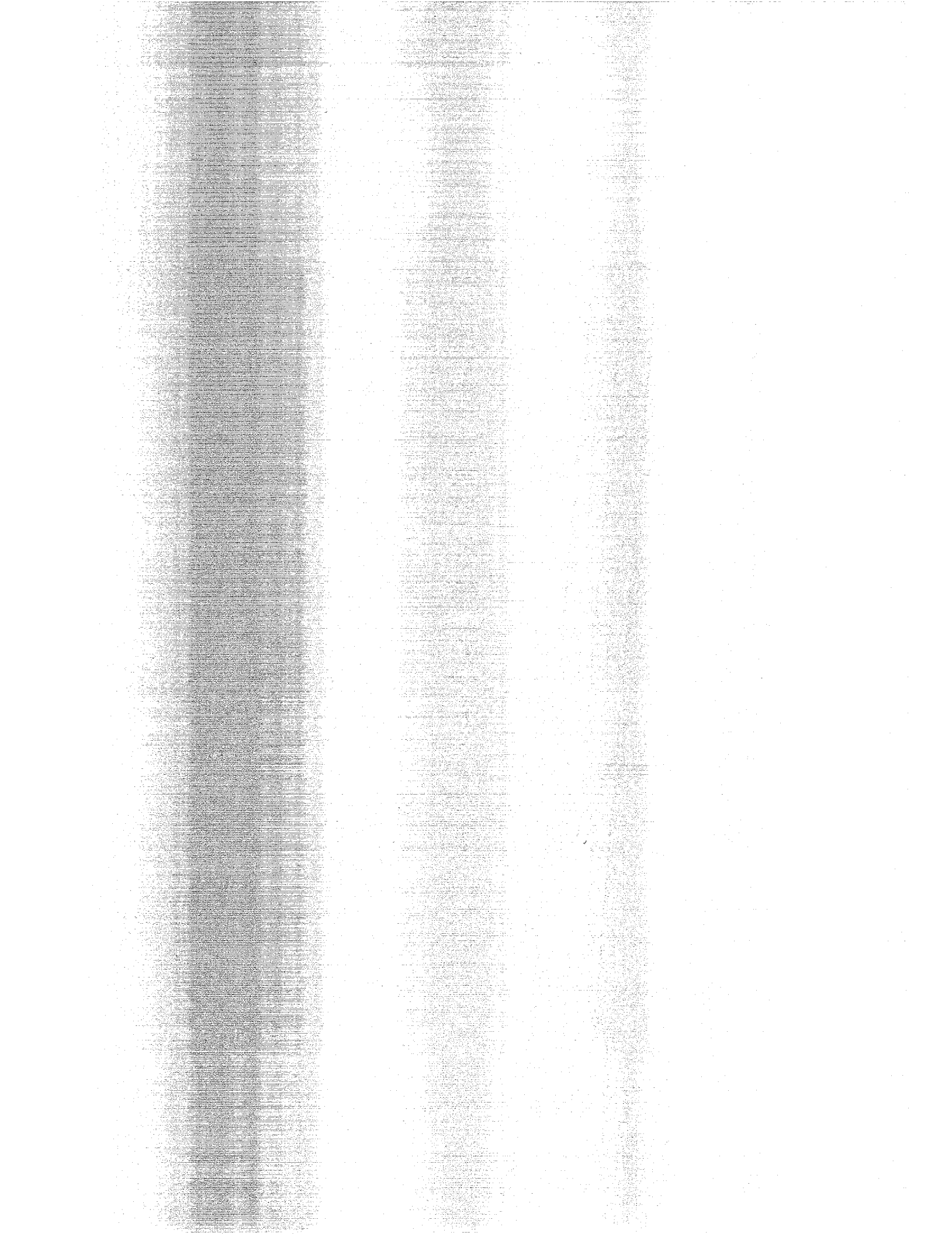
Residential Energy Consumption Survey: Household Monthly Energy Consumption and Expenditures, 1978-1979; Order No. PB82-114901/HAA.

National Interim Energy Consumption Survey (Residential), 1978; Order No. PB81-108714/HAA.

Commercial Sector

Nonresidential Buildings Energy Consumption Survey: 1986 Data; Planned for September 1989.

Nonresidential Buildings Energy Consumption Survey: 1979 and 1983 Data; Order No. PB88-245162.





Glossary

Active Solar: As an energy source, energy from the sun collected and stored using mechanical pumps or fans to circulate heat-laden fluids or air between solar collectors and housing unit. Examples include the use of solar collectors for water or space heating. Data on the passive collection of solar energy, such as by trombe walls, were not collected on the 1987 RECS.

Adjusted Electricity: A measurement of electricity that includes the approximate amount of energy used to generate electricity. To approximate the adjusted amount of electricity, the site-value of the electricity is multiplied by a factor of three. This conversion factor of 3 is a rough approximation of the Btu value of raw fuels used to generate electricity in a steam-generation power plant. In this report, electricity is represented as site energy. See **Site Energy** and **Btu Conversion Factors**.

Aggregate Ratio: The ratio of two population aggregates (totals). For example, the aggregate expenditures per household is the ratio of the total expenditures in each category to the total number of households in the category. See **Mean**.

Air-Conditioned Rooms: The number of rooms the air-conditioning equipment is capable of cooling when the equipment is used. The question "How many rooms in your house/apartment can be cooled by your air conditioning?" refers to rooms that could be cooled if the air-conditioning equipment were used. There are no cases in the RECS data set of households with air-conditioning equipment that cooled zero rooms, but there are cases that have zero end-use energy for air conditioning because they did not use their air-conditioning equipment. See **Air-Conditioning Equipment**.

Air Conditioning: Air conditioning is one of four main end-use categories in this report. It is defined as the use of energy to cool the air in a housing unit by a refrigeration unit driven by electricity or gas. This definition excludes the use of energy to drive fans, blowers, or evaporative cooling systems ("Swamp Coolers") that are not connected to a refrigeration unit. It does include the use of electricity to drive fans that are part of a central air-conditioning system. Zero end-use energy for air conditioning is assigned to households that have air-conditioning equipment, but reported that the equipment was not used during the summer preceding the interview. See **End-Use** and **Appendix B**, "End-Use Estimation Methodology."

Air-Conditioning Equipment: A central air-conditioning system with ducts, and/or window or wall air conditioners that cools the air in a housing unit by a refrigeration unit driven by electricity or natural gas. Excluded are fans, blowers, or evaporative cooling systems ("swamp coolers") that are not connected to a refrigeration unit. Air-conditioning units that were not in working condition or were not used, are still included in RECS if they are in place in the housing unit. See **Air Conditioning**, **Air-Conditioned Rooms**, and **Refrigeration Unit**.

Air-Conditioning Intensity: The ratio of air-conditioning consumption or expenditures to square footage of cooled floorspace and cooling degree-days (base 65 degrees F). This intensity provides a way of comparing different types of housing units and households by controlling for differences in housing unit size and weather conditions. The square footage of cooled floorspace is equal to the product of the total square footage times the ratio of the number of rooms that could be cooled to the total number of rooms. If the entire housing unit is cooled, the cooled floorspace is the same as the total floorspace. The ratio is calculated on a weighted, aggregate basis according to this formula:

$$\text{Air-Conditioning Intensity} = \frac{\text{Btu for Air Conditioning}}{(\text{Cooled Square Feet} * \text{Cooling Degree-Days})}$$

See **Air Conditioning**, **Air-Conditioned Rooms**, and **Cooling Degree-Days**.

All-Electric Home: A residence in which electricity is used for the main source of energy for space heating, water heating, and electricity is used for space heating, water heating, and cooking. Other fuels may be used for supplementary heating or other purposes.

Appliances: Appliance operation is one of four main end-use categories in this report. It is defined as the use of energy for all uses except those covered by space heating, water heating, and air conditioning. This includes energy used in refrigerators, freezers, lights, televisions, personal computers, washing machines, and most small appliances. Special energy uses that are included in appliance usage are energy used to heat food, heat water for cooking, heat water for hot drinks, heat air to dry clothes, heat water for a swimming pool, heat water in a water bed, operate fans for a central forced-air space-heating system, and operate fans, blowers, or an evaporative cooling system (swamp coolers) not associated with air-conditioning equipment. See **End-Use** and **Appendix B**, "End-Use Estimation Methodology."

Appliances Used: Appliances possessed and used by the household during the year. Appliances possessed by the household but not used are not counted. Appliances loaned to the household for its regular use are included. Appliances temporarily not in working condition, but generally used by the household are included only if a repair person has been called or the appliance has been taken to a repair shop. The following list of appliances were asked specifically in the RECS: refrigerator, swimming pool, hot tub or jacuzzi heaters, stove top burners, ovens (excluding toaster ovens), microwave ovens, outdoor gas grills, clothes washers, dishwashers, clothes dryers, outdoor gas lights, dehumidifiers, humidifiers, evaporative coolers, fans, electric blankets, water-bed heaters, and television sets. Swimming pool, hot tub or jacuzzi heaters are included only if they are for the exclusive use of the housing unit; these heaters that are for the use of many resident households (such as those in apartment buildings, condominiums, or cooperatives) are excluded. The "range" (stove-top burners) and "oven" are considered two separate appliances, although they are often purchased as one appliance. See **Refrigerator** and **Evaporative Cooler**.

Assistance for Heating in Winter: Indicates the household answered "yes" to whether the household received assistance from the Low-Income Home Energy Assistance Program (LIHEAP) between October, 1986 and September, 1987. The purpose of LIHEAP was to provide assistance to low-income households to offset the rising costs of home energy that are excessive in relation to household income. The most recent report on the program is found in the U.S. Department of Health and Human Services', *Low-Income Home Energy Assistance Program: Report to Congress for Fiscal Year 1987*, July 21, 1988. Copies are available from: Office of Energy Assistance, Office of Community Services, 370 L'Enfant Promenade, S.W., Washington, D.C. 20447.

Assistance for Weatherization of Residence: The household received services free, or at a reduced cost, from the Federal, State, or local Government between October 1, 1986 and September 30, 1987. Any of the following services could have been received:

- a. Furnace tuneup and/or modifications,
- b. Insulation around the hot water heater,
- c. Insulation in the attic, outside wall, or basement/crawlspace below the floor of the house,
- d. Repair of broken furnace,
- e. Repair of broken windows or doors to keep out the cold or hot weather,
- f. Storm doors or windows added,
- g. Weather stripping or caulking around any windows or doors to the outside,
- h. Other home energy-saving devices.

Authorization Form: A form, to be signed by the respondent authorizing energy supplier companies that serve the respondent to release information on the amounts and costs of energy consumed in the housing unit during a specified period. See **Energy Supplier** and **Appendix A**, "How the Survey Was Conducted."

Availability of Natural Gas in the Neighborhood: Respondents who did not use natural gas were asked "Is gas from underground pipes available in this neighborhood?" Because respondents were not provided with a definition of "available" or "neighborhood," some variation is to be expected in what these concepts meant to each respondent. The intent of this question is to determine whether a residence could be hooked up to a gas line.

Average Number: See **Aggregate Ratio** and **Mean**.

Billing Period: The time between meter readings. It does not refer to the time when the bill was sent or when the payment was to have been received. In some cases, the billing period is the same as the billing cycle that corresponds closely (within several days) to meter-reading dates. For fuel oil and LPG, the billing period is the number of days between fuel deliveries.

Block-Rate Structure: An electric rate schedule with a provision for charging a different unit cost for various increasing blocks of demand for energy. A reduced rate is charged on succeeding blocks.

Btu (British thermal unit): The amount of energy required to raise the temperature of 1 pound of water by 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit and 1 atmosphere of pressure. One Btu is about equal to the heat given off by a blue-tip match. See **Btu Conversion Factors**.

Btu Conversion Factors: For this report, Btu conversion factors for site energy were as follows:

Electricity	3,412	Btu/kilowatthour
Natural Gas	1,031	Btu/cubic foot
Fuel Oil No. 1	135,000	Btu/gallon
Kerosene	135,000	Btu/gallon
Fuel Oil No. 2	138,690	Btu/gallon
LPG (propane)	91,330	Btu/gallon
Wood	20 million	Btu/cord

Other conversion factors used in this report include:

- 1 therm = 100,000 Btu
- 1 barrel = 42 gallons

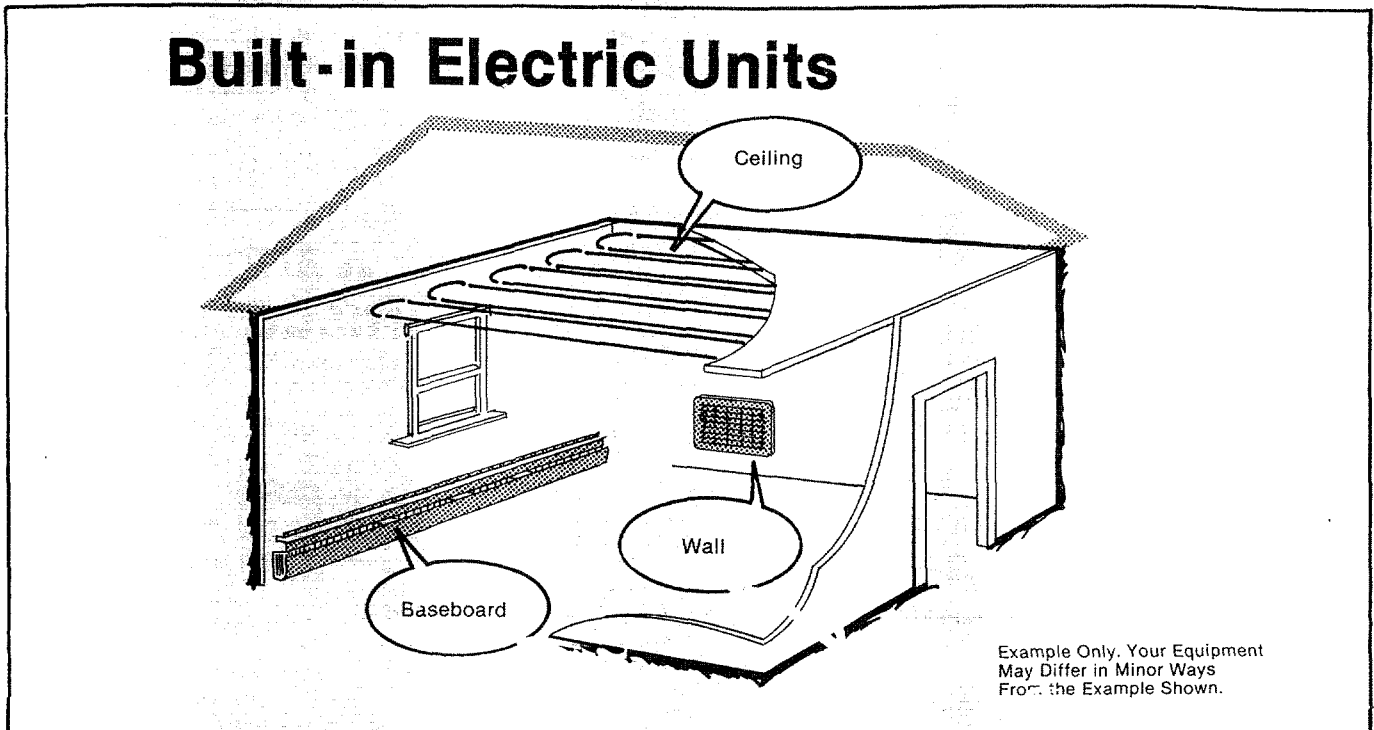
Because almost all LPG reported by the fuel suppliers was propane, the LPG conversion factor is that for propane. See **Wood Conversion to Btu, Site Energy, and Conversion Factor**.

Budget Plan: An agreement between the household and the utility company or fuel supplier that allows the household to pay the same amount for fuel each month for a number of months.

Building of 2-4 Units: See **Housing Structure**.

Building of 5 or More Units: See **Housing Structure**.

Built-in Electric Units: An individual-resistance electric-heating unit that is permanently installed in the floors, walls, ceilings, or baseboards and is part of the electrical installation of the building. Electric-heating devices that are plugged into an electric socket or outlet are not considered built in. See **Space-Heating Equipment**.



CDD: See **Cooling Degree-Days**.

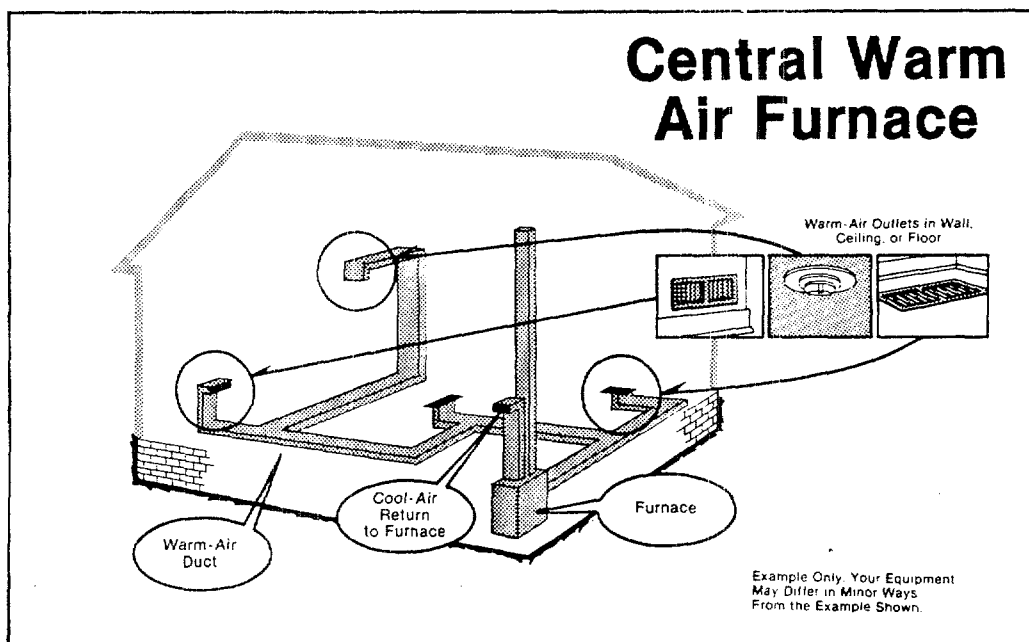
Census Division: A geographic area consisting of several States defined by the U.S. Department of Commerce, Bureau of the Census. See the map in **Appendix F**, "U.S. Census Regions and Divisions." The States are grouped into nine divisions and four regions:

Region	Division	States
Northeast	New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont
	Middle Atlantic	New Jersey, New York, and Pennsylvania
Midwest	East North Central	Illinois, Indiana, Michigan, Ohio, and Wisconsin
	West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota
South	South Atlantic	Delaware, the District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia
	East South Central	Alabama, Kentucky, Mississippi, and Tennessee
	West South Central	Arkansas, Louisiana, Oklahoma, and Texas
West	Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming
	Pacific	Alaska, California, Hawaii, Oregon, and Washington

Census Region: See **Census Division** and the map in **Appendix F**, "U.S. Census Regions and Divisions."

Central City: Usually one or more legally incorporated cities within the Metropolitan Statistical Area (MSA) that is significantly large by itself or large relative to the largest city in the MSA. Additional criteria for being classified central city include having at least 75 jobs for each 100 employed residents and having at least 40 percent of the resident workers employed within the city limits. Every MSA has at least one central city, which is usually the largest city. Central cities are commonly regarded as relatively large communities with a denser population and a higher concentration of economic activities than the outlying or suburban areas of the MSA. "Outside Central City" are those parts of the MSA that are not designated as central city. See **Metropolitan**.

Central Warm-Air Furnace: A central combustor or resistance unit--generally using gas, fuel oil, or electricity--that provides warm air through ducts leading to the various rooms in the housing unit. Heat pumps are not included in this category. A forced-air furnace is one in which a fan is used to force the air through the ducts. In a gravity furnace, air is circulated by gravity, relying on the natural flow of warm air up and cold air down. The warm air rises through ducts and the cold air falls through ducts that return it to the furnace to be reheated. This completes the circulation cycle.



Climate Zone: One of five climatically distinct areas, defined by long-term weather conditions affecting the heating and cooling loads in buildings. The zones were developed by the Energy End Use Division from seven distinct climate categories originally identified by the American Institute of Architects (AIA) for the U.S. Department of Energy and the U.S. Department of Housing and Urban Development. The zones were determined according to the 30-year average (1951-1980) of the annual heating and cooling degree-days (base 65 degrees F). The zones are defined as follows:

AIA Group	EEUD Climate Zone	Average Annual Cooling Degree-Days	Average Annual Heating Degree-Days
1	1	Under 2,000	Over 7,000
2	2	Under 2,000	5,500 to 7,000
3	3	Under 2,000	4,000 to 5,499
4	4	Under 2,000	2,000 to 3,999
5	4	Under 2,000	Under 2,000
6	5	2,000 or more	Under 2,000
7	5	2,000 or more	2,000 to 3,999

An individual household was assigned to a climate zone according to the 30-year average annual degree-days for an appropriate nearby weather station. See **Heating Degree-Days (HDD)**, **Cooling Degree-Days (CDD)**, and **NOAA Division**.

Coal: A combustible mineral substance (carbonized vegetable matter); in this report, the term includes its derivative (formed by destructive distillation or imperfect combustion) coke. This report contains statistics on the number of households using coal and their consumption of other fuels; however, no data were collected on the consumption of coal. See **Fuel**.

Condominium: A type of ownership that enables a person to own an apartment or house in a project of similar units. The owner has his/her own deed and, most likely, his/her own mortgage on the unit. The owner also holds a common or joint ownership in all common areas, such as hallways, entrances, and elevators. Ownership may cover one-family houses, row houses, and townhouses as well as apartments.

Consumption: The amount of electricity or natural gas used by, or delivered to, the household during a 365-day period. For fuel oil, kerosene, and LPG, the quantity represents fuel purchased, not fuel consumed. If the level of fuel in the tank was the same at the beginning and end of the annual period, then the quantity consumed would be the same as the quantity purchased. Measurements or reports of the level of fuel in the tank were not included in the data collection. The time period for the energy consumption in this report is January through December 1987.

Control Total: The number of elements in the population or a subset of the population. The sample weights for the observed elements in a survey are adjusted so that they add up to the control total. The value of a control total is not obtained from the survey, it is obtained from an outside source. For the RECS, the control totals are given by the number of households in one of the 12 cells by categorizing households by the four Census regions and by three categories of metropolitan status (Metropolitan Statistical Area--central city, Metropolitan Statistical Area--outside central city, and non-Metropolitan Statistical Area). The control totals were obtained from the Current Population Survey. See Table A9, in Appendix A, "How the Survey Was Conducted."

Conversion Factor: A number which translates units of one system into corresponding values of another system. Conversion factors are used to translate physical units of measures for various fuels into Btu equivalents. See **Btu Conversion Factors**.

Cooking Stove: A stove built for preparing food. In this survey it may be used as the main heating equipment. The range (stove-top burners) and oven are considered two separate appliances in this survey. See **Main Heating Equipment and Appliances Used**.

Cooling Degree-Days (CDD): A measure of how hot a location was over a period of time, relative to a base temperature. In this report, the base temperature is 65 degrees Fahrenheit, and the period of time is one year. The cooling degree-days for a single day is the difference between that day's average temperature and the base temperature, if the daily average is greater than the base; and zero, if the daily temperature is less than or equal to the base temper-

ature. The average daily temperature is the mean of the maximum and minimum temperatures for a 24-hour period. Cooling degree-days are determined by subtracting 65 from the average daily temperature. For example, a day with an average temperature of 85 degrees F has 20 cooling degree-days ($85 - 65 = 20$), while a day with an average temperature of 65 degrees F or lower has zero. After being calculated for each day, the number of cooling degree-days can be summed over a larger unit of time (a month, a year).

In 1987, for the first time in the RECS, cooling degree-days for households were taken from records of an appropriate nearby weather station. In previous surveys, weather data were assigned to households according to the NOAA division in which the household was located. See **NOAA Division and Climate Zone**.

Elderly: Households with a householder age 60 years or older. Nonelderly households have a householder age 59 years or younger.

Electricity: Metered electric power supplied by a central utility company to a residence via underground or above-ground power lines. It does not refer to electricity generated on site for the exclusive use of a residence. When a residence has its own generating capability, the fuel used for the generator will be specified. The Btu equivalent for electricity used in this report is the **site energy** or the energy value as received by the household. See **Btu Conversion Factors, Site Energy, and Adjusted Electricity**.

Electricity Paid by Household: The household paid the electric utility company directly for all household uses of electricity (such as water heating, space heating, air-conditioning, cooking, lighting, and operating appliances.) Bills paid by a third party are not counted as paid by the household. See **Electricity**.

End Use: A function for which energy sources or fuels are used in the household. In this report, four main end-use categories were estimated: space heating, air conditioning, water heating and appliance usage. The amount of energy used for these end uses is estimated by means of a nonlinear regression technique, rather than by using metered data. See **Space Heating, Air Conditioning, Water Heating, Appliances, Metered Data, and Appendix B, "End-Use Estimation: Methodology."**

Energy Supplier: Fuel companies supplying electricity, natural gas, fuel oil, kerosene or LPG to the household. See **Authorization Form and Appendix A, "How the Survey Was Conducted."**

Estimated Bill: A set of charges for a fuel, calculated by the supplier when the meter is not read. The estimate may be based on one or more of the following factors: past usage, usage by similar households, and weather data.

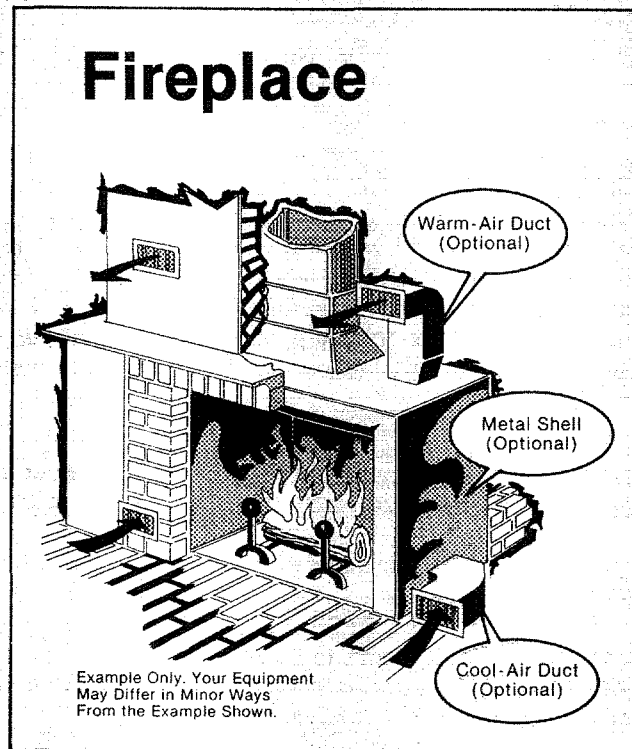
Evaporative Cooler (Swamp Cooler): A type of cooling equipment using evaporation of water to cool air. This type of equipment is commonly found in warm, dry climates. It does **not** cool air by use of a refrigeration unit, so it is not considered air-conditioning equipment in this report. See **Appliances Used**.

Expenditures: Funds spent for the energy consumed in, or delivered to, a housing unit during a given period of time. For this report, all expenditure statistics are presented on an annual basis, for calendar year 1987. The total dollar amount includes State and local taxes, but excludes merchandise repairs, or special service charges. For households on a budget plan, the expenditures are for the actual consumption. Electricity and natural gas expenditures are for the amount of those energy sources consumed. Fuel oil, kerosene, and LPG expenditures are for the amount of fuel purchased, which may differ from the amount of fuel consumed (See **Consumption**). For households that do not pay to their fuel supplier directly, the expenditures for fuels are estimated and included in the tables. In 1987, for 19 percent of the households, the cost of one or more fuels was included in a tenant's rent or paid by someone outside of the household.

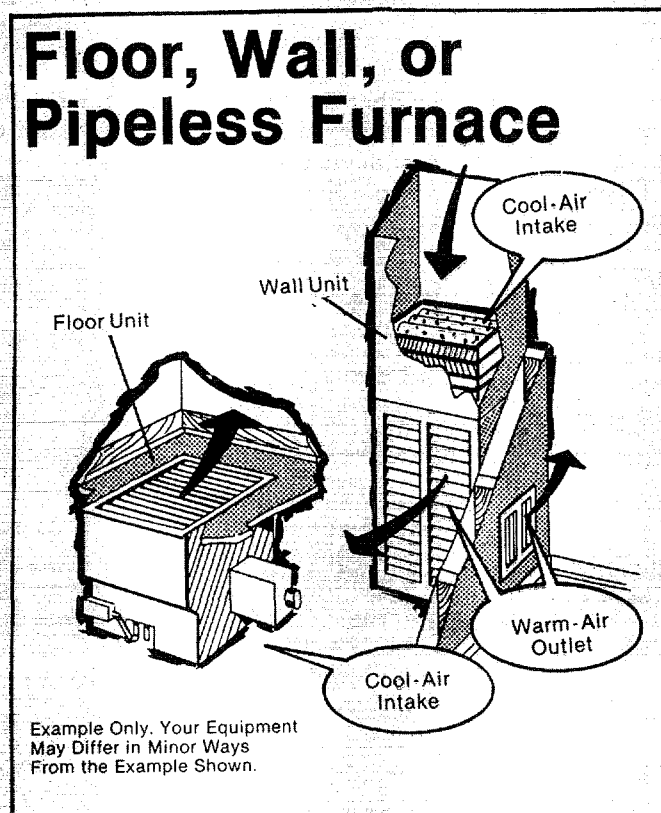
Expenditures as a Percentage of Income: The household energy expenditures divided by the family's income. The median percentage is the percentage of income spent on energy for the middle household, when the households are ranked by the percentage they spend on energy. That is, 50 percent of the weighted households in the cell spend a lower percentage on energy than the median value. See **Median**.

Family Income: The total combined income (before taxes and deductions) of all members of the family from all sources, for the 12 months before the interview. It includes wages, salaries, tips, commissions, and income from Social Security, pensions, interest, dividends, rent, public assistance, and unemployment insurance. This definition includes the total income of all family members who lived in the household during the 12 months before the interview, regardless of whether they were living there at the time of the interview. Income of nonfamily members of the household is not included. "Family" includes the following types of relationships: mother, father, sister, brother, son, daughter, father-in-law, uncle, aunt, niece, grandchild, foster child (and similar relationships).

Fireplace: Usually a masonry unit which burns wood, that is built into the wall of a house. Fireplaces in mobile homes are included. A fireplace must have a permanent chimney. Fireplaces may have glass doors or metal shields to cover the opening into the room. Accessories such as convective grates or radiant grates may be present to increase the efficiency of the fireplace. A free-standing fireplace that can be detached from its chimney is a heating stove. See **Heating Stove**.



Floor, Wall, or Pipeless Furnace: One of three types of space-heating equipment designed to warm the rooms of a housing unit. A floor furnace is located below the floor and delivers heated air to the room immediately above, or (if under a partition) to the room on each side. A wall furnace is installed in a partition or in an outside wall and delivers heated air to the rooms on one or both sides. A pipeless furnace is installed in a basement and delivers heated air through a large register in the floor of the room or hallway immediately above. See **Main Heating Equipment**.



Fossil Fuels: Sources of energy extracted from the earth. In this report, fossil fuels are natural gas, fuel oil, kerosene, and liquefied petroleum gas. See **Natural Gas, Fuel Oil, Kerosene, and Liquefied Petroleum Gas.**

Fuel: The primary fuel delivered to a residential site. It may be converted to some other form of energy at the site. In this report, electricity is included as a fuel. Other primary fuels are coal, fuel oil, kerosene, liquefied petroleum gas (LPG), natural gas, and solar collectors. Consumption and expenditure data were not collected for coal or solar applications.

Fuel Oil: A liquid petroleum product less volatile than gasoline, used as an energy source. In this report, fuel oil includes No. 1, No. 2, or No. 4 grade fuel oil or residual oil that is burned for space-heating or water-heating purposes. No. 1 distillate fuel oil is a form of heating oil used mostly as a blending stock to assure that heavier grades of fuel flow under severe cold weather conditions. No. 2 distillate collectively refers to No. 2 heating oil and No. 2 diesel fuel. Although these products are not precisely identical, they are essentially interchangeable in most applications. No. 2 fuel oil is the most common form of heating oil. No. 4 distillate is a blend of No. 2 and No. 5 or No. 6 residual fuel oil, used in large stationary diesel engines and boilers equipped with fuel-preheating equipment. Residual fuel oil refers to the heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are boiled off in refinery operations. See **Fuel.**

Fuel Oil Paid by Household: The household paid the supplier directly for all household uses of fuel oil or kerosene (such as space heating or water heating). Bills paid by a third party are not counted as paid by the household. See **Fuel.**

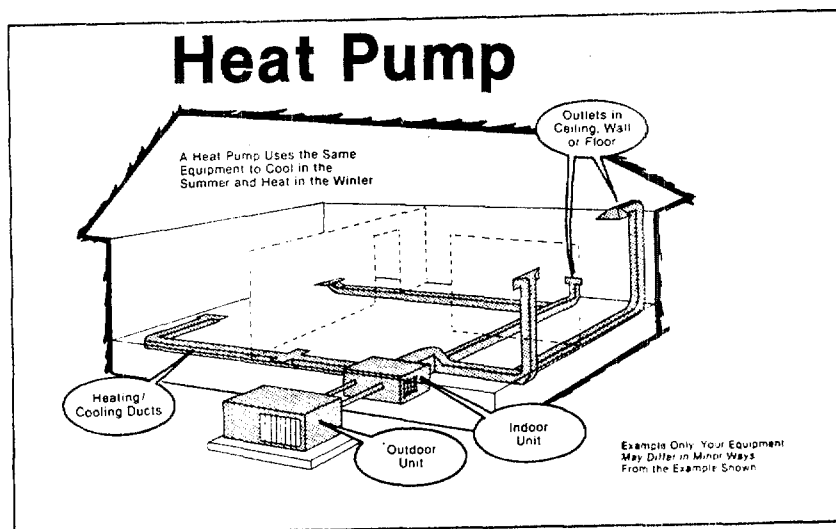
Fuel Oil Supplier: See **Energy Supplier.**

Gas Paid by Household: The household paid the utility company directly for all household uses of natural gas (such as water heating, space heating, air conditioning, cooking, and operating appliances including outdoor gas lights). Bills paid by a third party are not counted as paid by the householder. See **Fuel.**

HDD: See **Heating Degree-Days.**

Heat Pump (Reverse Cycle System): A year-round heating/air-conditioning system in which refrigeration equipment supplies both heating and cooling through ducts leading to individual rooms. A heat pump generally consists of a compressor, both indoor and outdoor coils, and a thermostat. In the RECS, all heat pumps are considered to be electrically powered.

The heat pump, when attached to a central furnace, is either the main or secondary heating equipment (depending on how often the heat pump operates). If it operates for a short time and then the furnace comes on, the heat pump is secondary (or additional) heating equipment. If the heat pump is sufficient to provide the desired warmth, the heat pump is cited as the main heating equipment.



Heated Area of Residence: This area is the portion of the measured square feet of a housing unit that is heated during most of the winter season. Rooms that are shut off during the heating season to save fuel are not counted as heated square footage. Attached garages that are unheated, and unheated areas in basements and attics, are not counted as heated square feet. See **Square Feet**.

Heating Degree-Days (HDD): A measure of how cold a location was over a period of time, relative to a base temperature. In this report, the base temperature used is 65 degrees Fahrenheit, and the period of time is one year. The heating degree-days for a single day is the difference between the base temperature and the day's average temperature, if the daily average is less than the base; and zero, if the daily average temperature is greater than or equal to the base temperature. The average daily temperature is the mean of the maximum and minimum temperature for a 24-hour period. Heating degree-days are determined by subtracting the average daily temperature below 65 degrees F from the base 65. For example, a day with an average temperature of 50 degrees F has 15 heating degree-days ($65 - 50 = 15$), while one with an average temperature of 65 degrees F or higher has zero.

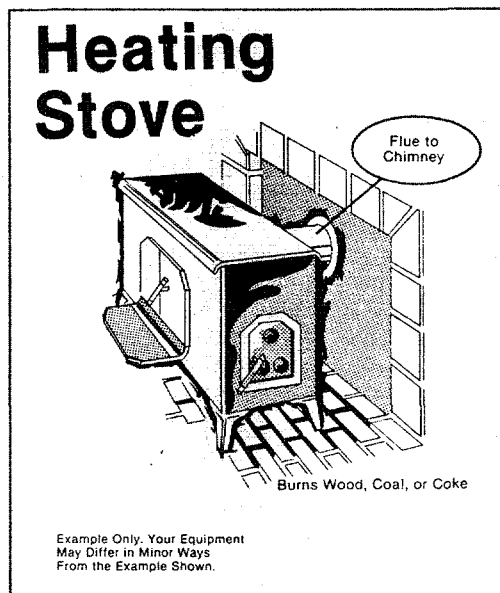
In 1987, for the first time in the RECS, heating degree-days for households were taken from records of an appropriate nearby weather station. In previous surveys, weather data were assigned to households according to the NOAA division in which the household was located. See **NOAA Division and Climate Zone**.

Heating Intensity: The ratio of space-heating consumption or expenditures to square footage of heated floorspace and heating degree-days (base 65 degrees F). This ratio provides a way of comparing different types of housing units and households by controlling for differences in housing unit size and weather conditions. The square footage of heated floorspace is based upon the measurements of the floorspace that is heated. The ratio is calculated on a weighted, aggregate basis according to the following formula:

$$\text{Heating Intensity} = \frac{\text{Btu for space heating}}{(\text{Heated Square Feet} \times \text{Heating Degree-Days})}$$

See **Main Heating Equipment, Heated Area of Residence, and Heating Degree-Days**.

Heating Stove Burning Wood, Coal, and Coke: Any free-standing box or controlled-draft stove; or a stove installed in a fireplace opening, using the chimney of the fireplace. Stoves are made of cast iron, sheet metal, or plate steel. Free-standing fireplaces that can be detached from their chimneys are considered heating stoves. "Airtight" stoves allow the user to control the amount of air in the stove to regulate the rate of combustion. The doors fit tightly so that the air flow can be controlled. Many airtight stoves have a gasket around the door of the stove. "Nonairtight" stoves are those lacking gaskets around their door openings.



Hispanic Descent: This, as the question on race, was self-determined by the respondent. The respondent was asked, "Is the householder of Spanish or Hispanic descent?" The respondent's answer was recorded. See **Race**.

Hot-Deck Imputation: A statistical procedure for deriving a probable response to a questionnaire item concerning a household or vehicle, where no response was given during the survey. To perform this procedure, an analyst sorts the households or vehicles by variables related to the missing item. Thus, a series of sort categories are formed, which are internally homogeneous with respect to the sort variables. Within each category, households or vehicles for which the questionnaire item is not missing are randomly selected to serve as "donors" to supply values for the missing item of "recipient" households or vehicles. See **Imputation** and **Appendix A**, "How the Survey Was Conducted."

Household: A family, an individual, or a group of up to nine unrelated persons occupying the same housing unit. "Occupy" means the housing unit was the person's usual or permanent place of residence at the time of the first field contact. The household includes babies, lodgers, boarders, employed persons who live in the housing unit, and persons who usually live in the household but are away traveling or in a hospital. The household does not include persons (normally members of the household) who were away from home as college students or as members of the armed forces at the time of the contact. The household does not include the following: (1) persons temporarily visiting with the household if they have a place of residence elsewhere; (2) persons who take their meals with the household, but usually lodge or sleep elsewhere; (3) domestic employees or other persons employed by the household who do not sleep in the same housing unit; or (4) persons who are former members of the household, but have since become inmates of correctional or penal institutions, mental institutions, homes for the aged or needy, homes or hospitals for the chronically ill or handicapped, nursing homes, convents or monasteries, or other places in which residents may remain for long periods of time. By definition, the number of households is the same as the number of occupied housing units.

Householder: The person (or one of the people) in whose name the home is owned or rented. If there is no lease or similar agreement, or if the person who owns the home or pays the rent does not live in the housing unit, the householder is the person responsible for paying the household bills, or whoever is generally in charge.

Housing Structure: One of four structural types used to categorize the building in which the housing unit was located. The types of structure are as follows:

Single-family housing unit--a structure that provides living space for one household or family. The structure may be detached, attached on one side (semidetached), or attached on two sides. Attached houses are considered single-family houses as long as the house itself is not divided into more than one housing unit and has an independent outside entrance. A single-family house is contained within walls that go from the basement (or the ground floor, if there is no basement) to the roof. (A mobile home with one or more rooms added is classified as a single-family home.)

House or building with two to four housing units--a structure that is divided into living quarters for two, three, or four families or households. This category also includes houses originally intended for occupancy by one family (or for some other use) that have since been converted to separate dwellings for two to four families. Typical arrangements in these types of living quarters are separate apartments downstairs and upstairs, or one apartment on each of three or four floors.

Building with five or more housing units--a structure that contains living quarters for five or more households or families.

Mobile home or trailer--a structure that has all the facilities of a dwelling unit but is built on a movable chassis. It may be placed on a permanent or temporary foundation and may contain one room or more. If rooms are added to the structure, it is considered a single-family housing unit.

Housing Unit: A structure or part of a structure where a household lives. It has direct access from the outside of the building either directly or through a common hall. Housing units do not include group quarters such as prisons or nursing homes where 10 or more unrelated persons live. Hotel and motel rooms are considered housing units if occupied as the usual or permanent place of residence.

Imputation: A statistical method used to fill in values for missing items, designed to minimize the bias of estimates based on the filled-in data set. See **Hot-Deck Imputation** and **Appendix A**, "How the Survey Was Conducted."

Indicator Variable: A variable that is equal to either zero or one. The variable equals one when a set of conditions is met and equals zero when the set of conditions is not met. In particular, the variable "indicates" that the conditions have been met when the variable equals one.

Kerosene: A distilled product of oil or coal with the generic name kerosene, having properties similar to those of No. 1 fuel oil. Kerosene is primarily used in cooking stoves, space heaters, water heaters, or for lighting equipment that uses wicks. It is sometimes sold under the names "range oil," "stove oil," or "coal oil." See **Fuel and Fuel Oil**.

kWh (kilowatt-hour): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 Btu. See **Btu and Btu Conversion Factors**.

LIHEAP or Low-Income Home Energy Assistance Program: See **Assistance for Heating in Winter**.

Liquefied Petroleum Gas (LPG): Any fuel gas supplied to a residence in liquid form, such as propane or butane. It may also be called "bottled gas". It is usually delivered by tank truck and stored near the residence in a tank or cylinder until used. Propane was the most common liquefied petroleum gas supplied to RECS households. Household use of LPG solely for outdoor gas grills or in recreational vehicles is not considered sufficient use to mark the household as a user of LPG. See **Fuel**.

LPG: See **Liquefied Petroleum Gas**.

LPG Paid by Household: The household paid the fuel supplier directly for all household uses of LPG such as water heating, space heating, air conditioning, cooking, (other than cooking on an outdoor grill, which is excluded) and operating appliances. Bills paid by a third party are not counted as paid by the household. See **Fuel**.

Main Heating Equipment: The equipment primarily used for heating ambient air in the housing unit. The main heating equipment is reported as such even if it is temporarily out of order. If two types of heating equipment are used, the main heating equipment is the one that is used more. If both are used equally, the main heating equipment is the one that appears first on the list in the question. A "cooking stove" may be used as the main heating equipment even though it was built for preparing food. See also description of specific types of heating equipment, such as **Central Warm-Air Furnace, Heat Pump, Built-In Electric Units, Steam or Hot-Water System, Floor, Wall or Pipeless Furnace, Heating Stove, Room Heater, and Secondary Heating Equipment**

Main Heating Fuel: The fuel named by the respondent in response to the question "What is the main fuel used for heating your home?" If two or more heating fuels are used, the main heating fuel is the one that provides most of the heat for the home. See **Secondary Heating Fuel**.

Master-Metering: Measurement of electricity or natural gas consumption of several tenants or housing units using a single meter. That is, one meter measures the energy usage for several households collectively.

Mean: The simple arithmetic average for a population; that is, the sum of all the values in a population divided by the size of the population. For this report, population means are estimated by computing the weighted sum of the sample values, then dividing by the sum of the sample weights. Thus, the mean is an aggregate ratio with the total number of households the denominator. See **Aggregate Ratio and Weight**.

Median: A measure of central tendency, intended to express a "typical" value for an attribute. The median is different from the arithmetic average (mean) in that its value is not influenced much by extremes. For example, the mean number of cords of wood consumed per household would be affected by the inclusion of a few heavy users of wood, and would not express wood consumption for a "typical" wood-using household. However, the median number of cords of wood consumed per household would not be so affected. Medians are computed by listing all values in ascending order. The value that divides the list in half is the median.

Metered Data: End-use data obtained through the direct measurement of the total energy consumed for specific uses within the individual household. Individual appliances can be submetered by connecting the recording meters directly to individual appliances. See **End Use and Submetered Data**.

Metropolitan: A group of households located within Metropolitan Statistical Areas (MSA's) as defined by the U.S. Office of Management and Budget. Except in New England, an MSA is (1) a county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or (2) an urbanized area of at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). The contiguous counties are included in an MSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, MSA's consist of towns and cities, rather than counties. See **Nonmetropolitan and Central City**.

Metropolitan Status: Refers to geographic location of the households in relationship to Metropolitan Statistical Areas (MSA's). See **Metropolitan**, **Nonmetropolitan**, and **Central City**.

Mobile Home: See **Housing Structure**.

MSA: See **Metropolitan**.

Multistage Area Probability Sample: A sample design executed in stages with geographic "clusters" of sampling units selected at each stage. This procedure reduces survey expense while maintaining national coverage. See **Appendix A**, "How the Survey Was Conducted."

Natural Gas: Hydrocarbon gas (mostly methane) supplied as an energy source to individual housing units by underground pipelines from a central utility company. It does not refer to privately-owned gas wells operated by the household, nor to liquefied petroleum gas. See **Fuel**.

NOAA Division: One of the 345 weather divisions designated by the National Oceanic and Atmospheric Administration (NOAA) encompassing the 48 contiguous States. 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.

Nonelderly: See **Elderly**.

Nonmetropolitan: Households not located within Metropolitan Statistical Areas as defined by the U.S. Office of Management and Budget. See **Metropolitan**.

Number of Rooms: Subdivisions of a housing unit. Rooms such as living rooms, dining rooms, bedrooms, kitchens, lodgers' rooms, finished basements or attic rooms, recreation rooms, and permanently enclosed sun porches that are used year-round are undivided. Rooms used for offices by a person living in the unit are also included in this survey. "Finished" means that the ceiling and walls are covered with finishing materials.

In the RECS, bathrooms, halls, foyers, or vestibules, balconies, closets, alcoves, pantries, strip or pullman kitchens, laundry or furnace rooms, unfinished attics or basements, open porches, and unfinished space used for storage are not considered rooms.

A partially divided room, such as a dinette next to a kitchen or a living room, is considered a separate room only if there is a partition from floor to ceiling--but not if the partition consists solely of shelves or cabinets. If a room is used by occupants of more than one unit, the room is included with the unit from which it is most easily reached.

Occupied Housing Unit: A unit someone was living in as his or her usual or permanent place of residence when the first field contact was made. The definition "Occupied Housing Units" is the same as that used by the U.S. Bureau of Census. See **Housing Unit**.

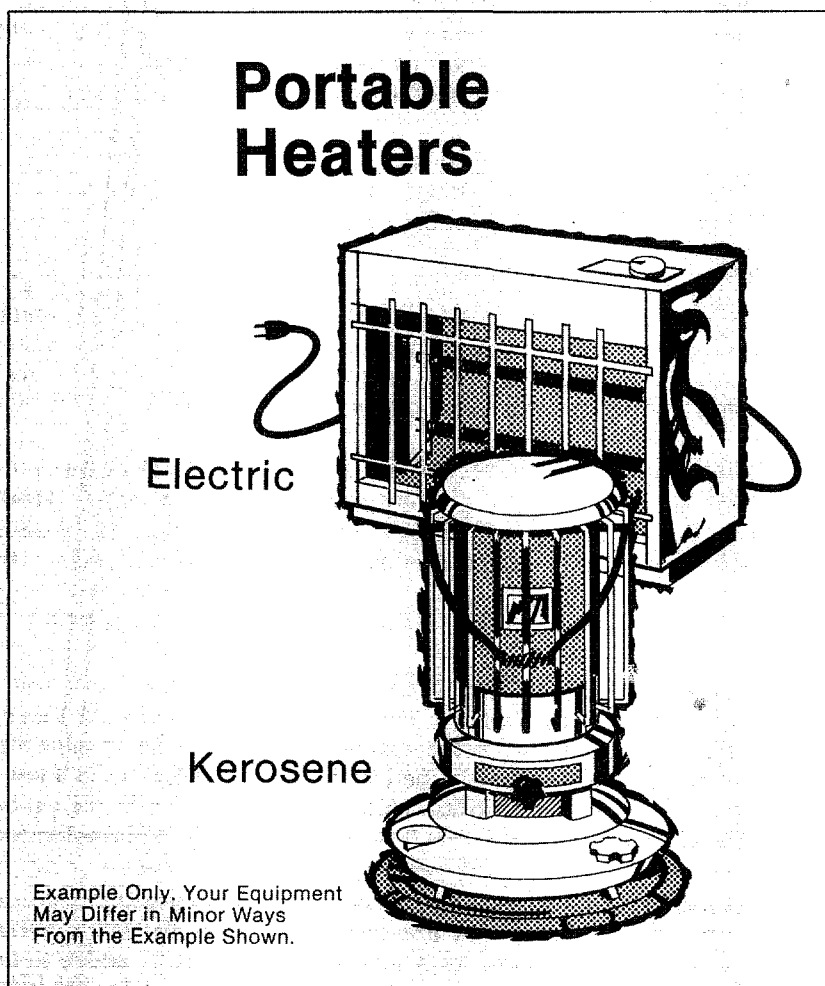
Outside Central City: See **Central City**.

Oven: An appliance that is an enclosed compartment supplied with heat and used for cooking food. Toaster ovens are not considered ovens for this survey. The range (stove-top burners) and oven are considered two separate appliances for the RECS, although they are often purchased as one appliance. See **Appliances Used**.

Owned/Rented: The relationship of the occupants of a structure to the structure itself, not to the land on which the structure is located. "Owned" means the owner or co-owner is a member of the household. The housing unit is considered owned if it is mortgaged and not fully paid for. A household is classified "rented" even if the rent is paid by someone not living in the unit. "Rent free" means the unit is not owned or being bought and no money is paid or contracted for rent. Such units are usually provided in exchange for services rendered or as an allowance or favor from a relative or friend not living in the unit. Unless shown separately, rent-free households are grouped with rented households.

Payment Method for Utilities: The method by which fuel suppliers or utility companies were paid for all electricity, natural gas, fuel oil, kerosene, or liquefied petroleum gas used by a household. Households that paid the utility company directly were classified in this survey as "all paid by household." Households that paid directly for at least one but not all of their fuels used and that has at least one fuel charge included in the rent were classified as "some paid, some included in rent." Households for which all fuels used were included in rent were classified as "all included in rent." If the household did not fall into one of these categories, it was classified as "other." Examples of households falling into the "other" category are: (1) households for which fuel bills were paid by a social service agency or a relative, and (2) households that paid for some of their fuels used but paid for other fuels through another arrangement.

Portable Electric Heater: A heater that uses electricity and that can be picked up and moved.



Portable Kerosene Heater: A heater that uses kerosene and that can be picked up and moved.

Poverty: Low-income classifications to which certain households are assigned using U.S. Bureau of the Census definitions. These definitions based on the number of family members in the household and the income of the entire family. "Below 100 percent of poverty line" encompasses a group of households with incomes below the poverty level as defined by the U.S. Bureau of the Census. "Below 125 percent of poverty line" includes a group of households with incomes below 125 percent of the poverty level. These groups of the poor and near-poor represent alternative levels for defining poverty. See Table C3 for the size and income criteria.

Primary Sampling Unit (PSU): A sampling unit selected at the first stage in multistage area probability sampling. 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 1,800 PSU's by a procedure similar to the one used by the Census Bureau for its Current Population Survey. PSU's can be composed of one or more MSA's or can be composed of rural counties. See **Metropolitan and Appendix A, "How the Survey Was Conducted."**

Propane: See *Liquefied Petroleum Gas or LPG*.

PSU: See *Primary Sampling Unit*.

Public Housing: Housing units owned by a local housing authority or other local public agency such as a housing and redevelopment authority or a housing development agency. These organizations receive subsidies from the Federal or State government, but the local agency owns the property. To live in such a project, one must apply to the local housing authority.

Quadrillion: The quantity 1,000,000,000,000,000 (10^{15}).

Race: The primary ethnic background of the person considered to be the householder as determined by the respondent. Each respondent was asked, "Which of the groups on this exhibit best describes the householder?" The groups included: white, black or Negro, American Indian, Alaskan native, Asian, and Pacific Islander. The word "race" was not used in either the questionnaire or the instructions. A separate question was asked Hispanic Descent. See **Hispanic Descent**.

Range: The stove-top burners used for cooking food. The range and oven are considered two separate appliances in RECS, although they are often purchased as one appliance. See **Appliances Used**.

Refrigeration Unit: A unit that lowers the temperature through a mechanical process. In a typical refrigeration unit, electricity powers a motor that runs a pump to compress the refrigerant into a liquid. (A "refrigerant" is a substance that changes between liquid and gaseous states under desirable temperature and pressure conditions.) Heat from the compressed liquid is removed and discharged from the unit and the refrigerant then evaporates when pressure is reduced. The refrigerant picks up heat as it evaporates and it returns to the compressor to repeat the cycle.

A few refrigeration units use gas (either natural gas or LPG) in an absorption process than does not use a compressor. The gas is burned to heat a chemical solution in which the refrigerant has been absorbed. Heating drives off the refrigerant which is later condensed. The condensed refrigerant evaporates by a release of pressure, and it picks up heat as it evaporates. The evaporated refrigerant is then absorbed back into the chemical solution, the heat is removed from the solution and discharged as waste heat, and the process repeats itself. By definition, refrigerators, freezers, and air-conditioning equipment all contain refrigeration units. See **Air-Conditioning Equipment**.

Refrigerator: A cabinet or box for keeping food cool, usually powered by electricity. Those few refrigerators with no freezer sections are included in the nonfrost-free category. "Frost-free" means that frost does not build up on the insides of the freezer section or the ice-cube section. All home refrigerators are assumed to have electric refrigeration units. Gas refrigeration units are not being manufactured in the United States for use in the home. Gas refrigerators (using LPG) are being manufactured for use in recreational vehicles, but LPG used in recreational vehicles is not included in the RECS. See **Appendix C, "Quality of the Data," Refrigeration Unit, and Appliances Used**.

Regression Imputation: A statistical technique for predicting the value of a numerical variable that is missing. The technique involves developing a regression equation that predicts the value of the missing variable based upon variables that are not missing or have already been imputed. A random error is usually added to the predicted value. The sum of the predicted value and the random error is used as the imputed value for the missing variable. See **Imputation**.

Relative Standard Error: See **RSE or Relative Standard Error**.

Rent: See **Owned/Rented**.

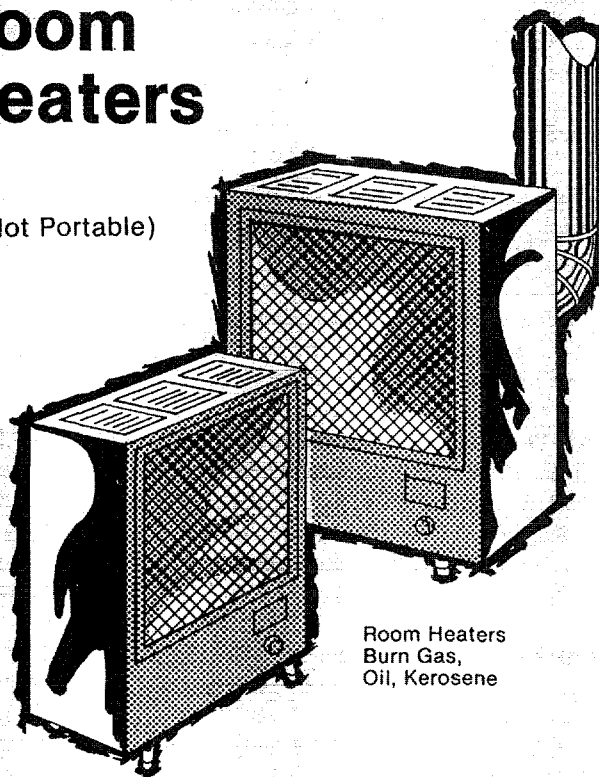
Rent Subsidy: Housing units that have a reduced rent because the Federal, State, or local Government is paying part of the cost of construction, building mortgage, or operating expenses.

Residential: Occupied housing units, including mobile homes, single-family housing units (attached and detached), and apartments. Residential does not include vacant housing units or second homes. See **Occupied Housing Units, Household, and Housing Unit**.

Room Heater Burning Gas, Oil, Kerosene: Any of the following equipment: circulating heaters, convectors, radiant gas heater, space heaters, or other nonportable room heaters that may or may not be connected to a flue, vent, or chimney. See **Main Heating Equipment**.

Room Heaters

(Not Portable)



Room Heaters
Burn Gas,
Oil, Kerosene

Example Only. Your Equipment
May Differ in Minor Ways
From the Example Shown.

Rooms: See Number of Rooms.

RSE or Relative Standard Error: A measure of the reliability or precision of a survey statistic. Variability occurs in survey statistics because the different samples that could be drawn would each produce different values for the survey statistics. Relative Standard Error, or RSE, is a measure of precision on a percentage scale. The RSE is defined as the standard error of a survey estimate, divided by the survey estimate and multiplied by 100. (Standard error is the square root of the variance.) For example, an RSE of 50 percent means that the standard error is half as large as the survey estimate. See Appendix C, "Quality of the Data," for a discussion of sampling errors.

RSE Column Factor: An adjustment factor that appears above each column of the tables and is used to compute RSE's. For a survey estimate in a particular row and column of a table (that is, a particular "cell"), the approximate RSE is obtained by multiplying the RSE row factor by the RSE column factor for that cell. See RSE, RSE Row Factor, and Appendix C, "Quality of the Data."

RSE Row Factor: A factor that appears to the right of each row of the tables, and is used to compute RSE's. For a survey estimate in a particular row and column of a table (that is, a particular "cell"), the approximate RSE is obtained by multiplying the RSE row factor by the RSE column factor for that particular cell. The row factor is equal to the geometric mean of the RSE's in a particular row of the tables. See RSE, RSE Column Factor, and Appendix C, "Quality of the Data."

Sampling: The procedure used to select housing units for interview from the population of residential housing units in the United States. See Multistage Area Probability Sample and Appendix A, "How the Survey Was Conducted."

Secondary Heating Equipment: Equipment used less often than the main heating equipment. See Main Heating Equipment.

Secondary Heating Fuel: Fuels used in secondary heating equipment. When no secondary heating equipment is used, a secondary heating fuel that is used in the main heating equipment is not included in the tabulations. This occurs when, for example, wood and coal are both used in a furnace but wood is named the main heating fuel. Coal, in this case, is not tabulated. See **Main Heating Fuel**.

Single-Family: See **Housing Structure**.

Site Energy: The Btu value of energy at the point it enters the home, sometimes referred to as "delivered" energy. In this report, the site value of energy is used for all fuels, including electricity. See **Adjusted Electricity** and **Btu Conversion Factors**.

Solar Collector: Equipment that actively concentrates thermal energy from the sun. The energy is usually used for space heating, for water heating, or for heating swimming pools. Either air or liquid is the working medium. Data was not collected on passive solar. See **Fuel and Active Solar**.

Space Heating: Space heating is one of four main end-use categories in this report. It is defined as the use of energy to generate heat for warmth in housing units using space-heating equipment. The equipment could be the main space-heating equipment or secondary space-heating equipment. It does not include the use of energy to operate appliances (such as lights, televisions, and refrigerators) that give off heat as a byproduct. In addition, the use of electricity to operate fans in central forced-air heating equipment is not included in space heating--this use is included in the appliance end-use category. See **End Use** and **Appendix B**, "End-Use Estimation Methodology."

Space-Heating Equipment: See **Main Heating Equipment**.

Square Feet: The floor area of the housing unit that is enclosed from the weather. Basements are included, whether or not they contain finished space. Garages are included if they have a wall in common with the house. Attics that have finished space and attics that have some heated space are included. Crawlspace are not included, even if they are enclosed from the weather. Sheds and other buildings that are not attached to the house are not included.

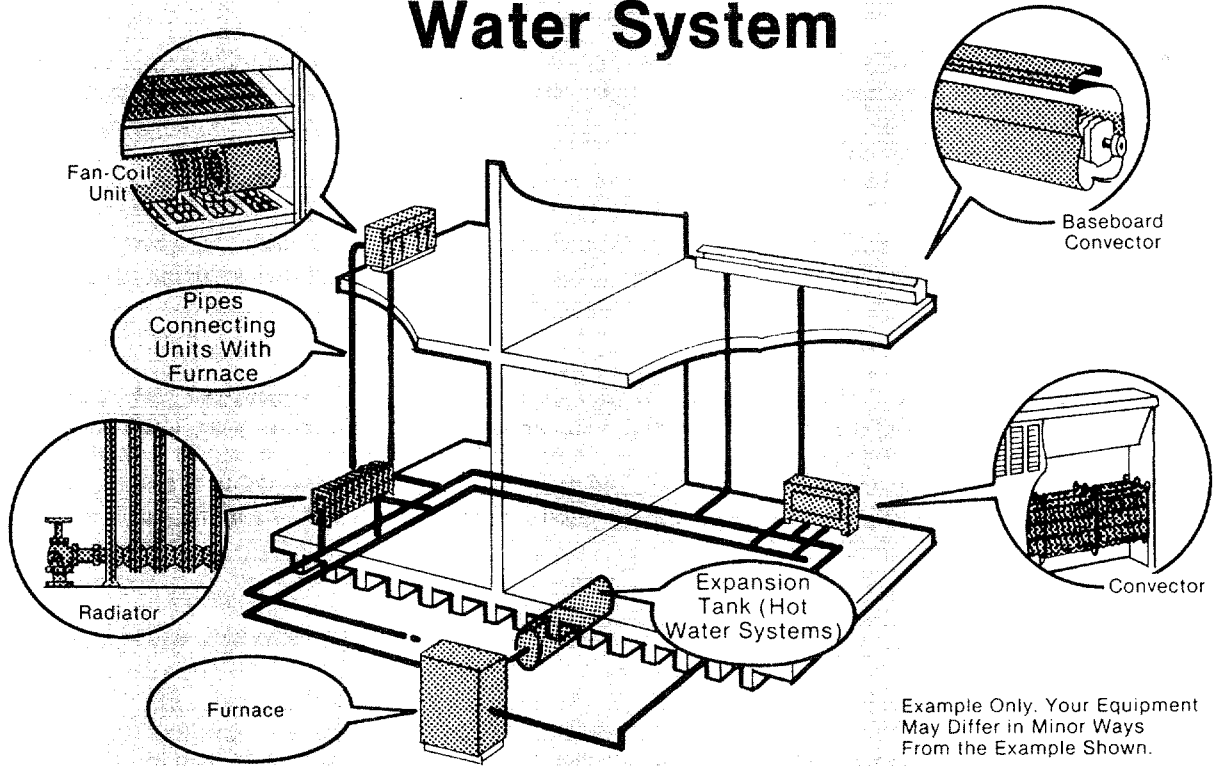
"Measured Square Feet" means that the measurement of the dimensions of the home did not rely on the respondent's reports but was an actual measurement made by the interviewer using a metallic, retractable, 50-foot tape measure. For details on how the measurement was made and how the data were treated, see **Appendix A**, "Estimates of Housing Unit Size."

Standard Price: The average residential rate for one kilowatt-hour (kWh). The local electric rate was computed from: *Typical Electric Bills* January 1, 1987 DOE/EIA-0040(87); the U.S. Department of Agriculture typical bill data; billing data rates; and telephone calls to local utilities when no other data were available. The standard price is independent of the household's level of electricity consumption. See **Appendix A**, "How the Survey Was Conducted."

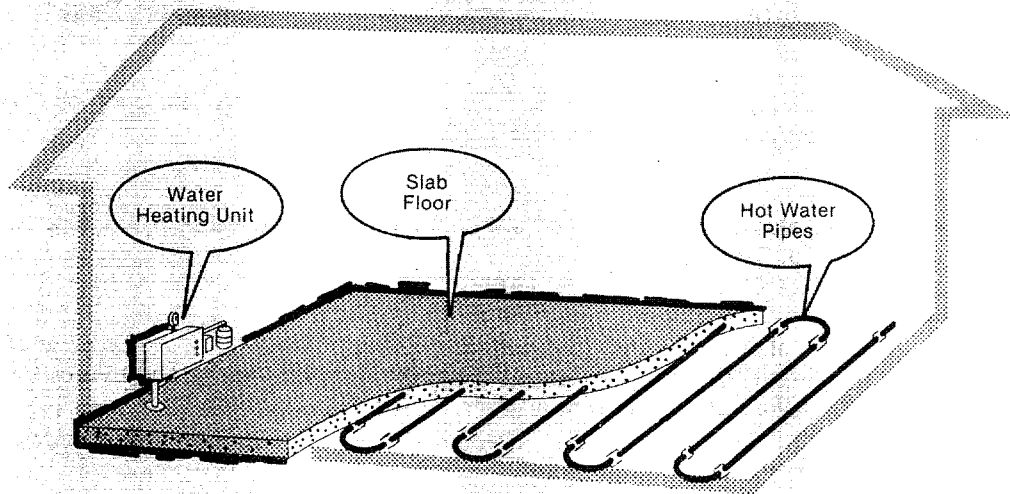
Status of Unit: See **Owned/Rented**.

Steam or Hot-Water System: Either of two types of central heating system that supplies steam or hot water to radiators, convectors, or pipes. The more common type supplies either steam or hot water to conventional radiators, baseboard radiators, convectors, heating pipes embedded in the walls or ceilings, or heating coils or equipment that are part of a combined heating/ventilating or heating/air-conditioning system. The other type supplies radiant heat through pipes that carry hot water and are inlaid in a concrete slab floor. See **Main Heating Equipment**.

Steam or Hot Water System



Hot Water Pipes Running Through Slab Floor



Example Only. Your Equipment May Differ in Minor Ways From the Example Shown

Stove: See **Heating Stove** and **Cooking Stove**.

Submetered Data: End-use consumption data obtained for individual appliances when a recording device has been attached to the appliance to measure the amount of energy consumed by the appliance. See **Metered Data**.

Total Square Footage: Square footage of floorspace summed or aggregated over all households in a category (such as all households in the United States). In this survey, aggregate square footage was estimated by multiplying each household's square footage by its weight, then summing over all sample households in a category to represent nationwide totals. See **Square Feet** and **Weight**.

Vacant Housing Unit: A housing unit not occupied when the first field contact was made. An occupied seasonal or migratory housing unit is classified as vacant at the time of the first contact if all of its occupants had a usual place of residence elsewhere.

Vehicles: Motorized vehicles used by U.S. households for personal transportation. Excluded are: motorcycles, mopeds, large trucks, and buses. Included are: automobiles, station wagons, passenger vans, utility vans, motor homes, pickup trucks, and jeeps or other 4-wheel drive vehicles. In order to be included, vehicles must be: (1) owned by members of the household; (2) company cars not owned by household members but regularly available to household members for their personal use and ordinarily kept at home; or (3) rented or leased for 1 month or more. See **Vehicle Used on the Job**.

Vehicle Used on the Job: A vehicle used by anyone in the household for job-related activities, excluding commuting to and from work. See **Vehicles**.

Water Heating: Water heating is one of four main end-use categories in this report. It is defined as the use of energy to heat water for hot running water, as well as the use of energy to heat water on stoves and in auxiliary water-heating equipment for bathing, cleaning and other noncooking applications of hot water. The use of energy to heat water for cooking and hot drinks is not considered to be water heating--this use is included in the appliance end-use category. In addition, the use of energy to heat water for a swimming pool is not water heating--it also included in the appliance end-use category. See **End Use** and **Appendix B**, "End-Use Estimation Methodology."

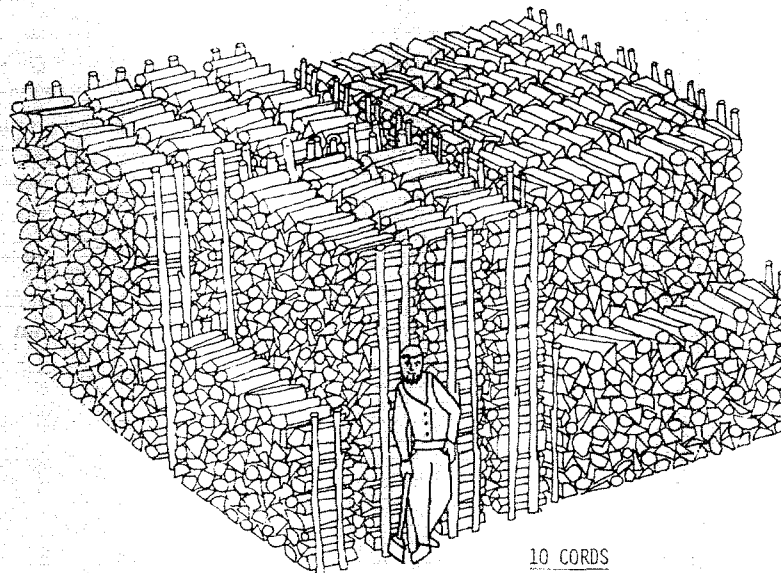
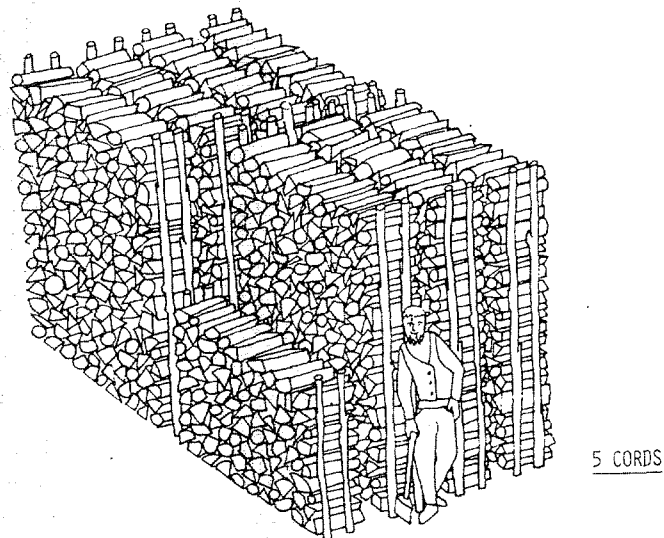
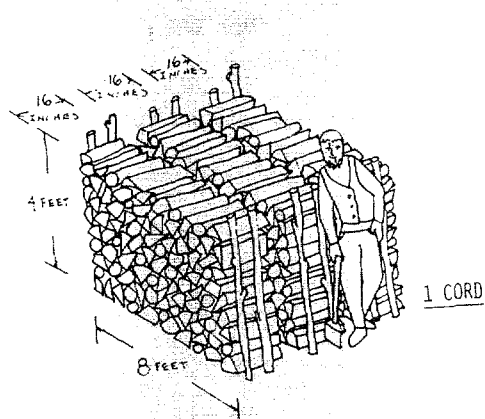
Weight: The number of households in the United States that a particular sample unit represents. To estimate the total value of an attribute (such as square footage) in the U.S. residential population as a whole, each sample household's value is multiplied by the household's weight. Summing the weighted sample values provides an estimate of the nationwide total. See **Multistage Area Probability Sample**, and **Appendix C**, "Quality of the Data."

Whole-House Cooling Fan: A large fan located in the attic or entrance to the attic and cools the whole house by drawing air through lower level windows. See **Appliances Used**.

Window or Ceiling Fan: Fans located in the window or installed on the ceiling. Portable or floor fans that are not used in a window are not counted. See **Appliances Used**.

Wood Consumption: The amount of wood burned in a fireplace, stove, or furnace, in the home at any time during the preceding 12 months as reported by the respondent at the time of the interview. The figures for wood burned cover the major part of the 1986-1987 heating season.

A cord of wood measures 4 feet by 4 feet by 8 feet and is approximately 128 cubic feet. A third of a cord measures 16 inches by 4 feet by 8 feet. In order to enable respondents to be more accurate in reporting the amount of wood they burned, especially those households that used more than 5 cords of wood, respondents were shown drawings which included a person holding an ax as a point of reference, and showed wood piles containing 5 and 10 cords. A smaller scale copy of the drawing shown to respondents for 1, 5, and 10 cords is reproduced below.



Wood Conversion to Btu: Converting cords of wood into a Btu equivalent is an imprecise procedure. The number of cords each household reports having burned is inexact, even with the more precise drawings provided, because the estimate requires the respondent to add up the use of wood over a 12-month period during which wood may have been added to the supply as well as removed. Besides errors of memory inherent in this task, the estimates are subject to problems in definition and perception of what a cord is. The nominal cord as delivered to a suburban residential buyer may differ from the dimensions of the standard cord. This difference is possible because wood is most often cut in lengths that are longer than what makes a third of a cord (16 inches) and shorter than what makes a half cord (24 inches).

In other cases, wood is bought or cut in unusual units (for example, pickup truck-load or trunk load). Finally, volume estimates are difficult to make when the wood is left in a pile instead of being stacked. Other factors that make it difficult to estimate the Btu value of the wood burned is that the amount of empty space between the stacked logs may vary from 12 to 40 percent of the volume. Moisture content may vary from 20 percent in dried wood to 50 percent in green wood. (Moisture reduces the useful Btu output because energy is used in driving off the moisture.) Finally, some tree species contain twice the Btu content of species with the lowest Btu value. Generally, hard woods

have greater Btu value than soft woods. Wood was converted to Btu at the rate of 20 million Btu per cord, which is a rough average that takes all these factors into account. See **Btu Conversion Factors**.

Year of Construction: The year the structure was originally completed or the year any part of the structure was first occupied. For mobile homes, year of construction is the model year.

