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Residential-Energy-Demand Modeling and the NIECS Data Base: An Evaluation

by

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Prepared by

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EXECUTIVE SUMMARY

The purpose of this report is to evaluate the 1978-79 National Interim Energy Consumption Survey (NIECS) data base in terms of its usefulness for estimating residential energy demand models based on household appliance choice and utilization decisions. The NIECS contains detailed energy usage information at the household level for 4081 households during the April 1978 to March 1979 period. Among the data included are information on the structural and thermal characteristics of the housing unit, demographic characteristics of the household, fuel usage, appliance characteristics and actual energy consumption over the 12-month period. In comparison to several earlier surveys of household energy consumption, the NIECS contains approximately twice as many sample households, covers all four of the primary residential fuels - electricity, natural gas, fuel oil and LPG - and is the only national survey to include detailed information on recent household conservation and retrofit activities.

Although NIECS is a highly detailed source of household energy usage information, there are several major problems with the data base which severely limit its usefulness as a source of research data. These problem areas, discussed in detail in Section 3 , include:

i) response error, primarily arising from the apparent inability of many households to accurately answer technically-related questions concerning their housing unit;

ii) the innoculation procedures used to process the "monthly" or

billing period data on fuel consumption and expenditures, including the fact that only the innoculated data is reported;

iii) the type of weather information given, especially HDD and CDD data, based on adjusted NOAA weather division aggregates rather than actual weather conditions at each location;

iv) the imputation procedures used for a large number of household variables and responses, by which the real data was replaced with "unflagged" imputed estimates; and

v) the lack of more specific household location information at the state level, so that the necessary additional price data required to estimate econometric models of residential energy demand can be matched to the NIECS observations.

While each of these problems may seem rather minor in terms of its consequences, this is not the case. Taken together, the effect is quite likely to be substantial in terms of limiting the usefulness of the NIECS data base. Given the significant potential of this data set for accurately modeling household appliance choice and utilization decisions, and thereby better understanding a key aspect of residential energy demand, this constitutes a real tragedy.

Acknowledgements

We would like to acknowledge the helpful assistance of a number of individuals in answering our many questions and referring us to additional sources of NIECS information: Wendall Thompson (DOE), Phil Windell (DOE), Leslie Whitaker (DOE), Paul Werbos (DOE), Reuben Cohen (RAC), Dawn Day (RAC), Carl Blumstein (LBL), and Trudy Cameron (Princeton). However, these individuals and the agencies they represent should not be held responsible for any remaining errors in the following report, a responsibility which we alone assume.

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November, 1981

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RESIDENTIAL ENERGY DEMAND MODELING AND THE NIECS DATA: AN EVALUATION BASE

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1. INTRODUCTION:

The purpose of this report is to evaluate the 1978-79 NIECS data base in terms of its usefulness for estimating residential energy demand models based on household appliance choice and utilization decisions. This particular focus has two implications: i) we are primarily concerned with the estimation of relationships among NIECS (and other) variables, and ii) the specific relationships we are concerned with involve economic models of residential energy demand. Since the residential demand for energy (exclusive of vehicle-related demand) is primarily determined by the number, type, size, efficiency and utilization of household appliances - including everything from a gas-fired, forced air furnace to an electric toaster oven - it is clear that household energy demand depends upon both the choice of the appliance stock and the extent to which this stock is utilized. Thus, the basic assessment criterion used in this report to evaluate the NIECS data is the ability of the data set to produce the necessary information required to accurately estimate econometric models of residential appliance choice and utilization.

The National Energy Consumption Survey, or NIECS, contains detailed energy demand information at the household level for 4081 households over the period April 1978 to March 1979. Among the data included are information on structural characteristics of the housing unit,

demographic characteristics of the household, fuel usage, appliance characteristics and actual energy consumption over the 12-month period. NIECS was conducted during the 1978-79 winter by the Response Analysis Corporation (RAC) of Princton, New Jersey, for the Energy Information Administration (EIA) of the Department of Energy as an interim pilot survey for the Residential Energy Consumption Survey, or RECS, which subsequently began as an annual survey in 1980.

Following this introduction, Section II of the report contains brief descriptions of the major components of the NIECS data set. Of particular interest from the point of view of the econometrician interested in estimating unbiased relationships are the discussions on the sample frame and the imputation procedures used in NIECS. There are also two extensive tables at the end of this section, giving detailed statistical and other information on most of the non-vehicle NIECS variables. Section III contains an assessment of the NIECS data, focusing on four areas: measurement error, sample design, imputation problems and additional data needed to estimate appliance choice/use models. Section IV summarizes and concludes the report.

2. SURVEY DESIGN AND DATA

NIECS was based on a national probability sample of U.S. households, outlined in further detail below. It achieved an unusually high response rate, over 90 percent, which was the direct result of an aggresive multi-wave design consisting of up to three personal interview attempts followed up by a mailed questionnaire to those households which had still not been interviewed. The household questionnaire consisted of 126 questions, while the mailed questionnaire was a smaller subset of these

questions. Additional information on monthly fuel consumption and expenditures for each household was requested from the associated fuel suppliers. Information on weather and household location was also added. The result is a NIECS public data set, consisting of two files - household data and monthly fuel usage data - and over 700 variables for each of the 4081 households.

One of the more important aspects of the NIECS data is that extensive imputation procedures were used in preparing the final public use files. There appear to be three basic reasons for these imputations: i) to minimize the number of missing-data or non-response observations; ii) to annualize actual fuel consumption data based on variable billing periods to facilitate inter-household comparisons; and iii) to improve the accuracy and completeness of the mailed questionnaire responses. Unfortunately, as it stands now, it is impossible for a user of the public file to distinguish between valid responses and the imputed data, except in the case of the mailed questionnaire observations. This presents the user with potentially serious problems, as discussed further below.

The NIECS variables can be divided into seven basic groups - housing characteristics, retrofit/conservation efforts, heating/air conditioning (HVAC) equipment, other major household appliances, demographic characteristics, household energy use and consumption, and other relevant information. In this section, we first briefly discuss each of these groups in turn, followed by a description of the sample design and imputation procedures used. This section also contains two tables giving extensive statistical and other information on all of the NIECS variables of direct relevance to the focus of this report, i.e., estimating appliance choice/utilization models.

Table 1. NIECS Information - A Summary[1]

Housing characteristics
- Housing type
- Year house built
- Number of floors
- Floor area
- Number of rooms
- Number and type of windows
- Number and type of storm windows
- Number and type of outside doors
- Number of storm doors
- Presence, type, amount of attic insulation
- Wall insulation

Retrofit/conservation efforts[2]
- Storm windows
- Weatherstripping
- Clock thermostat
- Attic insulation
- Wall insulation
- Floor insulation
- Hot water pipe insulation
- Hot water heater insulation
- Other insulation
- Caulking
- Plastic coverings on windows or doors

Heating/cooling equipment
- Main heating system type and fuel
- Secondary heating system type and fuel
- Type of air conditioning equipment
- Number of rooms air conditioned

Household appliances
- Fuel used for water heating
- Number and type of refrigerators
- Number and type of cooking equipment
- Use of other household appliances

Demographic characteristics
- Number, age, sex, and employment status of household members
- Marital status of respondent
- Race of respondent
- Education of respondent and spouse
- Total household income for 1977
- Housing tenure (own or rent)

Energy use and consumption[3]
- Use of electricity, natural gas, LPG, and fuel oil
  - -for different functions
  - -paid by household
  - -consumption, and expenditure

Other information
- Geographic location
- Heating degree days
- Cooling degree days
- Type of community

[1] Questions were also asked about ownership and use of motor vehicles, but this information was not relevent to this project.

[2] Refers to conservation actions taken between January 1977 and the date of the interview, fall 1978.

[3] Data on monthly household fuel consumption and expenditures by type of fuel were obtained from fuel suppliers. The data cover the one-year period from April 1978 through March 1979.

2.1 Housing Characteristics

One of the key factors in modeling residential energy demand is the physical characteristics of the housing unit, such as type, age and size of house. The NIECS file contains a number of variables relating to both the structural characteristics and the thermal integrity of the shell: type and age of house, number of floors, number of rooms, square feet of living space, type of plumbing, number and type of windows - both regular and storm, and type and amount of insulation. A fundamental problem with several of these variables, especially the more technical ones, is the apparent inability of many households to give accurate responses. This result is certainly not surprising but it does have serious implications for users of the data. We shall have more to say about this, and related issues, in our discussion of measurement error in the next section.

2.2 Retro/Conservation Efforts

Given the timing of the survey, five years after the 1973-74 OPEC energy price shock, a number of questions concerning both retrofit - the reconfiguration of energy-using equipment in order to increase efficiency - and conservation - steps taken to reduce energy consumption, other than by increasing appliance efficiency - efforts of the household since January 1977 were asked. These questions were concerned with the increased use of storm windows and doors, any weatherstripping, caulking or insultation added to the house, rooms closed off during the previous winter, and new heating equipment installed. Interestingly enough, households were not asked whether or not they had set back their thermostat.

2.3 Heating/Air Conditioning Equipment

Since the heating/cooling system used in a household is typically the single most intensive user of energy among household appliances, a variety of questions were posed concerning the type and configuration of the HVAC equipment. These questions included the type and fuel used for both the main and secondary heating systems, type of heating controls used, type of air conditioning equipment and the number of rooms air conditioned.

2.4 Household Appliances

In addition to the above information on the heating and air conditioning equipment used by the household, information on other major household appliances was also collected. For water-heating equipment, this included the presence, type and fuel used. Questions were asked concerning the number and type of refrigerators and cooking appliances, including a number of energy-related characteristics. Information on the availability of such other major appliances as washing machines, electric dishwashers, food freezers, and clothes dryers was also collected. Unfortunately, information on the capacity, utilization rate and energy efficiency of these appliances was not included.

2.5 Demographic Characteristics

A variety of information on the demographic characteristics of each household are included in the NIECS data. These include the number, age, sex and employment status of household members, the marital status, race and education level of the respondent, total household income (in

1977),whether or not the housing unit is owned or rented, the estimated value of the property, and the monthly rent paid in the case of renters. Information on the geographic location of the household was added later.

2.6 Energy Use and Consumption

Although some information on fuel usage was available from the questions concerning type of fuel used for various appliances, the major source of fuel consumption and expenditure data were the households' fuel suppliers. Households were asked to sign an authorization form giving DOE permission to request such data from their fuel suppliers. The response was quite good; roughly 95 percent of the households signed the authorization form, and the response rate for fuel suppliers varied from approximately 90 percent in the case of electricity and natural gas utilities to a little over 75 percent for fuel oil, kerosene and LPG. These data were then used to estimate annual consumption and expenditures for each type of fuel used for a standard 365-day period. The billing period data was also used, after first being innoculated, to prepare the "monthly" data file.

2.7 Other Information

A limited amount of information on geographic location, type of community and weather is also available for each household. The geographic location information is limited to the Census region - North East, North Central, South and West - for each household. Two types of community information are given: an SMSA-size variable, distinguishing between large (over a million in 1970 population) and small (less than a million) SMSA's and between SMSA and non-SMSA communities; and

an urban/rural variable distinguishing between metropolitan and non-metropolitan communities. Two types of weather information for each household are also given. The first is a weather zone classification, based on a seven-zone system defined by the AIA (American Institute of Architects) in terms of both heating and cooling degree days for each location for the 1978-79 season (July through June for the 12-month heating season and January through December for the 12-month cooling season). These estimates came from the NOAA weather division within which each household resided and were based on adjusted long run 46-year normals or averages. Heating and cooling degree day data for each billing period, after first being innoculated, were also included in the "monthly" file of fuel consumption.

2.8 The NIECS Sample Frame

NIECS was based on a four stage, area probability sample of households, actually housing units, in the U.S. Basically, the four stage sampling procedure used was as follows:

i) primary sampling unit (PSU) selection - the United States (excluding Alaska, Hawaii and military installations) was first divided into 1,140 geographic areas, the areas were then grouped into 103 strata on the basis of region, community type and socio-economic characteristics, and one PSU was selected from each of the 103 strata with known probability. The 103 PSU's included 38 self-representing PSU's consisting of the 25 largest SMSA's, and 65 non-self-representing PSU's selected from the remaining strata. PSU's ranged in size from 50,000 to three million persons, based on 1970 population.

ii) secondary sampling unit (SSU) selection - each of the 103 PSU's was then subdivided into a number of SSU's, where each SSU was an area of appoximately 2,500 population in 1970. A total of 400 selected SSU's was supplemented with an additional 56 SSU's, giving a total of 456 SSU's where the supplemental SSU's were selected to reflect areas of substantial post-1970 residental construction.

iii) segment selection - each of the 456 selected SSU's were further subdivided into geographic segments, where each segment was generally a contiguous area of approximately 25 housing units.

iv) ultimate sampling unit (USU) selection - USU's or clusters, consisting of approximately 10 housing units were randomly selected from the segments with known probability. The clusters used in NIECS ranged in size from 1 to 26 housing units and were generally located in the same residential block or group of blocks.

Using these procedures, a total of 4,849 housing units were selected for the national sample. Since 342 of these units were later determined to be either vacant or seasonal units, this resulted in a final national sample of 4,507 occupied housing units. Personal interviews were completed at 3,842 households (85.2 percent) and mailed questionnaires were completed by another 239 households (5.3 percent), for an overall survey response of 4,081 or 90.5 percent. The personal interview response rate was highest in the South (89.9 percent) and in non-metropolitan locations (over 90 percent) and lowest in the North East (80.5 percent) and in large-SMSA central city locations (about 77 percent).

2.9 Imputation Procedures

Fairly extensive data imputation was carried out on the NIECS data either to minimize the number of non-response observations or to increase the accuracy of data judged to be imcomplete or inaccurate. For example, the fuel consumption data was for billing periods which did not generally add up to 365 days over the same period. Imputation procedures were therefore used to adjust the billing period data to give annualized estimates for a standard 365-day period. Furthermore, the mailed questionnaire responses were both incomplete, in that many of the 126 questions were not included, and were judged to be less accurate than their personal interview counterparts. Thus, imputed values were substituted for virtually all of the mailed questionnaire responses.

Several different imputation procedures were used depending upon the particular variable in question. According to RAC, the "procedures selected were those which were deemed to satisfy the interim nature of the survey. An important consideration was a time schedule on which the work could be carried out to permit reasonably early publication and use of the NIECS data." (Report on Methodology, Part I, p. 59). For items in the household questionnaire judged to be relatively unimportant, such as type of supplementary heating equipment, type of water heater and refrigerator features, imputation consisted of assigning the modal value of the variable to the missing responses. For items judged to be more important or to be closely related to fuel consumption, such as year housing unit built, number of floors, number of bathrooms, dimensions of largest room, main heating fuel and family income, a so-called "hot deck" procedure was used to impute missing data.

For all variables except family income, this "hot deck" procedure consisted of sorting the households into region/PSU/type of structure cells and then selecting a donor household in the same cell and cluster as the household with the missing data. If such a household could not be found in the same cluster, then a "nearby" cluster - either in the same PSU or in the same type of structure depending upon the variable in question - was searched. Once located, the value of the variable in question from the donor household was substituted for the missing response. In the case of household income, the imputation procedure involved cells classified by race, age of head, sex and marital status, owner versus renter, value of housing unit and amount of rent paid. Values were not imputed for several variables, such as square feet of living space, and presence and type of insulation, where it was felt that such estimates would be unreliable. The number of non-responses and the imputation procedure used for each of the personal interview variables are shown in Table 4, taken from the Report on Methodology (RAC, 1981).

In the case of family income, slightly less than 12 percent of the household questionnaire values were missing and therefore were imputed. For the non-income variables, this proportion did not exceed 7.3 percent, and for most items was less than two percent. These figures do not include the 239 mailed questionnaires.

In the case of the mailed questionnaires, the imputation procedure was more severe in that virtually all of the associated data was imputed. This was done by first sorting the cases by census region, type of structure, space heating fuel, hot water fuel, air conditioning fuel, number of rooms and family size.

A donor household was selected from the appropiate cell and the entire set of values for that household, with the exception of the sorting variables, was imputed to the mail-response household.

The fuel consumption and expenditure data received from fuel suppliers required annualization to convert it to a standard 365-day period. In addition, missing data responses, generally caused either by the non-cooperation of either the household or the fuel supplier or because fuel costs were not paid for directly but were included within the rent payments, were also subjected to imputation. For all five types of fuels, regression models were used to impute fuel use to households for which either no data or only fragmentary (less than 5 months) data were available. In the case of electricity and natural gas, partial (between 5 and 11 months) and "full-year" (at least 11 months) data were adjusted to a 365-day annual period using ratio-type adjustments to the available data.

2.10 Summary Tables of NIECS Variables

2.10.A Household NIECS Variables: Survey and Coding Information

Table A is an alphabetical listing of all of the NIECS household questionnaire variables, 391 in total, with additional survey information for each variable also shown. This information includes a brief description of each variable, a key-word classification, the related household survey question number, the coding convention (or units) used for each variable, and any relevant comments.

It should be noted that there are a total of 595 variables for each of the 4081 households included in the NIECS annual data public use file. These variables include 391 questionnaire variables plus 204 recorded and additional information variables, such as location, weather data, etc. Additional variables for each household are included in the "monthly" fuel consumption and expenditure file.

In general, the following non-response codes were used:

6 = don't know

7 = refused to answer

8 = no answer

9 = not applicable

For multiple column responses, leading 9's were used to fill the field, e.g. 96 or 996 for "don't know", and 998 for "no answer."

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
		HOUSEHOLD NIECS VARIABLES: SURVEY AND CODING INFORMATION			
ACAULK	ADD-CAULKING (around outside windows or doors)	HOUSE/RETROFIT INSULATION RETROFIT	43	1=yes 0=no	-refers to since 1/1/77
ACLKTHRM	ADD-AUTOMATIC-OR-CLOCK-THERMOSTAT	HOUSE/RETROFIT RETROFIT CONSERVATION	41.05	1=yes 2=in process 0=no	-refers to since 1/1/77
AHTPUMP	ADD-ELECTRIC-HEAT-PUMP	RETROFIT HOUSE/RETROFIT CONSERVATION	41.11	1=yes 2=in process 0=no	-refers to since 1/1/77
AINSATRF	ADD-INSUL-ATTIC-OR-ROOF	RETROFIT INSULATION HOUSE/RETROFIT	41.06	1=yes 2=in process 0=no	-refers to since 1/1/77
AINSHWP	ADD-INSUL-HOT-WATER-PIPES	HOUSE/RETROFIT INSULATION WATER HEATING RETROFIT	41.08	1=yes 2=in process 0=no	-refers to since 1/1/77
AINSOTHR	ADD-INSUL-OTHER	HOUSE/RETROFIT INSULATION RETROFIT	41.10	1=yes 2=in process 0=no	-refers to since 1/1/77
AINSUFL	ADD-INSUL-UNDER-FLOOR	HOUSE/RETROFIT INSULATION RETROFIT	41.07	1=yes 2=in process 0=no	-refers to since 1/1/77
AINSWALL	ADD-INSUL-OUTSIDE WALLS	HOUSE/RETROFIT INSULATION RETROFIT	41.07	1=yes 2=in process 0=no	-refers to since 1/1/77

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
AINSWHTR	ADD-INSUL-WATER-HEATER	HOUSE/RETROFIT WATER HEATING INSULATION RETROFIT	41.09	1=yes 2=in process 0=no	-refers to since 1/1/77
ANEWFURN	ADD-NEW-FURNACE	HOUSE/RETROFIT HEATING RETROFIT	41.13	1=yes 2=in process 0=no	-refers to since 1/1/77
ANEWWHTR	ADD-NEW-WATER-HEATER	HOUSE/RETROFIT WATER HEATING RETROFIT	41.12	1=yes 2=in process 0=no	-refers to since 1/1/77
APLSTCOV	ADD-PLASTIC-COVERING (over windows or doors)	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	46	1=yes 0=no	-refers to since 1/1/77
ASTDOOR	ADD-STORM-DOOR	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	41.03	1=yes 2=in process 0=no	-refers to since 1/1/77
ASTINWIN	ADD-STORM-WINDOW-OR-INSUL-GLAS	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	41.01	1=yes 2=in process 0=no	-refers to since 1/1/77
AWETHSTR	ADD-WEATHER-STRIPPING (around outside doors or windows)	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	41.04	1=yes 2=in process 0=no	-refers to since 1/1/77

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
AWINSHUT	ADD-CLOSABLE-SHUTTERS (for windows)	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	41.02	1=yes 2=in process 0=no	-refers to since 1/1/77
HACCNTL	HAVE-AIR-COND-CONTROL (for central AC system)	AIR CONDITIONING HOUSE/AIR CONDITIONING	24	1=yes 0=no	-if have central AC
HACCOTH	HAVE-AIR-COND-OTHER-CONTROL (for central AC system)	AIR CONDITIONING HOUSE/AIR CONDITIONING	25.3	1=yes 0=no	-for "yes" responses to HACCNTL (#24)
HACHILO	HAVE-AIR-COND-HI-LO-SWITCH (for central AC system)	AIR CONDITIONING HOUSE/AIR CONDITIONING	25.2	1=yes 0=no	-for "yes" responses to HACCNTL (#24)
HACTHERM	HAVE-AIR-COND-THERMOSTAT (for central AC system)	AIR CONDITIONING HOUSE/AIR CONDITIONING	25.1	1=yes 0=no	-for "yes" responses to HACCNTL (#24)
HAUTOWSH	HAVE-AUTOMATIC-WASHING-MACHINE	APPLIANCES/OTHER-MAJOR	61.1	1=yes 0=no	
HCENTAC	HAVE-CENTRAL-AIR-CONDITIONING	AIR CONDITIONING HOUSE/AIR CONDITIONING	19.1	1=yes 0=no	-for have room AC units, see HROOMAC
HCOMPLUM	HAVE-COMPLETE-PLUMBING (within living quarters)	HOUSE/PLUMBING	6	1=yes 2=no, some facilities 3=no facilities	
HELCLSDY	HAVE-ELECTRIC-CLOTHES-DRYER	APPLIANCES/OTHER-MAJOR	61.5	1=yes 0=no	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
HELDISHW	HAVE-ELECTRIC-DISH-WASHER	APPLIANCES/OTHER-MAJOR	61.3	1=yes 0=no	
HELOVEN	HAVE-ELECTRIC-OVEN	APPLIANCES/COOKING	55.3	1=yes 0=no	
HELRANGE	HAVE-ELECTRIC-RANGE/COUNTER-TOP	APPLIANCES/COOKING	55.5	1=yes 0=no	
HGASOVEN	HAVE-GAS-OVEN	APPLIANCES/COOKING	55.4	1=yes 0=no	
HGASRANG	HAVE-GAS-RANGE/COUNTER-TOP	APPLIANCES/COOKING	55.6	1=yes 0-no	
HGSCLSDY	HAVE-GAS-CLOTHES-DRYER	APPLIANCE/OTHER-MAJOR	61.6	1=yes 0=no	
HHTCNTL	HAVE-HEATING-CNTLROL-SYSTEM (to adjust temperature)	HOUSE/HEATING HEATING	14	1=yes 0=no	
HHTCNTO	HAVE-HEATING-CONTROL-OTHER (to adjust temperature)	HOUSE/HEATING HEATING	15.3	1=yes 0=no	-for "yes" response to HHTCNTL (#14)
HHTTHERM	HAVE-HEATING-CONTROL-THERMOSTAT (to adjust temperature)	HOUSE/HEATING HEATING	15.1	1=yes 0=no	-for "yes" response to HHTCNTL (#14)
HHTVALVE	HAVE-HEATING-CONTROL-RADIATOR-VALVE (to adjust temperature)	HOUSE/HEATING HEATING	15.2	1=yes 0=no	-for "yes" response to HHTCNTL (#14)

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
HHTWATER	HAVE-HOT-RUNNING-WATER	HOUSE/PLUMBING	33	1=yes 0=no	
HINATTIC	HAVE-INSULATION-IN-ATTIC/ROOF	HOUSE/INSULATION INSULATION	36	1=yes 0=no 6=don't know	
HINWALL	HAVE-INSULATION-IN-OUTSIDE-WALLS	HOUSE/INSULATION INSULATION	40	1=yes 0=no 6=don't know	
HMICOVEN	HAVE-MICROWAVE-OVEN	APPLIANCES/COOKING	55.2	1=yes 0=no	
HODGASGL	HAVE-OUTDOOR-GAS-GRILL	APPLIANCES/COOKING	55.7	1=yes 0=no	
HODGASLT	HAVE-OUTDOOR-GAS-LIGHT	HOUSE/LIGHTING	61.7	1=yes 0=no	
HREFRIG	HAVE-REFRIGERATOR	APPLIANCES/REFRIGERATOR REFRIGERATOR	49	1=yes 0=no	
HRFAIWD1	HAVE-REFRIG1-AUTO-ICE-WATER	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.31	1=yes 0=no 6=don't know	
HRFAIWD2	HAVE-REFRIG2-AUTO-ICE-WATER	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.32	1=yes 0=no 6=don't know	
HRFENSV1	HAVE-REFRIG1-ENERGY-SAVE-SWITCH	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.41	1=yes 0=no 6=don't know	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
HRFENSV2	HAVE-REFRIG2-ENERGY-SAVE-SWITCH	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.42	1=yes 0=no 6=don't know	
HRFEXIN1	HAVE-REFRIG1-EXTRA-INSUL	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.51	1=yes 0=no 6=don't know	
HRFEXIN2	HAVE-REFRIG2-EXTRA-INSUL	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.52	1=yes 0=no 6=don't know	
HRFICEM1	HAVE-REFRIG1-AUTO-ICE-MAKER	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.21	1=yes 0=no 6=don't know	
HRFICEM2	HAVE-REFRIG2-AUTO-ICE-MAKER	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.22	1=yes 0=no 6=don't know	
HRFSFD1	HAVE-REFRIG1-SEPARATE-FREEZER-COMPARTMENT	APPLIANCES/REFRIGERATOR REFRIGERATOR	53.1	1=yes 0=no	
HRFSFD2	HAVE-REFRIG2-SEPARATE-FREEZER-COMPARTMENT	APPLIANCES/REFRIGERATOR REFRIGERATOR	53.2	1=yes 0=no	
HRFTEMP1	HAVE-REFRIG1-TEMP-CONTROL	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.11	1=yes 0=no 6=don't know	
HRFTEMP2	HAVE-REFRIG2-TEMP-CONTROL	APPLIANCES/REFRIGERATOR REFRIGERATOR	54.12	1=yes 0=no 6=don't know	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
HROOMAC	HAVE-ROOM-AIR-CONDITIONERS	AIR CONDITIONING HOUSE/AIR CONDITIONING	19.2	1=yes 0=no	-for have central AC, see HCENTAC
HSHEATEQ	HAVE-SECONDARY-HEATING-EQUIP	HOUSE/HEATING HEATING	16	1=yes 0=no	-see KMHEATEQ for primary heating equipment
HSMCKAPL	HAVE-SMALL-ELECTRIC-COOKING-APPLIANCES	APPLIANCES/COOKING	55.1	1=yes 0=no	-includes small electric appliances such as toaster oven or fry pan
HSPFDFRZ	HAVE-SEPARATE-FOOD-FREEZER	APPLIANCES/OTHER-MAJOR	61.4	1=yes 0=no	-for food freezer separate from refrigerator
HVEHICLE	HAVE-ANY-VEHICLES	VEHICLES	62	1=yes 0=no	-includes cars, trucks, vans, motorcycles, mopeds or similar vehicles
HWRNGWSH	HAVE-ELECTRIC-WRINGER-WASHING-MACHINE	APPLIANCES/OTHER-MAJOR	61.2	1=yes 0=no	
KACAULK	CODE-NUMBER-TIMES-ADDED-CAULKING	RETROFIT INSULATION	44	1=once 2=more than once	-refers to since 1/1/77 -also see ACAULK, MACAULK, YACAULK -for ACAULK=yes
KACSYSCN	CODE-AC-SYSTEM-COMMON	AIR CONDITIONING HOUSE/AIR CONDITIONING	23	1=common system 2=individual system	-question not asked for one-family house, mobile home or trailer
KAPLSCOV	CODE-NUMBER-TIMES-ADDED-PLASTIC-COVER (over windows or doors)	HOUSE/RETROFIT WINDOWS-DOORS INSULATION RETROFIT	47	1=once 2=more than once	-for APLSTCOV=1

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KAUTHORZ	CODE-UTILITY-AUTHORIZATION-SIGNED		124	1=yes 0=no	
KCOOKFL	CODE-COOKING-FUEL-MOST-USED	FUELS/USE	60	1=piped gas 2=gas, LPG 3=fuel oil 4=kerosene or coal oil 5=electricity 6=coal or coke 7=wood or charcoal 21=other	
KELOVSC1	CODE-ELECTRIC-OVEN1-SELF-CLEAN	APPLIANCES/COOKING	57.1	1=self-cleaning 2=continuous cleaning 0=neither of these	
KELOVSC2	CODE-ELECTRIC-OVEN2-SELF-CLEAN	APPLIANCES/COOKING	57.2	1=self-cleaning 2=continuous cleaning 0=neither of these	
KEMPL01-12	CODE-EMPLOYMENT-RELATION-1-12	HOUSEHOLD/MEMBERS	100	1=full time 2=part time 0=not employed	
KENGTYV1-4	CODE-ENGINE-TYPE-VEHICLE-1-4	VEHICLES/TYPE	84	1=1-cylinder 2=2-cylinder 3=3-cylinder 4=4-cylinder 5=5-cylinder 6=6-cylinder 8=8-cylinder 11=rotary 12=electric 21=other 96=don't know	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KFIGMPG1-4	CODE-ACTUAL-CALCULATION-MPG-VEHICLE-1-4	VEHICLES/USE	80.1	1=actual 2=impression	-for highway driving - refers to NMPGHWY and NMPGLOC
KFIMPG21-4	CODE-ACTUAL-CALCULATION MPG2-VEHICLE-1-4	VEHICLES/USE	82.1	1=actual 2=impression	-for non-highway driving - refers to NMPGAVG
KFLCNAC	CODE-FUEL-CENTRAL-AIR-COND	AIR CONDITIONING HOUSE/AIR CONDITIONING FUELS/TYPE	22	1=gas 2=electricity 6=don't know	-question asked if had central AC
KFLMHEAT	CODE-FUEL-MAIN-HEATING-SYSTEM	HEATING FUELS/USE HOUSE/HEATING	13	1=piped gas 2=gas, LPG 3=fuel oil 4=kerosene 5=electricity 6=coal 7=wood 8=solar 9=wood or coal 21=other 0=no fuel used	
KFLSHEAT	CODE-FUEL-SECOND-HEATING-SYSTEM	HEATING FUELS/USE HOUSE/HEATING	18	same as KFLMHEAT	-only asked if HSHEATEQ=1(yes)
KFLTYPV1-4	CODE-USUAL-FUEL-TYPE-VEHICLE-1-4	VEHICLES/TYPE	83.1	1=unleaded regular gas 2=unleaded premium gas 3=regular gasoline 4=premium gasoline 5=diesel 6=electricity 21=other	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KFOSUPPL	CODE-NUMBER-FUEL-OIL-SUPPLIERS	HEATING HOUSE/HEATING FUELS/SUPPLIERS	119	1=one 2=more than one	-refers to past 12 months - see NFOSUPPL
KFUELOT	CODE-FUEL-BILL-CHARGES-FOR-OTHER-PURPOSES	FUELS/USE	116	1=yes 0=no	-yes if charges include farm or other business use -for households paying own fuel bill
KGASOVC1	CODE-GAS-OVEN1-SELF-CLEANING	APPLIANCES/COOKING	59.1	1=self-cleaning 2=continuous cleaning 0=neither of these	
KGASOVC2	CODE-GAS-OVEN2-SELF-CLEANING	APPLIANCES/COOKING	59.2	1=self-cleaning 2=continuous cleaning 0=neither of these	
KHEATCOM	CODE-IS-HEATING-SYSTEM-COMMON	HOUSE/HEATING	12	1=common system 2=indiv. syst.	-question not asked for one-family house, mobile home or trailer
KINATBAT	CODE-INSUL-ATTIC-BATTS-OR-BLANKETS	HOUSE/INSULATION INSULATION	38.1	1=yes 0=no	-if have attic or roof insulation; i.e. HINATTIC = 1.
KINATFBC	CODE-INSUL-ATTIC-FIBERGLASS-CELLULOSE-OR-OTHER	HOUSE/INSULATION INSULATION	39	1=fiberglass 2=cellulose 3=rock wool 4=vermiculite 5=other	-for house with loose fill or blown material insulation in attic; i.e. KINATLOS=1

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KINATFOM	CODE-INSUL-ATTIC-FOAM-IN-PLACE	HOUSE/INSULATION INSULATION	38.4	1=yes 0=no	-if have attic or roof insulation; i.e. HINATTIC = 1.
KINATLOS	CODE-INSUL-ATTIC-LOOSE-FILL	HOUSE/INSULATION INSULATION	38.2	1=yes 0=no	-if have attic or roof insulation, i.e. HINATTIC = 1.
KINATOTR	CODE-INSUL-ATTIC-OTHER	HOUSE/INSULATION INSULATION	38.5	1=yes 0=no	-if have attic or roof insulation, i.e. HINATTIC = 1.
KINATPFB	CODE-INSUL-ATTIC-PLAS-FOAM-BRD	HOUSE/INSULATION INSULATION	38.3	1=yes 0=no	-if have attic or roof insulation, i.e. HINATTIC = 1.
KINCOME	CODE-HOUSEHOLD-INCOME-1977	HOUSEHOLD/CHARACTERISTICS	109	1=under $3000 2=$3000-$4999 3=$5000-$7999 4=$8000-$9999 5=$10000-$11999 6=$12000-$14999 7=$15000-$19999 8=$20000-$24999 9=$25000-$29999 10=$30000-$34999 11=$35000-$39999 12=$40000-$44999 13=$45000-$49999 14=$50000 or more	
KKNSQFT	CODE-KNOW-SQUARE-FEET	HOUSE/BASIC	9.1	1=yes 0=no	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KLPGSUPP	CODE-NUM-LPG-SUPPLIERS	FUELS/SUPPLIERS	122	1=one 2=more than one	
KLRGRMES	CODE-LARGEST-ROOM-ESTIMATOR	HOUSE/BASIC	10.2	1=respondent estimate 2=interviewer estimate 3=measured	
KLRGRMSP	CODE-LARGEST-ROOM-SHAPE	HOUSE/BASIC	10.1	1=room rectangular 2=room L-shaped	
KMAKEDV1-2	CODE-MAKE-DISPOSED-VEH-1-2	VEHICLES/DISPOSED-OF	88.1	see RAC Report on Methodology, Part III, Appendix C, pp 30-62	
KMAKEV1-4	CODE-MAKE-VEHICLE-1-4	VEHICLES/TYPE	65.1	"	
KMARSTAT	CODE-MARITAL-STATUS-RESPONDENT	HOUSEHOLD/CHARACTERISTICS	101	1=married 2=widowed 3=divorced-separated 4=never married	
KMHEATEQ	CODE-MAIN-HEATING-EQUIP	HOUSE/HEATING HEATING	11	0=no heating system 1=hot water pipes 2=radiators or cnvtr 3=central warm air 4=electric heat pump 5=electric wall units 6=pipeless furnace 11=heaters with flue 12=heaters without flue 13=fireplace or stove 14=portable heater 15=kitchen stove 21=other (specify) 96=don't know	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KMODLNV1-4	CODE-MODEL-NAME-VEHICLE-1-4	VEHICLES/TYPE	66.1	see RAC Report on Methodology, Part III, Appendix C, pp 30-62	
KMODNDV1-2	CODE-MODEL-NAME-DISP-VEHICLE-1-2	VEHICLES/DISPOSED OF	89.1	"	
KNELOVEN	CODE-NUMBER-ELECTRIC-OVENS	APPLIANCES/COOKING COOKING	56	1=one 2=more than one	
KNGASOV	CODE-NUMBER-GAS-OVENS	APPLIANCES/COOKING COOKING	58	1=one 2=more than one	
KNUMFLRS	CODE-NUMBER-OF-FLOORS (used for year-round living space)	HOUSE/BASIC	4	1=one floor 2=1+half floors 3=2 floors 4=2+half floors 5=3 or more floors	
KOWNCOND	CODE-OWNED-CONDO-OR-COOP	HOUSE/BASIC	111	0=no 1=yes, condo 2=yes, coop	-if own house
KOWNRENT	CODE-DWELLING-OWNED-OR-RENTED	HOUSEHOLD/CHARACTERISTICS	110	1=own 2=rent 3=rent free	
KOWNVALU	CODE-VALUE-OF-OWNED-RESIDENCE	HOUSE/BASIC	112	1=less than $10000 2=$10000-$19999 3=$20000-$29999 4=$30000-$39999 5=$40000-$59999 6=$60000-$79999 7=$80000-$99999 8=$100000-$149999 9=$150000-$199999 10=$200000-$249999 11=$250000 or more 96=don't know 97=refused	-if own house

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KPLUMIND	CODE-PLUMBING-INDIVIDUAL	HOUSEHOLD/PLUMBING	7	1=this household only 2=shared with others	-question asked if house had complete plumbing
KREFDEF1	CODE-REFRIG1-DEFROST-TYPE	REFRIGERATOR	52.1	1=manual defrost 2=automatic defrost 3=full frost-free	
KREFDEF2	CODE-REFRIG2-DEFROST-TYPE	REFRIGERATOR	52.2	1=manual defrost 2=automatic defrost 3=full frost-free	
KREFRFL1	CODE-REFRIG1-GAS-OR-ELECT	REFRIGERATOR	51.1	1=electric 2=gas	
KREFRFL2	CODE-REFRIG2-GAS-OR-ELECT	REFRIGERATOR	51.2	1=electric 2=gas	
KRELAT01-12	CODE-RELATIONSHIP-1-12	HOUSEHOLD/MEMBERS	95	1=respondent 2=spouse 3=child 4=grandchild 5=greatgrandchild 6=parent 7=grandparent 21=other relative 31=foster child 41=other nonrelative	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KRESPEDU	CODE-RESPONDENT-EDUCATION	HOUSEHOLD/MEMBERS	105	0=no schooling 1=first grade 2=second grade 3=third grade 4=fourth grade 5=fifth grade 6=sixth grade 7=seventh grade 8=eighth grade 9=ninth grade 10=tenth grade 11=eleventh grade 12=twelfth grade 13=1 year college 14=2 years college 15=3 years college 16=4 years college 17=5 years college 18=6-more yrs college	
KRESPFIN	CODE-RESPONDENT-FINISH-GRADE	HOUSEHOLD/MEMBERS	106	0=no 1=yes	
KRESRACE	CODE-RACE-OF-RESPONDENT	HOUSEHOLD/MEMBERS	102	1=white 2=black 5=other	
KRMCLFLU	CODE-ROOM-CLOSED-FUEL-UNAVAIL	HEATING CONSERVATION	31.2	0=no 1=yes	-if one or more rooms were closed off during winter of 1977-78, i.e. KRMCLOSE = 1.

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KRMCLNUS	CODE-ROOM-CLOSED-NOT-USED	HEATING CONSERVATION	31.4	0=no 1=yes	-if one or more rooms were closed off during winter of 1977-78, i.e. KRMCLOSE = 1.
KRMCLNWM	CODE-ROOM-CLOSED-NOT-WARM	HEATING CONSERVATION	31.3	0=no 1=yes	-if one or more rooms were closed off during winter of 1977-78, i.e. KRMCLOSE = 1.
KRMCLOSE	CODE-ROOMS-CLOSED-WINTER77-78	HEATING CONSERVATION	30	0=no 1=yes 5=not appropriate (did not live here last winter)	
KRMCLOTH	CODE-ROOM-CLOSED-OTHER	HEATING CONSERVATION	31.5	0=no 1=yes	-if one or more rooms were closed off during winter of 1977-78, i.e. KRMCLOSE = 1.
KRMCLSFL	CODE-ROOM-CLOSED-SAVE-FUEL	HEATING CONSERVATION	31.1	0-no 1=yes	-if one or more rooms were closed off during winter of 1977-78, i.e. KRMCLOSE = 1.
KSEX01-12	CODE-SEX-RELATION-1-12	HOUSEHOLD/MEMBERS	95.2	1=female 2=male	
KSHARHOM	CODE-SHARED-HOUSING-UNIT	HOUSE/BASIC	103	0=no 1=yes	
KSHEATEQ	CODE-SECONDARY-HEAT-EQUIP	HOUSE/HEATING HEATING	17	same as KMHEATEQ	-only asked if HSHEATEQ = 1 (yes).
KSPOUEDU	CODE-SPOUSE-EDUCATION	HOUSEHOLD/MEMBERS	107	same as KRESPEDU	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KSPOUFIN	CODE-SPOUSE-FINISH-GRADE	HOUSEHOLD/MEMBERS	108	0=no 1=yes	
KTYPEDV1-2	CODE-TYPE-DISPOSED-VEH-1-2	VEHICLES/DISPOSED OF	87.1	1=station wagon 2=automobile 3=jeep-like vehicle 4=passenger van-bus 5=cargo van 6=pickup truck 7=other truck 8=motor home 9=motorcycle 10=moped-motor bicycle 11=big bus 21=other	
KTYPEV1-4	CODE-TYPE-VEHICLE-1-4	VEHICLES/TYPE	64.1	same as KTYPEDV1-2	
KUJBPYV1-4	CODE-USED-JOB-PART-YR-VEH-1-4	VEHICLES/USE	71.1	0=no 1=yes	
KUJBWYV1-4	CODE-USED-JOB-WHOLE-YR-VEH-1-4	VEHICLES/USE	76.1	0=no 1=yes	
KUSEPRV1-4	CODE-PERIOD-OF-USE-VEHICLE 1-4	VEHICLES/USE	67.1	1=in past 12 months 2=more than 12 months	
KUSJBDV1-2	CODE-USED-JOB-DISP-VEHICLE-1-2	VEHICLES/USE	93.1	0=no 1=yes	
KVEHDISP	CODE-VEHICLE-DISPOSED-OF-12-MO	VEHICLES/DISPOSED OF	85	0=no 1=yes	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
KWHEATFL	CODE-WATER-HEATER-FUEL	WATER HEATING HOUSE/WATER HEATING	32	same as KFLMHEAT	
KWHPTFUR	CODE-WATER-HEATER-PART-FURNACE	WATER HEATING HOUSE/WATER HEATING	35	1=part of furnace 2=separate 6=don't know	
KWHTCOM	CODE-WATER-HEATER-COMMON	WATER HEATING HOUSE/WATER HEATING	34	1=common system 2=individual system	-not asked for one-family house, mobile home or trailer
KYHOUSBT	CODE-YEAR-HOUSE-BUILT	HOUSE/BASIC	3	1=before 1940 2=1940-1949 3=1950-1959 4=1960-1964 5=1965-1969 6=1970-1974 7=1975 8=1976 9=1977 10=1978 11=1979	
KYMOVEIN	CODE-YEAR-MOVED-IN	HOUSE/BASIC	1	same coding as KYHOUSBT	
MACCAULK1-3	MONTH-ADD-CAULK-1-3	HOUSE/RETROFIT CONSERVATION INSULATION RETROFIT	45	month coded 1=Jan. to 12=Dec.	-for ACAULK = yes -995 = in process

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
MACLKTHM	MONTH-ADDED-AUTO-THERMOSTAT	HOUSE/RETROFIT CONSERVATION RETROFIT	42.050	month coded 1=Jan. to 12=Dec.	
MAHTPUMP	MONTH-ADD-ELECTRIC-HEAT-PUMP	HOUSE/RETROFIT RETROFIT	42.110	month coded 1=Jan. to 12=Dec.	
MAINSATR	MONTH-ADDED-INSUL-ATTIC-ROOF	HOUSE/RETROFIT RETROFIT INSULATION	42.060	month coded 1=Jan. to 12=Dec.	
MAINSHWP	MONTH-ADD-INSUL-HOT-WATER-PIPE	HOUSE/RETROFIT RETROFIT INSULATION	42.080	month coded 1=Jan. to 12=Dec.	
MAINSOTR	MONTH-ADD-INSUL-OTHER	HOUSE/RETROFIT RETROFIT INSULATION	42.100	month coded 1=Jan. to 12=Dec.	
MAINSUFL	MONTH-ADD-INSUL-UNDER-FLOOR	HOUSE/RETROFIT RETROFIT INSULATION	42.070	month coded 1=Jan. to 12=Dec.	
MAINSWAL	MONTH-ADD-INSUL-OUTSIDE-WALLS	HOUSE/RETROFIT RETROFIT INSULATION	42.070	month coded 1=Jan. to 12=Dec.	
MAINSWHT	MONTH-ADD-INSUL-WATER-HEATER	HOUSE/RETROFIT RETROFIT INSULATION	42.090	month coded 1=Jan. to 12=Dec.	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
MANEWFRN	MONTH-ADD-NEW-FURNACE	HOUSE/RETROFIT RETROFIT HEATING	42.130	month coded 1=Jan. to 12=Dec.	
MANEWWHT	MONTH-ADD-NEW-WATER-HEATER	HOUSE/RETROFIT RETROFIT WATER HEATING	42.120	month coded 1=Jan. to 12=Dec.	
MAPLCOV1-3	MONTH-ADD-PLASTIC-COVER-1-3	HOUSE/RETROFIT RETROFIT CONSERVATION	48.1	month coded 1=Jan. to 12=Dec.	-for APLSTCOV = yes
MASTDOOR	MONTH-ADDED-STORM-DOOR	HOUSE/RETROFIT RETROFIT INSULATION	42.030	month coded 1=Jan. to 12=Dec.	
MASTWIN	MONTH-ADD-STORM-OR-INSUL-WIN	HOUSE/RETROFIT RETROFIT INSULATION	42.010	month coded 1=Jan. to 12=Dec.	
MAWINSHT	MONTH-ADDED-WINDOW-CLOSE-SHUTR	HOUSE/RETROFIT RETROFIT INSULATION	42.020	month coded 1=Jan. to 12=Dec.	
MAWTHSTR	MONTH-ADDED-WEATHER-STRIPPING	HOUSE/RETROFIT RETROFIT INSULATION	42.040	month coded 1=Jan. to 12=Dec.	
MDISPV1-2	MONTH-DISPOSED-VEHICLE-1-2	VEHICLES/DISPOSED OF	91.11	month coded 1=Jan. to 12=Dec.	
MGOTV1-4	MONTH-GOTTEN-VEHICLE-1-4	VEHICLES/USE	68.11	month coded 1=Jan. to 12=Dec.	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
MMOVEIN	MONTH-MOVED-IN	HOUSE/BASIC	2	month coded 1=Jan. to 12=Dec.	-question asked if year moved into house was 1977 or later
NAGE01-12	NUM-AGE-RELATION-1-12	HOUSEHOLD/MEMBERS	95.3	age of person in years	
NCOMBATH	NUM-COMPLETE-BATHROOMS	HOUSE/PLUMBING	8.1	no. of bath-rooms (5 = five or more)	-question asked if house had complete plumbing
NDOORS	NUM-OUTSIDE-DOORS	HOUSE/WINDOWS-DOORS	28	no. of doors	
NDRIVERS	NUM-DRIVERS-IN-HOUSEHOLD	HOUSEHOLD/CHARACTERISTICS VEHICLES/USE	104	no. of drivers	
NFODELIV	NUM-FUEL-OIL-DELIVERIES-PAST-Y	FUELS/SUPPLIERS	118	no. of deliveries	
NFOSUPPL	NUM-FUEL-OIL-SUPPLIERS	FUELS/SUPPLIERS	120	no. of suppliers	
NHAFBATH	NUM-HALF-BATHROOMS	HOUSE/PLUMBING	8.2	no. of half bathrooms (5= five or more)	-question asked if house had complete plumbing
NHSLDMEM	NUM-MEMBERS-IN-HOUSEHOLD	HOUSEHOLD/MEMBERS	95.5	no. of persons	
NINATINS	NUM-INCHES-ATTIC-INSULATION	HOUSE/INSULATION INSULATION	37	inches of in-sulation	-if have attic or roof in-sulation, i.e. HINATTIC=1.
NLPGDELV	NUM-LPG-DELIVERIES-PAST-YEAR	FUELS/SUPPLIERS	121	no. of deliveries	

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
NLPGSUPP	NUM-LPG-SUPPLIERS	FUELS/SUPPLIERS	123	no. of suppliers	
NLRGRMML	NUM-FT-LARGE-ROOM-MAIN-LENGTH	HOUSE/BASIC	10.5	no. of feet	
NLRGRMMW	NUM-FT-LARGE-ROOM-MAIN-WIDTH	HOUSE/BASIC	10.3	no. of feet	
NLRGRMSL	NUM-FT-LARGE-ROOM-SHORT-LENGTH	HOUSE/BASIC	10.4	no. of feet	
NLRGRMSW	NUM-FT-LARGE-ROOM-SHORT-WIDTH	HOUSE/BASIC	10.6	no. of feet	
NMIJBDV1-2	NUM-MILES-JOB-DISP-VEHICLE-1-2	VEHICLES/DISPOSED OF	94.1	no. of miles driven	
NMILEDV1-2	NUM-MILES-DISP-VEHICLE-1-2	VEHICLES/DISPOSED OF VEHICLES/USE	92.1	no. of miles driven during past 12 mos.	
NMILPYV1-4	NUM-MILES-PART-YEAR-VEHICLE-1-4	VEHICLES/USE	69.1	no. of miles driven since acquiring (less than 12 mos)	-car owned less than 12 mos.
NMILWYV1-4	NUM-MILES-WHOLE-YEAR-VEHICLE-1-4	VEHICLES/USE	74.1	no. of miles driven in past 12 mos	-car owned more than 12 mos.
NMIPYHV1-4	NUM-MILES-PART-YR-HWY-VEH-1-4	VEHICLES/USE	70.1	no. of miles driven on high-way since acquiring (less than 12 mos)	-car owned 12 mos or less

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
NMIPYJV1-4	NUM-MILES-PART-YR-JOB-VEH1-4	VEHICLES/USE	72.1	no. of miles driven on-the-job since acquiring (less than 12 mos)	-car owned 12 mos or less
NMIWYHV1-4	NUM-MILES-WHOLE-YR-HWY-VEH-1-4	VEHICLES/USE	75.1	no. of miles driven on highway in past 12 mos	-car owned more than 12 mos
NMIWYJV1-4	NUM-MILES-WHOLE-YR-JOB-VEH-1-4	VEHICLES/USE	77.1	no. of miles driven on-the-job in past 12 mos	-car owned more than 12 mos
NMONRENT	NUM-MONTHLY-RENT	HOUSE/BASIC	113	monthly rent in dollars	-if rent house/apartment
NMPGAVG1-4	NUM-MPG-AVERAGE-VEHICLE-1-4	VEHICLES/USE	81.1	average mpg if car not used for highway driving	
NMPGHWY1-4	NUM-MPG-HIGHWAY-VEHICLE-1-4	VEHICLES/USE	78.1	mpg in highway driving	
NMPGLDV1-2	NUM-MPG-LOCAL-DISP-VEH-1-2	VEHICLES/DISPOSED OF	90.1	mpg in local driving	
NMPGLOC1-4	NUM-MPG-LOCAL-VEHICLE-1-4	VEHICLES/USE	79.1	mpg in local driving	
NREFRIG	NUM-REFRIGERATORS	REFRIGERATOR	50	no. of refrigerators	-for HREFRIG = yes

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Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
NRMACUNT	NUM-ROOM-AIR-CONDITIONER-UNITS	HOUSE/AIR CONDITIONING AIR CONDITIONING	21	no. of room AC units	
NROOMAC	NUM-ROOMS-AIR-CONDITIONED	HOUSE/AIR CONDITIONING AIR CONDITIONING	20	no. of AC rooms	-if have room AC units
NROOMS	NUM-ROOMS	HOUSE/BASIC	5	no. of rooms in house	-half rooms do not count
NSDOORS	NUM-STORM-DOORS	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	29	no. of storm doors	-if have one or more outside doors (NDOORS)
NSQFEET	NUM-SQUARE-FEET-IN-RESIDENCE	HOUSE/BASIC	9.2	square feet	
NSWINCAS	NUM-STORM-WINDOWS-CASEMENT	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.2	no. of windows	
NSWINJAL	NUM-STORM-WINDOWS-JALOUSIE	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.6	no. of windows	
NSWINOTR	NUM-STORM-WINDOWS-OTHER	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.8	no. of windows	
NSWINPIC	NUM-STORM-WINDOWS-PICTURE	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.4	no. of windows	
NSWINSDH	NUM-STORM-WIN-SINGLE-DBL-HUNG	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.1	no. of windows	
NSWINSGD	NUM-STORM-WIN-SLIDING-GL-DOOR	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.7	no. of windows	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
NSWINSLD	NUM-STORM-WINDOWS-SLIDING	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.3	no. of windows	
NSWINTLT	NUM-STORM-WINDOWS-TILTING	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	27.5	no. of windows	
NVEHDISP	NUM-VEHICLES-DISPOSED-OF-12-MO	VEHICLES/DISPOSED OF	86	no. of cars	
NVEHICLE	NUM-VEHICLES-IN-HOUSEHOLD	VEHICLES/TYPE	63	no. of cars	
NWINCASE	NUM-WINDOWS-CASEMENT	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.2	no. of windows	
NWINJAL	NUM-WINDOWS-JALOUSIE	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.6	no. of windows	
NWINOTHR	NUM-WINDOWS-OTHER	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.8	no. of windows	
NWINPIC	NUM-WINDOWS-PICTURE	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.4	no. of windows	
NWINSDH	NUM-WINDOWS-SINGLE-DBL-HUNG	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.1	no. of windows	
NWINSGDR	NUM-WINDOWS-SLIDING-GLASS-DOOR	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.7	no. of windows	
NWINSLID	NUM-WINDOWS-SLIDING	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.3	no. of windows	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
NWINTILT	NUM-WINDOWS-TILTING	HOUSE/WINDOWS-DOORS WINDOWS-DOORS	26.5	no. of windows	
PELAC	PAY-ELECTRIC-AIR-CONDITIONING	FUELS/PAYMENT	115.05	1=paid by household 2=included in rent 5=other	
PELCOOK	PAY-ELECTRIC-COOKING	FUELS/PAYMENT	115.02	1=paid by household 2=included in rent 5=other	
PELHEAT	PAY-ELECTRIC-FOR-HEAT	FUELS/PAYMENT	115.04	1=paid by household 2=included in rent 5=other	
PELHOTWA	PAY-ELECTRIC-FOR-HOT-WATER	FUELS/PAYMENT	115.03	1=paid by household 2=included in rent 5=other	
PELLIGHT	PAY-ELECTRIC-LIGHTS-APPLIANCES	FUELS/PAYMENT	115.01	1=paid by household 2=included in rent 5=other	
PFOHEAT	PAY-FUEL-OIL-FOR-HEAT	FUELS/PAYMENT	115.17	1=paid by household 2=included in rent 5=other	
PFOHTWA	PAY-FUEL-OIL-FOR-HOT-WATER	FUELS/PAYMENT	115.16	1=paid by household 2=included in rent 5=other	
PGASAPPL	PAY-GAS-FOR-APPLIANCES	FUELS/PAYMENT	115.07	1=paid by household 2=included in rent 5=other	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
PGASCNAC	PAY-GAS-CENTRAL-AIR-CONDITION	FUELS/PAYMENT	115.10	1=paid by household 2=included in rent 5=other	
PGASCOOK	PAY-GAS-FOR-COOKING	FUELS/PAYMENT	115.06	1=paid by household 2=included in rent 5=other	
PGASHEAT	PAY-GAS-FOR-HEAT	FUELS/PAYMENT	115.09	1=paid by household 2=included in rent 5=other	
PGASHTWA	PAY-GAS-FOR-HOT-WATER	FUELS/PAYMENT	115.08	1=paid by household 2=included in rent 5=other	
PLPGAPPL	PAY-LPG-FOR-APPLIANCES	FUELS/PAYMENT	115.12	1=paid by household 2=included in rent 5=other	
PLPGCNAC	PAY-LPG-CENTRAL-AIR-CONDITION	FUELS/PAYMENT	115.15	1=paid by household 2=included in rent 5=other	
PLPGCOOK	PAY-LPG-FOR-COOKING	FUELS/PAYMENT	115.11	1=paid by household 2=included in rent 5=other	
PLPGHEAT	PAY-LPG-FOR-HEAT	FUELS/PAYMENT	115.14	1=paid by household 2=included in rent 5=other	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
PLPGHTWA	PAY-LPG-FOR-HOT-WATER	FUELS/PAYMENT	115.13	1=paid by household 2=included in rent 5=other	
UELAC	USE-ELECTRIC-AIR-CONDITIONING	FUELS/USE	114.05	0=not used 1=used	
UELCOOK	USE-ELECTRIC-COOKING	FUELS/USE	114.02	0=not used 1=used	
UELHEAT	USE-ELECTRIC-FOR-HEAT	FUELS/USE	114.04	0=not used 1=used	
UELHOTWA	USE-ELECTRIC-FOR-HOT-WATER	FUELS/USE	114.03	0=not used 1=used	
UELLIGHT	USE-ELECTRIC-LIGHTS-APPLIANCES	FUELS/USE	114.01	0=not used 1=used	
UFOHEAT	USE-FUEL-OIL-FOR-HEAT	FUELS/USE	114.17	0=not used 1=used	
UFOHTWA	USE-FUEL-OIL-FOR-HOT-WATER	FUELS/USE	114.16	0=not used 1=used	
UGASAPPL	USE-GAS-FOR-APPLIANCES	FUELS/USE	114.07	0=not used 1=used	
UGASCNAC	USE-GAS-CENTRAL-AIR-CONDITION	FUELS/USE	114.10	0=not used 1=used	
UGASCOOK	USE-GAS-FOR-COOKING	FUELS/USE	114.06	0=not used 1=used	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
UGASHEAT	USE-GAS-FOR-HEAT	FUELS/USE	114.09	0=not used 1=used	
UGASHTWA	USE-GAS-FOR-HOT-WATER	FUELS/USE	114.08	0=not used 1=used	
ULPGAPPL	USE-LPG-FOR-APPLIANCES	FUELS/USE	114.12	0=not used 1=used	
ULPGCNAC	USE-LPG-CENTRAL-AIR-CONDITION	FUELS/USE	114.15	0=not used 1=used	
ULPGCOOK	USE-LPG-FOR-COOKING	FUELS/USE	114.11	0=not used 1=used	
ULPGHEAT	USE-LPG-FOR-HEAT	FUELS/USE	114.14	0=not used 1=used	
ULPGHTWA	USE-LPG-FOR-HOT-WATER	FUELS/USE	114.13	0=not used 1=used	
YACAULK1-3	YEAR-ADD-CAULK-1-3	HOUSE/RETROFIT RETROFIT INSULATION CONSERVATION	45	year added	-for ACAULK = yes -995=in process
YACLKTHM	YEAR-ADDED-AUTO-THERMOSTAT	HOUSE/RETROFIT RETROFIT HEATING CONSERVATION	42.050	year added	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
YAHTPUMP	YEAR-ADD-ELECTRIC-HEAT-PUMP	HOUSE/RETROFIT RETROFIT HEATING CONSERVATION	42.110	year added	
YAINSATR	YEAR-ADDED-INSUL-ATTIC-ROOF	HOUSE/RETROFIT RETROFIT INSULATION	42.060	year added	
YAINSHWP	YEAR-ADD-INSUL-HOT-WATER-PIPE	HOUSE/RETROFIT RETROFIT INSULATION	42.080	year added	
YAINSOTR	YEAR-ADD-INSUL-OTHER	HOUSE/RETROFIT RETROFIT INSULATION	42.100	year added	
YAINSUFL	YEAR-ADD-INSUL-UNDER-FLOOR	HOUSE/RETROFIT RETROFIT INSULATION	42.070	year added	
YAINSWAL	YEAR-ADD-INSUL-OUTSIDE-WALLS	HOUSE/RETROFIT RETROFIT INSULATION	42.070	year added	
YAINSWHT	YEAR-ADD-INSUL-WATER-HEATER	HOUSE/RETROFIT RETROFIT INSULATION	42.090	year added	
YANEWFRN	YEAR-ADD-NEW-FURNACE	HOUSE/RETROFIT RETROFIT HEATING	42.130	year added	

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
YANEWWHT	YEAR-ADD-NEW-WATER-HEATER	HOUSE/RETROFIT RETROFIT WATER HEATING	42.120	year added	
YAPLCOV1-3	YEAR-ADD-PLASTIC-COVER-1-3	HOUSE/RETROFIT RETROFIT INSULATION	48.12	year added	-for APLSTCOV = yes
YASTDOOR	YEAR-ADDED-STORM-DOOR	HOUSE/RETROFIT RETROFIT WINDOWS-DOORS	42.030	year added	
YASTWIN	YEAR-ADD-STORM-OR-INSUL-WIN	HOUSE/RETROFIT RETROFIT WINDOWS-DOORS	42.010	year added	
YAWINSHT	YEAR-ADDED-WINDOW-CLOSE-SHUTTR	HOUSE/RETROFIT RETROFIT WINDOWS-DOORS	42.020	year added	
YAWTHSTR	YEAR-ADDED-WEATHER-STRIPPING	HOUSE/RETROFIT RETROFIT WINDOWS-DOORS	42.040	year added	
YDISPV1-2	YEAR-DISPOSED-VEHICLE-1-2	VEHICLES/DISPOSED OF	91.2	year disposed of	
YMODLDV1-2	YEAR-MODEL-DISP-VEHICLE-1-2	VEHICLES/DISPOSED OF	88.2	model year	
YMODLV1-4	YEAR-MODEL-VEHICLE-1-4	VEHICLES/TYPE	65.2	model year	
YPGOTV1-4	YEAR-PAST-GOT-VEH-1-4	VEHICLES/TYPE	73.1	year purchased	-car owned for more than 12 mos.

Table A

Variable	Description	Key Words	Survey Question Number	Units/Coding[1] Convention	Notes/References[2]
YRFOTV1-4	YEAR-RECENT-GOT-VEH-1-4	VEHICLES/TYPE	68.2	year purchased	-car owned for 12 mos or less

FOOTNOTES:

[1]The following special codes are used throughout the file: 6 = don't know, 7 = refused, 8 = no answer, 9 = not applicable. For multiple column answers, leading 9's are used to fill the field, e.g. 96, 998, etc. In general, 0 (zero) means "no", "none" or "zero".

[2]See NIECS REPORT ON METHODOLOGY (June 30, 1981), Part III, Appendix C, for more detailed description of editing and coding procedures used.

2.10.B Key NIECS Variables: Frequency Distributions and Summary Statistics

Table B is an alphabetical listing of a selected set of the NIECS household questionnaire variables plus a number of the recoded variables which are included on the NIECS public-use tape. The varaibles selected were those non-vehicle variables which were judged to be directly related to the household appliance choice/utilization decision. Several summary variables, summarizing more detailed variables, were also included.

Of the 391 household variables, 116 are related to vehicles and vehicle usage. Thus, there are a total of 275 non-vehicle household variables, of which 49 contain family-member information and 16 relate to windows. Three summary variables - NWINDOWS(total number of windows), NSTRWINS(total number of storm windows), and PERCSWIN(total storm windows/total windows), - were used in place of the 16 window variables, while 5 recoded variables - NHSLDMEN, KRSEDREC, KSPEDREC, KRSAGERC AND KPSAGERC - were used in place of the more detailed household-member variables. Of the remaining 210 variables, 182 were selected as being particularly relevant to the modeling of residential energy demand. An additional 65 recoded variables, having to do with location, community type, weather region, annual fuel consumption and expenditures, and other fuel usage information, were selected, for a total of 255(182 + 8 + 65) variables.

Table B summarizes the frequency distributions and related statistics for these 255 NIECS variables for each of 3,842 households. The 239 mailed questionnaire households were left out since virtually all of their responses were imputed. In the case of discrete or coded variables, Table B gives the frequency distribution of the responses

for each variable, both in absolute and relative terms and both with and without missing responses being counted. In addition, the minimum and maximum values and the range, mean and standard deviation for each variable are also shown. The frequency distribution also includes the coding catagories or definitions. In the case of several continuous variables, the frequency distribution is omitted but the statistics listed above are included. Thus, Table B includes a large amount of statistical information on most of the NIECS variables.

In general, the following non-response codes were used:

6 = don't know

7 = refused to answer

8 = no answer

9 = not applicable

For multiple column responses, leading 9's were used to fill the field, e.g. 96 or 996 for "don't know" and 998 for "no answer."

Table B

ACAULK ADD-CAULKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2490	64.8	72.4	72.4
YES	1.	950	24.7	27.6	100.0
	9.	402	10.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.276	STD DEV	0.447	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3440	MISSING CASES	402		

ACLKTHRM ADD-AUTO-OR-CLOCK-THERMOSTAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3341	87.0	97.1	97.1
YES	1.	81	2.1	2.4	99.4
IN PROCESS	2.	20	0.5	0.6	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3342	100.0	100.0	

MEAN	0.035	STD DEV	0.213	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AHTPUMP ADD-ELECTRIC-HEAT-PUMP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3417	88.9	99.3	99.3
YES	1.	11	0.3	0.3	99.6
IN PROCESS	2.	14	0.4	0.4	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.011	STD DEV	0.139	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSATRF ADD-INSUL-ATTIC-OR-ROOF

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3103	80.8	90.2	90.2
YES	1.	302	7.9	8.8	98.9
IN PROCESS	2.	37	1.0	1.1	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.109	STD DEV	0.345	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSHWP ADD-INSUL-HOT-WATER-PIPE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3268	85.1	94.9	94.9
YES	1.	151	3.9	4.4	99.3
IN PROCESS	2.	23	0.6	0.7	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.057	STD DEV	0.260	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSOTHR ADD-INSUL-OTHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3348	87.1	97.3	97.3
YES	1.	73	1.9	2.1	99.4
IN PROCESS	2.	21	0.5	0.6	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.033	STD DEV	0.211	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSUFL ADD-INSUL-UNDER-FLOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3297	85.8	95.8	95.8
YES	1.	114	3.0	3.3	99.1
IN PROCESS	2.	31	0.8	0.9	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.051	STD DEV	0.258	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSWALL ADD-INSUL-OUTSIDE-WALLS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3256	84.7	94.6	94.6
YES	1.	156	4.1	4.5	99.1
IN PROCESS	2.	30	0.8	0.9	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.063	STD DEV	0.276	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AINSWHTR ADD-INSUL-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3368	87.7	97.9	97.9
YES	1.	55	1.4	1.6	99.4
IN PROCESS	2.	19	0.5	0.6	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.027	STD DEV	0.193	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

ANEWFURN ADD-NEW-FURNACE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3312	86.2	96.2	96.2
YES	1.	113	2.9	3.3	99.5
IN PROCESS	2.	17	0.4	0.5	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.043	STD DEV	0.225	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

ANEWWHTR ADD-NEW-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3248	84.5	94.4	94.4
YES	1.	179	4.7	5.2	99.6
IN PROCESS	2.	15	0.4	0.4	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.061	STD DEV	0.256	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

APLSTCOV ADD-PLASTIC-COVERING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2833	73.7	82.4	82.4
YES	1.	607	15.8	17.6	100.0
	9.	402	10.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.176	STD DEV	0.381	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3440	MISSING CASES	402		

ASTDOOR ADD-STORM-DOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3122	81.3	90.7	90.7
YES	1.	281	7.3	8.2	98.9
IN PROCESS	2.	39	1.0	1.1	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.104	STD DEV	0.341	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

ASTINWIN ADD-STORM-WINDOW-OR-INSUL-GLAS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3096	80.6	89.9	89.9
YES	1.	299	7.8	8.7	98.6
IN PROCESS	2.	47	1.2	1.4	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.114	STD DEV	0.358	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AWETHSTR ADD-WEATHER-STRIPPING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2807	73.1	81.6	81.6
YES	1.	586	15.3	17.0	98.6
IN PROCESS	2.	49	1.3	1.4	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.199	STD DEV	0.433	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	3442	MISSING CASES	400		

AWINSHUT ADD-WINDOW-CLOSABLE-SHUTTERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3398	88.4	98.7	98.7
YES	1.	27	0.7	0.8	99.5
IN PROCESS	2.	17	0.4	0.5	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.018	STD DEV	0.165	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CA[illegible]	3442	MISSING CASES	400		

HACCNTL HAVE-AIR-COND-CNTLROL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	10	0.3	1.1	1.1
YES	1.	877	22.8	98.9	100.0
	9.	2955	76.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.989	STD DEV	0.106	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	887	MISSING CASES	2955		

HACCOTH HAVE-AIR-COND-OTHER-CONTROL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	876	22.8	99.9	99.9
YES	1.	1	0.0	0.1	100.0
	9.	2965	77.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.001	STD DEV	0.034	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	877	MISSING CASES	2965		

HACHILO HAVE-AIR-COND-HI-LO-SWITCH

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	837	21.8	95.4	95.4
YES	1.	40	1.0	4.6	100.0
	9.	2965	77.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.046	STD DEV	0.209	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	877	MISSING CASES	2965		

HACTHERM HAVE-AIR-COND-THERMOSTAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	21	0.5	2.4	2.4
YES	1.	856	22.3	97.6	100.0
	9.	2965	77.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.976	STD DEV	0.153	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	877	MISSING CASES	2965		

HAUTOWSH HAVE-AUTOMATIC-WASHING-MACHINE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1043	27.1	27.1	27.1
YES	1.	2799	72.9	72.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.729	STD DEV	0.445	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HCENTAC HAVE-CENTRAL-AIR-CONDITIONING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2955	76.9	76.9	76.9
YES	1.	887	23.1	23.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.231	STD DEV	0.421	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HCOMPLUM HAVE-COMPLETE-PLUMBING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
YES	1.	3798	98.9	98.9	98.9
NO, SOME FACILITIES	2.	31	0.8	0.8	99.7
NO FACILITIES	3.	13	0.3	0.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.015	STD DEV	0.146	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

HELCLSDY HAVE-ELECTRIC-CLOTHES-DRYER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2030	52.8	52.8	52.8
YES	1.	1812	47.2	47.2	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.472	STD DEV	0.499	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HELDISHW HAVE-ELECTRIC-DISH-WASHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2513	65.4	65.4	65.4
YES	1.	1329	34.6	34.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.346	STD DEV	0.476	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HELOVEN HAVE-ELECTRIC-OVEN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1776	46.2	46.2	46.2
YES	1.	2066	53.8	53.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.538	STD DEV	0.499	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HELRANGE HAVE-ELECTRIC-RANGE-COUNTER-TP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1735	45.2	45.2	45.2
YES	1.	2107	54.8	54.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.548	STD DEV	0.498	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HGASOVEN HAVE-GAS-OVEN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2105	54.8	54.8	54.8
YES	1.	1737	45.2	45.2	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.452	STD DEV	0.498	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HGASRANG HAVE-GAS-RANGE-COUNTER-TOP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2055	53.5	53.5	53.5
YES	1.	1787	46.5	46.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.465	STD DEV	0.499	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HGSCLSDY HAVE-GAS-CLOTHES-DRYER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3269	85.1	85.1	85.1
YES	1.	573	14.9	14.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.149	STD DEV	0.356	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HHTCNTL HAVE-HEATING-CNTLROL-SYSTEM

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	465	12.1	12.2	12.2
YES	1.	3359	87.4	87.8	100.0
	9.	18	0.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.878	STD DEV	0.327	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3824	MISSING CASES	18		

HHTCNTO HAVE-HEATING-CONTROL-OTHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3295	85.8	98.1	98.1
YES	1.	64	1.7	1.9	100.0
	9.	483	12.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.019	STD DEV	0.137	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3359	MISSING CASES	483		

HHTTHERM HAVE-HEATING-THERMOSTAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	155	4.0	4.6	4.6
YES	1.	3204	83.4	95.4	100.0
	9.	483	12.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.954	STD DEV	0.210	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3359	MISSING CASES	483		

HHTVALVE HAVE-HEATING-RADIATOR-VALVE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3216	83.7	95.7	95.7
YES	1.	143	3.7	4.3	100.0
	9.	483	12.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.043	STD DEV	0.202	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3359	MISSING CASES	483		

HHTWATER HAVE-HOT-RUNNING-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	35	0.9	0.9	0.9
YES	1.	3791	98.7	99.1	100.0
	9.	16	0.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.991	STD DEV	0.095	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3826	MISSING CASES	16		

HINATTIC HAVE-INSULATION-IN-ATTIC-ROOF

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	644	16.8	21.1	21.1
YES	1.	2404	62.6	78.9	100.0
	6.	394	10.3	MISSING	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.789	STD DEV	0.408	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3048	MISSING CASES	794		

HINWALL HAVE-INSULATION-IN-WALLS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	930	24.2	34.4	34.4
YES	1.	1772	46.1	65.6	100.0
	6.	740	19.3	MISSING	100.0
	9.	400	10.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.656	STD DEV	0.475	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	2702	MISSING CASES	1140		

HMICOVEN HAVE-MICROWAVE-OVEN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3522	91.7	91.7	91.7
YES	1.	320	8.3	8.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.083	STD DEV	0.276	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HODGASGL HAVE-OUTDOOR-GAS-GRILL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3621	94.2	94.2	94.2
YES	1.	221	5.8	5.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.058	STD DEV	0.233	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HODGASLT HAVE-OUTDOOR-GAS-LIGHT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3776	98.3	98.3	98.3
YES	1.	66	1.7	1.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.017	STD DEV	0.130	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HREFRIG HAVE-REFRIGERATOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	12	0.3	0.3	0.3
YES	1.	3830	99.7	99.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.997	STD DEV	0.056	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HRFAIWD1 HAVE-REFRIG1-AUTO-ICE-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3733	97.2	97.5	97.5
YES	1.	97	2.5	2.5	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.025	STD DEV	0.157	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HRFAIWD2 HAVE-REFRIG2-AUTO-ICE-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	527	13.7	99.6	99.6
YES	1.	2	0.1	0.4	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.004	STD DEV	0.061	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HRFENSV1 HAVE-REFRIG1-EN-SAVE-SWITCH

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3356	87.4	87.6	87.6
YES	1.	474	12.3	12.4	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.124	STD DEV	0.329	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HRFENSV2 HAVE-REFRIG2-EN-SAVE-SWITCH

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	506	13.2	95.7	95.7
YES	1.	23	0.6	4.3	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.043	STD DEV	0.204	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HRFEXIN1 HAVE-REFRIG1-EXTRA-INSUL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3316	86.3	86.6	86.6
YES	1.	514	13.4	13.4	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.134	STD DEV	0.341	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HRFEXIN2 HAVE-REFRIG2-EXTRA-INSUL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	505	13.1	95.5	95.5
YES	1.	24	0.6	4.5	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.045	STD DEV	0.208	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HRFICEM1 HAVE-REFRIG1-AUTO-ICE-MAKER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3237	84.3	84.5	84.5
YES	1.	593	15.4	15.5	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.155	STD DEV	0.362	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HR[illegible]EM2 HAVE-REFRIG2-AUTO-ICE-MAKER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	514	13.4	97.2	97.2
YES	1.	15	0.4	2.8	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.028	STD DEV	0.166	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HRFSFD1 HAVE-REFRIG1-SEPARATE-FRZR-DR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	873	22.7	22.8	22.8
YES	1.	2957	77.0	77.2	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.772	STD DEV	0.420	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HRFSFD2 HAVE-REFRIG2-SEPARATE-FRZR-DR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	315	8.2	59.5	59.5
YES	1.	214	5.6	40.5	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.405	STD DEV	0.491	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HRFTEMP1 HAVE-REFRIG1-TEMP-CONTROL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	102	2.7	2.7	2.7
YES	1.	3728	97.0	97.3	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.973	STD DEV	0.161	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3830	MISSING CASES	12		

HRFTEMP2 HAVE-REFRIG2-TEMP-CONTROL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	31	0.8	5.9	5.9
YES	1.	498	13.0	94.1	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.941	STD DEV	0.235	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	529	MISSING CASES	3313		

HROOMAC HAVE-ROOM-AIR-CONDITIONERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2555	66.5	66.5	66.5
YES	1.	1287	33.5	33.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.335	STD DEV	0.472	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HSHEATEQ HAVE-SECONDARY-HEATING-EQUIP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2663	69.3	69.6	69.6
YES	1.	1161	30.2	30.4	100.0
	9.	18	0.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.304	STD DEV	0.460	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3824	MISSING CASES	18		

HSMCKAPL HAVE-SMALL-COOKING-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1178	30.7	30.7	30.7
YES	1.	2664	69.3	69.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.693	STD DEV	0.461	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HSFrurRZ HAVE-SEPARATE-FOOD-FREEZER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2421	63.0	63.0	63.0
YES	1.	1421	37.0	37.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.370	STD DEV	0.483	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

HWRNGWSH HAVE-WRINGER-WASHING-MACHINE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3665	95.4	95.4	95.4
YES	1.	177	4.6	4.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.046	STD DEV	0.210	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KACAULK CODE-TIMES-ADDED-CAULKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ONE	1.	740	19.3	77.9	77.9
MORE THAN ONE	2.	210	5.5	22.1	100.0
	9.	2892	75.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.221	STD DEV	0.415	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	950	MISSING CASES	2892		

KACSYSCN CODE-AC-SYSTEM-COMMON

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
COMMON SYSTEM	1.	46	1.2	26.1	26.1
INDIV. SYSTEM	2.	130	3.4	73.9	100.0
	9.	3666	95.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.739	STD DEV	0.441	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	176	MISSING CASES	3666		

K_...VALU CODE-VALUE-OF-OWNED-RESIDENCE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
LESS THAN $10,000	1.	170	4.4	6.4	6.4
$10,000 - $19,999	2.	219	5.7	8.2	14.6
$20,000 - $29,999	3.	363	9.4	13.6	28.3
$30,000 - $39,999	4.	476	12.4	17.9	46.2
$40,000 - $59,999	5.	708	18.4	26.6	72.8
$60,000 - $79,999	6.	344	9.0	12.9	85.7
$80,000 - $99,999	7.	179	4.7	6.7	92.4
$100,000 - $149,999	8.	128	3.3	4.8	97.3
$150,000 - $199,999	9.	35	0.9	1.3	98.6
$200,000 - $249,999	10.	16	0.4	0.6	99.2
$250,000 OR MORE	11.	22	0.6	0.8	100.0
	99.	1182	30.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	4.586	STD DEV	1.952	RANGE	10.000
MINIMUM	1.000	MAXIMUM	11.000		
VALID CASES	2660	MISSING CASES	1182		

KOWNRENT CODE-DWELLING-OWNED-OR-RENTED

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
OWN	1.	2660	69.2	69.2	69.2
RENT	2.	1123	29.2	29.2	98.5
RENT FREE	3.	59	1.5	1.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.323	STD DEV	0.499	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

KNU... ERS CODE-NUMBER-OF-FLOORS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ONE FLOOR	1.	2713	70.6	70,6	70.6
1 &HALF FLOORS	2.	119	3.1	3.1	73.7
2 FLOORS	3.	789	20.5	20.5	94.2
2 &HALF FLOORS	4.	26	0.7	0.7	94.9
3 OR MORE FLOORS	5.	195	5.1	5.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.665	STD DEV	1.133	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	3842	MISSING CASES	0		

KOWNCOND CODE-OWNED-CONDO-OR-COOP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2592	67.5	97.4	97.4
YES, CONDOMINIUM	1.	30	0.8	1.1	98.6
YES, COOPERATIVE	2.	38	1.0	1.4	100.0
	9.	1182	30.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.040	STD DEV	0.259	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	2660	MISSING CASES	1182		

KNELOVEN CODE-NUMBER-ELECTRIC-OVENS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ONE	1.	1810	47.1	87.6	87.6
MORE THAN ONE	2.	256	6.7	12.4	100.0
	9.	1776	46.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.124	STD DEV	0.330	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	2066	MISSING CASES	1776		

KNGASOV CODE-NUMBER-GAS-OVENS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ONE	1.	1665	43.3	95.9	95.9
MORE THAN ONE	2.	72	1.9	4.1	100.0
	9.	2105	54.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.041	STD DEV	0.199	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	1737	MISSING CASES	2105		

K...TEQ CODE-MAIN-HEATING-EQUIP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO HEATING SYSTEM	0.	18	0.5	0.5	0.5
HOT WATER PIPES	1.	57	1.5	1.5	2.0
RADIATORS OR CNVTR	2.	578	15.0	15.0	17.0
CENTRAL WARM AIR	3.	1974	51.4	51.4	68.4
ELECTRIC HEAT PUMP	4.	64	1.7	1.7	70.0
ELECTRIC WALL UNITS	5.	286	7.4	7.4	77.5
PIPELESS FURNACE	6.	302	7.9	7.9	85.3
HEATERS WITH FLUE	11.	227	5.9	5.9	91.3
HEATERS WITHOUT FLUE	12.	127	3.3	3.3	94.6
FIREPLACE OR STOVE	13.	117	3.0	3.0	97.6
PORTABLE HEATER	14.	87	2.3	2.3	99.9
KITCHEN STOVE	15.	1	0.0	0.0	99.9
OTHER	21.	4	0.1	0.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	4.553	STD DEV	3.389	RANGE	21.000
MINIMUM	0.0	MAXIMUM	21.000		
VALID CASES	3842	MISSING CASES	0		

KMARSTAT CODE-MARITAL-STATUS-RESPONDENT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
MARRIED	1.	2623	68.3	68.3	68.3
WIDOWED	2.	471	12.3	12.3	80.5
DIVORCED-SEPARATED	3.	384	10.0	10.0	90.5
NEVER MARRIED	4.	364	9.5	9.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.607	STD DEV	1.004	RANGE	3.000
MINIMUM	1.000	MAXIMUM	4.000		
VALID CASES	3842	MISSING CASES	0		

KnowFT CODE-KNOW-SQUARE-FEET

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2201	57.3	57.3	57.3
YES	1.	1641	42.7	42.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.427	STD DEV	0.495	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KLPGSUPP CODE-NUM-LPG-SUPPLIERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES	0	MISSING CASES	3842		

KINCOME CODE-HOUSEHOLD-INCOME-1977

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
UNDER $3,000	1.	244	6.4	6.4	6.4
$3,000 - $4,999	2.	286	7.4	7.4	13.8
$5,000 - $7,999	3.	425	11.1	11.1	24.9
$8,000 - $9,999	4.	322	8.4	8.4	33.2
$10,000 - $11,999	5.	315	8.2	8.2	41.4
$12,000 - $14,999	6.	404	10.5	10.5	52.0
$15,000 - $19,999	7.	598	15.6	15.6	67.5
$20,000 - $24,999	8.	494	12.9	12.9	80.4
$25,000 - $29,999	9.	291	7.6	7.6	87.9
$30,000 - $34,999	10.	186	4.8	4.8	92.8
$35,000 - $39,999	11.	80	2.1	2.1	94.9
$40,000 - $44,999	12.	54	1.4	1.4	96.3
$45,000 - $49,999	13.	38	1.0	1.0	97.3
$50,000 OR MORE	14.	105	2.7	2.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	6.113	STD DEV	3.093	RANGE	13.000
MINIMUM	1.000	MAXIMUM	14.000		
VALID CASES	3842	MISSING CASES	0		

KHEATCOM CODE-IS-HEATING-SYSTEM-COMMON

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
COMMON SYSTEM	1.	506	13.2	59.0	59.0
INDIV. SYSTEM	2.	352	9.2	41.0	100.0
	9.	2984	77.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.410	STD DEV	0.492	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	858	MISSING CASES	2984		

KGASOVC1 CODE-GAS-OVEN1-SELF-CLEANING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NEITHER OF THESE	0.	1499	39.0	86.3	86.3
SELF-CLEANING	1.	121	3.1	7.0	93.3
CONTINUOUS CLEANING	2.	117	3.0	6.7	100.0
	9.	2105	54.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.204	STD DEV	0.545	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	1737	MISSING CASES	2105		

KGASOVC2 CODE-GAS-OVEN2-SELF-CLEANING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NEITHER OF THESE	0.	59	1.5	81.9	81.9
SELF-CLEANING	1.	8	0.2	11.1	93.1
CONTINUOUS CLEANING	2.	5	0.1	6.9	100.0
	9.	3770	98.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.250	STD DEV	0.575	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VA CASES	72	MISSING CASES	3770		

K.SUPPL CODE-NUM-FUEL-OIL-SUPPLIERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES 0 MISSING CASES 3842

KFUELOT CODE-FUEL-BILL-OTHER-PURPOSES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES 0 MISSING CASES 3842

KFLSHEAT CODE-FUEL-SECOND-HEATING-SYS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PIPED GAS	1.	194	5.0	16.7	16.7
GAS, LPG	2.	40	1.0	3.4	20.2
FUEL OIL	3.	11	0.3	0.9	21.1
KEROSENE	4.	9	0.2	0.8	21.9
ELECTRICITY	5.	319	8.3	27.5	49.4
COAL	6.	9	0.2	0.8	50.1
WOOD	7.	563	14.7	48.5	98.6
WOOD OR COAL	9.	14	0.4	1.2	99.8
OTHER	21.	2	0.1	0.2	100.0
	99.	2681	69.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	5.255	STD DEV	2.356	RANGE	20.000
MINIMUM	1.000	MAXIMUM	21.000		
VALID CASES	1161	MISSING CASES	2681		

KFL...AT CODE-FUEL-MAIN-HEATING-SYSTEM

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PIPED GAS	1.	2106	54.8	55.1	55.1
GAS, LPG	2.	154	4.0	4.0	59.1
FUEL OIL	3.	746	19.4	19.5	78.6
KEROSENE	4.	83	2.2	2.2	80.8
ELECTRICITY	5.	613	16.0	16.0	96.8
COAL	6.	19	0.5	0.5	97.3
WOOD	7.	100	2.6	2.6	99.9
WOOD OR COAL	9.	2	0.1	0.1	100.0
OTHER	21.	1	0.0	0.0	100.0
	99.	18	0.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.328	STD DEV	1.738	RANGE	20.000
MINIMUM	1.000	MAXIMUM	21.000		
VALID CASES	3824	MISSING CASES	18		

KEREADNG READING-AT-ENDING-NG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3842	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.0	STD DEV	0.0	RANGE	0.0
MINIMUM	0.0	MAXIMUM	0.0		
VALID CASES	3842	MISSING CASES	0		

KFLCNAC CODE-FUEL-CENTRAL-AIR-COND

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
GAS	1.	67	1.7	7.6	7.6
ELECTRICITY	2.	820	21.3	92.4	100.0
	9.	2955	76.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.924	STD DEV	0.264	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	887	MISSING CASES	2955		

KEEOVSC2 CODE-ELECTRIC-OVEN2-SELF-CLEAN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NEITHER OF THESE	0.	209	5.4	81.6	81.6
SELF-CLEANING	1.	26	0.7	10.2	91.8
CONTINUOUS CLEANING	2.	21	0.5	8.2	100.0
	9.	3586	93.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.266	STD DEV	0.600	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	256	MISSING CASES	3586		

KEREADEL READING-AT-ENDING-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3842	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.0	STD DEV	0.0	RANGE	0.0
MINIMUM	0.0	MAXIMUM	0.0		
VALID CASES	3842	MISSING CASES	0		

KCOSTNG SOURCE-ESTIMATED-COST-NG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2065	53.7	53.7	53.7
ANNUALIZED ESTIMATE	1.	1777	46.3	46.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.463	STD DEV	0.499	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KELOVSC1 CODE-ELECTRIC-OVEN1-SELF-CLEAN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NEITHER OF THESE	0.	1444	37.6	69.9	69.9
SELF-CLEANING	1.	460	12.0	22.3	92.2
CONTINUOUS CLEANING	2.	162	4.2	7.8	100.0
	9.	1776	46.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.379	STD DEV	0.626	RANGE	2.000
MINIMUM	0.0	MAXIMUM	2.000		
VALID CASES	2066	MISSING CASES	1776		

KCOSTFO SOURCE-ESTIMATED-COST-FO

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3382	88.0	88.0	88.0
ANNUALIZED ESTIMATE	1.	460	12.0	12.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.120	STD DEV	0.325	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KCOSTLPG SOURCE-ESTIMATED-COST-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3646	94.9	94.9	94.9
ANNUALIZED ESTIMATE	1.	196	5.1	5.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.051	STD DEV	0.220	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KCOOKFL CODE-COOKING-FUEL-MOST-USED

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PIPED GAS	1.	1511	39.3	39.6	39.6
GAS, LPG	2.	238	6.2	6.2	45.8
FUEL OIL	3.	1	0.0	0.0	45.8
ELECTRICITY	5.	2067	53.8	54.1	100.0
WOOD OR CHARCOAL	7.	1	0.0	0.0	100.0
	99.	24	0.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	3.230	STD DEV	1.940	RANGE	6.000
MINIMUM	1.000	MAXIMUM	7.000		
VALID CASES	3818	MISSING CASES	24		

KCOSTEL SOURCE-ESTIMATED-COST-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	718	18.7	18.7	18.7
ANNUALIZED ESTIMATE	1.	3124	81.3	81.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.813	STD DEV	0.390	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VA CASES	3842	MISSING CASES	0		

KCOLLLPG DATA-COLLECTION-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3506	91.3	91.3	91.3
HOUSEHOLD INTERVIEW	1.	336	8.7	8.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.087	STD DEV	0.283	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KCOLLNG DATA-COLLECTION-NG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1434	37.3	37.3	37.3
HOUSEHOLD INTERVIEW	1.	2408	62.7	62.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.627	STD DEV	0.484	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KCOLLEL DATA-COLLECTION-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1	0.0	0.0	0.0
HOUSEHOLD INTERVIEW	1.	3841	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.016	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KCOLLFO DATA-COLLECTION-FUEL-OIL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2999	78.1	78.1	78.1
HOUSEHOLD INTERVIEW	1.	843	21.9	21.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.219	STD DEV	0.414	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

KBREADEL READING-AT-BEGINNING-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	972	25.3	25.3	25.3
ACTUAL READING	1.	2148	55.9	55.9	81.2
ESTIMATED BILL	2.	154	4.0	4.0	85.2
UNKNOWN	6.	378	9.8	9.8	95.1
	8.	190	4.9	4.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.625	STD DEV	2.188	RANGE	8.000
MINIMUM	0.0	MAXIMUM	8.000		
VALID CASES	3842	MISSING CASES	0		

KBREADNG READING-AT-BEGINNING-NG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2181	56.8	56.8	56.8
ACTUAL READING	1.	1194	31.1	31.1	87.8
ESTIMATED BILL	2.	309	8.0	8.0	95.9
	3.	9	0.2	0.2	96.1
UNKNOWN	6.	114	3.0	3.0	99.1
	8.	35	0.9	0.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.730	STD DEV	1.332	RANGE	8.000
MINIMUM	0.0	MAXIMUM	8.000		
VALID CASES	3842	MISSING CASES	0		

KAVALNG DATA-AVAILABLE-NG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1434	37.3	37.3	37.3
ALL USES PAID BY HOU	1.	1839	47.9	47.9	85.2
SOME USES PAID BY HO	2.	39	1.0	1.0	86.2
NO DATA FROM SUPPLIE	3.	530	13.8	13.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.913	STD DEV	0.963	RANGE	3.000
MINIMUM	0.0	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

KAVALPG DATA-AVAILABLE-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3506	91.3	91.3	91.3
ALL USES PAID BY HOU	1.	249	6.5	6.5	97.7
NO DATA FROM SUPPLIE	3.	87	2.3	2.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.133	STD DEV	0.501	RANGE	3.000
MINIMUM	0.0	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

K...LEL DATA-AVAILABLE-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1	0.0	0.0	0.0
ALL USES PAID BY HOU	1.	3324	86.5	86.5	86.5
SOME USES PAID BY HO	2.	18	0.5	0.5	87.0
NO DATA FROM SUPPLIE	3.	499	13.0	13.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.264	STD DEV	0.674	RANGE	3.000
MINIMUM	0.0	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

KAVALFO DATA-AVAILABLE-FO

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2999	78.1	78.1	78.1
ALL USES PAID BY HOU	1.	548	14.3	14.3	92.3
NO DATA FROM SUPPLIE	3.	295	7.7	7.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.373	STD DEV	0.834	RANGE	3.000
MINIMUM	0.0	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

KAPLSCOV CODE-TIMES-ADDED-PLASTIC-COVER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ONE	1.	434	11.3	71.5	71.5
MORE THAN ONE	2.	173	4.5	28.5	100.0
	9.	3235	84.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.285	STD DEV	0.452	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	607	MISSING CASES	3235		

KAUTHORZ CODE-UTILIY-AUTHORIZATION-SIGN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES	0	MISSING CASES	3842

KPLUMIND CODE-PLUMBING-INDIVIDUAL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
THIS HOUSEHOLD ONLY	1.	3731	97.1	98.2	98.2
SHARED WITH OTHERS	2.	67	1.7	1.8	100.0
	9.	44	1.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.018	STD DEV	0.132	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	3798	MISSING CASES	44		

KREFDEF1 CODE-REFRIG1-DEFROST-TYPE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
MANUAL DEFROST	1.	1477	38.4	38.6	38.6
AUTOMATIC DEFROST	2.	299	7.8	7.8	46.4
FULL FROST-FREE	3.	2054	53.5	53.6	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.151	STD DEV	0.948	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	3830	MISSING CASES	12		

KREFDEF2 CODE-REFRIG2-DEFROST-TYPE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
MANUAL DEFROST	1.	370	9.6	69.9	69.9
AUTOMATIC DEFROST	2.	32	0.8	6.0	76.0
FULL FROST-FREE	3.	127	3.3	24.0	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.541	STD DEV	0.854	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	529	MISSING CASES	3313		

KREFRFL1 CODE-REFRIG1-GAS-OR-ELECT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ELECTRIC	1.	3815	99.3	99.6	99.6
GAS	2.	15	0.4	0.4	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.004	STD DEV	0.062	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	3830	MISSING CASES	12		

KREFRFL2 CODE-REFRIG2-GAS-OR-ELECT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
ELECTRIC	1.	525	13.7	99.2	99.2
GAS	2.	4	0.1	0.8	100.0
	9.	3313	86.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.008	STD DEV	0.087	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	529	MISSING CASES	3313		

KREGION CODE-CENSUS-REGION

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NORTH EAST	1.	827	21.5	21.5	21.5
NORTH CENTRAL	2.	1063	27.7	27.7	49.2
SOUTH	3.	1268	33.0	33.0	82.2
WEST	4.	684	17.8	17.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.471	STD DEV	1.018	RANGE	3.000
MINIMUM	1.000	MAXIMUM	4.000		
VALID CASES	3842	MISSING CASES	0		

KRESRACE CODE-RACE-OF-RESPONDENT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
WHITE	1.	3433	89.4	89.4	89.4
BLACK	2.	348	9.1	9.1	98.4
OTHER	5.	61	1.6	1.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.154	STD DEV	0.567	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	3842	MISSING CASES	0		

KRMCLFLU CODE-ROOM-CLOSED-FUEL-UNAVAIL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1132	29.5	99.1	99.1
YES	1.	10	0.3	0.9	100.0
	9.	2700	70.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.009	STD DEV	0.093	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	1142	MISSING CASES	2700		

KRMCLNUS CODE-ROOM-CLOSED-NOT-USED

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	505	13.1	44.2	44.2
YES	1.	637	16.6	55.8	100.0
	9.	2700	70.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.558	STD DEV	0.497	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	1142	MISSING CASES	2700		

KRMCLNWM CODE-ROOM-CLOSED-NOT-WARM

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1034	26.9	90.5	90.5
YES	1.	108	2.8	9.5	100.0
	9.	2700	70.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.095	STD DEV	0.293	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	1142	MISSING CASES	2700		

KRMCLOSE CODE-ROOMS-CLOSED-WINTER77-78

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2213	57.6	66.0	66.0
YES	1.	1142	29.7	34.0	100.0
NOT APP.	5.	487	12.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.340	STD DEV	0.474	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3355	MISSING CASES	487		

KRMCLOTH CODE-ROOM-CLOSED-OTHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1132	29.5	99.1	99.1
YES	1.	10	0.3	0.9	100.0
	9.	2700	70.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.009	STD DEV	0.093	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	1142	MISSING CASES	2700		

KRMCLSFL CODE-ROOM-CLOSED-SAVE-FUEL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	403	10.5	35.3	35.3
YES	1.	739	19.2	64.7	100.0
	9.	2700	70.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.647	STD DEV	0.478	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	1142	MISSING CASES	2700		

KRSAGERC CODE-AGE-RESPONDENT-RECODE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3	0.1	0.1	0.1
18-29	1.	844	22.0	22.0	22.0
30-44	2.	1114	29.0	29.0	51.0
45-59	3.	881	22.9	22.9	74.0
60 AND OVER	4.	1000	26.0	26.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.529	STD DEV	1.102	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		
VALID CASES	3842	MISSING CASES	0		

KRSEDREC CODE-RESPONDENT-EDUCATN-RECODE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
SOME GRADE SCHOOL	1.	337	8.8	8.8	8.8
COMPLETED GRADE SCHO	2.	239	6.2	6.2	15.0
SOME HIGH SCHOOL	3.	664	17.3	17.3	32.3
COMPLETED HIGH SCHOO	4.	1279	33.3	33.3	65.6
SOME COLLEGE	5.	697	18.1	18.1	83.7
COLLEGE GRADUATE	6.	318	8.3	8.3	92.0
GRADUATE WORK	7.	308	8.0	8.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	4.027	STD DEV	1.564	RANGE	6.000
MINIMUM	1.000	MAXIMUM	7.000		
VALID CASES	3842	MISSING CASES	0		

KSHARHOM CODE-SHARED-HOUSING-UNIT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES	0	MISSING CASES	3842

KSHEATEQ CODE-SECONDARY-HEAT-EQUIP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
HOT WATER PIPES	1.	4	0.1	0.3	0.3
RADIATORS OR CNVTR	2.	6	0.2	0.5	0.9
CENTRAL WARM AIR	3.	16	0.4	1.4	2.2
ELECTRIC HEAT PUMP	4.	4	0.1	0.3	2.6
ELECTRIC WALL UNITS	5.	107	2.8	9.2	11.8
PIPELESS FURNACE	6.	14	0.4	1.2	13.0
HEATERS WITH FLUE	11.	68	1.8	5.9	18.9
HEATERS WITHOUT FLUE	12.	53	1.4	4.6	23.4
FIREPLACE OR STOVE	13.	646	16.8	55.6	79.1
PORTABLE HEATER	14.	237	6.2	20.4	99.5
KITCHEN STOVE	15.	1	0.0	0.1	99.6
OTHER	21.	5	0.1	0.4	100.0
	99.	2681	69.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	11.989	STD DEV	3.003	RANGE	20.000
MINIMUM	1.000	MAXIMUM	21.000		
VALID CASES	1161	MISSING CASES	2681		

KSMSASZ CODE-SIZE-OF-SMSA

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
SMSA OVER 1000000	1.	1476	38.4	38.4	38.4
SMSA UNDER 1000000	2.	1041	27.1	27.1	65.5
OUTSIDE SMSA	3.	1325	34.5	34.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.961	STD DEV	0.853	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	3842	MISSING CASES	0		

KSOUEL SOURCE-OF-ESTIMATED-QUANT-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1	0.0	0.0	0.0
ACTUAL METER READING	1.	2059	53.6	53.6	53.6
START ESTIMATED-END	2.	518	13.5	13.5	67.1
START ACTUAL-END EST	3.	89	2.3	2.3	69.4
BOTH PERIODS ESTIMAT	4.	204	5.3	5.3	74.7
ANNUALIZED ESTIMATE	5.	329	8.6	8.6	83.3
REGRESSION ESTIMATE	6.	642	16.7	16.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.518	STD DEV	1.987	RANGE	6.000
MINIMUM	0.0	MAXIMUM	6.000		
VALID CASES	3842	MISSING CASES	0		

KSOUFO SOURCE-OF-ESTIMATED-QUANT-FO

CATEGORY LABEL *	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2999	78.1	78.1	78.1
ACTUAL METER READING	1.	464	12.1	12.1	90.1
START ESTIMATED-END	2.	2	0.1	0.1	90.2
REGRESSION ESTIMATE	6.	377	9.8	9.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.711	STD DEV	1.775	RANGE	6.000
MINIMUM	0.0	MAXIMUM	6.000		
VALID CASES	3842	MISSING CASES	0		

* incorrect labels - should be
1 = delivery from supplier
2 = estimate by supplier
6 = regression estimate
(0 = fuel not used)

KSOULPG SOURCE-ESTIMATED-QUANT-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3506	91.3	91.3	91.3
DELIVERY FROM SUPPLI	1.	199	5.2	5.2	96.4
REGRESSION ESTIMATE	6.	137	3.6	3.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.266	STD DEV	1.125	RANGE	6.000
MINIMUM	0.0	MAXIMUM	6.000		
VALID CASES	3842	MISSING CASES	0		

KSOUNG SOURCE-OF-ESTIMATED-QUANT-NG

CATEGORY LABEL *	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1434	37.3	37.3	37.3
DELIVERY FROM SUPPLI	1.	1088	28.3	28.3	65.6
ESTIMATE BY SUPPLIER	2.	234	6.1	6.1	71.7
	3.	106	2.8	2.8	74.5
	4.	233	6.1	6.1	80.6
	5.	118	3.1	3.1	83.6
REGRESSION ESTIMATE	6.	629	16.4	16.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.866	STD DEV	2.219	RANGE	6.000
MINIMUM	0.0	MAXIMUM	6.000		
VALID CASES	3842	MISSING CASES	0		

* incorrect label - should be
1 = actual meter reading
2 = start estimated - end
3 = start actual - end est.
4 = both periods estimated
5 = annualized estimate
6 = regression estimate
(0 = fuel not used)

KSPAGERC CODE-AGE-SPOUSE-RECODE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	5	0.1	0.2	0.2
18-29	1.	498	13.0	19.1	19.3
30-44	2.	842	21.9	32.3	51.5
45-59	3.	751	19.5	28.8	80.3
60 AND OVER	4.	514	13.4	19.7	100.0
	99.	1232	32.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.487	STD DEV	1.018	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		
VALID CASES	2610	MISSING CASES	1232		

KSPEDREC CODE-SPOUSE-EDUCATION-RECODE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
SOME GRADE SCHOOL	1.	196	5.1	7.5	7.5
COMPLETED GRADE SCHO	2.	153	4.0	5.8	13.3
SOME HIGH SCHOOL	3.	437	11.4	16.7	30.0
COMPLETED HIGH SCHOO	4.	946	24.6	36.1	66.0
SOME COLLEGE	5.	464	12.1	17.7	83.7
COLLEGE GRADUATE	6.	227	5.9	8.7	92.4
GRADUATE WORK	7.	200	5.2	7.6	100.0
	99.	1219	31.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	4.071	STD DEV	1.509	RANGE	6.000
MINIMUM	1.000	MAXIMUM	7.000		
VALID CASES	2623	MISSING CASES	1219		

KTIMEEL PERIOD-OF-TIME-EL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1	0.0	0.0	0.0
330 OR MORE DAYS	1.	2888	75.2	75.6	75.6
150-329 DAYS	2.	386	10.0	10.1	85.7
1-149 DAYS	3.	54	1.4	1.4	87.1
NO DATA FROM UTILITY	4.	492	12.8	12.9	100.0
DATA NOT USED	9.	21	0.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.515	STD DEV	1.025	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		
VALID CASES	3821	MISSING CASES	21		

KTIMEFO PERIOD-OF-TIME-FO

CATEGORY LABEL *	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2999	78.1	78.1	78.1
330 OR MORE DAYS	1.	466	12.1	12.1	90.2
150-329 DAYS	2.	81	2.1	2.1	92.3
NO DATA FROM UTILITY	4.	295	7.7	7.7	100.0
DATA NOT USED	9.	1	0.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

* incorrect labels - should be
1 = data from supplier complet
2 = data from supplier not co
3 = no data from supplier
4 = data not used
(0 = fuel not used)

KTIMELPG PERIOD-OF-TIME-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	3506	91.3	91.3	91.3
DATA FROM SUPPLIER complete	1.	199	5.2	5.2	96.4
DATA FROM SUPPLIER not complete	2.	50	1.3	1.3	97.7
DATA NOT USED	4.	87	2.3	2.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.168	STD DEV	0.662	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		
VALID CASES	3842	MISSING CASES	0		

KTIMENG PERIOD-OF-TIME-NG

CATEGORY LABEL *	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1434	37.3	37.3	37.3
DATA FROM SUPPLIER C	1.	1691	44.0	44.0	81.3
DATA FROM SUPPLIER N	2.	155	4.0	4.0	85.4
NO DATA FROM SUPPLIE	3.	39	1.0	1.0	86.4
DATA NOT USED	4.	523	13.6	13.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.096	STD DEV	1.293	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		
VALID CASES	3842	MISSING CASES	0		

* incorrect labels - should be

1 = 330 or more days

2 = 150-329 days

3 = 1-149 days

4 = no data from utility

9 = data not used

(0 = fuel not used)

KTYPLVQT CODE-TYPE-LIVING-QUARTERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
MOBILE HOME	1.	262	6.8	6.8	6.8
SINBLE FAMILY DETACH	2.	2547	66.3	66.4	73.3
SINGLE FAMILY ATTACH	3.	164	4.3	4.3	77.6
BLDG OF 2-4 UNITS	5.	460	12.0	12.0	89.6
BLDG OF 5 OR MORE UN	6.	400	10.4	10.4	100.0
	99.	9	0.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.752	STD DEV	1.515	RANGE	5.000
MINIMUM	1.000	MAXIMUM	6.000		
VALID CASES	3833	MISSING CASES	9		

KURBRURL CODE-URBAN-OR-RURAL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
URBAN	1.	2801	72.9	72.9	72.9
RURAL	2.	1041	27.1	27.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.271	STD DEV	0.445	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID (5	3842	MISSING CASES	0		

KWEATHRZ CODE-AIA-WEATHER-ZONE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
AIA ZONE 1	1.	308	8.0	8.0	8.0
AIA ZONE 2	2.	1093	28.4	28.4	36.5
AIA ZONE 3	3.	1030	26.8	26.8	63.3
AIA ZONE 4	4.	874	22.7	22.7	86.0
AIA ZONE 6	6.	269	7.0	7.0	93.0
AIA ZONE 7	7.	268	7.0	7.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	3.272	STD DEV	1.583	RANGE	6.000
MINIMUM	1.000	MAXIMUM	7.000		
VALID CASES	3842	MISSING CASES	0		

KWHEATFL CODE-WATER-HEATER-FUEL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO FUEL USED	0.	16	0.4	0.4	0.4
PIPED GAS	1.	2081	54.2	54.2	54.6
GAS, LPG	2.	148	3.9	3.9	58.4
FUEL OIL	3.	259	6.7	6.7	65.2
KEROSENE	4.	2	0.1	0.1	65.2
ELECTRICITY	5.	1322	34.4	34.4	99.6
WOOD	7.	14	0.4	0.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.569	STD DEV	1.869	RANGE	7.000
MINIMUM	0.0	MAXIMUM	7.000		
VALID CASES	3842	MISSING CASES	0		

KWHPTFUR CODE-WATER-HEATER-PART-FURNACE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PART OF FURNACE	1.	147	3.8	4.7	4.7
NOT PART OF FURNACE	2.	2991	77.9	95.3	100.0
	6.	15	0.4	MISSING	100.0
	9.	689	17.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

KWHTCOM CODE-WATER-HEATER-COMMON

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
COMMON SYSTEM	1.	552	14.4	64.0	64.0
INDIV. SYSTEM	2.	310	8.1	36.0	100.0
	9.	2980	77.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.360	STD DEV	0.480	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	862	MISSING CASES	2980		

KYHOUSBT CODE-YEAR-HOUSE-BUILT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
BEFORE 1940	1.	1226	31.9	31.9	31.9
1940 - 1949	2.	396	10.3	10.3	42.2
1950 - 1959	3.	704	18.3	18.3	60.5
1960 - 1964	4.	407	10.6	10.6	71.1
1965 - 1969	5.	409	10.6	10.6	81.8
1970 - 1974	6.	451	11.7	11.7	93.5
1975	7.	64	1.7	1.7	95.2
1976	8.	61	1.6	1.6	96.8
1977	9.	72	1.9	1.9	98.6
1978	10.	52	1.4	1.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	3.283	STD DEV	2.211	RANGE	9.000
MINIMUM	1.000	MAXIMUM	10.000		
VALID CASES	3842	MISSING CASES	0		

KYMOVEIN CODE-YEAR-MOVED-IN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
BEFORE 1940	1.	152	4.0	4.0	4.0
1940 - 1949	2.	186	4.8	4.8	8.8
1950 - 1959	3.	421	11.0	11.0	19.8
1960 - 1964	4.	334	8.7	8.7	28.4
1965 - 1969	5.	443	11.5	11.5	40.0
1970 - 1974	6.	709	18.5	18.5	58.4
1975	7.	203	5.3	5.3	63.7
1976	8.	278	7.2	7.2	71.0
1977	9.	415	10.8	10.8	81.8
1978	10.	689	17.9	17.9	99.7
1979	11.	12	0.3	0.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	6.245	STD DEV	2.723	RANGE	10.000
MINIMUM	1.000	MAXIMUM	11.000		
VALID CASES	3842	MISSING CASES	0		

MACLKTHM MONTH-ADDED-AUTO-THERMOSTAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	1	0.0	1.2	1.2
FEBRUARY	2.	5	0.1	6.2	7.4
MARCH	3.	10	0.3	12.3	19.8
APRIL	4.	3	0.1	3.7	23.5
MAY	5.	2	0.1	2.5	25.9
JUNE	6.	6	0.2	7.4	33.3
JULY	7.	8	0.2	9.9	43.2
AUGUST	8.	6	0.2	7.4	50.6
SEPTEMBER	9.	5	0.1	6.2	56.8
OCTOBER	10.	20	0.5	24.7	81.5
NOVEMBER	11.	9	0.2	11.1	92.6
DECEMBER	12.	6	0.2	7.4	100.0
	99.	3761	97.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.642	STD DEV	3.218	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	81	MISSING CASES	3761		

MAHTPUMP MONTH-ADD-ELECTRIC-HEAT-PUMP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
FEBRUARY	2.	1	0.0	9.1	9.1
MAY	5.	1	0.0	9.1	18.2
JUNE	6.	1	0.0	9.1	27.3
JULY	7.	1	0.0	9.1	36.4
SEPTEMBER	9.	1	0.0	9.1	45.5
OCTOBER	10.	2	0.1	18.2	63.6
NOVEMBER	11.	2	0.1	18.2	81.8
DECEMBER	12.	2	0.1	18.2	100.0
	99.	3831	99.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	8.636	STD DEV	3.233	RANGE	10.000
MINIMUM	2.000	MAXIMUM	12.000		
VALID CASES	11	MISSING CASES	3831		

MAINSATR MONTH-ADDED-INSUL-ATTIC-ROOF

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	21	0.5	7.0	7.0
FEBRUARY	2.	14	0.4	4.6	11.6
MARCH	3.	17	0.4	5.6	17.2
APRIL	4.	15	0.4	5.0	22.2
MAY	5.	13	0.3	4.3	26.5
JUNE	6.	16	0.4	5.3	31.8
JULY	7.	43	1.1	14.2	46.0
AUGUST	8.	30	0.8	9.9	56.0
SEPTEMBER	9.	32	0.8	10.6	66.6
OCTOBER	10.	50	1.3	16.6	83.1
NOVEMBER	11.	35	0.9	11.6	94.7
DECEMBER	12.	16	0.4	5.3	100.0
	99.	3540	92.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.374	STD DEV	3.213	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	302	MISSING CASES	3540		

MAINSHWP MONTH-ADD-INSUL-HOT-WATER-PIPE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	15	0.4	9.9	9.9
FEBRUARY	2.	12	0.3	7.9	17.9
MARCH	3.	2	0.1	1.3	19.2
APRIL	4.	4	0.1	2.6	21.9
MAY	5.	4	0.1	2.6	24.5
JUNE	6.	6	0.2	4.0	28.5
JULY	7.	6	0.2	4.0	32.5
AUGUST	8.	2	0.1	1.3	33.8
SEPTEMBER	9.	16	0.4	10.6	44.4
OCTOBER	10.	34	0.9	22.5	66.9
NOVEMBER	11.	36	0.9	23.8	90.7
DECEMBER	12.	14	0.4	9.3	100.0
	99.	3691	96.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	8.099	STD DEV	3.693	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	151	MISSING CASES	3691		

MAINSOTR MONTH-ADD-INSUL-OTHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	5	0.1	6.8	6.8
FEBRUARY	2.	1	0.0	1.4	8.2
MARCH	3.	3	0.1	4.1	12.3
APRIL	4.	5	0.1	6.8	19.2
MAY	5.	2	0.1	2.7	21.9
JUNE	6.	4	0.1	5.5	27.4
JULY	7.	6	0.2	8.2	35.6
AUGUST	8.	4	0.1	5.5	41.1
SEPTEMBER	9.	9	0.2	12.3	53.4
OCTOBER	10.	18	0.5	24.7	78.1
NOVEMBER	11.	10	0.3	13.7	91.8
DECEMBER	12.	6	0.2	8.2	100.0
	99.	3769	98.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	8.041	STD DEV	3.212	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	73	MISSING CASES	3769		

MAINSUF_ ..ONTH-ADD-INSUL-UNDER-FLOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	8	0.2	7.0	7.0
FEBRUARY	2.	3	0.1	2.6	9.6
MARCH	3.	7	0.2	6.1	15.8
APRIL	4.	2	0.1	1.8	17.5
MAY	5.	3	0.1	2.6	20.2
JUNE	6.	7	0.2	6.1	26.3
JULY	7.	6	0.2	5.3	31.6
AUGUST	8.	9	0.2	7.9	39.5
SEPTEMBER	9.	16	0.4	14.0	53.5
OCTOBER	10.	24	0.6	21.1	74.6
NOVEMBER	11.	18	0.5	15.8	90.4
DECEMBER	12.	11	0.3	9.6	100.0
	99.	3728	97.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	8.140	STD DEV	3.280	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	114	MISSING CASES	3728		

MAINSWAL MONTH-ADD-INSUL-OUTSIDE-WALLS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	5	0.1	3.2	3.2
FEBRUARY	2.	9	0.2	5.8	9.0
MARCH	3.	9	0.2	5.8	14.7
APRIL	4.	6	0.2	3.8	18.6
MAY	5.	9	0.2	5.8	24.4
JUNE	6.	9	0.2	5.8	30.1
JULY	7.	19	0.5	12.2	42.3
AUGUST	8.	16	0.4	10.3	52.6
SEPTEMBER	9.	24	0.6	15.4	67.9
OCTOBER	10.	32	0.8	20.5	88.5
NOVEMBER	11.	10	0.3	6.4	94.9
DECEMBER	12.	8	0.2	5.1	100.0
	99.	3686	95.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.538	STD DEV	2.965	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	156	MISSING CASES	3686		

MAINSWHI MONTH-ADD-INSUL-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	2	0.1	3.6	3.6
FEBRUARY	2.	4	0.1	7.3	10.9
MARCH	3.	4	0.1	7.3	18.2
APRIL	4.	4	0.1	7.3	25.5
MAY	5.	6	0.2	10.9	36.4
JUNE	6.	2	0.1	3.6	40.0
JULY	7.	6	0.2	10.9	50.9
SEPTEMBER	9.	3	0.1	5.5	56.4
OCTOBER	10.	11	0.3	20.0	76.4
NOVEMBER	11.	8	0.2	14.5	90.9
DECEMBER	12.	5	0.1	9.1	100.0
	99.	3787	98.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.400	STD DEV	3.478	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	55	MISSING CASES	3787		

MANEWFRN MONTH-ADD-NEW-FURNACE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	10	0.3	8.8	8.8
FEBRUARY	2.	9	0.2	8.0	16.8
MARCH	3.	1	0.0	0.9	17.7
APRIL	4.	4	0.1	3.5	21.2
MAY	5.	6	0.2	5.3	26.5
JUNE	6.	7	0.2	6.2	32.7
JULY	7.	7	0.2	6.2	38.9
AUGUST	8.	8	0.2	7.1	46.0
SEPTEMBER	9.	16	0.4	14.2	60.2
OCTOBER	10.	29	0.8	25.7	85.8
NOVEMBER	11.	10	0.3	8.8	94.7
DECEMBER	12.	6	0.2	5.3	100.0
	99.	3729	97.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.504	STD DEV	3.384	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	113	MISSING CASES	3729		

MANEWWHT MONTH-ADD-NEW-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	9	0.2	5.0	5.0
FEBRUARY	2.	16	0.4	8.9	14.0
MARCH	3.	11	0.3	6.1	20.1
APRIL	4.	8	0.2	4.5	24.6
MAY	5.	12	0.3	6.7	31.3
JUNE	6.	13	0.3	7.3	38.5
JULY	7.	12	0.3	6.7	45.3
AUGUST	8.	16	0.4	8.9	54.2
SEPTEMBER	9.	18	0.5	10.1	64.2
OCTOBER	10.	30	0.8	16.8	81.0
NOVEMBER	11.	24	0.6	13.4	94.4
DECEMBER	12.	10	0.3	5.6	100.0
	99.	3653	95.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.274	STD DEV	3.362	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	179	MISSING CASES	3663		

MASTDOOR MONTH-ADDED-STORM-DOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	13	0.3	4.6	4.6
FEBRUARY	2.	7	0.2	2.5	7.1
MARCH	3.	11	0.3	3.9	11.0
APRIL	4.	16	0.4	5.7	16.7
MAY	5.	23	0.6	8.2	24.9
JUNE	6.	20	0.5	7.1	32.0
JULY	7.	28	0.7	10.0	42.0
AUGUST	8.	31	0.8	11.0	53.0
SEPTEMBER	9.	26	0.7	9.3	62.3
OCTOBER	10.	62	1.6	22.1	84.3
NOVEMBER	11.	31	0.8	11.0	95.4
DECEMBER	12.	13	0.3	4.6	100.0
	99.	3561	92.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.665	STD DEV	2.967	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	281	MISSING CASES	3561		

MASTWIN MONTH-ADD-STORM-OR-INSUL-WIN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	14	0.4	4.7	4.7
FEBRUARY	2.	6	0.2	2.0	6.7
MARCH	3.	13	0.3	4.3	11.0
APRIL	4.	20	0.5	6.7	17.7
MAY	5.	15	0.4	5.0	22.7
JUNE	6.	17	0.4	5.7	28.4
JULY	7.	24	0.6	8.0	36.5
AUGUST	8.	30	0.8	10.0	46.5
SEPTEMBER	9.	28	0.7	9.4	55.9
OCTOBER	10.	73	1.9	24.4	80.3
NOVEMBER	11.	46	1.2	15.4	95.7
DECEMBER	12.	13	0.3	4.3	100.0
	99.	3543	92.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.940	STD DEV	3.018	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	299	MISSING CASES	3543		

MAWINSHT MONTH-ADDED-WINDOW-CLOSE-SHUTR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	3	0.1	11.1	11.1
FEBRUARY	2.	2	0.1	7.4	18.5
MARCH	3.	1	0.0	3.7	22.2
APRIL	4.	2	0.1	7.4	29.6
MAY	5.	1	0.0	3.7	33.3
JUNE	6.	1	0.0	3.7	37.0
AUGUST	8.	4	0.1	14.8	51.9
SEPTEMBER	9.	1	0.0	3.7	55.6
OCTOBER	10.	7	0.2	25.9	81.5
NOVEMBER	11.	4	0.1	14.8	96.3
DECEMBER	12.	1	0.0	3.7	100.0
	99.	3815	99.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.259	STD DEV	3.696	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	27	MISSING CASES	3815		

MAWTHSIR MONTH-ADDED-WEATHER-STRIPPING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	50	1.3	8.5	8.5
FEBRUARY	2.	20	0.5	3.4	11.9
MARCH	3.	18	0.5	3.1	15.0
APRIL	4.	10	0.3	1.7	16.7
MAY	5.	12	0.3	2.0	18.8
JUNE	6.	17	0.4	2.9	21.7
JULY	7.	25	0.7	4.3	25.9
AUGUST	8.	30	0.8	5.1	31.1
SEPTEMBER	9.	63	1.6	10.8	41.8
OCTOBER	10.	137	3.6	23.4	65.2
NOVEMBER	11.	156	4.1	26.6	91.8
DECEMBER	12.	48	1.2	8.2	100.0
	99.	3256	84.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	8.515	STD DEV	3.361	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	586	MISSING CASES	3256		

MMOVEIN MONTH-MOVED-IN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
JANUARY	1.	50	1.3	4.5	4.5
FEBRUARY	2.	40	1.0	3.6	8.1
MARCH	3.	74	1.9	6.6	14.7
APRIL	4.	77	2.0	6.9	21.6
MAY	5.	87	2.3	7.8	29.4
JUNE	6.	129	3.4	11.6	40.9
JULY	7.	109	2.8	9.8	50.7
AUGUST	8.	132	3.4	11.8	62.5
SEPTEMBER	9.	146	3.8	13.1	75.6
OCTOBER	10.	118	3.1	10.6	86.2
NOVEMBER	11.	91	2.4	8.2	94.4
DECEMBER	12.	63	1.6	5.6	100.0
	99.	2726	71.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	7.114	STD DEV	2.987	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	1116	MISSING CASES	2726		

VARIAB NCELYRB NUM-CONSUM-ELEC-YR-MBTU

MEAN	33343.691	STD DEV	28196.953	RANGE	246909.000
MINIMUM	0.0	MAXIMUM	246909.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCELYRP NUM-CONSUM-ELEC-YR-KWH

MEAN	9772.477	STD DEV	8264.055	RANGE	72365.000
MINIMUM	0.0	MAXIMUM	72365.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCFKYRB NUM-CONSUM-FUELOILKERO-YR-MBTU

MEAN	26680.223	STD DEV	61364.848	RANGE	441313.000
MINIMUM	0.0	MAXIMUM	441313.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCFKYRP NUM-CONSUM-FUELOIL-KERO-YR-GAL

MEAN	192.373	STD DEV	442.460	RANGE	3182.000
MINIMUM	0.0	MAXIMUM	3182.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCLPYRB NUM-CONSUM-LPG-YR-MBTU

MEAN	4270.813	STD DEV	20455.086	RANGE	326333.000
MINIMUM	0.0	MAXIMUM	326333.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCLPYRP NUM-CONSUM-LPG-YR-GAL

MEAN	46.761	STD DEV	223.962	RANGE	3573.000
MINIMUM	0.0	MAXIMUM	3573.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCNGYRB NUM-CONSUM-NAT-GAS-YR-MBTU

MEAN	74643.250	STD DEV	83631.000	RANGE	599801.000
MINIMUM	0.0	MAXIMUM	599801.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NCNGYRP NUM-CONSUM-NAT-GAS-YR-CU-FT

MEAN	73108.000	STD DEV	81910.875	RANGE	587464.000
MINIMUM	0.0	MAXIMUM	587464.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

NCOMBATH NUM-COMPLETE-BATHROOMS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2932	76.3	77.2	77.2
	2.	772	20.1	20.3	97.5
	3.	83	2.2	2.2	99.7
	4.	10	0.3	0.3	100.0
	5.	1	0.0	0.0	100.0
	9.	44	1.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.256	STD DEV	0.503	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		

VALID CASES 3798 MISSING CASES 44

VARIABLE NCOOLDD NUM-COOLING-DEGREE-DAYS

MEAN	1137.611	STD DEV	837.521	RANGE	3900.000
MINIMUM	100.000	MAXIMUM	4000.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

NDOORS NUM-OUTSIDE-DOORS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	189	4.9	4.9	4.9
	1.	437	11.4	11.4	16.3
	2.	1980	51.5	51.5	67.8
	3.	889	23.1	23.1	91.0
	4.	249	6.5	6.5	97.4
	5.	61	1.6	1.6	99.0
	6.	24	0.6	0.6	99.7
	7.	5	0.1	0.1	99.8
	8.	6	0.2	0.2	99.9
	9.	1	0.0	0.0	100.0
	10.	1	0.0	0.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.241	STD DEV	1.051	RANGE	10.000
MINIMUM	0.0	MAXIMUM	10.000		
VALID CASES	3842	MISSING CASES	0		

NDRIVE... NUM-DRIVERS-IN-HOUSEHOLD

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	306	8.0	8.0	8.0
	1.	1047	27.3	27.3	35.2
	2.	1906	49.6	49.6	84.8
	3.	393	10.2	10.2	95.1
	4.	137	3.6	3.6	98.6
	5.	40	1.0	1.0	99.7
	6.	12	0.3	0.3	100.0
	7.	1	0.0	0.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.787	STD DEV	0.970	RANGE	7.000
MINIMUM	0.0	MAXIMUM	7.000		
VALID CASES	3842	MISSING CASES	0		

VARIABLE NELNDX ELECTRIC-APPLIANCE-INDEX

MEAN	41.765	STD DEV	17.903	RANGE	93.000
MINIMUM	0.0	MAXIMUM	93.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NELPSEL ELAPSED-DAYS-EL

MEAN	269.438	STD DEV	157.101	RANGE	396.000
MINIMUM	0.0	MAXIMUM	396.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NELPSNG ELAPSED-DAYS-NG

MEAN	156.298	STD DEV	179.242	RANGE	430.000
MINIMUM	0.0	MAXIMUM	430.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE ODELIV NUM-FUEL-OIL-DELIVERIES-PAST-Y

STATISTICS CAN NOT BE COMPUTED FOR THIS VARIABLE.
VARIABLE IS EITHER MISSING FOR EVERY CASE, ALPHANUMERIC, OR HAS NUMERIC VALUES EXCEEDING 10,000,000,000,000.

NFOSUPPL NUM-FUEL-OIL-SUPPLIERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES 0 MISSING CASES 3842

VARIABLE NGASNDX GAS-APPLIANCE-INDEX

MEAN	6.051	STD DEV	6.692	RANGE	35.000
MINIMUM	0.0	MAXIMUM	35.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

NHAFBATH .NUM-HALF-BATHROOMS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	2866	74.6	75.5	75.5
	1.	859	22.4	22.6	98.1
	2.	71	1.8	1.9	99.9
	3.	1	0.0	0.0	100.0
	4.	1	0.0	0.0	100.0
	9.	44	1.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.265	STD DEV	0.487	RANGE	4.000
MINIMUM	0.0	MAXIMUM	4.000		

VALID CASES 3798 MISSING CASES 44

VARIABLE NHEATDD NUM-HEATING-DEGREE-DAYS

MEAN	5039.742	STD DEV	2068.588	RANGE	9900.000
MINIMUM	300.000	MAXIMUM	10200.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

NHSLDMEM NUM-MEMBERS-IN-HOUSEHOLD

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	680	17.7	17.7	17.7
	2.	1284	33.4	33.4	51.1
	3.	673	17.5	17.5	68.6
	4.	645	16.8	16.8	85.4
	5.	318	8.3	8.3	93.7
	6.	155	4.0	4.0	97.7
	7.	40	1.0	1.0	98.8
	8.	25	0.7	0.7	99.4
	9.	11	0.3	0.3	99.7
	10.	7	0.2	0.2	99.9
	11.	1	0.0	0.0	99.9
	12.	3	0.1	0.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.879	STD DEV	1.579	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		
VALID CASES	3842	MISSING CASES	0		

VARIABLE HUDOE DOE-HOUSING-UNIT-NUMBER

MEAN	6.644	STD DEV	4.172	RANGE	25.000
MINIMUM	1.000	MAXIMUM	26.000		

VALID OBSERVATIONS - 3642 MISSING OBSERVATIONS - 0

VARIABLE NINATINS NUM-INCHES-ATTIC-INSULATION

MEAN	5.741	STD DEV	2.809	RANGE	45.000
MINIMUM	1.000	MAXIMUM	46.000		

VALID OBSERVATIONS - 1586 MISSING OBSERVATIONS - 2256

VARIABLE NLPGDELV NUM-LPG-DELIVERIES-PAST-YEAR

STATISTICS CAN NOT BE COMPUTED FOR THIS VARIABLE.
VARIABLE IS EITHER MISSING FOR EVERY CASE, ALPHANUMERIC, OR HAS NUMERIC VALUES EXCEEDING 10,000,000,000,000.

NLPGSUPP NUM-LPG-SUPPLIERS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	9.	3842	100.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

VALID CASES 0 MISSING CASES 3842

VARIABLE ONINTV INTERVIEW-MONTH

MEAN	10.251	STD DEV	2.694	RANGE	11.000
MINIMUM	1.000	MAXIMUM	12.000		

VALID OBSERVATIONS - 3840 MISSING OBSERVATIONS - 2

VARIABLE NMONRENT NUM-MONTHLY-RENT

MEAN	181.557	STD DEV	90.316	RANGE	654.000
MINIMUM	6.000	MAXIMUM	660.000		

VALID OBSERVATIONS - 1123 MISSING OBSERVATIONS - 2719

VARIABLE NPSUDOE DOE-PSU-NUMBER

MEAN	4660.902	STD DEV	2154.945	RANGE	7341.000
MINIMUM	1010.000	MAXIMUM	8351.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

NREFRIG NUM-REFRIGERATORS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	3301	85.9	86.2	86.2
	2.	507	13.2	13.2	99.4
	3.	22	0.6	0.6	100.0
	9.	12	0.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.144	STD DEV	0.367	RANGE	2.000
MINIMUM	1.000	MAXIMUM	3.000		
VALID CASES	3830	MISSING CASES	12		

NRMACUN .IUM-ROOM-AIR-CONDITIONER-UNITS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	875	22.8	68.0	68.0
	2.	298	7.8	23.2	91.1
	3.	84	2.2	6.5	97.7
	4.	18	0.5	1.4	99.1
	5.	3	0.1	0.2	99.3
	6.	3	0.1	0.2	99.5
	7.	4	0.1	0.3	99.8
	10.	1	0.0	0.1	99.9
	11.	1	0.0	0.1	100.0
	99.	2555	66.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.458	STD DEV	0.870	RANGE	10.000
MINIMUM	1.000	MAXIMUM	11.000		
VALID CASES	1287	MISSING CASES	2555		

NROOMAC NUM-ROOMS-AIR-CONDITIONED

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1682	43.8	44.1	44.1
	1.	499	13.0	13.1	57.1
	2.	269	7.0	7.0	64.2
	3.	213	5.5	5.6	69.8
	4.	297	7.7	7.8	77.5
	5.	316	8.2	8.3	85.8
	6.	223	5.8	5.8	91.7
	7.	164	4.3	4.3	96.0
	8.	88	2.3	2.3	98.3
	9.	42	1.1	1.1	99.4
	10.	14	0.4	0.4	99.7
	11.	4	0.1	0.1	99.8
	12.	4	0.1	0.1	99.9
	13.	1	0.0	0.0	100.0
	14.	1	0.0	0.0	100.0
	99.	25	0.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	2.167	STD DEV	2.618	RANGE	14.000
MINIMUM	0.0	MAXIMUM	14.000		
VALID CASES	3817	MISSING CASES	25		

NROOMS NUM-ROOMS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	29	0.8	0.8	0.8
	2.	69	1.8	1.8	2.6
	3.	346	9.0	9.0	11.6
	4.	825	21.5	21.5	33.0
	5.	923	24.0	24.0	57.1
	6.	756	19.7	19.7	76.7
	7.	474	12.3	12.3	89.1
	8.	242	6.3	6.3	95.4
	9.	105	2.7	2.7	98.1
	10.	36	0.9	0.9	99.0
	11.	18	0.5	0.5	99.5
	12.	11	0.3	0.3	99.8
	13.	2	0.1	0.1	99.8
	14.	3	0.1	0.1	99.9
	15.	1	0.0	0.0	99.9
	17.	1	0.0	0.0	100.0
	18.	1	0.0	0.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	5.378	STD DEV	1.777	RANGE	17.000
MINIMUM	1.000	MAXIMUM	18.000		
VALID CASES	3842	MISSING CASES	0		

NSDOORS NUM-STORM-DOORS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	1647	42.9	42.9	42.9
	1.	640	16.7	16.7	59.5
	2.	1126	29.3	29.3	88.8
	3.	347	9.0	9.0	97.9
	4.	67	1.7	1.7	99.6
	5.	9	0.2	0.2	99.8
	6.	5	0.1	0.1	100.0
	7.	1	0.0	0.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.115	STD DEV	1.143	RANGE	7.000
MINIMUM	0.0	MAXIMUM	7.000		
VALID CASES	3842	MISSING CASES	0		

VARIABLE LOCDOE DOE-SAMPLE-LOCATION-NUMBER

MEAN	238.996	STD DEV	129.704	RANGE	455.000
MINIMUM	1.000	MAXIMUM	456.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NSQFEET NUM-SQUARE-FEET-IN-RESIDENCE

MEAN	1357.806	STD DEV	906.760	RANGE	9940.000
MINIMUM	55.000	MAXIMUM	9995.000		

VALID OBSERVATIONS - 2535 MISSING OBSERVATIONS - 1307

VARIABLE NSQIDDOE DOE-SEQUENTIAL-ID-NUMBER

MEAN	2922.269	STD DEV	1109.542	RANGE	3842.000
MINIMUM	1001.000	MAXIMUM	4843.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NSTRMWINS - TOTAL NUMBER STORM WINDOWS

MEAN	7.243	STD DEV	8.330	RANGE	113.000
MINIMUM	0.0	MAXIMUM	113.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NWEIGHT NUM-WEIGHT

MEAN	18735.484	STD DEV	5830.711	RANGE	46411.000
MINIMUM	8340.000	MAXIMUM	54751.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NWINDOWS - TOTAL NUMBER WINDOWS

MEAN	12.966	STD DEV	7.133	RANGE	113.000
MINIMUM	0.0	MAXIMUM	113.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NXELYR NUM-EXPEND-ELEC-YR-PENNIES

MEAN	39884.930	STD DEV	25997.176	RANGE	224800.000
MINIMUM	0.0	MAXIMUM	224800.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NXFKYR NUM-EXPEND-FUELOILKRO-YR-PENNY

MEAN	10491.199	STD DEV	24242.898	RANGE	177800.000
MINIMUM	0.0	MAXIMUM	177800.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE .PYR NUM-EXPEND-LPG-YR-PENNIES

MEAN	2149.688	STD DEV	9321.004	RANGE	114600.000
MINIMUM	0.0	MAXIMUM	114600.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NXNGYR NUM-EXPEND-NAT-GAS-YR-PENNIES

MEAN	20387.895	STD DEV	22746.785	RANGE	204400.000
MINIMUM	0.0	MAXIMUM	204400.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

VARIABLE NYRINTV INTERVIEW-YEAR

MEAN	78.091	STD DEV	0.530	RANGE	20.000
MINIMUM	78.000	MAXIMUM	98.000		

VALID OBSERVATIONS - 3842 MISSING OBSERVATIONS - 0

PAYALL PAY-FOR-ALL-FUELS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	465	12.1	12.1	12.1
YES	1.	3377	87.9	87.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.879	STD DEV	0.326	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PAYANY PAY-FOR-ANY-FUEL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	172	4.5	4.5	4.5
YES	1.	3670	95.5	95.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.955	STD DEV	0.207	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PAYEL PAY-FOR-ELECTRICITY

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	198	5.2	5.2	5.2
YES	1.	3644	94.8	94.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.948	STD DEV	0.221	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PAYFK PAY-FOR-FUEL-OIL-OR-KEROSENE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3126	81.4	81.4	81.4
YES	1.	716	18.6	18.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.186	STD DEV	0.389	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PAYLP PAY-FOR-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3515	91.5	91.5	91.5
YES	1.	327	8.5	8.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.085	STD DEV	0.279	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PAYNG PAY-FOR-NATURAL-GAS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1710	44.5	44.5	44.5
YES	1.	2132	55.5	55.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.555	STD DEV	0.497	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

PELAC PAY-ELECTRIC-AIR-CONDITIONING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	2001	52.1	95.8	95.8
INCLUDED IN RENT	2.	72	1.9	3.4	99.3
OTHER	5.	15	0.4	0.7	100.0
	9.	1754	45.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.063	STD DEV	0.381	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	2088	MISSING CASES	1754		

PELCOOK PAY-ELECTRIC-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	2321	60.4	96.6	96.6
INCLUDED IN RENT	2.	65	1.7	2.7	99.3
OTHER	5.	17	0.4	0.7	100.0
	9.	1439	37.5	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.055	STD DEV	0.370	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	2403	MISSING CASES	1439		

PELHEAT PAY-ELECTRIC-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	918	23.9	94.9	94.9
INCLUDED IN RENT	2.	45	1.2	4.7	99.6
OTHER	5.	4	0.1	0.4	100.0
	9.	2875	74.8	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.063	STD DEV	0.330	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CA	967	MISSING CASES	2875		

PELHOTWA .AY-ELECTRIC-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	1349	35.1	95.7	95.7
INCLUDED IN RENT	2.	49	1.3	3.5	99.2
OTHER	5.	11	0.3	0.8	100.0
	9.	2433	63.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.066	STD DEV	0.394	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	1409	MISSING CASES	2433		

PELLIGHT PAY-ELECTRIC-LIGHTS-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	3640	94.7	94.8	94.8
INCLUDED IN RENT	2.	168	4.4	4.4	99.1
OTHER	5.	33	0.9	0.9	100.0
	9.	1	0.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.078	STD DEV	0.419	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	3841	MISSING CASES	1		

VARIABLE PERCSWIN - TOTAL STORM WINDOWS / TOTAL WINDOWS

MEAN	0.507	STD DEV	0.467	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		

VALID OBSERVATIONS - 3840 MISSING OBSERVATIONS - 2

PFOHEAT PAY-FUEL-OIL-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	716	18.6	84.9	84.9
INCLUDED IN RENT	2.	118	3.1	14.0	98.9
OTHER	5.	9	0.2	1.1	100.0
	9.	2999	78.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.183	STD DEV	0.527	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	843	MISSING CASES	2999		

PFOHTWA PAY-FUEL-OIL-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	169	4.4	61.7	61.7
INCLUDED IN RENT	2.	99	2.6	36.1	97.8
OTHER	5.	6	0.2	2.2	100.0
	9.	3568	92.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.449	STD DEV	0.716	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	274	MISSING CASES	3568		

PGASAPPL PAY-GAS-FOR-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	663	17.3	97.9	97.9
INCLUDED IN RENT	2.	13	0.3	1.9	99.9
OTHER	5.	1	0.0	0.1	100.0
	9.	3165	82.4	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.025	STD DEV	0.206	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	677	MISSING CASES	3165		

PGASCNAC PAY-GAS-CENTRAL-AIR-CONDITION

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	71	1.8	94.7	94.7
INCLUDED IN RENT	2.	2	0.1	2.7	97.3
OTHER	5.	2	0.1	2.7	100.0
	9.	3767	98.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.133	STD DEV	0.664	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID C	75	MISSING CASES	3767		

PGASCOOK PAY-GAS-FOR-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	1359	35.4	86.6	86.6
INCLUDED IN RENT	2.	191	5.0	12.2	98.8
OTHER	5.	19	0.5	1.2	100.0
	9.	2273	59.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.170	STD DEV	0.535	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	1569	MISSING CASES	2273		

PGASHEAT PAY-GAS-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	1886	49.1	88.6	88.6
INCLUDED IN RENT	2.	219	5.7	10.3	98.9
OTHER	5.	23	0.6	1.1	100.0
	9.	1714	44.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.146	STD DEV	0.505	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	2128	MISSING CASES	1714		

PGASHTWA PAY-GAS-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	1807	47.0	88.1	88.1
INCLUDED IN RENT	2.	229	6.0	11.2	99.3
OTHER	5.	15	0.4	0.7	100.0
	9.	1791	46.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.141	STD DEV	0.457	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	2051	MISSING CASES	1791		

PLPGAPPL PAY-LPG-FOR-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	33	0.9	100.0	100.0
	9.	3809	99.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.0	RANGE	0.0
MINIMUM	1.000	MAXIMUM	1.000		
VALID CASES	33	MISSING CASES	3809		

PLPGCNAC ...Y-LPG-CENTRAL-AIR-CONDITION

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	2	0.1	100.0	100.0
	9.	3840	99.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.0	RANGE	0.0
MINIMUM	1.000	MAXIMUM	1.000		
VALID CASES	2	MISSING CASES	3840		

PLPGCOOK PAY-LPG-FOR-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	239	6.2	96.8	96.8
INCLUDED IN RENT	2.	7	0.2	2.8	99.6
OTHER	5.	1	0.0	0.4	100.0
	9.	3595	93.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.045	STD DEV	0.302	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	247	MISSING CASES	3595		

PLPGHEAT PAY-LPG-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	181	4.7	97.3	97.3
INCLUDED IN RENT	2.	4	0.1	2.2	99.5
OTHER	5.	1	0.0	0.5	100.0
	9.	3656	95.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.043	STD DEV	0.326	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		
VALID CASES	186	MISSING CASES	3656		

PLPGHTWA PAY-LPG-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
PAID BY HOUSEHOLD	1.	143	3.7	96.6	96.6
INCLUDED IN RENT	2.	5	0.1	3.4	100.0
	9.	3694	96.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.034	STD DEV	0.181	RANGE	1.000
MINIMUM	1.000	MAXIMUM	2.000		
VALID CASES	148	MISSING CASES	3694		

UELAC USE-ELECTRIC-AIR-CONDITIONING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	1754	45.7	45.7	45.7
USED	1.	2088	54.3	54.3	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.543	STD DEV	0.498	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UELCOOK USE-ELECTRIC-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	1439	37.5	37.5	37.5
USED	1.	2403	62.5	62.5	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.625	STD DEV	0.484	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UELHEAT USE-ELECTRIC-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	2875	74.8	74.8	74.8
USED	1.	967	25.2	25.2	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.252	STD DEV	0.434	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UELHOTWA USE-ELECTRIC-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	2433	63.3	63.3	63.3
USED	1.	1409	36.7	36.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.367	STD DEV	0.482	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UELLIGHT USE-ELECTRIC-LIGHTS-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	1	0.0	0.0	0.0
USED	1.	3841	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.016	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UFOHEAT USE-FUEL-OIL-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	2999	78.1	78.1	78.1
USED	1.	843	21.9	21.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.219	STD DEV	0.414	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UFOHTWA USE-FUEL-OIL-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3568	92.9	92.9	92.9
USED	1.	274	7.1	7.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.071	STD DEV	0.257	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UGASAPPL USE-GAS-FOR-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3165	82.4	82.4	82.4
USED	1.	677	17.6	17.6	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.176	STD DEV	0.381	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UGASCNAC USE-GAS-CENTRAL-AIR-CONDITION

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3767	98.0	98.0	98.0
USED	1.	75	2.0	2.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.020	STD DEV	0.138	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UGASCOOK USE-GAS-FOR-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	2273	59.2	59.2	59.2
USED	1.	1569	40.8	40.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.408	STD DEV	0.492	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UGASHEAT USE-GAS-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	1714	44.6	44.6	44.6
USED	1.	2128	55.4	55.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.554	STD DEV	0.497	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

UGASHTWA USE-GAS-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	1791	46.6	46.6	46.6
USED	1.	2051	53.4	53.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.534	STD DEV	0.499	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

ULPGAPPL USE-LPG-FOR-APPLIANCES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3809	99.1	99.1	99.1
USED	1.	33	0.9	0.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.009	STD DEV	0.092	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

ULPGCNAC USE-LPG-CENTRAL-AIR-CONDITION

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3840	99.9	99.9	99.9
USED	1.	2	0.1	0.1	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.001	STD DEV	0.023	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

ULPGCOOK USE-LPG-FOR-COOKING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3595	93.6	93.6	93.6
USED	1.	247	6.4	6.4	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.064	STD DEV	0.245	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

ULPGHEAT USE-LPG-FOR-HEAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3656	95.2	95.2	95.2
USED	1.	186	4.8	4.8	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.048	STD DEV	0.215	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

ULPGHTWA USE-LPG-FOR-HOT-WATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NOT USED	0.	3694	96.1	96.1	96.1
USED	1.	148	3.9	3.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.039	STD DEV	0.192	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

USEANY USE-ANY-FUEL

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
YES	1.	3842	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.0	RANGE	0.0
MINIMUM	1.000	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

USEEL USE-ELECTRICITY

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1	0.0	0.0	0.0
YES	1.	3841	100.0	100.0	100.0
	TOTAL	3842	100.0	100.0	

MEAN	1.000	STD DEV	0.016	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

USEFK USE-FUEL-OIL-OR-KEROSENE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	2999	78.1	78.1	78.1
YES	1.	843	21.9	21.9	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.219	STD DEV	0.414	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

USELP USE-LPG

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	3506	91.3	91.3	91.3
YES	1.	336	8.7	8.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.087	STD DEV	0.283	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

USENG USE-NATURAL-GAS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	0.	1434	37.3	37.3	37.3
YES	1.	2408	62.7	62.7	100.0
	TOTAL	3842	100.0	100.0	

MEAN	0.627	STD DEV	0.484	RANGE	1.000
MINIMUM	0.0	MAXIMUM	1.000		
VALID CASES	3842	MISSING CASES	0		

YACLKTHM YEAR-ADDED-AUTO-THERMOSTAT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	37	1.0	45.7	45.7
1978	78.	44	1.1	54.3	100.0
	99.	3761	97.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.543	STD DEV	0.501	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	81	MISSING CASES	3761		

YAHTPUMP YEAR-ADD-ELECTRIC-HEAT-PUMP

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	7	0.2	63.6	63.6
1978	78.	4	0.1	36.4	100.0
	99.	3831	99.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.364	STD DEV	0.505	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	11	MISSING CASES	3831		

YAINSATR YEAR-ADDED-INSUL-ATTIC-ROOF

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	154	4.0	51.0	51.0
1978	78.	148	3.9	49.0	100.0
	99.	3540	92.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.490	STD DEV	0.501	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	302	MISSING CASES	3540		

YAINSHWP YEAR-ADD-INSUL-HOT-WATER-PIPE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	79	2.1	52.3	52.3
1978	78.	68	1.8	45.0	97.4
1979	79.	4	0.1	2.6	100.0
	99.	3691	96.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.503	STD DEV	0.552	RANGE	2.000
MINIMUM	77.000	MAXIMUM	79.000		
VALID CASES	151	MISSING CASES	3691		

YAINSOTR YEAR-ADD-INSUL-OTHER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	29	0.8	39.7	39.7
1978	78.	43	1.1	58.9	98.6
1979	79.	1	0.0	1.4	100.0
	99.	3769	98.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.616	STD DEV	0.517	RANGE	2.000
MINIMUM	77.000	MAXIMUM	79.000		
VALID CASES	73	MISSING CASES	3769		

YAINSUFL YEAR-ADD-INSUL-UNDER-FLOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	54	1.4	47.4	47.4
1978	78.	60	1.6	52.6	100.0
	99.	3728	97.0	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.526	STD DEV	0.502	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	114	MISSING CASES	3728		

YAINSWAL YEAR-ADD-INSUL-OUTSIDE-WALLS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	78	2.0	50.0	50.0
1978	78.	78	2.0	50.0	100.0
	99.	3686	95.9	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.500	STD DEV	0.502	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	156	MISSING CASES	3686		

YAINSWHT YEAR-ADD-INSUL-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	30	0.8	54.5	54.5
1978	78.	25	0.7	45.5	100.0
	99.	3787	98.6	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.455	STD DEV	0.503	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	55	MISSING CASES	3787		

YANEWFRN YEAR-ADD-NEW-FURNACE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	58	1.5	51.3	51.3
1978	78.	55	1.4	48.7	100.0
	99.	3729	97.1	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.487	STD DEV	0.502	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	113	MISSING CASES	3729		

YANEWWHT YEAR-ADD-NEW-WATER-HEATER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	82	2.1	45.8	45.8
1978	78.	97	2.5	54.2	100.0
	99.	3663	95.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.542	STD DEV	0.500	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	179	MISSING CASES	3663		

YASTDOOR .EAR-ADDED-STORM-DOOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	142	3.7	50.5	50.5
1978	78.	139	3.6	49.5	100.0
	99.	3561	92.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.495	STD DEV	0.501	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	281	MISSING CASES	3561		

YASTWIN YEAR-ADD-STORM-OR-INSUL-WIN

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	158	4.1	52.8	52.8
1978	78.	141	3.7	47.2	100.0
	99.	3543	92.2	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.472	STD DEV	0.500	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	299	MISSING CASES	3543		

YAWINSHT YEAR-ADDED-WINDOW-CLOSE-SHUTTR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	12	0.3	44.4	44.4
1978	78.	15	0.4	55.6	100.0
	99.	3815	99.3	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.556	STD DEV	0.506	RANGE	1.000
MINIMUM	77.000	MAXIMUM	78.000		
VALID CASES	27	MISSING CASES	3815		

YAWTHSTR YEAR-ADDED-WEATHER-STRIPPING

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1977	77.	333	8.7	56.8	56.8
1978	78.	251	6.5	42.8	99.7
1979	79.	2	0.1	0.3	100.0
	99.	3256	84.7	MISSING	100.0
	TOTAL	3842	100.0	100.0	

MEAN	77.435	STD DEV	0.503	RANGE	2.000
MINIMUM	77.000	MAXIMUM	79.000		
VALID CASES	586	MISSING CASES	3256		

3. NIECS DATA ASSESSMENT

Although NIECS is the largest and most detailed household energy demand survey to date, there are nevertheless several problems - including problems of both commision and ommision - with the existing data set in terms of coverage, accuracy and consistency. These problems in turn raise substantive issues with respect to the econometric estimation of residential appliance choice and utilization models. Four such problem areas are discussed below: measurement error, including both response error and survey error; problems related to the particular sample frame used; problems created by the imputation procedures used in which real data was replaced with imputed values; and the need to add substantial amounts of data, particularly price data, to the NIECS data to permit the estimation of choice/utilization models. In each case, we describe the nature of the problem, its estimation implications and how the problem could either have been avoided or minimized.

3.1 Measurement Error

One source of measurement error in personal interview surveys of this kind is response error, related to the knowledgeability of the interviewee concerning answers to questions being asked. This type of error, in terms of residential energy demand, is likely to be related to such factors as whether the respondent owns or rents the housing unit, whether the housing unit is a single-family dwelling or part of an apartment building, and the technical level of the question. For example, it is likely that owners of single-family housing will be more knowledgeable concerning the characteristics of their dwelling than will be apartment renters. In general, it would also be reasonable to expect

more accurate answers to more general questions - such as whether the unit does or does not have attic insulation - and less accurate responses in the case of more detailed questions - such as number of inches of wall insulation or whether or not the water heater is part of the furnace. In the case of most surveys, it is difficult to assess this type of response error since such an assessment requires a detailed on-site check of responses. Such a survey was carried out in the case of NIECS, although on a somewhat limited scale, so that it is possible to get at least a general assessment of the extent of this type of response error in NIECS.

A second type of measurement error is related either to the type of procedures and editing used to process the raw data into final data, or to the type of raw data collected and presented. As an example of the first type of error in NIECS, the monthly fuel usage data collected from the households' fuel suppliers were "innoculated" and only the innoculated data are available on the public use file. As an example of the second type of error, the weather information in NIECS is an estimated average of long run weather conditions - heating and cooling degree days - for the NOAA weather division in which the household resides, rather than the actual current weather conditions for, say, the nearest weather station. While the reported weather conditions may be satisfactory for some uses, they may not be very reliable indicators for others. Both of these types of survey error are discussed further, along with their associated modeling and estimation implications.

3.1.1 Response Error

One of the unique features of NIECS was a small scale technical survey, Energy Assessment (EA) , which was conducted by Technology

and Economics, Inc. of Cambridge, Mass. on a sub-sample of 44 NIECS housing units, 42 of which were single family dwellings. In the EA survey, trained individuals visited the households and estimated floor area, counted windows, examined attic insulation and noted the characteristics of the heating/air conditioning system and other major household appliances. Thus, it is possible to compare the EA data with the NIECS responses for the 44 households and thereby assess the extent of response error, at least with respect to the variables included in the EA survey.

Unfortunately, there are several problems with the design and conduct of the EA survey which substantially reduce its potential for accurately assessing NIECS response error: namely, the procedures used were not well standardized, the sample was apparently selected in part for convenience, there were important definitional differences between the EA and NIECS definitions of some of the key variables examined, and the survey team was not experienced - the job lasted for only a month or so and paid five dollars an hour. In general, the EA survey does not appear to have been designed with the problems of direct comparison with NIECS data in mind. Nevertheless, some comparisons are still possible. [The EA survey is described in the Report on Methodology, Part VI, while a comparison of the NIECS and EA responses is available in a recent report by Carl Blumstein, Carl York and William Kemp, " An Assessment of the National Interim Energy Consumption Survey," Energy and Resources Group, University of California - Berkeley (undated draft) - hereafter referred to as the BYK report.]

Perhaps the most interesting comparison involves the variable "number of square feet of living space" for which the BYK analysis found considerable discrepancies. For the 27 single-family housing units which had usable numbers from each survey, BYK found a mean difference of 169 square feet and a mean absolute difference of 519 square feet. Apparent errors of over 50 percent in the NIECS data were not uncommon. In general the NIECS respondents tended to underestimate the size of their housing unit. However, there are two major factors which severely mute the validity of this comparison, the first involving a definitional difference and the second a difference in the measurement techniques used. With respect to the definitional difference, NIECS defined housing unit size in terms of "living space" while the EA definition referred to "conditioned space." Secondly, NIECS used either a respondent or interviewer estimate in terms of inside dimensions, while the EA measurement procedure used the outside dimensions of the building, the number of floors and the estimated amount of unconditioned space. Thus, one can not be sure whether the apparent differences between the two sets of responses represent response error or survey differences,

There were also significant, but less dramatic, differences between the two surveys with respect to such variables as number of windows, amount and type of attic insulation, type of main heating equipment, type of water heater, presence of room air conditioners, refrigerator type and characteristics, presence of separate food freezer, and type of clothes dryer fuel used. Interestingly, with respect to clothes-dryer fuel, there was a tendency for NIECS households to claim gas when in fact they had an electric-heating dryer. On the hand, there was a close correspondence between the two surveys with respect to such varibles as

existence of attic insulation, main heating and water heating fuels used, and the presence of central air conditioning, automatic clothes washers and electric dishwashers.

In general, these results seem to indicate substantial respondent error in the case of questions involving technical detail, even a fairly minor amount. For future surveys, it is heartening to know that households are generally knowledgeable concerning the presence of attic insulation - a result further substantiated by a recent PG&E survey of over 700 owner-occupied single-family house - but the fact that they are not very accurate in assessing amount of either living space or insulation, for example, has clear implications for the design of residential energy surveys. Since these two variables in particular - size of living space and amount of insulation - are of critical importance in modeling appliance choice and usage, two suggestions seem appropriate. The first, also suggested by BYK, is that a careful and well-designed EA type of survey be conducted on a somewhat larger sub-sample with the sole prupose of evaluating the accuracy of respondent error. By using the same variable definitions, a well-trained group of surveyors and a random sample from the original survey, it should be possible to more accurately assess the extent and location of respondent error. The second, and related, suggestion is that some thought be give to using alternative data collection procedures - for example, using interviewer measurements or estimates, rather than household responses - for questions which are critical and which appear to be difficult for households to answer accurately. This would require further training for the interviewer, plus providing him/her with the necessary measuring instruments, but the payoff in reduced respondent error is likely to be significant.

The BYK report also attempted to assess the extent of respondent error in the case of apartment tenants. Their procedure consisted of looking for households which were likely to be residents of the same structure, and should therefore have a number of common responses - for example, age of building, type of water heater, etc. Unfortunately, NIECS does not identify whether or not households are from the same apartment building, but in several cases it appeared that this assumption was quite likely to be valid. Based on these inter-household comparisons, BYK found that the associated households did indeed have trouble identifying such variables as the age of the structure, type of main heating equipment and water-heating fuel used. Of course, this is certainly not surprising since tenants, especially those living in multiple-unit buildings, are probably less likely to be familiar with building characteristics than owners, especially owners of single-family housing. This does suggest, however, that future household interview surveys might do well to differentiate between residents of single-family versus multiple-family dwellings, and perhaps between owners versus renters, in designing the response procedures to be used. In some cases, it may even be necessary to collect the necessary information from the building superintendent or agent rather than directly from the household. In the NIECS, this procedure was used for fuel usage information in the case of apartment households, but it probably should have been used for additional questions as well.

3.1.2 Survey Error

A second type of measurement error was deliberately introduced by RAC to mask the exact monthly fuel consumption pattern of households, and therefore the identity of households, from utilities who might be able to match this information with known consumption data for their customers. The monthly fuel usage information collected by NIECS from the households' fuel suppliers consisted of both consumption and expenditures by billing period for the four primary residential fuels - electricity, natural gas, fuel oil and LPG (propane) - over a 12-month period, April 1978 through March 1979. For each household, fuel type and billing period, four variables were recorded - beginning date of billing period, ending date of billing period, expenditure in dollars, and consumption in physical units, i.e. kwh for electricity, cubic feet for natural gas, etc. The length of the billing period, in days, was then computed from the beginning and ending dates.

The innoculation procedure used consisted of adjusting four primary variables - beginning date, ending date, consumption and expenditure. The first step in this innoculation procedure was to randomly adjust both the beginning and ending dates for each billing period by up to plus or minus three days. The fuel consumption and expenditure information was then adjusted, proportionately to maintain consistency across the four variables. For example, assume three consecutive billing periods of actual length n_1 , n_2 , and n_3 , in days. Suppose that the ending date of the first period (beginning date of the second period) had one day subtracted from it, while the ending date of the second period (beginning date of the third period) had two days added to it. Thus, the innoculated billing periods would now have adjusted lengths of $n_1 - 1$, $n_2 + 3$ and $n_3 - 2$. The consumption adjustment would

entail adding $1/n_1$ of the first period's consumption and $2/n_3$ of the third period's consumption to the actual consumption for the second period, and subtracting like amounts from the first period and third period consumptions, respectively. A similar adjustment procedure was also applied to the associated expenditure data. The adjusted or innoculated values for beginning and ending dates, elapsed time, consumption and expenditure were then reported on the public use file in place of the actual or real data. (The associated heating and cooling degree days were also based on the innoculated billing periods, but were computed using actual daily data.)

A basic implication of this procedure is increased noise in the data due to the innoculation. Furthermore, the amount of extra noise introduced is not likely to be insignificant since the elapsed time, and hence the consumption and expenditure, of any billing period was adjusted by a maximum amount of approximately 20 percent, consisting of either adding or subtracting 3 days to each of the beginning and ending dates of a typical monthly billing period of 30 days in duration. Thus, a fair amount of distortion in the reported data is likely as a result.

Whether or not the additional innoculation noise affects statistical analyses which use the data depends upon the type of analyses being used. For example, if the monthly pattern of fuel usage is the focus of analyses, the error introduced through innoculation may critical since the intertemporal pattern is likely to have been distorted substantially. On the other hand, the estimation of average fuel prices will probably not be distorted very much since they involve the ratio of two innoculated variables, expenditure and consumption, both of which were randomly (and consistently) adjusted. In either case, however, the noise component of

the data has been increased, a result which will reduce the precision of any parameters estimated from the data.

Given the potential for significantly affecting statistical analyses, especially in the case of regression estimates, and the doubtful nature of the claim that innoculation was necessary to prevent individual household identification, such procedures for treating valid data should probably not be used. It simply doesn't make sense to spend time and effort in sample design and data collection to insure highly reliable data and then turn around and deliberately reduce the accuracy of the published data.

A second source of survey error is contained in the weather information provided by NIECS, especially the heating (HDD) and cooling (CDD) degree day variables. The basic problem here is the size of the geographic region used in computing both of these variables, but there are also some related minor problems in terms of the reported weather zone classification.

The NIECS data file provides both annual and billing period estimates of the number of heating and cooling degree days for the National Oceanic and Atmospheric Administration (NOAA) weather division corresponding to each household. Degree days measure the difference between the mean daily temperature, i.e. the average of the daily maximum and minimum temperatures, and a given base temperature, with this daily difference then being aggregated over days. Heating (cooling) degree days are positive when the mean daily temperature is below (exceeds) the base temperature, and are zero otherwise. The annual degree day estimates for NIECS are for the 1978-79 season and are based on 46-year averages or normals, adjusted for the actual 1978-79 weather conditions. The annual HDD and

CDD data use a base temperature of 65 degrees F. The corresponding monthly data are based on actual daily degree-day data, aggregated over each innoculated (or adjusted) billing period, and are available for 14 different base temperatures, including 65 degrees F. For the annual data, the heating season is defined as the 12-month period from July through June, while the cooling season corresponds to the calendar year.

A NOAA weather division is a geographical area, generally a group of countries, within which climatic conditions are relatively homogenous. However, for a county within which weather conditions vary considerably, the division does not follow county boundaries. On average, a state contains seven NOAA weather divisions, while a weather division contains an average of nine counties. There are a total of 344 NOAA weather divisions within the United States, containing approximately 13,000 reporting weather stations.

The annual degree day data - contained in NHEATDD and NCOOLDD - are annual 46-year averages or normals, adjusted on the basis of the actual 1978-79 weather and then rounded off to the nearest 100 degree days. The 46-year annual normals for the period 1931-76 used annual data available from NOAA for weather stations in each of the 344 weather divisions, and were computed by averaging across all reporting weather stations in the weather division corresponding to each NIECS household. Thus, two households in the same weather division have the same 46-year average or normal. An adjustment factor was then applied to correct for differences between the actual 1978-79 weather and the average long-term conditions. Adjustments were made on a regional basis, using the nine Census divisions, and separate adjustments were made for HDD and CDD. The adjustment factors used are reported in Table 2 , and consist of the

TABLE 2

Regional Degree Day Adjustment Factors

Census Division	1978-79 HDD Adjustment Factor	1978 CDD Adjustment Factor
New England	1.020	0.893
Middle Atlantic	1.044	0.896
East North Central	1.112	0.945
West North Central	1.151	1.026
South Atlantic	1.044	0.992
East South Central	1.103	1.000
West South Central	1.174	1.036
Mountain	1.103	0.984
Pacific	1.049	1.195

Source: U.S. DEPT. OF ENERGY, ENERGY INFORMATION ADMINISTRATION, "National Interim Energy Consumption Survey: Exploring the Variability in Energy Consumption," July 1981, DOE/EIA-0272, APPENDIX B, p. 58.

ratio of the 1978-79 annual data and the corresponding 46-year average over all NOAA weather divisions in each of the Census divisions. The final degree day data reported in the NIECS file is the product of the 46-year annual normal for each weather division and the respective regional adjustment factor, rounded usually to the nearest 100 degree days. In some cases, the resulting product was apparently rounded by more than 100 degree days if it was felt that the geographical identity of the household might be compromised by reporting the more precise number.

In many cases, the estimated HDD and CDD data are not likely to be very accurate estimates of the actual 1978-79 weather at a NIECS household location. There are two reasons for this. First, the estimates of the 46-year normals for each location were based on weather division averages, and these averages may not be very representative if the weather division is large in size or is characterized by varying weather conditions within the division. For example, the South Coast Drainage weather division in California contains Santa Barbara, Los Angeles, Anaheim and San Diego and extends as far east as the San Bernadino mountains. The Sacramento Drainage includes Sacramento and portions of the San Joaquin valley, as well as substantial mountainous areas in northern California. While California may be somewhat of an extreme case in this respect, there is certainly room for considerable variation in weather conditions across many of the NOAA weather divisions. If so, weather division averages will not be very representative of many individual locations.

The second reason is that the adjustment factors were defined only at the Census division level and, therefore, are not likely to result in accurate adjustments for the actual weather conditions at individual

locations. For example, the Pacific Census division contains Washington, Oregon and California, and the same adjustment factor was applied to all households in these three quite different states. The basic point here is that the product of a weather division average and a Census division adjustment factor is not likely to adequately represent actual 1978-79 weather conditions at an individual household location.

For our purposes, a better procedure would have been to base the weather variables on information from the nearest reporting weather station. An alternative procedure would be one based on a consistent use of the weather division, i.e. using the weather division for both the 46-year normal and the adjustment factor. Both procedures would yield more reliable estimates of individual locations than the procedure used. In addition, it would have been desirable to report both the long-term normals and the 1978-79 actual data, since residential energy demand in terms of appliance choice is presumably based on expected, rather than actual, weather conditions - which can be related to long-term normals - while the appliance utilization decision is probably more closely related to actual weather conditions.

Turning to the monthly weather data, these variables were derived directly from actual daily degree day data also available for NOAA weather divisions. This actual daily data was then aggregated into billing period data, but is only reported for the innoculated (rather than the actual) billing periods. While this does mean that the HDD and CDD data reported on the monthly file are consistent with the innoculated consumption and expenditure data - see our previous discussion of the innoculation procedures in Section 3.1.2 - it also introduces distortion into both the monthly estimates and the related intertemporal pattern of

weather conditions. Again, the result of deliberately introducing noise into the data is to certainly render the estimated parameters of models based on this data less precise, and probably to produce some bias as well. A second problem is that the monthly and annual data will not "add up", that is, the sum of the reported billing period data over a suitable 365-day period will not equal the reported annual data. This result is due both to the innoculation procedure used in the monthly data and the Census division adjustment of the annual data. This lack of consistency between the monthly and annual weather data means that the two types of data must be used separately, rather than in a joint specification, reducing degrees of freedom in estimation and restricting the types of models that can be estimated.

Finally, there are some minor problems with the weather zone classification used by NIECS and the associated weather maps reproduced in various NIECS publications. Weather zones, based on long term weather conditions in terms of HDD and CDD and developed by the American Institute of Architects (AIA) for the U.S. Departments of Energy and Housing and Urban Development, were used to classify each household. This classification - see the NIECS variable KWEATHRZ - was based on data for the NOAA weather division within which each housing unit was located. The AIA weather zone definitions are shown in Table 3 , and consist of seven geographic areas within the continental U.S.

The first thing to note from Table 3 is that AIA zones 4 and 5 were combined, and reported as zone 4 , in order to prevent geographical identification of households in the coastal areas of southern California. Thus, the NIECS file reports only six weather zones: 1 - 4 , 6 and 7 . Also note that weather zone 7 has more heating degree days, by

Table 3

AIA Weather Zones

The following weather zones, developed by the American Institute of Architects (AIA) for the U.S. Departments of Energy and Housing and Urban Development, are used to classify housing units based on long term weather conditions.

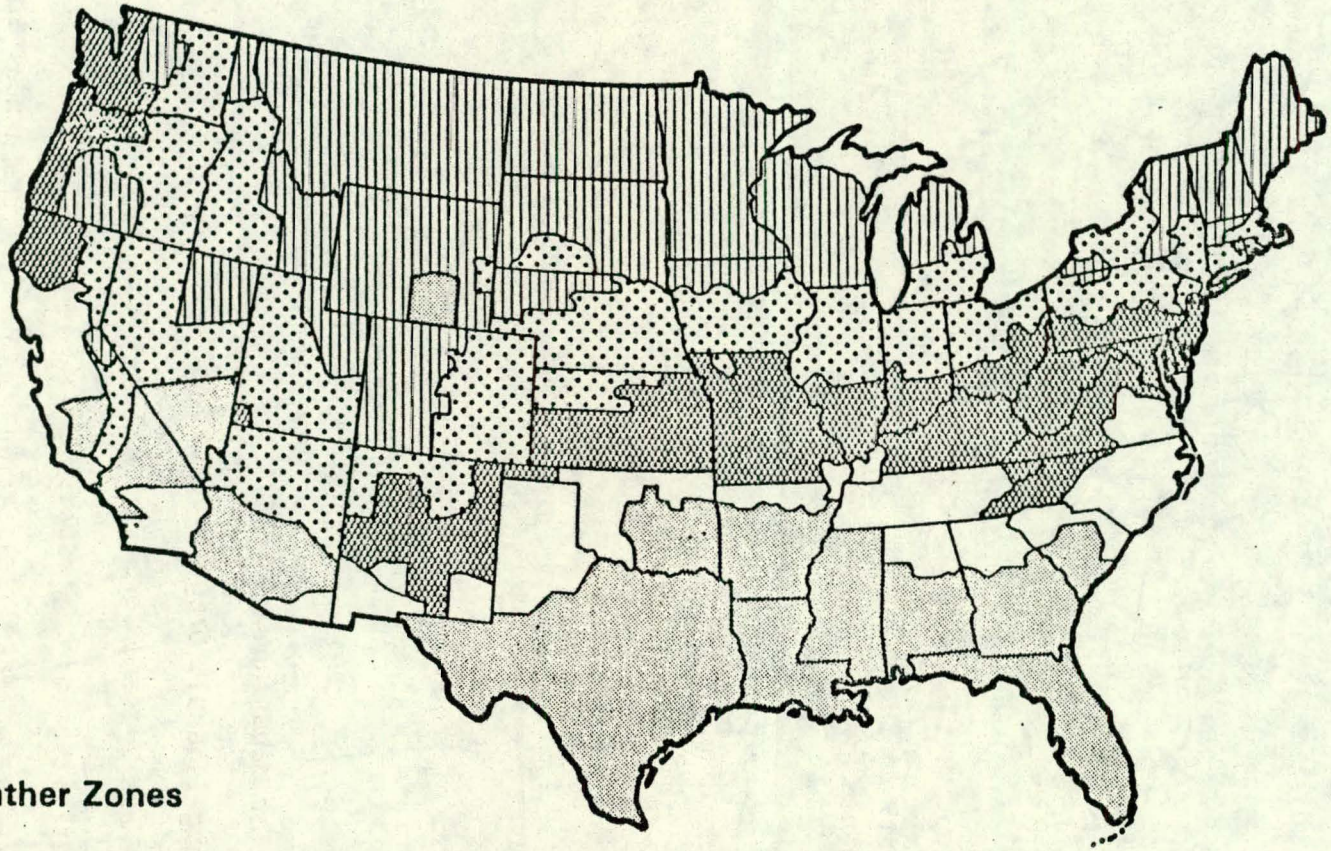
Zone	Cooling Degree Days	Heating Degree Days	Comments
1	Less than 2,000	More than 7,000	
2	Less than 2,000	5,500 to 7,000	
3	Less than 2,000	4,000 to 5,499	
4	Less than 2,000	2,000 to 3,999	Zones 4 and 5 are combined to prevent geographic identity of households in zone 5--lower coastal areas of California.
5	Less than 2,000	Less than 2,000	
6	More than 2,000	Less than 2,000	
7	More than 2,000	2,000 to 3,999	

Source: U.S. Department of Energy, Energy Information Administration, Residential Energy Consumption Survey: 1970-80 Consumption and Expenditures, Part I; April, 1981 (DOE/EIA-0262/1) , p. 89 .

definition, than weather zones 6 , so that the zone numbers are not monotonically increasing in "warmness." That is, weather zone 7 is actually colder than weather zone 6 .

Besides the weather zone classification reported for each household, the NIECS publications also include a U.S. weather zone map, shown in Figure 1, to aid in the geographical identification of HDD and CDD weather patterns. However, there are several potentially confusing problems with this map. First, the weather zone map shows only five, rather than seven, zones. The explanation of this inconsistency is that weather zones 4 and 5 , defined in Table 3 , have been redefined as zone 4 on the weather zone map, while weather zones 6 and 7 in Table 3 have been combined into zone 5 on the map. This redefinition of weather zones for the purposes of the weather zone map is clear from the zonal definitions reported at the bottom of Figure 1, but is likely to be confusing to the casual reader. A second problem is that there are minor errors in the maps included in several of the earlier NIECS publications. According to DOE, the weather zone map shown on p. 141 of the 1979 Household Screener Survey publication - Residential Energy Consumption Survey: 1979-80 Consumption and Expenditures, April, 1981 (DOE/EIA-0262/1) - is accurate. A comparison of this map with several of the earlier maps indicates that small areas of California, Missouri, New York (Long Island), Oregon, South Dakota, Texas (panhandle), Utah, West Virginia and Wyoming were affected. However, neither of these problems - the redefinition of the weather zones and the inconsistencies among maps - affects the weather information reported on the annual and monthly NIECS data tapes.

United States Weather Zone Map
of
Heating Degree Days (HDD) and Cooling Degree Days (CDD)

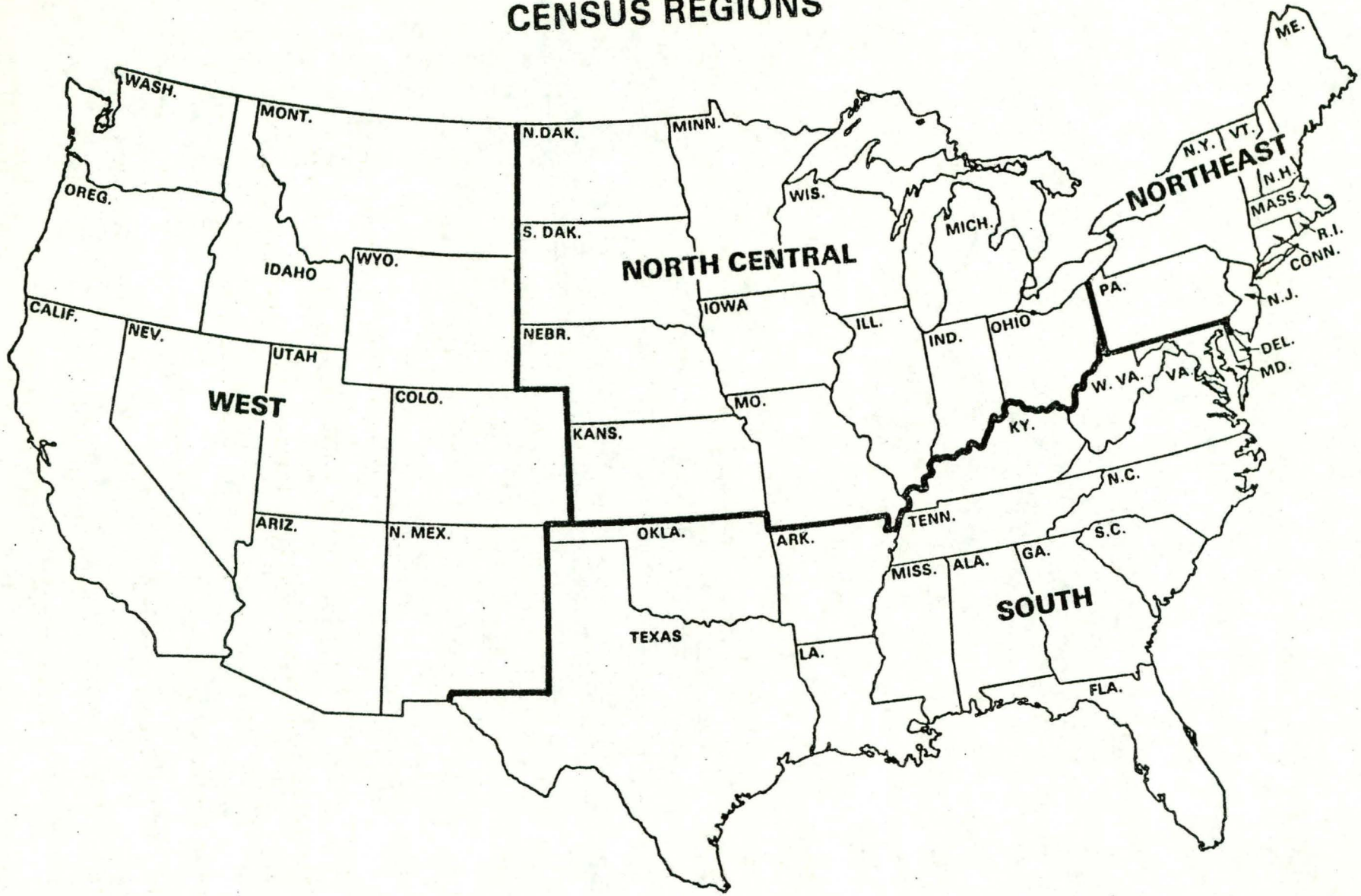


Weather Zones

Zone 1 Is Less Than 2,000 CDD and Greater Than 7,000 HDD.
Zone 2 Is Less Than 2,000 CDD and 5,500-7,000 HDD.
Zone 3 Is Less Than 2,000 CDD and 4,000-5,499 HDD.
Zone 4 Is Less Than 2,000 CDD and Less Than 4,000 HDD.
Zone 5 Is Greater Than 2,000 CDD and Less Than 4,000 HDD.

Source: U. S. Department of Energy, Energy Information Administration, Residential Energy Consumption Survey: 1979-80 Consumption and Expenditures, Part I: April 1981 (DOE/EIA-0262/1), p. 141.

CENSUS REGIONS



3.2 Problems Related to the Sample Design

There are three sources of non-randomness in the NIECS sample: 1) a complex cluster sampling frame in which the probabilities that households are sampled are neither constant nor independent, 2) loss of respondents due to contact failure or refusal, and 3) missing item responses. For estimation of population characteristics, it is necessary to restore the representativeness of the sample; this is usually done by reweighting the observations. The NIECS data set contains weights designed for this purpose which are discussed below. For estimation of causal models of appliance purchase or usage, it is necessary only that data on the linkage from the input to the output variables of the model be representative. It is not necessary that the distribution of the input data be representative. Thus, stratification on input variables generally does not affect causal model estimation, and it is neither necessary nor desirable to weight observations in such analysis.

Sample stratification on attrition which is correlated with an output variable in a causal model will yield non-representative data on the causal link and lead to biased estimates. The NIECS sample frame involves geographic clustering in which there is some pattern of non-representativeness between large SMSA, small SMSA, and rural areas. However, there does not appear to be any contamination of the sample frame by variables such as equipment holdings or use labels which are of primary interest for energy studies. Thus, the NIECS data should not be used to study causes of location choice without careful statistical corrections for representativeness. However, for other purposes,the stratification should present no special problems.

One feature of the NIECS cluster design discussed earlier is that in

the final cluster a number of households are drawn from a small geographical area, and apparently in some cases from the same apartment house. This is likely to produce correlations between intra-cluster responses. This is at variance with the usual statistical assumptions of independent observations. In model estimation, such dependence will generally not bias parameter estimates, but will bias downward the estimated standard errors of the parameter estimates.

Sample attrition in the NIECS data has been minimized by a careful interviewer call-back and follow-up procedure. Personal interviews were completed for 85 percent of the sampled respondents. An additional 5.3 percent of the households responded only by mail interviews. Non-comparability of the personal and mail interview data make the mail responses unusable for model estimation.

Personal interview non-response appears to follow the usual pattern that one and two person households with all persons working are under-sampled. However, comparison of the unweighted NIECS personal interview sample with Annual Housing Survey data on selected variables suggests that attrition biases are minimal; see Table 4 below.

Data attrition due to item non-response is a serious problem in the NIECS data. This has been handled by EIA by imputation of most missing observations using the methods described in detail in Section 3.3. This imputation is satisfactory for estimation of population characteristics. However, it is extremely damaging for causal model estimation, since the ad hoc relationships between inputs and outputs used for the imputation are intermingled with data reflecting the true causal link. Because of an extraordinarily stupid decision by EIA not to flag location of imputations, it is impossible for the researcher to undo this mischief.

TABLE 4: Comparison of Frequency Distributions:
NIECS and the 1978 Annual Housing Survey

Variable	Unweighted NIECS	Total U.S. NIECS	Total U.S. AHS*	North East NIECS	North East AHS*	North Central NIECS	North Central AHS*	South NIECS	South AHS*	West NIECS	West AHS*
Total occupied housing units (in thousands)	3842	76,608	77,167	17,363	16,952	20,614	20,171	24,603	25,094	14,028	14,950
A) Type of Housing Structure											
Single-Detached	66	63	64	46	49	75	70	69	71	58	62
Single-Attached	4	4	4	9	7	3	2	2	3	3	3
2 - 4 units	12	14	13	24	21	14	13	8	8	12	11
5 or more units	10	12	15	18	21	4	12	9	11	21	17
Mobile home, Trailer, other	7	6	5	3	2	4	4	12	6	5	7
B) Year House Built											
1939 or earlier	32	33	32	47	50	42	40	18	20	28	20
1940 - 1949	10	10	10	11	8	8	8	11	11	10	11
1950 - 1959	18	18	17	16	14	18	16	20	18	17	20
1960 - 1964	11	10	10	7	8	8	9	14	11	13	12
1965 - 1969	11	11	12	7	8	9	11	13	14	13	13
1970 or later	18	18	20	12	11	15	17	24	26	20	24
C) Housing Tenure											
Own	69	67	65	59	60	75	70	70	67	58	61
Rent	31	33	35	41	40	25	30	30	33	42	39
D) No. of Rooms											
1-3 rooms	13	13	14	16	17	7	11	13	12	18	19
4 rooms	22	22	20	23	18	18	17	23	21	26	22
5 rooms	24	23	24	18	20	25	25	26	27	22	22
6 rooms	20	19	21	19	21	23	22	20	21	14	18
7 or more	21	22	22	25	24	27	24	18	20	20	19

TABLE 4 (Continued)

Variable	Unweighted NIECS	Total U.S. NIECS	Total U.S. AHS*	North East NIECS	North East AHS*	North Central NIECS	North Central AHS*	South NIECS	South AHS*	West NIECS	West AHS*
) Primary Heating Equip.											
arm-air furnace	51	50	52	37	35	70	70	44	50	47	50
lec. heat pump	2	2	1	1	--	1	1	3	3	1	1
team,hot water	17	17	18	52	55	14	15	4	4	5	3
uilt-in elec.	7	7	7	7	5	3	5	8	8	13	12
loor-wall or ipeless furnace	8	8	8	1	1	3	3	10	9	18	22
oom heaters	9	10	10	1	3	6	6	17	20	12	6
ireplace, stove, ortable heater	5	5	4	-	1	3	1	13	7	5	5
) Primary heating fuel											
atural gas	55	55	55	40	37	74	70	41	48	68	68
uel oil, kerosene	21	22	21	51	55	15	14	17	13	6	5
lectricity	16	16	16	8	6	5	8	27	26	20	20
PG (propane)	4	4	5	--	1	4	6	8	9	2	3
ood	3	2	1	--	1	1	1	5	3	3	1
ther	1	1	1	--	1	--	1	2	2	1	3
) Family Income 1977											
ess than $5,000	14	14	16		16		15		19		14
5,000-$9,999	20	19	20		19		18		21		19
10,000-$14,999	19	19	19	na	19	na	18	na	19	na	18
15,000-$19,999	16	15	14		14		15		14		14
20,000-$24,999	13	13	12		12		13		11		12
25,000 or more	18	20	19		20		21		16		22

The NIECS data provides weights on observations which are intended to restore the representativeness of the sample for the purposes of estimating population characteristics. These weights are also appropriate for simulating population response using fitted causal models. The comparison in Table 4 of the unweighted and weighted NIECS data with 1978 Annual Housing Survey data indicates first that the weights have relatively little effect on NIECS sample characteristics, and second that the weighted NIECS data and Annual Housing Survey data are generally comparable, differing by less than two standard deviations from the NIECS sample proportions.

The overall NIECS sample weights are the product of five factors,

$$\text{overall weight} = [\text{basic weight}] \cdot [\text{special factor}] \cdot [\text{attrition factor}] \cdot [\text{First ratio factor}] \cdot [\text{Second ratio factor}],$$

where

[basic wt.] = 100,000/7 = basic design household sampling rate ;

[special factor] = 2 if final cluster (segment) was large and sampled at half normal rate, = 1 otherwise ;

[attrition factor] = (No. of interviews attempted)/(No. of interviews completed) within the segment ;

$$[\text{first ratio factor}] = \frac{(\text{Prop. of Hh in stratum with heating fuel i})}{(\text{Prop. of Hh in sampled PSU with heating fuel i})},$$

where the nation is divided into 103 strata, with one Primary Sampling Unit (PSU) sampled from each, and the fuels are i = gas, oil, electricity, LPG, other. ;

$$[\text{second ratio factor}] = \frac{(\text{Prop. of Hh in Census region \& SMSA type, current Population Survey})}{(\text{Prop. of Hh in Census region \& SMSA type, NIECS data})}.$$

The first ratio factor requires particular comment. Both numerator and denominator are calculated from 1970 Census data. The intent of this factor is to correct for non-representativeness of the PSU sampled within

the stratum with respect to the important output variable of heating fuel. Note first that this factor depends on choice. As a consequence, attempts to estimate causal models of fuel choice using weighted data will be biased. It is best to use unweighted data for such analysis; however, if weighted data is used, the first ratio factor should be omitted.

In simulation and forecasting from fitted causal models, the NIECS weights are generally appropriate. There is a question of whether the first ratio factor should be excluded from the weights. If the input variables are uniform across a stratum mean because of random noise, then the first ratio factor is a helpful variance-reducing correction and should be included in the weight. If, as is more likely, the deviation in fuel shares in the sampled PSU is caused by a deviation of the input variables from their stratum mean, then the causal model will provide the proper corrective once it is fed input variables which are weighted to be representative. In this case, application of the first ratio factor will overcorrect and lead to biased forecasts. The best procedure in this case is to omit the first ratio factor from the NIECS weights.

3.3 Imputation Problems

As outlined earlier in this report, a number of household questionnaire responses were imputed and the imputed, rather than the real, responses were included in the NIECS public use tape. The cases in which imputation was used include: i) household non-responses, in which case either the modal value or the response of a "donor" household for the variable in question was used; ii) mailed questionnaire responses, for which "donor" household responses were used for all variables; and

iii) missing or incomplete fuel usage data, in which case either ratio adjustments or estimates based on regression models were used to impute values. The number of non-responses and the imputation procedure used for each of the household questionnaire variables are shown in Table 5 , taken from Report on Methodology (RAC, 1981), Part III, Appendix G.

The fundamental problem with the imputed data is that there is no indication on the NIECS public use tape as to which responses are real and which are imputed. Thus, the individual researcher is precluded from using his/her own judgement as to whether or not the imputation procedures used were appropriate for the research task at hand. No matter how carefully an imputation procedure is designed and carried out, it is likely to be invalid for at least some uses depending upon the particular variable and research application. For example, 232 (6.0 percent) of the "year housing built" responses, 175 (4.6 percent) of the "number of bathrooms" responses, 449 (11.7 percent) of the "family income" responses, and 234 (6.1 percent) of the "value of housing" responses were imputed using "hot deck", i.e. donor household, procedures. These are important variables in terms of modeling household appliance choice and utilization decisions, and not being able to distinguish between real and estimated data represents a potentially serious source of unknown bias. In this regard, it is encouraging that for the "square feet of living space" and "presence and type of insulation" variables, imputation was not used even though the non-response rate was 1300 (33.8 percent) and up to 818 (21.3 percent), respectively.

Table 5

IMPUTATIONS FOR ITEM NONRESPONSE IN HOUSEHOLD QUESTIONNAIRE

Question number and topic[2]	Number of nonresponses[3]	Procedure and notes[4]
1. Year moved into housing unit	4	Hot deck
2. Month moved in	25	Random assignment to month
3. Year housing unit built	232	Hot deck
4. Number of floors of living space	20	Hot deck
5. Number of rooms	0	Hot deck
6. Complete plumbing facilities	0	
7. Plumbing facilities used for this household only	179	
8. Number of bathrooms	175	Hot deck
9. Square feet of living space	1300	Not imputed
10. Shape of largest room Room dimensions	15 90	Hot deck Hot deck (Imputed from household with largest room of same shape)
11. Main heating equipment	20	Hot deck (Some codes dependent on main heating fuel)
12. Heating equipment is central system or for living quarters of household only	109	Hot deck
13. Main heating fuel	12	Hot deck
14. Presence of temperature control device	8	Modal value
15. Specific temerature control device	50	Modal value
16. Presence of supplementary heating equipment	17	Modal value
17. Type of supplementary heating equipment	3	Modal value

See notes at end of listing.

18.	Supplementary heating fuel	3	Hot deck (Main heating fuel must match)
19.	Presence of air conditioning	0	
20.	Number of rooms air conditioned	39	Hot deck (Housing unit must have same air conditioning type and same number or rooms)
21.	Number of window units	10	Modal value
22.	Central sir conditioning fuel	78	Modal value
23.	Air conditioning is central system or for living quarters of houshold only	29	Hot deck
24.	Presence of air conditioning control	32	Modal value
25.	Specific AC control devices	16	Modal value
26.	Number of windows and sliding	0-2[a]	Hot deck
27.	Number of storm windows or insulating glass	1-26[a]	Hot deck
28.	Number of doors to outside	14	Hot deck
29.	Number of doors to outside with storm windows or insulating glass	10	Hot deck
30.	Rooms closed off	1	Modal value
31.	Reasons for closing off rooms	4	Modal value
32.	Hot water fuel	32	Hot deck
33.	Presence of hot running water	50	Modal value
34.	Hot water supplied by central system or heater for living quarters of household only	89	Hot deck
35.	Separate hot water heater, or part of furnace	118	Modal value

[a]Range for specific types of windows

36-40.	Presence and type of Insulation	199-818[b]	Not imputed
41-48.	Installation or addition of energy conservation equipment	2-58[b]	Hot deck
49-61.	Appliances and features other than specified below	0-61[b]	Modal values
	Presence of energy saver switch	249	Recoded as "No"
	Presence of extra insulation in walls or doors	982	Recoded as "No"
62-94.	Household vehicles		Not imputed
95-100.	Relationship of household members to respondent	36	Hot deck (Based on family relationships and ages of members of household)
	Sex of household member	4	Hot deck
	Age of household members	109	Hot deck
	Employment status of household members	N.A.	Hot deck
101.	Marital status	4	Hot deck
102.	Race	279	Hot deck within ultimate clusters (Interviewer observations in clusters with large numbers of households with missing information)
103.	Housing unit shared by another family	75	Not imputed
104.	Number of drivers in household	5	Hot deck
105.	Highest school grade attended by respondent	17	Hot deck
106.	Did respondent finish highest grade attended	111	Hot deck (Donor must have same highest grade attended)

[b]Range for specific items

107.	Highest school grade attended by spouse	32	Hot deck
108.	Did spouse finish highest grade attended	78	Hot deck (Donor must have same highest grade attended)
109.	Family income	449	Hot deck (Based on characteristics of household and household head)
110.	Own or rent home	6	Hot deck
111.	Is housing unit part of cooperative or condominium	240	Hot deck
112.	Value of housing unit	234	Hot deck
113.	Monthly rent of housing unit	24	Hot deck
114.	Fuels for specific end uses	0-15	Hot deck (Known fuel used for heating and hot water must match)
115.	Is payment for fuel made to utility company or included in rent	0-78	Hot deck (Known payment methods for heating and hot water must match)
116-117.	Fuel use for non-household purposes	310	Not imputed
118.	Number of fuel oil deliveries per year	22	Hot deck
119-120.	Number of companies from which fuel oil is purchased	11	Hot deck
121.	Number of LPG deliveries per year	24	Hot deck
122-123.	Number of companies from which LPG is purchased	18	Hot deck

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[2]See questionnaire for specific wording of question.

[3]Number includes "don't know" responses, refusals to answer question, and questions inadvertently skipped or not marked.

[4]Unless otherwise indicated, sorting sequence for the hot deck procedure was sample cluster within type of living quarters within PSU.

The basic point, an extremely important one, to be made here is that the individual user of the data must have the ability, and hence prerequisite information, to select out appropriate sub-samples of responses for his/her own use if the data set is to achieve maximum use across a wide spectrum of users and/or applications. Only the real data should be included in such a data set, thus permitting the researcher to apply whatever imputation procedures are appropriate in each case. If imputation must be used before public release of the data, a minimum requirement is that the user be able to differentiate between real and imputed data. Otherwise, the general usefulness of the data set is severely restricted.

Indeed, we think it would be extremely useful, even at this late date, to have a "flagged" version of the current NIECS data set made available. Since both pre- and post-imputation versions of the data set exist, known as the "May" and "December" files, respectively, this should be a relatively easy task. The benefits to users in terms of removing an unknown source of error and thereby permitting more accurate estimation of residential energy demand models would be significant. An alternative approach would be to make the pre-imputed or May file publicly available for research use.

Turning to the mailed questionnaire responses, the imputation procedure used was much more severe in that once a "donor" household was identified, all of the responses of the donor household were substituted for the mailed responses of the mailed questionnaire household. The result, if this data is used along with the real data, is potential measurement error of an unknown magnitude. Fortunately, there were only 239 mailed questionnaire households, or 5.9 percent of the 4081

households, included. Further, they are listed at the end of the public use files, as households 3843 through 4081, and thus, can easily be deleted. In terms of estimating models of appliance choice/utilization, we would recommend that these observations be ignored as being of unknown validity.

The third group of variables for which imputation procedures were used was the monthly fuel consumption and expenditure data. Two basic problems were encountered with this data: first, the reported data did not in general correspond to a standard 365-day period so that both annualization and standardization were required inorder to create annual estimates for the period April 1978 through March 1979; and second, some households had either incomplete or missing data for some or all of the fuels used. Imputation procedures using various regression models were used for the second group, discussed further below, while ratio adjustment (rather than imputation) was used in the first case.

In general, households were divided into three catagories, depending upon the completeness of the fuel usage data provided by the fuel suppliers, as follows:

i) Complete records - This group included households for which 329 or more days of data were reported in the case of electricity and natural gas. The only adjustment required was to standardize the data tothe April 1978 - March 1979 period. For fuel oil and LPG users, a full 12 months of data for the standard 12-month period were required.

ii) Partial records - Households for which between 150 and 329 days of data were available for electricity and natural gas were put into this catagory. A ratio adjustment procedure, using fuel consumption proportions for complete record households in the same

end-use/climate-zone cell, was used to annualize the incomplete data to the standard 12-month period. Fuel oil and LPG users were not included in this catagory.

iii) Non-responses - Households that refused to sign the fuel supplier authorization waiver, whose fuel company refused to cooperate with the survey, where less than 150 days of data were available in the case of electricity and natural gas, or where there were less than 12 months of data for fuel oil and LPG users were put into this catagory. The actual responses, where available, were ignored, and all fuel usage data was imputed using regression models.

The regression variables used included such variables as heating degree days, number of rooms, square feet of main room and family income, and were fitted using step-wise regression procedures. Separate consumption equations were developed for each fuel by major end uses, and similar equations were also estimated for fuel expenditures. A final ratio check was carried out on the ratio of imputed expenditure and imputed consumption to see that the implicit average fuel price was reasonable in magnitude. Where it was not, the imputed expenditures were further adjusted in terms of given maximum and minimum values for the average price ratio. Table 6 summarizes the goodness-of-fit statistics for the various comsumption and expenditure regression models used.

Table 6 : SUMMARY STATISTICS FOR FUEL IMPUTATION REGRESSIONS

Model	Fuel/End Use	R^2 Consumption	Expenditure
E1	electricity - space heating and air conditioning	.47	.46
E2	electricity - space heating only	.65	.37
E3	electricity - air conditioning only	.57	.50
E4	electricity - other uses	.55	.47
G1	nat. gas - space heating and air conditioning	.61	.46
G2	nat. gas - space heating only	.44	.43
G4	nat. gas - other uses	.29	.20
L1	LPG - space heating	.61	.54
L2	LPG - other than space heating	.38	.33
F1	fuel oil - space heating	.45	.46

Source: Report on Methodology (RAC, 1981), Part III, Appendix F.

Tables 7A and 7B report various distributions for the three catagories of fuel records, fuel type and type of structure for the NIECS households. Table 7A shows the percentage of households in each catagory, and indicates the extent to which imputation was necessary by fuel type used for space heating. The distributions for other end uses were reported to be similar to those shown for space heating. Table 7A indicates that, among households paying for home heating fuel, imputation was required for 11.3 percent of the electricity-using households and 15.2 percent of the natural gas-using households. For fuel oil and LPG users, the figures are considerably higher, 35.8 and 36.2 percent, respectively. No effort was made to collect (or impute) fuel usage data for households that did not pay for the fuel(s) they used. Clearly, a large amount of the reported annual fuel usage data is imputed, though the problem is less severe in the case of electricity and natural gas. In particular, the fuel oil and LPG usage data must be regarded as highly suspect not only given the major extent of the imputations used but also because the reported delivery data is not likely to be indicative of actual consumption, particularly at the beginning and ending points of the 12-month period where substantial "inventory error" may occur.

The non-response, and hence imputation, proportions by type of housing structure reported in Table 7B reveal that the imputed fuel usage data is generally concentrated among non-single-family housing, although the non-response proportion for mobile home electricity users is within range of those reported for single-family housing units.

Again, the basic problem here is the inability to distinguish between real and imputed data, a problem that could be easily corrected through "flagging". Lacking the necessary "flags" indicating the presence of

Table 7A Fuel Type By Imputation Catagory

	Elec-tricity	Natural Gas	Oil	LPG
All Households				
Complete	74.1	68.1	53.8	57.4
Partial	8.3	4.8	0	0
Missing/Non-Response	17.6	27.1	46.1	42.6
Households That Pay For Home Heating				
Complete	78.9	79.3	64.2	63.8
Partial	9.7	5.4	0	0
Missing/Non-Response	11.3	15.2	35.8	36.2

Table 7B Housing Structure By Fuel and Respondent Type

	Mobile Homes	Single Family Detached	Single Family Attached	2-4 Unit Building	5-or-More Unit Building
Electricity					
Respondents	81.9	89.9	88.6	68.3	52.5
No response	18.1	10.2	11.4	31.7	47.5
Natural Gas					
Respondents	64.2	87.4	73.0	51.4	26.8
No response	35.8	12.6	27.0	48.6	73.2
Fuel Oil					
Respondents	46.6	68.3	54.5	25.7	1.0
No response	53.4	31.7	45.5	74.3	99.0
LPG					
Respondents	50.0	64.7	50.0	25.0	0
No response	50.0	35.3	50.0	75.0	100.0

imputed data, the research user would be well advised to restrict residential energy demand modeling to the single-family detached housing category and to consider only electricity and natural gas usage. These two groups, plus the electricity/single-family-attached group, have the smallest imputed data proportions, generally in the 10 to 12 percent range. The relatively large amounts of imputed data in the other groups renders their use unwise until further assessment of the associated errors can be carried out. Of course, such assessment will require distinguishing between the real and the imputed data.

3.4 Data Problems

3.4.1 Existing Public Use Data

The data on the NIECS public use tape is generally complete with few apparent problems. A general assessment of the reasonableness of the data for each variable is available in terms of the means, ranges, standard deviations, maximum and minimum values, and the extent of missing data computed for most of the non-vehicle variables and reported in Table B . The processing and checking of this amount of data, over 700 variables for 4081 households, was clearly a major task, and both DOE and RAC (the prime contractor) are to be commended for the generally excellent quality of the data made available.

There are a few minor problems which should be reported. The last personal interview household on the tape, number 3842, has an incorrect PSU number - it should be 8051 instead of the reported 8351 value.

Eleven of the NIECS variables have apparently been "masked", that is, either no information is given or else only a single code value is reported for all households. These variables include KAUTHORZ , KEREADEL , KEREADNG , KFOSUPPL , KFUELOT , KLPGSUPP , KSHARHOM , NFODELIV , NFOSUPPL , NLPGDELV and NLPGSUPP . Interestingly enough, values were reported for KBREADEL and KBREADNG , the beginning-of-year equivalents of KEREADEL and KEREADNG , although the number of non-zero values reported do not match the number of households using each of these fuels, as given by KAVALEL (or KCOLLEL) and KAVALNG (or KCOLLNG) .
There is also a transposition of coding definitions between KSOUFO and KSOUNG and between KTIMEFO and KTIMENG . The coding definitions should reflect the difference between "piped-in" fuels (electricity and natural gas) and "delivered" fuels (fuel oil and LPG), but in the two cases noted above, fuel oil is treated as a "piped-in" fuel and natural gas as a "delivered" fuel. This mistake presumably does not affect the reported responses, merely their code definitions. The corrected code definitions are shown in notes listed under each of these variables in Table B.

There may also be a problem with the variable KURBRURL , by way of comparison with the numbers reported for the variable KSMSASZ . As can be seen in Table B, there are a reported 2,801 urban households and 1,041 rural households, where rural refers to places of less than 2,500 inhabitants as defined in the 1970 Census. But, looking at KSMSASZ in Table B, only 1,325 households are reported to be located outside of SMSA's, which presumably includes non-SMSA urban, suburban and rural locations. Thus, by comparison, 1,041 of the 1,325 non-SMSA households, or about 80 percent, are reported as being rural, a proportion which

seems rather high. In addition, there is the apparent coincidence of the same number, 1,041, being reported both as the number of households located in small SMSA's (under 1,000,000) and the number of rural households.

Finally, it is interesting to note - although this does not necessarily imply any error in the reported data - that no residential use of solar energy was reported in the entire survey. One might have expected to find solar-use responses for either secondary space heating fuel (KFLSHEAT) or water heating fuel (KWHEATFL) , but no such responses are recorded. The answer may be that by 1978-79 there was still only very limited use of solar energy for residential heating.

3.4.2 Additional or Supplementary Data Needed

Although the NIECS data contain a great deal of detailed information on the residential energy demand characteristics of individual households, it does not contain all of the information required to model household appliance choice and utilization. Substantial amounts of additional data are required, much of it in the form of both equipment and fuel price data. A further requirement, required to match cross-sectional price data to individual households, is more specific household location information, at least to the state level. Following a brief outline of the appliance choice model data requirements, each of these groups of supplementary data are discussed.

The general microeconomic paradigm involves agent - in this case the household - optimization over some choice set subject to given constraints. At the microeconomic or individual agent level of decision-making, prices and income generally enter as exogenous variables

or parameters to the agent. The endogenous decision variables are quantities and characteristics of various goods and services. In the case of appliance choice - restricted in our discussion to the case of energy-using household appliances - the household selects an appliance stock in terms of such decision variables as type of appliance, efficiency (in terms of energy use), capacity and quantity for use in providing such household services as space heating and cooling, heated water, refrigeration and clean dry clothes. Technological constraints enter in the form of trade-offs among capital costs (in the form of installed equipment) efficiency and capacity. Operating costs, primarily fuel costs, are related to the energy-using efficiency of the appliance. Given the behavioral assumption of either lifetime cost minimization or utility maximization, the basic problem of the household is to select and operate an optimal stock of appliances. For example, more efficient appliances will generally cost more to purchase and install but will have lower operating costs, whereas less efficient appliances will have lower capital costs but higher operating costs. The appliance utilization decision, i.e. the extent to which an appliance will be used, can also be modeled, either seperately from or simultaneously with the appliance choice or selection decision.

Clearly, a key part of this problem entails prices, both equipment prices (appliance cost plus installation costs) and fuel operating prices. The relevent equipment prices are the current installed prices of the various appliance alternatives facing the household at the time the decision is made. These prices are likely to vary cross-sectionally, i.e. across locations, especially given variation in the labor component of installation costs. Operating costs or fuel prices are more

complicated since it is expected operating costs, and hence expected fuel prices, over the lifetime of the appliance that are relevent. In general, modeling expectations adequately requires extensive time-series of data since expectations are presumably based, in large part, on historical or past information. Furthermore, the required time-series fuel price data must be locationally-specific, given significant cross-section variations in the fuel prices facing individual households. The result is an extensive price data requirement - equipment and fuel - requiring both cross-section and time-series data, as well as the location of each household.

3.4.2A Appliance Capital Costs

One of the fundamental shortcomings of the NIECS data set for the purpose of estimating appliance choice models is that data on the capacity and efficiency of major household appliances - space heating and air conditioning equipment, water heaters and other appliances such as stoves, refrigerators, clothes washers and dryers, dish washers, etc. - was not collected. It is therefore necessary to estimate the capacity requirements for each household, as well as imposing assumptions to handle efficiency variations. As an example, consider the case of a household heating and air conditioning (HVAC) system. The HVAC capacity requirements are directly related to the physical and thermal characteristics of the structure, such as the type and size of the house, number of floors, number of doors and windows, and amount and type of insulation. Much of this information is available from NIECS, although some key design parameters are missing - house exposure (e.g. southern, northern, etc.), type of house and average ambient (outside) temperature.

One possible approach to estimating household HVAC costs, for both the selected and alternative systems, is by using a residential thermal load model of the kind used by thermal engineers when designing household HVAC requirements. Such a model would use the known physical and thermal characteristics of the structure to estimate the HVAC design capacity. Unknown parameters, such as type and exposure of house, can be circumvented either by assuming average values or by using estimates from regression models based on known NIECS information. The result would be two basic capacity estimates, space heating and air conditioning loads (in, say, BTU's per hour), plus related secondary parameter estimates - number of feet of ducting, pipe and/or wiring required, number of registers or number of baseboard heaters, size of required oil tank, plenum, etc. This is precisely the kind of information required by an HVAC contractor to cost out the equipment and installation costs of the designed system. Table 8 shows one possible listing of 19 HVAC alternatives which could be used in a residential HVAC choice model.

Water heating capacity and efficiency were also not collected by NIECS, but capacity can be estimated using such variables as size of house, number of floors and bathrooms, and family size. Efficiency can be assumed to be constant across households or else can be related to either type of water heating fuel used and/or age of equipment, using year house built as a crude proxy for the later.

The available information on other major household appliances is generally restricted to presence, number and type of fuel, although a variety of refrigerator and some oven characteristics are reported. Thus, both capacity and efficiency for these appliances must either be assumed constant across households or else related to such variables as

Table 8 : RESIDENTIAL HVAC ALTERNATIVES

No.	Description	Duct	Pipe	Registers	Baseboards	Plenum	Vent Chimney	Oil Tank	BB Wiring	Room AC
1.	gas-forced air-no CAC	X		X		X	X			X
2.	gas-forced air-comb.CAC	X		X		X	X			
3.	gas-hot water-no CAC		X		HW		X			X
4.	gas-hot water-sep. CAC	X	X	X	HW		X			
5.	gas-wall units-no CAC		X*					X		X
6.	gas-wall units-sep. CAC	X	X*	X			X			
7.	oil-forced air-no CAC	X		X		X	X	X		X
8.	oil-forced air-comb.CAC	X		X		X	X	X		
9.	oil-hot water-no CAC		X		HW		X	X		X
10.	oil-hot water-sep. CAC	X	X	X	HW		X	X		
11.	oil-wall units-no CAC		X*					X	X	
12.	oil-wall units-sep. CAC	X	X*	X	X			X	X	
13.	elec.-forced air-no CAC	X		X		X				X
14.	elec.-forced air-comb. CAC	X		X		X				
15.	elec.-heat pump (forced air)	X		X		X				
16.	elec.-hot water-no CAC		X		HW					X
17.	elec.-hot water-sep. CAC	X	X	X	HW					
18.	elec.-baseboard-no CAC				EL				X	X
19.	elec.-baseboard-sep. CAC	X		X	EL				X	

* for fuel

size of house, family size and/or fuel type. Since the associated appliance costs, both purchase and operating, are considerably smaller than those related to the HVAC and water heating systems, such treatment will probably not unduly influence the resulting residential energy demand estimates.

Given design capacity, and where possible efficiency, estimates for the actual choices, as well as a variety of alternatives, the next step is to price out the installed cost of the full set of options. One such approach, given the necessary design estimates discussed above, is to cost out each HVAC alternative using construction cost estimates - such as those available in publications by F. W. Dodge or R. S. Means, for example - for both equipment and installation costs. For each alternative, a typical equipment design must be selected - for example, a cast iron boiler with insulated flush jacket in the case of an oil-fired hot water furnace, or an air-to-air split system in the case of an electric heat pump - and then the required design capacity can be used to estimate equipment costs. Since equipment costs probably show little regional variation, relatively speaking, there is probably no need to adjust these figures for household location. Installation costs, primarily labor costs, can also be estimated from these same sources for each type of required equipment. However, labor costs do show substantial regional variation, requiring them to be adjusted for household location. Locationally-specific labor costs estimates are also available in these publications - for example, R. S. Means publishes cross-section indexes of both materials and installation costs for 162 major cities - and can be used to adjust installation costs by household

location, given the required location information. Similar estimates are also available for water heating alternatives.

Information on capital costs for other household appliances is much more limited. Publications such as Consumers Guide and Consumers Research Magazine can be used to price out equipment costs for such appliances as room air conditioners, stoves, refrigerators, dish washers, washing machines and clothes dryers. Installation costs can probably be ignored; in any case, such information is not readily available.

3.4.2B Fuel Prices

Annual fuel price data at at least the state level and for at least the three primary residential fuels - electricity, natural gas and fuel oil - is required to supplement the NIECS data for the purpose of estimating appliance choice and utilization models. More specific data, for example, at the individual utility level for the case of electricity and natural gas, would be desirable, but is not generally available. Detailed price data for the secondary residential fuels - LPG and kerosene - is also limited. Average annual fuel prices for the three primary fuels at the state level are currently available from several sources; the DOE State Energy Demand System (SEDS) data file for the period 1977-60 and the Oak Ridge National Laboratory data file for the years 1979-1954. In the case of both electricity and natural gas, it would be desirable to use marginal, rather than average, prices, given the declining-block structure of public utility pricing for these fuels, but again such information is not readily available. It could of course be constructed from individual utility rate structure data for past years, but this would be a time-consuming and costly process if a

sufficient number of both utilities and years were to be included.

Additional sources of residential fuel price data are the Edison Electric Institute's Statistical Yearbook (annual) for electricity and the American Gas Association's Gas Facts (annual) for natural gas, in the form of annual utility residential revenues and sales, the ratio of which provides an estimate of average price. More limited data for some of the other residential fuels is also available from other DOE sources, but most of this data is limited in years covered or is not specifically related to residential use.

3.4.2C Household State Location

One fundamental piece of information is missing from the current public use NIECS data set, information which is absolutely essential to the accurate modeling of residential energy demand. We refer to the location of the individual households, at at least the state level. The available household location information is contained in a single variable - KREGION - which indicates which of the four Census regions - North East, North Central, South and West - each household is located in. Somewhat more specific location information is also available by combining the information in two NIECS variables, KREGION and KWEATHRZ but even this information falls short of state locations.

The primary need for state level household location is to enable one to match the necessary supplementary capital cost and fuel price information, available generally at the state level, to each of the individual households. Only in this way can one construct the full set of information required for each observation, i.e. households, for estimating appliance choice models.

State location information would also enable one to use more precise weather information, primarily HDD and CDD, for the actual 1978-79 period. As outlined above, the weather information currently available on the annual file consists of estimates of HDD and CDD for the 1978-79 period, with the estimates being derived from NOAA weather division and Census division aggregates. Such information is not likely to be precise enough for obtaining accurate estimates of the household appliance choice model. What is needed is both long-term normals - for modeling the weather expectations related to appliance selection - and actual 1978-79 conditions - for modeling appliance utilization - at the state level for each household at a minimum. More precise household location information would, of course, be welcome as well, but is probably not absolutely necessary.

This research team has made several attempts, including a formal request to DOE, to obtain the necessary household location information. We have been rebuffed by officials at both DOE and RAC. The reasons given have to do with preserving household confidentiality, that is, the specific address and name of individual households. Our request for state locations, however, would in no way compromise such confidentiality, since much more detailed information is certainly required before one can deduce individual household addresses. Thus, we are not convinced that preserving sample confidentiality is a valid excuse for this failure to release the necessary information. What is actually at stake is the ultimate usefulness of the NIECS data set. Without some sort of additional location information, the usefulness of NIECS is quite limited. Given the significant potential of this detailed data set for accurately modeling household appliance choice and

utilization decisions and thereby better understanding a key aspect of residential energy demand, that is a tragedy.

4.0 CONCLUSIONS

The NIECS is clearly the most detailed household energy survey to date. Like its predecessor surveys, the Washington Center for Metropolitan Studies (WCMS) surveys of 1973 and 1975 and the Midwest Research Institute (MRI) survey of 1976-77, it contains detailed information on the housing, energy consumption and demographic characteristics of a large number of individual U.S. households during the 1970's. Some of the survey similarities and differences are shown in Table 9 , which compares the WCMS, MRI and NIEC surveys.

By way of comparison with these earlier surveys, NIECS contains roughly twice as many sample households and covers all four of the primary residential fuels, rather than just electricity and natural gas. While many of the variables relating to the structural and thermal characteristics of the shell, the appliance stock, energy consumption and expenditure and the demographic characteristics of the household are similar, NIECS is the only survey to include detailed information on the conservation and retrofit activities of the household (for the period 1977-79). Thus, it is uniquely equipped for analyzing shorter run residential responses to changing energy prices, income and other key parameters in terms of induced conservation efforts and modifications to the existing housing unit, rather than the more long-run effects revealed in basic changes in the housing and appliance stock. Furthermore, because detailed data on all four primary residential fuels are included, a wider range of fuel substitution effects can be probed within the

Table 9: RECENT RESIDENTIAL ENERGY SURVEYS - A COMPARISON

Variables Included	WCMS	MRI	NIECS
General - Sample/Survey:			
Population used	national+	16 cities	national+
Sample size (households)	1,455	1,985	4,081
Survey period - interview	1973, 1975	early '76	1978-79
Survey period - fuel usage	7/72-6/73	4/76-7/77	4/78-3/79
Survey period - appliance usage	n.s.	8/76-7/77 (150 households)	n.s.
Fuels surveyed - monthly usage	electric, nat. gas	elec., some nat. gas	elec., nat. gas, fuel oil, LPG
Housing Structure Characteristics:			
Type of housing	X	X	X
Year house built			X
No. of floors	X	/	X
Est. living space	X	/	X
No. of rooms/bathrooms	X	/	X
No. of windows/storm windows	X		X
No. of doors/storm doors	X		X
Attic insulation	/	/	X
Wall insulation	/	/	X
Awnings in use		X	
Basement/crawl space/garage	X		
Conservation/Retrofit Efforts:			
Storm windows/doors			X
Weatherstripping/caulking			X
Attic insulation		X	X
Wall/floor insulation			X
Hot water pipe insulation			X
Water heater insulation			X
Plastic covering - windows/doors			X
Clock thermostat			X
Heating/Cooling System:			
Main heating system - type, fuel	/	X	X
Sec. heating system - type, fuel	/	X	X
Air cond. equipment - type	X	X	X
Temperature settings used	X		
No. of rooms air cond.	X		X
No. room air conditioners	X	X	X

Table 9 (cont.)

Variables Included	WCMS	MRI	NIECS
Other Household Equipment:			
Water heater - type, fuel	/	/	X
Other major appliances - presence, type, number	X	detailed info. on no., type, age, capacity.	X
Small elec. appliances		X	
Energy Consumption:			
By type of fuel	/	/	X
Annual and monthly	X	X	X
For different functions	/	X	X
Paid by household	X		X
Quantity used	X	X	X
Expenditure	X	X	X
By individual appliance		X	
Meals - home, eat out	X		
Demographic Characteristics:			
Number, age, sex, employment status of household members	X	/	X
Marital status of respondent	X	X	X
Race of respondent	X		X
Education of respondent and spouse	X		X
Family income	X	X	X
Housing tenure - own or rent			X
Length of time at this address	X		
Vehicle/Transportation:			
Vehicle stock/use	X		X
Trip to work	X		
Public transportation use	X		
General travel	X		
Attitudinal Variables:	some	none	none
Other Information:			
Geographic location	X	X	X
Type of community	X	X	X
Weather conditions - HDD, CDD	X	X	X

+Poor household locations, defined by 1969 poverty level, were over-sampled

*Areas with extensive new residential construction since 1970 were over-sampled.

context of residential energy demand modeling. However, since detailed usage data at the individual household appliance level was not collected by the NIECS, it is not possible to disaggregate this analysis beyond the household level. In this regard, the MRI survey of individual appliance consumption is both unique and highly used.

In the process of reviewing the NIECS public use data files, we have identified a number of problem areas with respect to using the data to model residential energy demand at the household level. The major problem areas discussed in Section 3 included:

i) response error, especially in some of the more technically oriented variables;

ii) the innoculation procedure used to process the "monthly" or billing period data on fuel consumption and expenditures;

iii) the type of weather information given, especially HDD and CDD data, based on adjusted NOAA weather division aggregates;

iv) the imputation procedures used for a large number of household responses, in which real data was replaced with imputed estimates; and v) the lack of specific household location information, even at the state level.

In many of these areas, the basic problem can be traced back to an overriding - indeed, an almost paranoid - concern with preserving individual household confidentiality. For example, the use of innoculated, rather than actual, billing period data on fuel consumption and expenditure, the failure to provide more specific household location information and the lack of detailed weather information at specific locations appear to have all resulted from excessive concern with household confidentiality. We simply can not believe that the provision

of some additional detail in each of these areas could not be accomplished without compromising individual household identification. Without such additional information being made available to researchers, it will be difficult at best, and perhaps even impossible, for the full potential of the NIECS data set for analyzing residential energy demand, and thereby enabling the design of more effective energy policy, to be realized.

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