

# **Low Income Home Energy Data**

## **For Fiscal Year 2017**



**U.S. DEPARTMENT OF  
HEALTH AND HUMAN SERVICES  
Administration for Children and Families  
Office of Community Services  
Division of Energy Assistance  
October 2018**

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## **For Fiscal Year 2017**

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**List of Acronyms and Abbreviations**

ACF	HHS's Administration for Children and Families
ACS	American Community Survey
ASEC	CPS Annual Social and Economic Supplement
Btu	British thermal unit
CDD	Cooling Degree Day
CPI	Consumer Price Index
CPS	Current Population Survey
DEA	OCS's Division of Energy Assistance
DOE	U.S. Department of Energy
EIA	DOE's Energy Information Administration
FY	Fiscal Year
HDD	Heating Degree Day
HHS	U.S. Department of Health and Human Services
LIHEAP	Low Income Home Energy Assistance Program
LPG	Liquefied Petroleum Gas
MMBtus	Million British thermal units
NC	No cases in sample
NOAA	National Oceanographic and Atmospheric Administration
OBRA	Omnibus Budget Reconciliation Act of 1981
OCS	ACF's Office of Community Services
P.L.	Public Law
PUMS	Public Use Microdata Sample
RECS	Residential Energy Consumption Survey

## **Executive Summary**

This report presents home energy consumption and expenditure data. The primary information source for the data on residential energy is the 2009 Residential Energy Consumption Survey (RECS), which is administered by the Department of Energy's (DOE's) Energy Information Administration (EIA). The RECS covers all residential housing units that are primary residences in the United States and contains data for consumption and expenditures for calendar year 2009. All Fiscal Year (FY) 2017 residential energy consumption and expenditures figures for this report have been derived from the 2009 RECS data that were adjusted to reflect FY 2017 weather and fuel prices, as described in Appendix A.

### **Residential energy data**

In FY 2017, average residential energy expenditures for all households were \$2,069, and the mean individual energy burden was 8.0 percent of income.<sup>1</sup> Low income households had average energy expenditures of \$1,768, about 15 percent lower than the average for all households.<sup>2</sup> The mean individual energy burden for low income households was 17.2 percent, over twice the mean individual energy burden of all households. Low Income Home Energy Assistance Program (LIHEAP) recipient households had average residential energy expenditures of \$1,933, about 9 percent higher than the average for all low income households. The mean individual energy burden for LIHEAP recipients was 17.3 percent, over twice (9.3 percentage points higher than) the mean individual energy burden for all households and slightly higher (0.1 percentage points) than the mean individual energy burden for low income households.

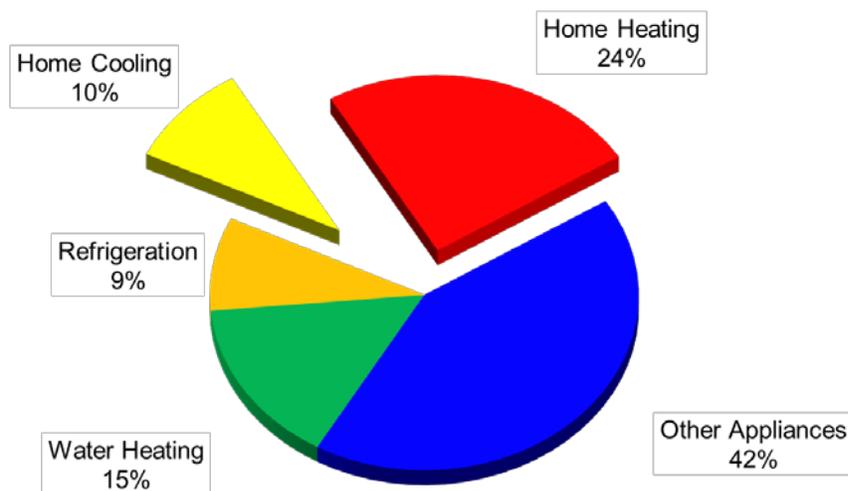
LIHEAP assists households with only that portion of residential energy costs that goes for home energy, i.e., home heating and home cooling. As shown in Figure 1, home heating and home cooling represented about 34 percent of residential energy expenditures for low income households in FY 2017. Refrigerators and freezers represented about 9 percent of residential energy expenditures, water heating represented about 15 percent of residential energy expenditures, and other appliances represented about 42 percent of residential energy expenditures.

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<sup>1</sup> The mean is the sum of all values divided by the number of values. The mean is also referred to as the average.

<sup>2</sup> Unless otherwise indicated, "low income" refers to households with income at or below the federal maximum LIHEAP eligibility standard (i.e., the greater of 150 percent of HHS Poverty Guidelines and 60 percent of state median income). The terms "low income" and "LIHEAP income eligible" are, unless otherwise indicated, equivalent in the Executive Summary. "Non-low income" refers to those households with incomes above the federal maximum LIHEAP eligibility standard.

**Figure 1. Percent of U.S. residential energy expenditures by low income households, by end use, FY 2017**



### **Home heating data**

The three most common heating fuels in 2009, the most recent year for which household heating fuel usage data are available, were natural gas (49 percent), electricity (34 percent), and fuel oil (6 percent). Over the last decade, the share of households using electricity as a main heating fuel has increased significantly, while the share using fuel oil has declined. There were only small deviations from this pattern in main heating fuel choice by income group.

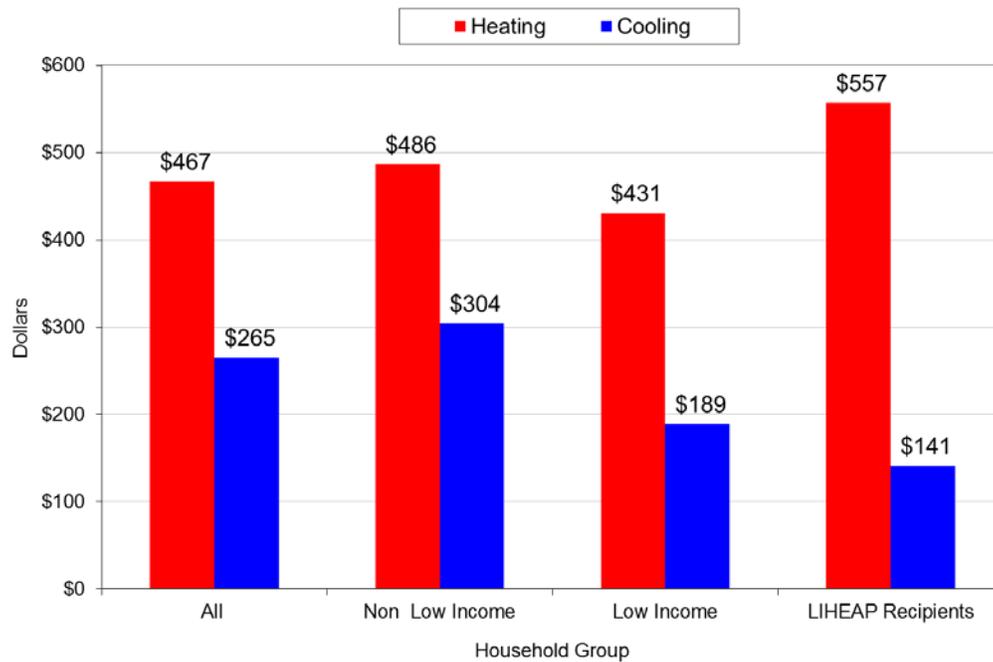
In FY 2017, as shown in Figures 2 and 3, average home heating expenditures for all households were \$467, and the mean individual home heating burden was 2.3 percent. Low income households had average home heating expenditures of \$431; this average was about 8 percent lower than that for all households. The mean individual home heating burden for low income households was 5.3 percent, over twice as much as the mean individual home heating burden for all households. The average home heating expenditures for LIHEAP recipient households was \$557, about 29 percent higher than the average for low income households and about 19 percent higher than the average for all households. Mean individual home heating burden for LIHEAP recipient households was 6.2 percent, more than two and a half times the average for all households, and 0.9 percentage points higher than that for all low income households. Average home heating expenditures (and consumption) for LIHEAP recipient households were greater than that for all low income households because LIHEAP heating assistance recipient households tend to live in colder climate regions.

## Home cooling data

In 2009, nearly 93 percent of all households cooled their homes using one of the methods recorded by the RECS.<sup>3</sup> Low income and LIHEAP recipient households were less likely to cool their homes than were non-low income households; 89.1 percent of low income households and 88.6 percent of LIHEAP recipient households cooled their homes using one of these methods.

As Figures 2 and 3 show, in FY 2017, for households that cooled, average home cooling expenditures for all households were \$265, and the mean individual home cooling burden was 1.1 percent. Low income households had average home cooling expenditures of \$189; this average was about 29 percent lower than that for all households. The mean individual home cooling burden for low income households was 2.3 percent, more than twice as much as the mean individual home cooling burden for all households. Average home cooling expenditures for LIHEAP recipient households were \$141, about 25 percent lower than the average for low income households and about 47 percent lower than the average for all households. The mean individual home cooling burden for LIHEAP recipient households was 1.5 percent, about 36 percent higher than the mean individual home cooling burden for all households.

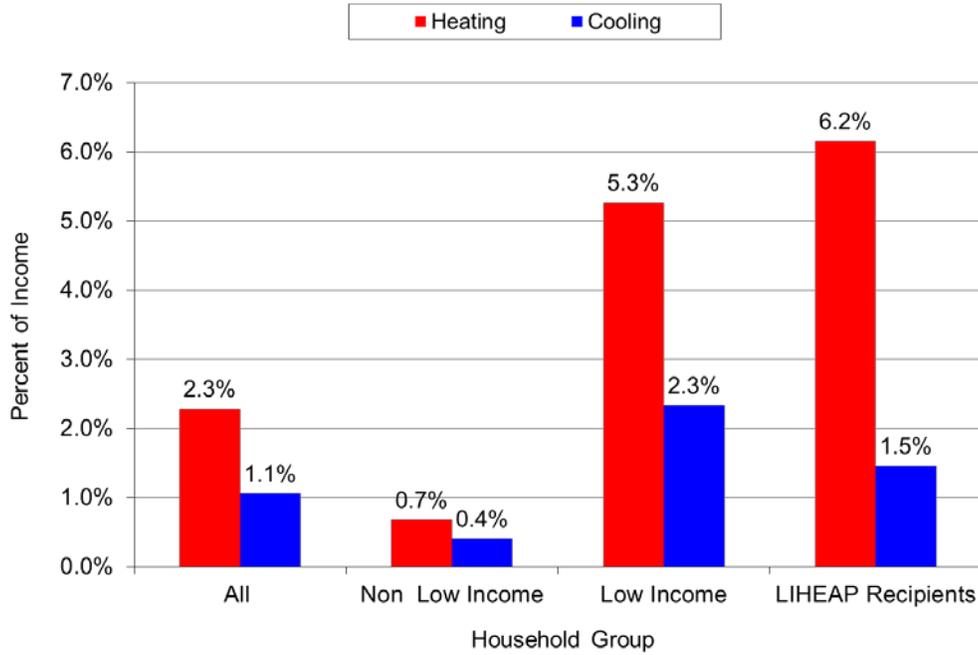
**Figure 2. Mean home heating and home cooling expenditures by all households, non-low income households, low income households, and LIHEAP recipient households, FY 2017**



<sup>3</sup> The 2009 RECS records cooling methods such as central or room air-conditioning as well as non-air-conditioning cooling devices (e.g., ceiling fans and evaporative coolers). The 2009 RECS excludes several types of cooling, such as table and window fans.

**Low Income Home Energy Data for FY 2017: Executive Summary**

**Figure 3. Mean individual burden of heating and cooling expenditures for all households, non-low income households, low income households, and LIHEAP recipient households, FY 2017**



## **I. Introduction**

The Low Income Home Energy Assistance Program (LIHEAP) is authorized by Title XXVI of the Omnibus Budget Reconciliation Act of 1981 (OBRA), Public Law 97-35, as amended. The Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services (HHS) administers LIHEAP at the federal level. ACF awards annual LIHEAP block grants to assist eligible low income households in meeting their home energy costs. ACF issues such grants to the 50 states and the District of Columbia, certain Indian tribes and tribal organizations, and certain U.S. insular areas.

In 1994, Congress amended the purpose of LIHEAP to clarify that LIHEAP is “to assist low income households, particularly those with the lowest incomes, that pay a high proportion of household income for home energy, primarily in meeting their immediate home energy needs” (The Human Services Amendments of 1994, P.L. 103-252, Sec. 302). Congress further indicated that LIHEAP grantees need to reassess their LIHEAP benefit structures to ensure that they are actually targeting those low income households that have the highest energy costs or needs. The Energy Policy Act of 2005 (P.L. 109-58) reauthorized LIHEAP through Fiscal Year (FY) 2007 without substantive changes. LIHEAP’s reauthorization is currently pending.

For LIHEAP grantees to reassess their LIHEAP benefit structures, they need performance statistics on LIHEAP applicants and eligible households. In addition, they need technical assistance in how to make use of the performance statistics in planning and implementing changes to their programs.

The *Low Income Home Energy Data Report* focuses on the home energy mission of LIHEAP by providing LIHEAP grantees with the latest national and regional data on home energy consumption, expenditures, and burden; and by providing data on the characteristics of the low income population in each state. Previously, the *Low Income Home Energy Data Report* was published as part of the *LIHEAP Home Energy Notebook*, which included additional sections on low income home energy trends, federal LIHEAP targeting performance, and special studies of important issues related to LIHEAP and low income home energy needs. Beginning with data for FY 2015, the individual sections from the *LIHEAP Home Energy Notebook* have been published separately in an effort to make the data available to LIHEAP grantees in a more timely fashion.

The following sections present home energy consumption and expenditure data. The primary data source for these sections is the 2009 Residential Energy Consumption Survey (RECS), which has energy consumption and expenditures data for calendar year 2009. For this report, the 2009 residential energy, home heating, and home cooling consumption and expenditures have been adjusted to reflect FY 2017 weather and fuel prices, and described in Appendix A. National data on total residential energy, home heating, and home cooling are presented in the following section, with regional variations in the national data included in Appendix A. Information on the characteristics of the low income population, by state, is presented in Appendix B.

## II. Residential Energy Data

Tables 1a to 1d present data on average annual residential energy consumption, expenditures, and burden by fuel type for all, non-low income, low income, and LIHEAP recipient households.<sup>4</sup> In FY 2017, average residential energy consumption for all households was 85.0 million British thermal units (MMBtus) and average expenditures were \$2,069. The mean individual residential energy burden for all households was 8.0 percent of income.

Low income households had average residential energy consumption of 73.8 MMBtus (about 13 percent less than all households) and average energy expenditures of \$1,768 (about 15 percent less than all households). Their mean individual residential energy burden was 17.2 percent, over twice that for all households and over five times that for non-low income households.

Average residential energy expenditures for LIHEAP recipient households were \$1,933, about 9 percent higher than that for all low income households. The mean individual residential energy burden was 17.3 percent, slightly higher (0.1 percentage points) than that for all low income households.

Households consume residential energy for a variety of uses that include space heating, water heating, space cooling (air-conditioning or circulation), refrigeration, and other appliances. Table 2 furnishes data on the percentage of the residential energy bill that is attributable to each of these five end uses. By statute, LIHEAP targets assistance to home energy expenditures, i.e., to home heating and home cooling expenditures. In FY 2017, home heating was 24 percent of the residential energy bill for low income households, and home cooling made up 10 percent.

**Table 1a. Residential energy: Average annual household consumption, expenditures, and burden by all households, by main heating fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
<b>All fuels</b>	85.0	\$2,069	8.0%	3.6%	2.5%
<b>Natural gas</b>	102.3	\$2,048	7.1%	3.3%	2.5%
<b>Electricity</b>	58.9	\$1,901	8.7%	3.8%	2.3%
<b>Fuel oil</b>	111.2	\$2,934	9.5%	4.5%	3.5%
<b>Kerosene</b>	61.9	\$1,849	12.4%	7.8%	2.2%
<b>LPG<sup>6/</sup></b>	102.4	\$2,912	9.7%	5.3%	3.5%

<sup>4</sup> Comparisons are made among the four income groups of all, non-low income, low income, and LIHEAP recipient households. All households represent the total number of households in the U.S. Non-low income households represent those households with annual incomes above the LIHEAP income maximum of the greater of 150 percent of HHS Poverty Guidelines and 60 percent of the state median income. Low income households represent those households with annual incomes at or under the LIHEAP income maximum of the greater of 150 percent of HHS Poverty Guidelines and 60 percent of the state median income. LIHEAP recipient households represent those low income households that received federal fuel assistance.

**Low Income Home Energy Data for FY 2017: II. Residential Energy Data**

**Table 1b. Residential energy: Average annual household consumption, expenditures, and burden by non-low income households, by main heating fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	91.0	\$2,231	3.0%	2.6%	2.1%
Natural gas	106.6	\$2,172	2.8%	2.4%	2.0%
Electricity	64.1	\$2,084	3.1%	2.7%	1.9%
Fuel oil	118.8	\$3,181	3.6%	3.3%	2.9%
Kerosene	68.5	\$2,166	4.0%	3.3%	2.0%
LPG <sup>6/</sup>	109.1	\$3,090	4.5%	4.1%	2.8%

**Table 1c. Residential energy: Average annual household consumption, expenditures, and burden by low income households, by main heating fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	73.8	\$1,768	17.2%	8.2%	9.0%
Natural gas	93.0	\$1,782	16.5%	8.0%	9.1%
Electricity	50.4	\$1,606	17.8%	7.9%	8.2%
Fuel oil	97.1	\$2,478	20.3%	10.5%	12.6%
Kerosene	59.3	\$1,721	15.7%	8.7%	8.8%
LPG <sup>6/</sup>	88.7	\$2,547	20.4%	12.1%	13.0%

**Table 1d. Residential energy: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by main heating fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	85.6	\$1,933	17.3%	8.5%	11.9%
Natural gas	102.3	\$1,889	16.8%	7.7%	11.7%
Electricity	53.7	\$1,622	16.9%	8.0%	10.0%
Fuel oil	104.9	\$2,658	17.9%	10.3%	16.4%
Kerosene	78.5*	\$2,421*	14.6%*	11.4%*	14.9%*
LPG <sup>6/</sup>	90.9	\$2,676	24.1%	14.9%	16.5%

<sup>1/</sup> Data are derived from the 2009 RECS, adjusted to reflect FY 2017 heating degree days, cooling degree days, and fuel prices. Data represent residential energy used from October 2016 through September 2017. See also Tables A-2, A-3a – A-3c, Appendix A.

<sup>2/</sup> A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refer to values in millions of Btus.

<sup>3/</sup> Mean individual burden is calculated by taking the mean, or average, of individual energy burdens, as calculated from FY 2017 adjusted RECS data. See Appendix A for information on calculation of energy burden.

<sup>4/</sup> Median individual burden is calculated by taking the median of individual energy burdens, as calculated from FY 2017 adjusted RECS data.

<sup>5/</sup> Mean group energy burden has been calculated by (1) calculating average residential energy expenditures from the 2009 RECS for each group of households; (2) adjusting those figures for FY 2017; and (3) dividing the adjusted figures by the average income for each group of households from the 2017 CPS ASEC.

<sup>6/</sup> Liquefied petroleum gas (LPG) refers to any fuel gas supplied to a residence in liquid compressed form, such as propane or butane.

\* = This figure should be viewed with caution because of the small number of sample cases.

**Low Income Home Energy Data for FY 2017: II. Residential Energy Data**

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Residential energy expenditures of low income households are distributed in roughly the same way as those of all households. However, LIHEAP recipients spent a higher proportion of their annual residential expenditures for space heating and a lower proportion for space cooling than did other groups. LIHEAP recipient households spent 28 percent of their annual residential expenditures for space heating, 4 percentage points more than did the average low income household. LIHEAP recipient households spent 7 percent for space cooling, 3 percentage points less than did the average low income household.

**Table 2. Residential energy: Percent of residential energy expenditures for each of the major end uses by all, non-low income, low income, and LIHEAP recipient households, United States, FY 2017<sup>1/</sup>**

End Use	All households	Non-low income households	Low income households	LIHEAP recipient households
Space heating	23%	22%	24%	28%
Space cooling	12%	13%	10%	7%
Water heating	14%	13%	15%	15%
Refrigeration	8%	8%	9%	8%
Appliances	44%	44%	42%	42%
All uses	100%	100%	100%	100%

<sup>1/</sup> Data are derived from the 2009 RECS, adjusted to reflect FY 2017 heating degree days, cooling degree days, and fuel prices. Data represent residential energy used from October 2016 through September 2017. Percentages may not add to 100 percent due to rounding.

### III. Home Heating Data

This section presents data on main heating fuel type, home heating consumption, home heating expenditures, and home heating burden.

#### Main heating fuel type

Table 3 shows that, in 2009, about half of the households in each income group used natural gas as their main heating fuel. Non-low income households used natural gas at the highest rate among household groups, 51.4 percent. More than 30 percent of households in each group, except LIHEAP recipient households, used electricity as their main heating fuel. Low income households used electricity at the highest rate among household groups, 36.7 percent, and LIHEAP recipient households used electricity at the lowest rate among household groups, 29.3 percent. LIHEAP recipient households tended to use fuel oil and kerosene more frequently than did households in other groups.

**Table 3. Home heating: Percent of households using major types of heating fuels by all, non-low income, low income, and LIHEAP recipient households, United States, 2009<sup>1/</sup>**

Heating fuel	All households	Non-low income households	Low income households	LIHEAP recipient households
<b>Natural gas</b>	49.0%	51.4%	44.4%	49.2%
<b>Electricity</b>	33.6%	31.9%	36.7%	29.3%
<b>Fuel oil</b>	6.1%	6.1%	6.1%	11.3%
<b>Kerosene</b>	0.4%	0.2%	0.9%	1.1%
<b>LPG</b>	4.9%	5.1%	4.6%	5.0%
<b>Other<sup>2/</sup></b>	2.9%	2.9%	3.0%	2.7%

<sup>1/</sup> Data are derived from the 2009 RECS. Percentages may not add to 100 percent due to rounding. See also Table A-4, Appendix A.

<sup>2/</sup> Households using wood, coal, and other minor fuels are categorized together under "Other."

Non-low income households increased their use of electricity for home heating from 29.2 percent in April 2005 to 31.9 percent in 2009.<sup>5</sup> Low income households increased their use of electricity as the main heat source from 31.8 percent in April 2005 to 36.7 percent in 2009. LIHEAP recipient households' use of electricity as their main heat source rose from 19.0 percent in April 2005 to 29.3 percent in 2009.

#### Home heating consumption, expenditures, and burden

Average annual home heating consumption, expenditures, and burden by fuel type for all, non-low income, low income, and LIHEAP recipient households are presented in Tables 4a to 4d. In FY 2017, average home heating consumption for all households was 31.9 MMBtus, average expenditures were \$467, and mean individual home heating burden was 2.3 percent.

Low income households had average home heating consumption of 28.5 MMBtus (about 11 percent less than the average for all households) and average home heating expenditures of \$431 (about 8 percent less than the average for all households). The mean individual home heating burden for low income households was 5.3 percent, over twice as much as the average home heating burden for all households and more than seven times the average home heating burden for non-low income households.

<sup>5</sup> Findings from the 2009 RECS, Energy Information Administration, U.S. Department of Energy.

**Low Income Home Energy Data for FY 2017: III. Home Heating Data**

Average home heating consumption for LIHEAP recipient households was 37.7 MMBtus (about 18 percent higher than the average for all households), and average home heating expenditures were \$557 (about 19 percent higher than the average for all households). Mean individual home heating burden for LIHEAP households was 6.2 percent, about 17 percent higher (or 0.9 percentage points higher) than the average for low income households and over twice the average for all households. Average home heating consumption for LIHEAP recipient households was about 32 percent greater than that for all low income households, because LIHEAP heating assistance recipient households tend to live in colder climate regions.

**Table 4a. Home heating: Average annual household consumption, expenditures, and burden by all households, by fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	31.9	\$467	2.3%	0.7%	0.6%
Natural gas	45.4	\$496	2.3%	0.8%	0.6%
Electricity	9.0	\$290	1.9%	0.6%	0.3%
Fuel oil	65.7	\$1,123	4.5%	1.7%	1.4%
Kerosene	30.8	\$592	4.5%	2.1%	0.7%
LPG <sup>6/</sup>	45.1	\$1,016	4.1%	1.8%	1.2%

**Table 4b. Home heating: Average annual household consumption, expenditures, and burden by non-low income households, by fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	33.8	\$486	0.7%	0.5%	0.4%
Natural gas	46.0	\$499	0.7%	0.5%	0.5%
Electricity	9.5	\$299	0.5%	0.4%	0.3%
Fuel oil	69.8	\$1,194	1.4%	1.2%	1.1%
Kerosene	31.9	\$625	1.1%	0.9%	0.6%
LPG <sup>6/</sup>	47.3	\$1,068	1.6%	1.3%	1.0%

**Table 4c. Home heating: Average annual household consumption, expenditures, and burden by low income households, by fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
All fuels	28.5	\$431	5.3%	1.8%	2.2%
Natural gas	44.1	\$491	5.8%	2.1%	2.5%
Electricity	8.4	\$276	4.2%	1.4%	1.4%
Fuel oil	58.1	\$991	10.2%	4.7%	5.1%
Kerosene	30.4	\$579	5.9%	3.3%	3.0%
LPG <sup>6/</sup>	40.4	\$908	9.3%	4.2%	4.6%

**Low Income Home Energy Data for FY 2017: III. Home Heating Data**

**Table 4d. Home heating: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by fuel type, United States, FY 2017<sup>1/</sup>**

Main heating fuel	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
<b>All fuels</b>	37.7	\$557	6.2%	2.3%	3.4%
<b>Natural gas</b>	51.1	\$574	6.9%	2.3%	3.5%
<b>Electricity</b>	9.5	\$312	4.3%	1.8%	1.9%
<b>Fuel oil</b>	61.9	\$1,068	8.4%	4.5%	6.6%
<b>Kerosene</b>	39.1*	\$748*	4.8%*	3.3%*	4.6%*
<b>LPG<sup>6/</sup></b>	42.8	\$985	9.1%	5.8%	6.1%

<sup>1/</sup> Data are derived from the 2009 RECS, adjusted to reflect FY 2017 heating degree days and fuel prices. Data represent home heating energy used from October 2016 through September 2017. See also Tables A-5, A-6a – A-6c, Appendix A.

<sup>2/</sup> A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refer to values in millions of Btus.

<sup>3/</sup> Mean individual burden is calculated by taking the mean, or average, of individual heating energy burdens, as calculated from FY 2017 adjusted RECS data. See Appendix A for information on energy burden calculation.

<sup>4/</sup> Median individual burden is calculated by taking the median of individual heating energy burdens, as calculated from FY 2017 adjusted RECS data

<sup>5/</sup> Mean group heating energy burden is calculated by (1) computing average home heating energy expenditures from the 2009 RECS for each group of households; (2) adjusting those figures for FY 2017; and (3) dividing the adjusted figures by the average income for each group of households from the 2017 CPS ASEC

<sup>6/</sup> Liquefied petroleum gas (LPG) refers to any fuel gas supplied to a residence in liquid compressed form, such as propane or butane

\* = This figure should be viewed with caution because of the small number of sample cases.

## IV. Home Cooling Data

This section presents data on home cooling type, home cooling consumption, home cooling expenditures, and home cooling burden.

### Cooling type

As shown in Table 5, about 93 percent of households in 2009 cooled their homes in ways recorded by the 2009 RECS (i.e. with air-conditioners or with non-air-conditioning cooling devices such as ceiling fans and evaporative coolers). Low income households were less likely to cool their homes than were non-low income households.

**Table 5. Home cooling: Percent of households with home cooling by all, non-low income, low income, and LIHEAP recipient households, United States, 2009<sup>1/</sup>**

Presence of Cooling	All Households	Non-low income households	Low income households	LIHEAP recipient households
Cooling <sup>2/</sup>	92.5%	94.3%	89.1%	88.6%
None <sup>3/</sup>	7.5%	5.7%	10.9%	11.4%

<sup>1/</sup> Data are derived from the 2009 RECS. See also Table A-7, Appendix A.

<sup>2/</sup> Represents households that cool with central or room air-conditioning as well as non-air-conditioning cooling devices (e.g., ceiling fans and evaporative coolers).

<sup>3/</sup> Represents households that do not cool or cool in ways other than those recorded by the 2009 RECS (e.g., the use of table and window fans).

### Home cooling consumption, expenditures, and burden

Average annual home cooling consumption, expenditures, and burden for all, non-low income, low income, and LIHEAP recipient households that cooled are presented in Table 6. In FY 2017, average home cooling consumption for all households that cooled was 6.8 MMBtus, average expenditures were \$265, and mean individual home cooling burden was 1.1 percent.

For low income households that cooled, average home cooling energy consumption was 4.9 MMBtus (about 28 percent less than the average for all households) and average home cooling expenditures were \$189 (about 29 percent less than the average for all households). The mean individual home cooling burden for low income households was 2.3 percent, more than twice the average home cooling burden of all households and five times that of non-low income households.

For households that cooled, average home cooling consumption for LIHEAP recipient households was 3.7 MMBtus (about 46 percent less than all households and 24 percent less than the average low income household), and average home cooling expenditures were \$141 (about 47 percent less than all households and 25 percent less than the average low income household). Mean individual home cooling burden for LIHEAP recipient households was 1.5 percent, about 36 percent higher than the average for all households.

**Low Income Home Energy Data for FY 2017: IV. Home Cooling Data**

**Table 6. Home cooling: Average annual household consumption, expenditures, and percent of income by all, non-low income, low income and LIHEAP recipient households that cooled, United States, FY 2017<sup>1/</sup>**

Household group	Fuel consumption (MMBtus) <sup>2/</sup>	Fuel expenditures	Mean individual burden <sup>3/</sup>	Median individual burden <sup>4/</sup>	Mean group burden <sup>5/</sup>
<b>All households</b>	6.8	\$265	1.1%	0.3%	0.3%
<b>Non-low income households</b>	7.7	\$304	0.4%	0.2%	0.3%
<b>Low income households</b>	4.9	\$189	2.3%	0.6%	1.0%
<b>LIHEAP recipient households</b>	3.7	\$141	1.5%	0.4%	0.9%

<sup>1/</sup> Data are derived from the 2009 RECS, adjusted to reflect FY 2017 cooling degree days and fuel prices. Data represent residential energy used from October 2016 through September 2017. See also Table A-7, Appendix A.

<sup>2/</sup> A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refer to values in millions of Btus.

<sup>3/</sup> Mean individual burden is calculated by taking the mean, or average, of individual cooling energy burdens, as calculated from FY 2017 adjusted RECS data. See Appendix A for information on energy burden calculation.

<sup>4/</sup> Median individual burden is calculated by taking the median of individual cooling energy burdens, as calculated from FY 2017 adjusted RECS data.

<sup>5/</sup> Mean group cooling energy burden is calculated by (1) computing average home cooling energy expenditures from the 2009 RECS for each group of households; (2) adjusting those figures for FY 2017; and (3) dividing the adjusted figures by the average income for each group of households from the 2017 Current Population Survey Annual Social and Economic Supplement (CPS ASEC).

## **Appendix A: Home Energy Estimates**

Appendix A provides information on how estimates of home energy data were derived from the 2009 Residential Energy Consumption Survey (RECS) and updated for FY 2017. The following topics are covered in this Appendix.

- Description of RECS.
- Strengths and limitations of RECS data.
- National and regional average home energy consumption and expenditures.
- Energy burden.

### **Description of RECS**

The RECS is a national household sample survey that provides information on residential energy use. It has been conducted by the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE) since 1978. It is designed to provide reliable data at the national and Census regional levels. The RECS includes information on energy consumption and expenditures, household demographics, housing characteristics, weatherization/conservation practices, home appliances, and type of heating and cooling equipment. Typically, this survey is conducted every four to six years. The most recent RECS was conducted in 2015; however, consumption and expenditure data for the 2015 RECS will not be published until 2018. Therefore, this report utilizes the 2009 RECS, the most recent iteration of the survey for which consumption and expenditure data are available.

The survey consists of three parts:

- EIA interviews households for information about which fuels are used, how fuels are used, energy-using appliances, structural features, energy-efficiency measures taken, demographic characteristics of the household, heating interruptions, and receipt of energy assistance.
- EIA interviews rental agents for households whose rent includes some portion of their energy bill. This information augments information from those households that may not be knowledgeable about the fuels used for space heating or water heating.
- After obtaining permission from respondents, EIA mails questionnaires to their energy suppliers to collect the actual billing data on energy consumption and expenditures. This fuel supplier survey eliminates the inaccuracy of self-reported data. When a household does not consent or when fuel consumption records are unusable or nonexistent, regression analysis is used to impute missing data.<sup>6</sup>

The 2009 RECS is the thirteenth survey in the series of surveys.<sup>7</sup> For the 2009 RECS, 12,083 households were interviewed, including 724 verified LIHEAP recipient households. For the tabulations in this report,

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<sup>6</sup> Regression analysis is a statistical tool for evaluating the relationship of one or more independent variables to a single continuous dependent variable. Formulas developed from regression analysis are used to predict the value of the dependent variable under varying conditions of the independent variable(s).

<sup>7</sup> More information about the RECS sample design, see Energy Information Administration, *Sample Design for the Residential Energy Consumption Survey*, DOE/EIA-0555 (94)/1, Washington, DC, August 1994. The data collected from the 2009 RECS are available from the EIA website: *RECS Survey Data*, Energy Information Administration, <http://www.eia.gov/consumption/residential/data/2009/>

2009 RECS consumption and expenditure data were updated using price and weather data to represent consumption and expenditures for FY 2017.

## **Strengths and limitations of RECS data**

The RECS provides the most recent, comprehensive data on home energy consumption and expenditures. The strengths of using RECS to derive home energy estimates are as follows.

- RECS uses a representative national household sample, providing statistically reliable estimates for all, non-low income, and low income households.
- The 2009 RECS included an oversample of LIHEAP recipient households that is representative of the population of LIHEAP heating and cooling assistance recipients.
- The RECS includes usage data for all residential fuels.
- Energy suppliers provide information on actual residential energy consumption and expenditures of RECS sample households in order to eliminate the inaccuracy of self-reported data.
- Regression analyses of RECS data provide estimates of the amounts of fuels going to various end uses, including home heating and cooling.

While the updated 2009 RECS data provide the most current and comprehensive data on residential energy use by low income households, several significant limitations must be addressed:<sup>8</sup>

- The 2009 RECS data for calendar year 2009 were updated to FY 2017 (October 1, 2016 to September 30, 2017), using procedures that adjust the 2009 data to reflect the weather and fuel prices for FY 2017. These procedures are comparable to those used for the FY 1986 - FY 2016 annual LIHEAP Reports to Congress. However, the reader should exercise caution in comparing the data in this report with data in annual LIHEAP Reports to Congress prior to FY 1986, in which consumption and expenditure data were estimated from the RECS year (April 1 to March 31).
- For some variables, disaggregation of data into subgroups at the regional level results in estimates made from a small number of sample cases. This is particularly true of the LIHEAP recipient households and the fuel oil, liquefied petroleum gas and kerosene heating subgroups. This affects the reliability of the estimates.
- The household is a basic reporting unit for RECS and LIHEAP. RECS defines a household as all individuals living in a housing unit, whether related or not, who (1) share a common direct access entry to the unit from outside the building or from a hallway, and (2) do not normally eat their meals with members of other units in the building. A household does not include temporary visitors or household members away at college or in the military. LIHEAP defines a household as one or more individuals living together as an economic unit who purchase energy in common or make undesignated payments for energy in their rent. Some variation in the count of households, particularly those containing renters or boarders, may result from the difference in definitions.
- The Current Population Survey Annual Social and Economic Supplement (CPS ASEC), conducted by the Bureau of the Census, provides, at national and regional levels, data on total household income as a specific dollar amount. CPS's larger sample size and method of collecting income data result in more accurate income data than RECS income data. Therefore, the 2017 CPS ASEC

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<sup>8</sup> Information about the quality of RECS data is available from the EIA website: *RECS Methodology*, Energy Information Administration, <http://www.eia.gov/consumption/residential/data/2009/index.cfm?view=methodology>.

is used to develop estimates of the number of low income households. In addition, mean income statistics from the CPS ASEC are used in the calculation of group energy burden for this report.<sup>9</sup>

- Households were classified in the 2009 RECS as eligible or ineligible for LIHEAP based on whether their income was above or below the maximum statutory income eligibility criteria (the greater of 150 percent of U.S. Department of Health and Human Services (HHS) Poverty Guidelines or 60 percent of the state median income). These estimates do not include households whose incomes may have exceeded the statutory income standards but who received LIHEAP benefits because they (1) were categorically eligible for LIHEAP under section 8624 (b)(2)(A) of the LIHEAP statute; (2) became income-ineligible for LIHEAP at the time of the survey; or (3) were deemed eligible for LIHEAP based on incorrectly-reported income. However, the tabulations of LIHEAP households also include survey respondents who were identified as LIHEAP recipients from state LIHEAP administrative data but who reported incomes higher than the maximum statutory income in the RECS survey.

## **Average home energy consumption and expenditures**

Average heating and cooling consumption and expenditure estimates for FY 2017 were calculated at national and regional levels for all, non-low income, low income, and LIHEAP recipient households, for various fuels. The heating and cooling estimates were updated for each 2009 RECS sample case using FY 2017 heating degree days, cooling degree days, and price inflators applied to the original expenditure data, as well as the multiple regression formula developed from the 2009 RECS. Home energy consumption and expenditure data were developed by aggregating and averaging home heating and cooling estimates for the sample cases that represented all, non-low income, low income, and LIHEAP recipient households.

Tables A-2 through A-3c display national and regional consumption and expenditure data for residential energy (including energy used for space heating, water heating, space cooling, and appliances). Tables A-4 through A-6c display national and regional usage, consumption, and expenditure data for home heating. Table A-7 displays national and regional usage, consumption, and expenditure data for home cooling. Analysis and discussion of home energy consumption and expenditures appear in Section II, Section III, and Section IV of this report.

## **Energy burden**

Energy burden is an important statistic for policymakers who are considering the need for energy assistance. Energy burden can be defined broadly as the burden placed on household incomes by the cost of residential energy. However, there are different ways to compute energy burden and different interpretations of the energy burden statistics. The purpose of this section is to examine alternative energy burden statistics and discuss the interpretation of each.<sup>10</sup>

Different “measures of central tendency” can be used to describe energy burden. The most commonly used measures are the mean and the median. As previously noted, the mean or average is computed as the sum of all values divided by the number of values. The median is computed as the value that is at the center of the distribution of values (i.e., 50 percent of the values are greater than the median and 50 percent are less).

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<sup>9</sup> Note that household-level energy and income data from RECS are used to calculate mean and median individual energy burden.

<sup>10</sup> More detailed information is available in the Division of Energy Assistance’s (DEA’s) technical report, *Characterizing the Impact of Energy Expenditures on Low Income Households: An Analysis of Alternative Energy Burden Statistics*, (November, 1994).

### **Computational procedures**

There are two ways to compute mean energy burden for households.<sup>11</sup> The first is the “mean individual” approach, and the second is the “mean group” approach. While these approaches appear to be similar, they give quite different values.

Using the “mean individual burden” approach, energy burden is computed as follows.

1. First, the ratio of energy expenditures to annual income for each household in a specified population is computed
2. Then, the mean of these energy burden ratios is computed for the population.<sup>12</sup> For example, consider the situation where there are four households with energy burdens of 4, 5, 7, and 8 percent
3. The mean of these energy burdens is calculated by adding the percentages (24 percentage points) and dividing by the number of households (four households), resulting in a mean individual burden of 6 percent.

Using the “mean group burden” approach, energy burden is computed as follows.

1. First, total annual energy expenditures for households and total annual income for households in a specified population are computed
2. Then, the ratio of total energy expenditures to total income is computed for the specified population. For example, consider the situation where a group consists of four households that have a total income of \$100,000 and a total energy bill of \$4,000
3. Dividing the \$4,000 in total energy bills by \$100,000 in total income results in a mean group burden of 4 percent.

According to the 2009 RECS, the mean residential energy burden for all LIHEAP federally eligible households, in 2009, using the first approach was 18.7 percent and using the second approach was 9.6 percent. The disparity between the two statistics is because the lowest income households spend a greater share of their income on residential energy than do higher income households.<sup>13</sup> If the relationship between income and residential energy expenditures is linear (i.e., a 10 percent increase in income is associated with a 10 percent increase in residential energy expenditures), the two statistics would be equal. However, since a number of low income households spend a large share of their income on energy, the relationship between income and residential energy expenditures is not linear (i.e., a 10 percent increase in income is associated with a considerably smaller increase in energy expenditures). Therefore, there is a substantial difference between the two statistics.

In the discussion of computational procedures, the “mean individual burden” was examined. It is also possible to look at the “median individual burden.” As noted above for LIHEAP income eligible households, the mean residential energy burden computed as the “mean individual burden” was 18.7 percent. The median of the distribution of residential energy burdens from the 2009 RECS survey was 9.2 percent. The disparity between these two statistics is the result of the skewed distribution of energy burden

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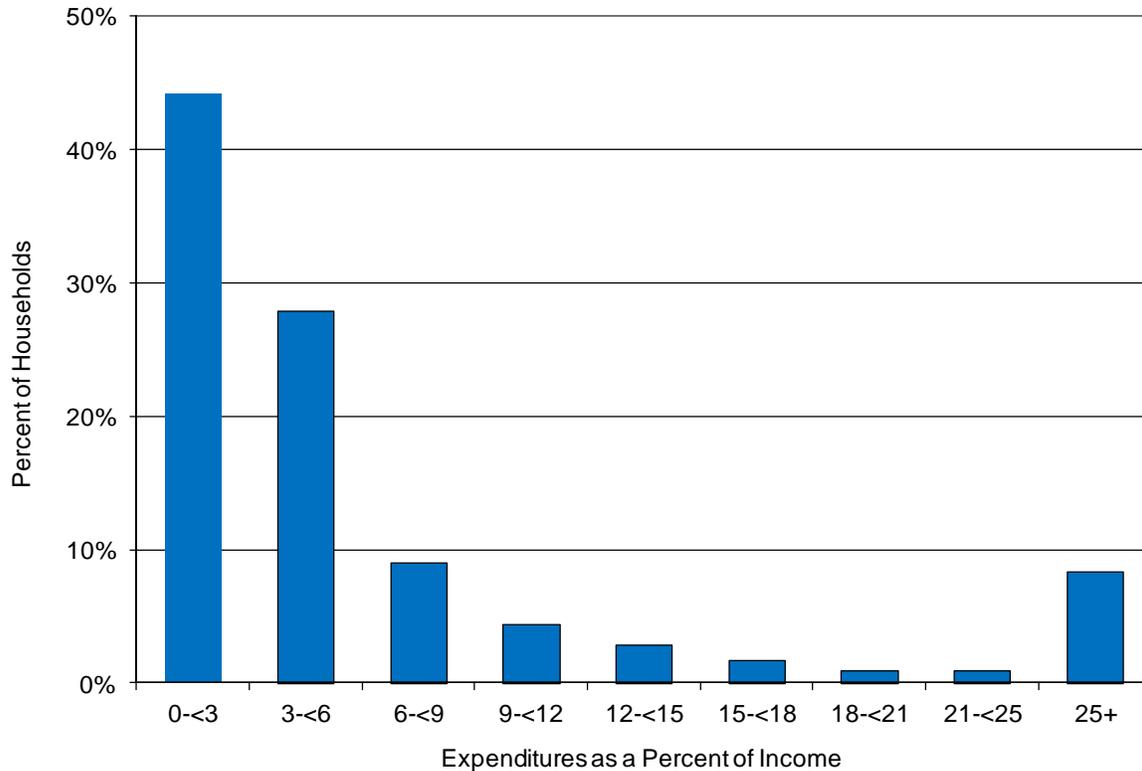
<sup>11</sup> The mean is the sum of all values divided by the number of values. The mean is also referred to as the average.

<sup>12</sup> For some households, residential energy expenditures appear to exceed income. Elderly households living on their savings are an example of such households. In calculating mean individual burden, the energy burden figures for such households have been limited to 100 percent.

<sup>13</sup> For example, 2009 RECS households with incomes of \$10,000 or less had average residential energy expenditures of \$1,556, while those with incomes between \$20,000 and \$35,000 had average residential energy expenditures of \$1,714. Thus, households which had more than twice as much income spent only 10 percent more on energy.

ratios. Figure A-1 demonstrates a skewed distribution of LIHEAP income eligible households by home energy burden.

**Figure A-1. Distribution of LIHEAP income eligible households by home energy burden, 2009**



**Data files**

The data files used to make estimates of energy burden also have some impact on the statistic. The RECS data file is the only reliable source of national information on energy expenditures. However, the income reported on the RECS is known to be deficient in several ways. First, it is generally true that income is underreported on household surveys. Second, the RECS collects income data less precisely through the use of income intervals. Finally, the CPS ASEC collects income more precisely by asking a series of detailed questions on income than the RECS does and also has a larger sample size than the RECS.

The RECS, which categorizes more households as income eligible for LIHEAP than the CPS ASEC, thus categorizes too many households as income eligible for LIHEAP. Based on the 2009 RECS, in calendar year 2009, 39.7 million households were estimated to be LIHEAP income eligible households. Based on the 2010 CPS ASEC, the estimate of LIHEAP income eligible households for calendar year 2009 was 37.1 million households. Since some households that were not LIHEAP income eligible were categorized by RECS as LIHEAP income eligible, the RECS overestimated the average energy expenditures for LIHEAP income eligible households.<sup>14</sup>

<sup>14</sup> The estimates of average energy burden may be overstated since RECS, like other surveys, understates income. Comparisons between the estimates of the number of LIHEAP income eligible households from the 1990 RECS and the March 1991 CPS suggest that the probable range of the overestimate in mean group energy burden is from 5-10 percent.

## **Data interpretations**

The statistic used to describe energy burden depends on the question being asked. Each statistic offers some data on energy burden while not telling the whole story by itself.

The key difference between “mean individual burden” and “mean group burden” is that the first statistic focuses on the experience of individual households and the second on the experience of a group of households. The “mean individual burden” furnishes more information on how individual households are affected by energy burden (i.e., it computes a mean by using each household’s burden). The “mean group burden” furnishes more information on group burden (i.e., it computes the share of all income earned by LIHEAP income eligible households that goes to pay for energy). Both statistics are useful, though the individual burden statistic puts more emphasis on the experience of individual households, and the group burden puts more emphasis on the share of group income that is used for energy.

The key difference between the “mean individual burden” and the “median individual burden” is that the first statistic furnishes information on all LIHEAP income eligible households at the expense of overstating what is happening to the “average” LIHEAP income eligible household. The second statistic furnishes information on the “average” LIHEAP income eligible household at the expense of disregarding what is happening to households at either end of the distribution.

The best way to furnish information on energy burden is to use all available statistics. For example, it would be informative to show the “mean individual burden,” the “median individual burden,” and the “distribution of individual energy burdens,” for all LIHEAP income eligible households, to indicate how individual households are affected by energy costs. In addition, it would be useful to show the “mean group burden” to indicate what share of income is going to pay energy bills for the group as a whole.

However, when doing an analysis of energy burden among several groups of households, it is very difficult to present the entire spectrum of available statistics. Thus, we usually limit the analysis to a comparison of one statistic between groups. In general, if only one statistic is used, either the “mean individual burden” or the “mean group burden” is preferred, since a mean is a more complete statistic than is a median. The choice between the two means is dictated by which of the following types of analysis is being conducted.

- If funding levels are being examined, the group burden is probably more useful. This statistic furnishes information on the size of the energy bill of LIHEAP income eligible households and the portion of income for this group that is spent on energy. Using this statistic allows direct examination of the relationship between the total energy bill and total LIHEAP funding.
- If targeting decisions are being examined, the mean or median individual burden is probably more useful. These statistics furnish information on the distribution of burdens among households in a group. Using these statistics helps to target those groups where a significant number of households have high energy burdens.

All three energy burden statistics are presented in this report’s tables to fully inform the reader. Beginning with the *FY 1992 LIHEAP Report to Congress*, the mean individual energy burden and mean group burden statistics have been furnished in the reports. Previous reports to Congress presented only the mean group burden. The text of this report references mean group burden to maintain consistency with the previous reports to Congress.

## **Projecting energy consumption and expenditures**

Projections were developed using microsimulation techniques that adjusted consumption and energy expenditures for changes in weather and prices. Consumption amounts for each household were adjusted for changes in heating and cooling degree days. Projected expenditures for each household were estimated

## ***Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates***

as a function of projected consumption changes and actual changes in fuel prices. In order to make these projections, it was assumed that households did not change their energy use behavior (that is, their tendency to seek a specific indoor temperature) as a result of weather, price, or other changes.

Consumption projections utilized end use consumption estimates that were developed with the 2009 RECS data. These estimates were based on models for each fuel, using households that had actual (not imputed) consumption records for the fuel. The models used nonlinear estimation techniques to estimate parameters that described the relationship of consumption to end uses, housing characteristics, weather, and demographics.

To develop consumption projections, heating and cooling end use estimates for Calendar Year 2009 were adjusted for weather differences between 2009 and FY 2017. The following equation was applied to each household in the microsimulation data file.

$$\text{FY 2017 Projected Btus} = \begin{aligned} & (2009 \text{ estimated heat use} * \text{HDD change}) + \\ & (2009 \text{ estimated cooling use} * \text{CDD change}) + \\ & (2009 \text{ estimated water heat use} + 2009 \text{ estimated appliance use}) \end{aligned}$$

Expenditure projections were a function of projected changes in consumption and actual changes in prices. The following equations were used.

$$\text{Preliminary Expenditures} = \text{2009 Expenditures} * \left( \frac{\text{FY 2017 Projected Usage}}{\text{2009 Actual Usage}} \right)$$

$$\text{Final Expenditures} = \text{Preliminary Expenditures} * \text{Price Change}^{15}$$

Table A-1 shows the national price factors that were used. The price factors show the actual change in the average price of a fuel from calendar year 2009 to FY 2017. For example, electricity prices increased by about 11.5 percent from 2009 to FY 2017.

**Table A-1. National price factors for FY 2017**

Fuel	Price Factors for FY 2017 Projections
<b>Electricity</b>	1.1154
<b>Natural gas</b>	0.9014
<b>Fuel oil / kerosene</b>	0.9508
<b>Liquefied petroleum gas (LPG)</b>	1.0175

Expenditure data were adjusted using national price factors for FY 2017. Earlier *LIHEAP Home Energy Notebooks* used state-level price factor data. For FY 1993/1994, state-level data did not vary much from the national average for electricity and natural gas. For electricity, price changes varied between 0.3 percent and 1.2 percent; the national average was 0.8 percent. For natural gas, price changes varied between 1.7 percent and 2.8 percent; the national average was 2 percent. Expenditure projections using national price data do not appear to be significantly different from those obtained using state-level price data.

<sup>15</sup> Price factors were developed using price data obtained from the Energy Information Administration for electricity, natural gas, and LPG, and the BLS Consumer Price Index for fuel oil. Consumption data were obtained from the Energy Information Administration for all fuels. Electricity price data used for calculating price factors are from the *Monthly Energy Review*, January 2018, and electricity consumption data is from the *Electric Power Monthly*, January 2018. Natural gas price and consumption data used for calculating price factors are from the *Monthly Energy Review*, January 2018. Fuel oil/kerosene price data for calculating price factors are from the U.S. City Average, Fuel Oil #2, Consumer Price Index of the Bureau of Labor Statistics, Series ID APU000072511. LPG price data were obtained from the Energy Information Administration website (<http://www.eia.doe.gov>). Fuel oil/kerosene and LPG consumption data are from the *Monthly Energy Review*, January 2018.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-2. Residential energy: Average consumption per household, by all fuels and specified fuels, by all, non-low income, low income and LIHEAP recipient households, by Census region, FY 2017<sup>1/</sup>**

Census Region	All Fuels <sup>2/</sup> (MMBtus) <sup>3/</sup>	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	85.0	102.3	58.9	111.2	61.9	102.4
US - Non-low income households	91.0	106.6	64.1	118.8	68.5	109.1
US - Low income households <sup>4/</sup>	73.8	93.0	50.4	97.1	59.3	88.7
US - LIHEAP recipient households <sup>5/</sup>	85.6	102.3	53.7	104.9	78.5*	90.9
Northeast - All households	102.2	110.9	49.5	113.2	66.3	108.3
Northeast - Non-low income households	109.0	117.0	54.5	121.7	72.8	116.8
Northeast - Low income households	89.9	100.6	41.3	96.8	63.5	85.5
Northeast - LIHEAP recipient households	93.7	99.0	44.3	106.3	81.5*	88.4*
Midwest - All households	104.0	114.8	64.1	100.0	NC	116.1
Midwest - Non-low income households	109.8	119.1	73.5	102.4	NC	119.5
Midwest - Low income households	93.3	106.5	50.5	98.1	NC	108.5
Midwest - LIHEAP recipient households	98.0	109.8	56.6	88.3*	NC	95.1
South - All households	72.0	94.9	59.6	100.2	54.9	86.3
South - Non-low income households	78.1	101.7	63.9	102.4	64.0*	95.2
South - Low income households	60.7	79.9	52.2	95.6	52.6*	71.0
South - LIHEAP recipient households	70.9	101.4	57.0	105.7*	61.0*	94.6*
West - All households	72.8	86.1	56.1	113.6	51.8*	99.0
West - Non-low income households	78.8	89.5	62.2	113.0	51.5*	103.7
West - Low income households	60.7	76.1	48.0	115.5*	52.2*	89.7
West - LIHEAP recipient households	65.4	87.8	45.4	115.9*	NC	57.6*

<sup>1</sup> Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2017 for heating and cooling degree days.

<sup>2</sup> Weighted average of natural gas, electricity, fuel oil, kerosene, and liquefied petroleum gas consumption. RECS consumption data are not collected for other fuels.

<sup>3</sup> A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refer to values in millions of Btus.

<sup>4</sup> Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>5</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-3a. Residential energy: Average annual expenditures, by amount (dollars) and mean group burden (percent of income), for all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$2,069	2.5%	\$2,048	2.5%	\$1,901	2.3%	\$2,934	3.5%	\$1,849	2.2%	\$2,912	3.5%
US - Non-low income households	\$2,231	2.1%	\$2,172	2.0%	\$2,084	1.9%	\$3,181	2.9%	\$2,166	2.0%	\$3,090	2.8%
US - Low income households <sup>3/</sup>	\$1,768	9.0%	\$1,782	9.1%	\$1,606	8.2%	\$2,478	12.6%	\$1,721	8.8%	\$2,547	13.0%
US - LIHEAP recipient households <sup>4/</sup>	\$1,933	11.9%	\$1,889	11.7%	\$1,622	10.0%	\$2,658	16.4%	\$2,421*	14.9%*	\$2,676	16.5%
Northeast - All households	\$2,572	2.8%	\$2,456	2.7%	\$1,891	2.1%	\$3,003	3.3%	\$1,978	2.2%	\$3,616	4.0%
Northeast - Non-low income households	\$2,790	2.3%	\$2,638	2.1%	\$2,066	1.7%	\$3,266	2.7%	\$2,298	1.9%	\$3,880	3.2%
Northeast - Low income households	\$2,185	9.7%	\$2,147	9.6%	\$1,604	7.1%	\$2,493	11.1%	\$1,838	8.2%	\$2,909	13.0%
Northeast - LIHEAP recipient households	\$2,234	12.3%	\$2,086	11.5%	\$1,583	8.7%	\$2,659	14.6%	\$2,488*	13.7%*	\$2,866*	15.7%*
Midwest - All households	\$1,958	2.5%	\$1,917	2.4%	\$1,624	2.0%	\$2,388	3.0%	NC	NC	\$2,995	3.8%
Midwest - Non-low income households	\$2,070	2.0%	\$2,009	2.0%	\$1,788	1.7%	\$2,492	2.4%	NC	NC	\$3,088	3.0%
Midwest - Low income households	\$1,755	9.0%	\$1,738	8.9%	\$1,388	7.1%	\$2,303	11.8%	NC	NC	\$2,785	14.3%
Midwest - LIHEAP recipient households	\$1,836	11.6%	\$1,742	11.0%	\$1,502	9.5%	\$2,299*	14.5%*	NC	NC	\$2,586	16.3%
South - All households	\$2,131	2.8%	\$2,246	2.9%	\$2,052	2.7%	\$2,737	3.5%	\$1,640	2.1%	\$2,625	3.4%
South - Non-low income households	\$2,315	2.3%	\$2,437	2.4%	\$2,222	2.2%	\$2,855	2.8%	\$1,877*	1.9%*	\$2,817	2.8%
South - Low income households	\$1,792	10.1%	\$1,820	10.2%	\$1,756	9.9%	\$2,487	14.0%	\$1,580*	8.9%*	\$2,293	12.9%
South - LIHEAP recipient households	\$1,929	14.6%	\$2,129	16.1%	\$1,776	13.4%	\$3,107*	23.4%*	\$2,022*	15.3%*	\$3,269*	24.7%*
West - All households	\$1,658	1.8%	\$1,704	1.9%	\$1,564	1.7%	\$2,815	3.1%	\$1,565*	1.7%*	\$2,727	3.0%
West - Non-low income households	\$1,805	1.6%	\$1,809	1.6%	\$1,760	1.5%	\$2,781	2.4%	\$1,933*	1.7%*	\$2,911	2.5%
West - Low income households	\$1,366	6.7%	\$1,391	6.8%	\$1,301	6.4%	\$2,914*	14.3%*	\$1,173*	5.8%*	\$2,367	11.6%
West - LIHEAP recipient households	\$1,286	7.4%	\$1,390	8.0%	\$1,186	6.8%	\$2,229*	12.9%*	NC	NC	\$1,518*	8.8%*

<sup>1/</sup> Estimates are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days, cooling degree days, and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered and billed costs for natural gas and electricity. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household's income used for residential energy expenditures. National and regional mean incomes are calculated from the 2017 CPS ASEC, which reports income for calendar year 2016. Mean group residential burden is computed as mean group energy expenditures (from RECS) divided by mean group income (from CPS ASEC). See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-3b. Residential energy: Average annual expenditures, by amount (dollars) and mean individual burden (percent of income), for all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$2,069	8.0%	\$2,048	7.1%	\$1,901	8.7%	\$2,934	9.5%	\$1,849	12.4%	\$2,912	9.7%
US - Non-low income households	\$2,231	3.0%	\$2,172	2.8%	\$2,084	3.1%	\$3,181	3.6%	\$2,166	4.0%	\$3,090	4.5%
US - Low income households <sup>3/</sup>	\$1,768	17.2%	\$1,782	16.5%	\$1,606	17.8%	\$2,478	20.3%	\$1,721	15.7%	\$2,547	20.4%
US - LIHEAP recipient households <sup>4/</sup>	\$1,933	17.3%	\$1,889	16.8%	\$1,622	16.9%	\$2,658	17.9%	\$2,421*	14.6%*	\$2,676	24.1%
Northeast - All households	\$2,572	8.7%	\$2,456	7.9%	\$1,891	9.5%	\$3,003	9.6%	\$1,978	14.8%	\$3,616	8.7%
Northeast - Non-low income households	\$2,790	3.2%	\$2,638	3.0%	\$2,066	2.6%	\$3,266	3.7%	\$2,298	4.1%	\$3,880	4.5%
Northeast - Low income households	\$2,185	18.4%	\$2,147	16.2%	\$1,604	20.9%	\$2,493	21.2%	\$1,838	19.5%	\$2,909	20.0%
Northeast - LIHEAP recipient households	\$2,234	16.4%	\$2,086	14.8%	\$1,583	17.2%	\$2,659	18.9%	\$2,488*	15.7%*	\$2,866*	18.3%*
Midwest - All households	\$1,958	8.0%	\$1,917	7.7%	\$1,624	8.7%	\$2,388	11.6%	NC	NC	\$2,995	8.8%
Midwest - Non-low income households	\$2,070	2.9%	\$2,009	2.8%	\$1,788	2.6%	\$2,492	3.9%	NC	NC	\$3,088	4.1%
Midwest - Low income households	\$1,755	17.3%	\$1,738	17.0%	\$1,388	17.5%	\$2,303	17.8%	NC	NC	\$2,785	19.6%
Midwest - LIHEAP recipient households	\$1,836	19.9%	\$1,742	19.5%	\$1,502	19.0%	\$2,299*	14.4%*	NC	NC	\$2,586	21.2%
South - All households	\$2,131	9.1%	\$2,246	8.5%	\$2,052	9.4%	\$2,737	5.7%	\$1,640	9.0%	\$2,625	10.7%
South - Non-low income households	\$2,315	3.4%	\$2,437	3.2%	\$2,222	3.4%	\$2,855	3.2%	\$1,877*	4.9%*	\$2,817	5.1%
South - Low income households	\$1,792	19.5%	\$1,820	20.3%	\$1,756	19.9%	\$2,487	11.0%	\$1,580*	10.0%*	\$2,293	20.3%
South - LIHEAP recipient households	\$1,929	19.1%	\$2,129	19.3%	\$1,776	18.4%	\$3,107*	11.5%*	\$2,022*	7.8%*	\$3,269*	54.9%*
West - All households	\$1,658	5.4%	\$1,704	4.5%	\$1,564	6.1%	\$2,815	13.8%	\$1,565*	4.2%*	\$2,727	10.5%
West - Non-low income households	\$1,805	2.3%	\$1,809	2.2%	\$1,760	2.3%	\$2,781	4.0%	\$1,933*	1.8%*	\$2,911	4.2%
West - Low income households	\$1,366	11.7%	\$1,391	11.5%	\$1,301	11.0%	\$2,914*	41.3%*	\$1,173*	6.8%*	\$2,367	22.7%
West - LIHEAP recipient households	\$1,286	9.6%	\$1,390	10.6%	\$1,186	8.9%	\$2,229*	8.6%*	NC	NC	\$1,518*	17.3%*

<sup>1/</sup> Estimates are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days, cooling degree days, and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered and billed costs for natural gas and electricity. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household income used for residential energy expenditures. For individual households, FY 2017 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2017 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2017 residential energy burden for each household is computed as estimated FY 2017 residential energy expenditures divided by estimated FY 2017 annual income. Mean individual residential burden is computed by computing the mean of the individual values. See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-3c. Residential energy: Average annual expenditures, by amount (dollars) and median individual burden (percent of income), for all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$2,069	3.6%	\$2,048	3.3%	\$1,901	3.8%	\$2,934	4.5%	\$1,849	7.8%	\$2,912	5.3%
US - Non-low income households	\$2,231	2.6%	\$2,172	2.4%	\$2,084	2.7%	\$3,181	3.3%	\$2,166	3.3%	\$3,090	4.1%
US - Low income households <sup>3/</sup>	\$1,768	8.2%	\$1,782	8.0%	\$1,606	7.9%	\$2,478	10.5%	\$1,721	8.7%	\$2,547	12.1%
US - LIHEAP recipient households <sup>4/</sup>	\$1,933	8.5%	\$1,889	7.7%	\$1,622	8.0%	\$2,658	10.3%	\$2,421*	11.4%*	\$2,676	14.9%
Northeast - All households	\$2,572	4.0%	\$2,456	3.8%	\$1,891	3.5%	\$3,003	4.4%	\$1,978	8.4%	\$3,616	4.6%
Northeast - Non-low income households	\$2,790	2.8%	\$2,638	2.6%	\$2,066	2.2%	\$3,266	3.2%	\$2,298	3.3%	\$3,880	3.9%
Northeast - Low income households	\$2,185	9.3%	\$2,147	9.0%	\$1,604	7.6%	\$2,493	11.0%	\$1,838	10.2%	\$2,909	9.4%
Northeast - LIHEAP recipient households	\$2,234	8.8%	\$2,086	7.5%	\$1,583	5.7%	\$2,659	11.2%	\$2,488*	11.7%*	\$2,866*	10.1%*
Midwest - All households	\$1,958	3.5%	\$1,917	3.4%	\$1,624	3.3%	\$2,388	6.7%	NC	NC	\$2,995	4.7%
Midwest - Non-low income households	\$2,070	2.6%	\$2,009	2.5%	\$1,788	2.3%	\$2,492	4.1%	NC	NC	\$3,088	3.7%
Midwest - Low income households	\$1,755	8.1%	\$1,738	7.9%	\$1,388	6.6%	\$2,303	9.6%	NC	NC	\$2,785	13.5%
Midwest - LIHEAP recipient households	\$1,836	8.5%	\$1,742	8.0%	\$1,502	8.3%	\$2,299*	6.1%*	NC	NC	\$2,586	14.9%
South - All households	\$2,131	4.2%	\$2,246	3.7%	\$2,052	4.2%	\$2,737	3.5%	\$1,640	7.7%	\$2,625	6.3%
South - Non-low income households	\$2,315	3.0%	\$2,437	2.8%	\$2,222	3.0%	\$2,855	3.0%	\$1,877*	4.3%*	\$2,817	4.9%
South - Low income households	\$1,792	9.2%	\$1,820	9.9%	\$1,756	8.8%	\$2,487	6.7%	\$1,580*	8.5%*	\$2,293	12.2%
South - LIHEAP recipient households	\$1,929	9.8%	\$2,129	11.3%	\$1,776	8.5%	\$3,107*	5.7%*	\$2,022*	7.8%*	\$3,269*	14.8%*
West - All households	\$1,658	2.5%	\$1,704	2.3%	\$1,564	2.8%	\$2,815	5.0%	\$1,565*	2.0%*	\$2,727	6.1%
West - Non-low income households	\$1,805	1.9%	\$1,809	1.9%	\$1,760	2.0%	\$2,781	3.3%	\$1,933*	2.0%*	\$2,911	4.0%
West - Low income households	\$1,366	5.5%	\$1,391	5.5%	\$1,301	5.6%	\$2,914*	47.0%*	\$1,173*	6.8%*	\$2,367	8.7%
West - LIHEAP recipient households	\$1,286	6.3%	\$1,390	5.8%	\$1,186	5.6%	\$2,229*	8.6%*	NC	NC	\$1,518*	9.5%*

<sup>1/</sup> Estimates are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days, cooling degree days, and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered and billed costs for natural gas and electricity. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household income used for residential energy expenditures. For individual households, FY 2017 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2017 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2017 residential energy burden for each household is computed as estimated FY 2017 residential energy expenditures divided by estimated FY 2017 annual income. Median individual residential burden is computed by computing the median of the individual values. See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-4. Home heating: Percent of households using major types of heating fuels, by all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel type, 2009<sup>1/</sup>**

Census Region	Natural Gas <sup>2/</sup>	Electricity	Fuel Oil	Kerosene	LPG	Other <sup>3/</sup>
US - All households	49.0%	33.6%	6.1%	0.4%	4.9%	2.9%
US - Non-low income households	51.4%	31.9%	6.1%	0.2%	5.1%	2.9%
US - Low income households <sup>4/</sup>	44.4%	36.7%	6.1%	0.9%	4.6%	3.0%
US - LIHEAP recipient households <sup>5/</sup>	49.2%	29.3%	11.3%	1.1%	5.0%	2.7%
Northeast - All households	51.9%	11.5%	27.5%	1.5%	3.6%	3.9%
Northeast - Non-low income households	51.1%	11.2%	28.4%	0.7%	4.1%	4.5%
Northeast - Low income households	53.4%	12.2%	26.0%	2.9%	2.7%	2.7%
Northeast - LIHEAP recipient households	53.0%	10.3%	28.4%	2.9%	4.1%	1.3%
Midwest - All households	69.0%	17.6%	1.8%	NC	8.2%	3.2%
Midwest - Non-low income households	70.4%	16.1%	1.3%	NC	8.8%	3.2%
Midwest - Low income households	66.4%	20.3%	2.9%	NC	7.0%	3.0%
Midwest - LIHEAP recipient households	66.4%	17.0%	3.2%	NC	9.8%	3.6%
South - All households	31.7%	57.4%	1.4%	0.4%	4.5%	2.1%
South - Non-low income households	33.9%	56.3%	1.5%	0.1%	4.4%	1.8%
South - Low income households	27.8%	59.4%	1.3%	0.8%	4.7%	2.7%
South - LIHEAP recipient households	28.0%	62.0%	2.9%	0.6%	2.2%	3.1%
West - All households	54.8%	28.3%	0.5%	0.1%	3.3%	3.2%
West - Non-low income households	61.4%	24.3%	0.6%	0.1%	3.3%	3.0%
West - Low income households	41.4%	36.3%	0.4%	0.2%	3.4%	3.8%
West - LIHEAP recipient households	45.9%	37.7%	0.8%	NC	2.8%	3.8%

<sup>1/</sup> Data derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. Represents main heating fuel used in 2009.

<sup>2/</sup> The sum of percentages across fuel types may not equal 100%, due to rounding.

<sup>3/</sup> This category includes households using wood, coal, and other minor fuels as a main heating source and households reporting no main fuel.

<sup>4/</sup> Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>5/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-5. Home heating: Average consumption per household, by all fuels and specified fuels, by all, non-low income, low income and LIHEAP recipient households, by Census region, FY 2017<sup>1/</sup>**

Census Region	All Fuels <sup>2/</sup> (MMBtus) <sup>3/</sup>	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	31.9	45.4	9.0	65.7	30.8	45.1
US - Non-low income households	33.8	46.0	9.5	69.8	31.9	47.3
US - Low income households <sup>4/</sup>	28.5	44.1	8.4	58.1	30.4	40.4
US - LIHEAP recipient households <sup>5/</sup>	37.7	51.1	9.5	61.9	39.1*	42.8
Northeast - All households	53.0	57.4	12.7	68.1	37.1	51.3
Northeast - Non-low income households	55.2	58.5	13.7	72.4	39.1	52.9
Northeast - Low income households	49.2	55.6	11.0	59.7	36.2	46.8
Northeast - LIHEAP recipient households	51.2	53.9	10.0	64.5	44.2*	47.1*
Midwest - All households	48.1	57.4	13.8	55.8	NC	57.5
Midwest - Non-low income households	50.1	58.7	15.4	56.0	NC	58.2
Midwest - Low income households	44.6	54.9	11.5	55.6	NC	55.8
Midwest - LIHEAP recipient households	47.3	58.7	12.4	45.0*	NC	44.4
South - All households	15.8	29.5	7.5	52.4	19.3	28.1
South - Non-low income households	17.1	30.8	7.8	55.5	18.4*	31.4
South - Low income households	13.5	26.5	7.0	45.8	19.6*	22.2
South - LIHEAP recipient households	17.2	33.9	8.7	49.6*	8.4*	33.6*
West - All households	24.6	35.8	9.9	57.2	23.9*	47.0
West - Non-low income households	27.4	36.9	10.2	58.6	15.3*	47.6
West - Low income households	19.0	32.6	9.6	53.0*	33.0*	45.7
West - LIHEAP recipient households	22.9	39.3	8.9	66.5*	NC	26.7*

<sup>1/</sup> Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2017 for heating degree days.

<sup>2/</sup> Weighted average of natural gas, electricity, fuel oil, kerosene, and liquefied petroleum gas space heating consumption. Consumption data are not collected for other fuels.

<sup>3/</sup> A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refer to values in millions of Btus.

<sup>4/</sup> Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>5/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-6a. Home heating: Average annual expenditures by amount and mean group burden, by all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel type, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$467	0.6%	\$496	0.6%	\$290	0.3%	\$1,123	1.4%	\$592	0.7%	\$1,016	1.2%
US - Non-low income households	\$486	0.4%	\$499	0.5%	\$299	0.3%	\$1,194	1.1%	\$625	0.6%	\$1,068	1.0%
US - Low income households <sup>3/</sup>	\$431	2.2%	\$491	2.5%	\$276	1.4%	\$991	5.1%	\$579	3.0%	\$908	4.6%
US - LIHEAP recipient households <sup>4/</sup>	\$557	3.4%	\$574	3.5%	\$312	1.9%	\$1,068	6.6%	\$748*	4.6%*	\$985	6.1%
Northeast - All households	\$850	0.9%	\$764	0.8%	\$531	0.6%	\$1,165	1.3%	\$702	0.8%	\$1,392	1.5%
Northeast - Non-low income households	\$889	0.7%	\$782	0.6%	\$552	0.4%	\$1,236	1.0%	\$777	0.6%	\$1,413	1.1%
Northeast - Low income households	\$781	3.5%	\$735	3.3%	\$497	2.2%	\$1,026	4.6%	\$669	3.0%	\$1,335	5.9%
Northeast - LIHEAP recipient households	\$811	4.4%	\$701	3.8%	\$422	2.3%	\$1,108	6.1%	\$844*	4.6%*	\$1,296*	7.1%*
Midwest - All households	\$567	0.7%	\$552	0.7%	\$386	0.5%	\$898	1.1%	NC	NC	\$1,167	1.5%
Midwest - Non-low income households	\$583	0.6%	\$558	0.5%	\$408	0.4%	\$934	0.9%	NC	NC	\$1,189	1.2%
Midwest - Low income households	\$539	2.8%	\$540	2.8%	\$353	1.8%	\$870	4.5%	NC	NC	\$1,118	5.7%
Midwest - LIHEAP recipient households	\$570	3.6%	\$582	3.7%	\$381	2.4%	\$709*	4.5%*	NC	NC	\$911	5.8%
South - All households	\$303	0.4%	\$357	0.5%	\$246	0.3%	\$934	1.2%	\$395	0.5%	\$699	0.9%
South - Non-low income households	\$319	0.3%	\$370	0.4%	\$253	0.3%	\$990	1.0%	\$334*	0.3%*	\$771	0.8%
South - Low income households	\$273	1.5%	\$327	1.8%	\$233	1.3%	\$816	4.6%	\$410*	2.3%*	\$576	3.2%
South - LIHEAP recipient households	\$335	2.5%	\$402	3.0%	\$279	2.1%	\$993*	7.5%*	\$171*	1.3%*	\$828*	6.2%*
West - All households	\$319	0.4%	\$347	0.4%	\$297	0.3%	\$978	1.1%	\$447*	0.5%*	\$1,016	1.1%
West - Non-low income households	\$341	0.3%	\$358	0.3%	\$306	0.3%	\$990	0.9%	\$274*	0.2%*	\$1,053	0.9%
West - Low income households	\$276	1.4%	\$314	1.5%	\$285	1.4%	\$945*	4.6%*	\$631*	3.1%*	\$944	4.6%
West - LIHEAP recipient households	\$298	1.7%	\$356	2.1%	\$275	1.6%	\$1,060*	6.1%*	NC	NC	\$576*	3.3%*

<sup>1/</sup> Expenditures shown in this table are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered, and billed costs for natural gas and electricity used. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household income used for home heating energy expenditures. National and regional mean incomes are calculated from the 2017 CPS ASEC, which reports income for calendar year 2016. Mean group home heating burden is computed as mean group energy expenditures (from RECS) divided by mean group income (from CPS ASEC). See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-6b. Home heating: Average annual expenditures by amount and mean individual burden, by all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel type, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$467	2.3%	\$496	2.3%	\$290	1.9%	\$1,123	4.5%	\$592	4.5%	\$1,016	4.1%
US - Non-low income households	\$486	0.7%	\$499	0.7%	\$299	0.5%	\$1,194	1.4%	\$625	1.1%	\$1,068	1.6%
US - Low income households <sup>3/</sup>	\$431	5.3%	\$491	5.8%	\$276	4.2%	\$991	10.2%	\$579	5.9%	\$908	9.3%
US - LIHEAP recipient households <sup>4/</sup>	\$557	6.2%	\$574	6.9%	\$312	4.3%	\$1,068	8.4%	\$748*	4.8%*	\$985	9.1%
Northeast - All households	\$850	3.7%	\$764	3.3%	\$531	3.7%	\$1,165	4.7%	\$702	5.9%	\$1,392	4.5%
Northeast - Non-low income households	\$889	1.1%	\$782	0.9%	\$552	0.7%	\$1,236	1.5%	\$777	1.3%	\$1,413	1.7%
Northeast - Low income households	\$781	8.4%	\$735	7.3%	\$497	8.6%	\$1,026	10.9%	\$669	7.9%	\$1,335	12.0%
Northeast - LIHEAP recipient households	\$811	7.4%	\$701	7.2%	\$422	4.7%	\$1,108	9.1%	\$844*	5.5%*	\$1,296*	7.8%*
Midwest - All households	\$567	3.0%	\$552	2.9%	\$386	3.3%	\$898	4.8%	NC	NC	\$1,167	4.0%
Midwest - Non-low income households	\$583	0.9%	\$558	0.8%	\$408	0.6%	\$934	1.6%	NC	NC	\$1,189	1.7%
Midwest - Low income households	\$539	6.9%	\$540	6.9%	\$353	7.2%	\$870	7.4%	NC	NC	\$1,118	9.3%
Midwest - LIHEAP recipient households	\$570	7.8%	\$582	8.2%	\$381	7.3%	\$709*	5.0%*	NC	NC	\$911	9.4%
South - All households	\$303	1.7%	\$357	1.8%	\$246	1.6%	\$934	2.1%	\$395	2.3%	\$699	3.2%
South - Non-low income households	\$319	0.5%	\$370	0.5%	\$253	0.4%	\$990	1.1%	\$334*	0.8%*	\$771	1.5%
South - Low income households	\$273	3.8%	\$327	4.8%	\$233	3.5%	\$816	4.1%	\$410*	2.7%*	\$576	6.2%
South - LIHEAP recipient households	\$335	4.5%	\$402	5.9%	\$279	3.9%	\$993*	4.2%*	\$171*	0.7%*	\$828*	12.4%*
West - All households	\$319	1.4%	\$347	1.2%	\$297	1.5%	\$978	9.7%	\$447*	1.8%*	\$1,016	6.1%
West - Non-low income households	\$341	0.5%	\$358	0.5%	\$306	0.4%	\$990	1.5%	\$274*	0.3%*	\$1,053	1.6%
West - Low income households	\$276	3.2%	\$314	3.2%	\$285	2.9%	\$945*	33.1%*	\$631*	3.4%*	\$944	15.0%
West - LIHEAP recipient households	\$298	2.3%	\$356	2.5%	\$275	2.3%	\$1,060*	4.1%*	NC	NC	\$576*	6.4%*

<sup>1/</sup> Expenditures shown in this table are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered, and billed costs for natural gas and electricity used. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household income used for home heating energy expenditures. For individual households, FY 2017 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2017 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2017 home heating energy burden for each household is computed by computing the mean of the individual values. See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-6c. Home heating: Average annual expenditures by amount and median individual burden, by all, non-low income, low income, and LIHEAP recipient households, by Census region and main heating fuel type, FY 2017**

Census Region	All Fuels <sup>1/</sup>	All Fuels <sup>2/</sup>	Natural Gas Heat	Natural Gas Heat	Electric Heat	Electric Heat	Fuel Oil Heat	Fuel Oil Heat	Kerosene Heat	Kerosene Heat	LPG Heat	LPG Heat
US - All households	\$467	0.7%	\$496	0.8%	\$290	0.6%	\$1,123	1.7%	\$592	2.1%	\$1,016	1.8%
US - Non-low income households	\$486	0.5%	\$499	0.5%	\$299	0.4%	\$1,194	1.2%	\$625	0.9%	\$1,068	1.3%
US - Low income households <sup>3/</sup>	\$431	1.8%	\$491	2.1%	\$276	1.4%	\$991	4.7%	\$579	3.3%	\$908	4.2%
US - LIHEAP recipient households <sup>4/</sup>	\$557	2.3%	\$574	2.3%	\$312	1.8%	\$1,068	4.5%	\$748*	3.3%*	\$985	5.8%
Northeast - All households	\$850	1.3%	\$764	1.1%	\$531	1.1%	\$1,165	1.7%	\$702	2.7%	\$1,392	1.7%
Northeast - Non-low income households	\$889	0.9%	\$782	0.8%	\$552	0.6%	\$1,236	1.2%	\$777	1.1%	\$1,413	1.2%
Northeast - Low income households	\$781	3.4%	\$735	3.0%	\$497	2.4%	\$1,026	5.0%	\$669	4.0%	\$1,335	4.5%
Northeast - LIHEAP recipient households	\$811	3.3%	\$701	2.3%	\$422	1.8%	\$1,108	5.4%	\$844*	3.3%*	\$1,296*	5.9%*
Midwest - All households	\$567	1.0%	\$552	1.0%	\$386	0.8%	\$898	2.7%	NC	NC	\$1,167	2.1%
Midwest - Non-low income households	\$583	0.7%	\$558	0.7%	\$408	0.5%	\$934	1.6%	NC	NC	\$1,189	1.5%
Midwest - Low income households	\$539	2.4%	\$540	2.5%	\$353	1.8%	\$870	4.1%	NC	NC	\$1,118	5.8%
Midwest - LIHEAP recipient households	\$570	2.8%	\$582	2.8%	\$381	2.2%	\$709*	2.4%*	NC	NC	\$911	5.8%
South - All households	\$303	0.5%	\$357	0.6%	\$246	0.5%	\$934	1.3%	\$395	1.1%	\$699	1.6%
South - Non-low income households	\$319	0.3%	\$370	0.4%	\$253	0.3%	\$990	1.0%	\$334*	0.9%*	\$771	1.2%
South - Low income households	\$273	1.3%	\$327	1.6%	\$233	1.2%	\$816	2.7%	\$410*	1.9%*	\$576	3.0%
South - LIHEAP recipient households	\$335	1.8%	\$402	2.1%	\$279	1.7%	\$993*	1.9%*	\$171*	0.7%*	\$828*	7.4%*
West - All households	\$319	0.4%	\$347	0.4%	\$297	0.6%	\$978	1.5%	\$447*	0.4%*	\$1,016	1.8%
West - Non-low income households	\$341	0.3%	\$358	0.3%	\$306	0.3%	\$990	1.3%	\$274*	0.4%*	\$1,053	1.2%
West - Low income households	\$276	0.9%	\$314	1.1%	\$285	1.2%	\$945*	21.3%*	\$631*	4.9%*	\$944	4.0%
West - LIHEAP recipient households	\$298	1.6%	\$356	1.7%	\$275	1.6%	\$1,060*	4.1%*	NC	NC	\$576*	3.8%*

<sup>1/</sup> Expenditures shown in this table are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for heating degree days and fuel price estimates for FY 2017. Expenditures represent the costs for fuel oil, kerosene, and LPG delivered, and billed costs for natural gas and electricity used. RECS expenditure data are not collected for other fuels.

<sup>2/</sup> Represents the percent of household income used for home heating energy expenditures. For individual households, FY 2017 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2017 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2017 home heating energy burden for each household is computed by computing the median of the individual values. See text in Appendix A for a discussion of energy burden.

<sup>3/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>4/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

\* = This figure should be viewed with caution because of the small number of sample cases.

NC = No cases in the 2009 RECS household sample.

**Low Income Home Energy Data for FY 2017: Appendix A: Home Energy Estimates**

**Table A-7. Home cooling: Percent of households that cool, average annual consumption per household, average annual expenditures per household, mean group burden, mean individual burden, and median individual burden for households that cooled, by all, non-low income, low income, and LIHEAP recipient households, by Census region, FY 2017**

Census Region	Percent that cool <sup>1/</sup>	Consumption <sup>2/</sup> (in MMBtus)	Expenditures <sup>2/</sup>	Mean group burden <sup>3/</sup>	Mean individual burden <sup>3/</sup>	Median individual burden <sup>3/</sup>
US - All households	92.5%	6.8	\$265	0.3%	1.1%	0.3%
US - Non-low income households	94.3%	7.7	\$304	0.3%	0.4%	0.2%
US - Low income households <sup>4/</sup>	89.1%	4.9	\$189	1.0%	2.3%	0.6%
US - LIHEAP recipient households <sup>5/</sup>	88.6%	3.7	\$141	0.9%	1.5%	0.4%
Northeast - All households	89.0%	2.4	\$129	0.1%	0.4%	0.1%
Northeast - Non-low income households	93.4%	2.7	\$144	0.1%	0.2%	0.1%
Northeast - Low income households	81.1%	1.8	\$96	0.4%	1.0%	0.3%
Northeast - LIHEAP recipient	79.9%	2.1	\$107	0.6%	0.9%	0.3%
Midwest - All households	95.0%	3.6	\$120	0.2%	0.5%	0.2%
Midwest - Non-low income households	97.1%	4.1	\$136	0.1%	0.2%	0.1%
Midwest - Low income households	91.3%	2.6	\$89	0.5%	1.0%	0.3%
Midwest - LIHEAP recipient households	91.2%	2.3	\$78	0.5%	0.9%	0.2%
South - All households	98.7%	11.6	\$444	0.6%	1.9%	0.7%
South - Non-low income households	99.4%	13.5	\$517	0.5%	0.7%	0.5%
South - Low income households	97.3%	8.2	\$307	1.7%	4.1%	1.4%
South - LIHEAP recipient households	99.5%	6.9	\$245	1.8%	2.7%	0.9%
West - All households	82.2%	4.8	\$199	0.2%	0.6%	0.1%
West - Non-low income households	83.7%	5.4	\$226	0.2%	0.3%	0.1%
West - Low income households	79.3%	3.5	\$140	0.7%	1.3%	0.3%
West - LIHEAP recipient households	81.8%	3.1	\$113	0.7%	0.9%	0.3%

<sup>1/</sup> Cooling includes central and room air-conditioning, as well as non-air-conditioning cooling devices (e.g., ceiling fans, evaporative coolers). Excludes households that do not cool or cool in ways other than those recorded by the 2009 RECS (e.g., table and window fans.)

<sup>2/</sup> Consumption and expenditures are derived from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy. The 2009 RECS data have been adjusted for cooling degree days and electricity price estimates for FY 2017. Expenditures represent billed costs for electricity used for home cooling.

<sup>3/</sup> Represents the percent of household income used for home cooling energy expenditures.

<sup>4/</sup> Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.

<sup>5/</sup> Includes verified LIHEAP recipient households from the 2009 RECS.

## **Appendix B: Income Eligible Household Estimates**

ACF encourages LIHEAP grantees to use performance measurement systems to manage LIHEAP programs. ACF has developed targeting performance indicators to support measurement of LIHEAP targeting at the grantee level. For a number of years, ACF has furnished state grantees with state-level estimates of the number of LIHEAP income eligible households, including the number of vulnerable households and the number of households by poverty level. State grantees can use these estimates with their own data on LIHEAP recipient characteristics to compute reciprocity targeting performance statistics.

State-level estimates of the number of income eligible households for FY 2017 were developed using the American Community Survey (ACS). The Census Bureau recommends the use of the ACS for the state-level income and poverty analysis.<sup>16</sup> ACF also uses the estimates from the ACS and household recipient data from the states' *LIHEAP Household Report* to develop state-level targeting indexes.

The 2012-2016 five-year ACS Public Use Microdata Sample (PUMS) data file is used to develop more precise estimates of the number of income eligible households than those that would have been obtained using the 2015 single-year ACS PUMS data.<sup>17</sup>

The federal maximum LIHEAP income standard is the greater of 60 percent of the state median income or 150 percent of HHS Poverty Guidelines.

Tables B-1 and B-2 show estimates of the number of LIHEAP income eligible households by vulnerability group,<sup>18</sup> derived from the 2012-2016 five-year ACS, using the federal maximum income standard and the FY 2017 state income standards, respectively. The state income standards are the income levels that the states set to define LIHEAP income eligibility. These state income standards may vary by LIHEAP component; however, they must fall between 110 percent of HHS Poverty Guidelines and the federal maximum income standard.

Similarly, Tables B-3 through B-4 show estimates of the number of LIHEAP income eligible households by poverty group, derived from the 2012-2016 five-year ACS, using the using the federal maximum income standard and the FY 2017 state income standards, respectively.

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<sup>16</sup> For an explanation, and to better understand the differences between the ACS and CPS ASEC, please visit the Census Bureau's Guidance for Data Users regarding "Which Data Source to Use" for poverty and income research at the following website: <https://www.census.gov/topics/income-poverty/poverty/guidance/data-sources.html>.

<sup>17</sup> The Census Bureau recommends multi-year data estimates from the ACS instead of estimates from the one-year ACS when the precision of the estimates is of primary importance. (See the Census Bureau's Guidance for Data Users regarding estimates from the ACS at the following website: <https://www.census.gov/programs-surveys/acs/guidance/estimates.html>) In prior *Notebooks*, state-level estimates of the eligible population were derived from the Census Bureau's 3-year ACS PUMS product. However, in 2015, the Census Bureau discontinued publication of its 3-year ACS PUMS. For the *FY 2015 Notebook* and the *FY 2016 Notebook*, the methodology chosen to develop state-level estimates of the eligible population was the three-year average of 1-year ACS PUMS files, which produced comparable estimates to the discontinued 3-year ACS PUMS. To maintain consistency with the Census Bureau's published ACS PUMS data, the *FY 2017 Notebook* uses the 5-year (2012-2016) ACS PUMS file to develop state-level estimates of the eligible population.

<sup>18</sup> The Census Bureau changed the questions on disability in ACS in 2008. Since the new questions were not comparable to those in previous years, the reader should exercise caution in comparing the estimates of households with disabled individuals with those in previous *Notebooks*.

**LIHEAP Home Energy Notebook for FY 2017: Appendix B: Income Eligible Household Estimates**

**Table B-1. State-level estimates of the number of LIHEAP income eligible households using the federal maximum LIHEAP income standard by vulnerability category<sup>1/ 2/ 3/</sup>**  
(2012-2016 ACS)

State	Total number of LIHEAP eligible households <sup>4/</sup>	LIHEAP eligible households with at least one person 60+ years	LIHEAP eligible households with at least one child less than 6 yrs. old	LIHEAP eligible households with at least one person with a disability <sup>5/</sup>	LIHEAP eligible households with no vulnerable members
Alabama	597,533	226,266	102,241	269,042	164,876
Alaska	63,445	19,285	15,620	23,342	20,183
Arizona	655,219	241,340	133,781	224,756	207,794
Arkansas	336,480	124,682	66,378	157,074	84,102
California	3,716,264	1,375,427	788,939	1,261,645	1,198,112
Colorado	583,310	204,180	106,772	188,304	204,802
Connecticut	433,877	184,450	64,414	155,437	131,002
Delaware	100,045	41,824	16,750	35,833	29,410
District of Columbia	75,822	25,988	11,000	30,504	25,940
Florida	2,050,786	904,206	327,952	729,255	601,931
Georgia	1,077,243	369,100	223,009	401,696	338,914
Hawaii	114,245	51,302	21,558	40,349	32,071
Idaho	152,227	52,816	30,617	57,444	45,156
Illinois	1,472,442	577,448	252,217	512,908	475,512
Indiana	735,341	263,475	140,717	291,632	218,540
Iowa	361,096	145,026	58,051	131,700	110,120
Kansas	315,572	113,375	62,664	117,760	96,456
Kentucky	573,913	217,460	97,170	286,564	137,753
Louisiana	609,045	227,004	106,946	256,365	178,675
Maine	170,798	75,638	21,553	79,919	40,074
Maryland	658,770	269,390	118,184	226,722	202,432
Massachusetts	856,746	386,734	116,104	350,605	234,034
Michigan	1,198,808	450,470	203,160	502,277	341,921
Minnesota	628,945	253,530	108,776	224,061	186,893
Mississippi	360,762	134,655	69,231	165,678	96,128
Missouri	710,750	270,607	119,996	301,245	198,647
Montana	118,213	46,762	18,319	45,625	35,574
Nebraska	208,681	77,390	40,842	73,110	65,374
Nevada	260,317	90,691	52,644	92,100	83,913
New Hampshire	149,408	65,442	19,644	61,221	40,988
New Jersey	1,047,284	452,867	173,164	353,209	321,176
New Mexico	228,270	86,091	43,319	90,958	67,169
New York	2,370,954	992,816	391,901	876,915	699,169
North Carolina	1,134,929	426,517	204,429	451,989	339,583
North Dakota	91,616	34,047	14,683	30,552	32,578
Ohio	1,447,973	557,475	247,623	605,476	399,540
Oklahoma	417,094	149,905	82,758	178,893	115,449
Oregon	423,372	161,228	73,664	173,904	121,655
Pennsylvania	1,579,900	707,618	228,903	670,091	406,225
Rhode Island	137,700	56,652	19,585	57,638	38,477
South Carolina	524,221	201,533	94,277	218,080	149,080
South Dakota	92,779	37,854	17,035	34,705	26,239
Tennessee	755,699	283,683	139,299	334,374	202,012
Texas	2,656,922	872,091	622,061	926,124	860,441
Utah	212,553	63,043	58,826	68,304	66,519
Vermont	77,045	36,137	9,282	32,872	19,797
Virginia	922,930	362,117	162,847	335,517	284,016
Washington	763,153	284,896	142,893	293,666	225,804
West Virginia	246,316	103,250	35,898	128,945	54,597
Wisconsin	691,229	277,674	110,598	254,510	207,402
Wyoming	61,148	23,683	10,063	20,497	20,729
All States	35,229,190	13,657,140	6,398,357	13,431,392	10,484,984

<sup>1/</sup> State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.

<sup>2/</sup> The federal maximum LIHEAP income standard is the greater of 60 percent of the state median income estimates or 150 percent of the HHS Poverty Guidelines.

<sup>3/</sup> A household can be counted under more than one vulnerability category.

<sup>4/</sup> The 2012-2016 ACS estimate of the total number of all U.S. households is 117,716,238.

<sup>5/</sup> The Census Bureau changed the questions on disability in ACS in 2008. The definition above includes individuals aged 15 years and older with any of the six difficulty types (hearing, vision, cognitive, ambulatory, self-care, and independent living) reported in ACS and individuals ages 15 through 64 who received Supplemental Security Income in the past year, and non-widowed individuals ages 19 through 61 who received Social Security income in the past year. The reader should exercise caution in comparing these estimates with those in previous *Notebooks*.

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**Table B-2. State-level estimates of the number of LIHEAP income eligible households using state maximum LIHEAP income standards by vulnerability category<sup>1/ 2/ 3/</sup>**  
(2012-2016 ACS)

State	State Income Guidelines for 4-Person Household as % of HHS Poverty Guidelines	Total number of LIHEAP eligible households <sup>4/</sup>	LIHEAP eligible households with at least one person 60+ years	LIHEAP eligible households with at least one child less than 6 yrs. old	LIHEAP eligible households with at least one person with a disability <sup>5/</sup>	LIHEAP eligible households with no vulnerable members
Alabama	150%	524,784	192,507	95,526	237,527	143,034
Alaska	150%	49,400	14,956	12,352	19,781	14,600
Arizona	161% <sup>6/7/</sup>	655,219	241,340	133,781	224,756	207,794
Arkansas	150% <sup>7/8</sup>	328,202	122,769	62,581	153,899	82,001
California	190% <sup>7/8/</sup>	3,712,296	1,374,263	785,621	1,260,009	1,197,899
Colorado	165%	409,733	137,085	80,860	137,931	138,459
Connecticut	262% <sup>7/8/</sup>	433,877	184,450	64,414	155,437	131,002
Delaware	200%	89,520	36,664	15,660	32,518	25,879
District of Columbia	207% <sup>7/8/</sup>	75,808	25,988	10,986	30,504	25,940
Florida	150%	1,777,564	762,875	302,861	638,723	515,801
Georgia	169% <sup>7/8/</sup>	1,075,905	368,551	221,951	401,185	338,836
Hawaii	150%	86,190	38,592	17,069	32,111	22,831
Idaho	150%	143,159	47,849	29,779	54,214	42,483
Illinois	150%	991,519	354,319	189,876	360,143	315,161
Indiana	150%	564,470	184,706	117,992	227,755	166,758
Iowa	175%	300,663	115,586	50,676	112,553	91,374
Kansas	130%	186,750	59,544	40,102	72,581	56,482
Kentucky	130%	410,291	142,842	75,628	215,176	93,358
Louisiana	172% <sup>7/8/</sup>	608,637	226,962	106,541	256,165	178,675
Maine	170%	133,202	62,723	17,106	66,766	26,030
Maryland	175%	386,361	153,635	73,458	147,989	108,138
Massachusetts	262% <sup>7/8/</sup>	856,746	386,734	116,104	350,605	234,034
Michigan	110%	598,929	177,463	119,183	263,912	174,056
Minnesota	190% <sup>7/9</sup>	499,685	199,538	88,623	187,256	141,147
Mississippi	141% <sup>7/8/</sup>	347,868	131,328	64,153	160,704	93,091
Missouri	135%	481,582	167,626	89,189	211,326	131,730
Montana	170% <sup>7/10</sup>	118,213	46,762	18,319	45,625	35,574
Nebraska	130%	121,466	41,725	25,910	45,529	36,278
Nevada	150%	222,509	73,712	47,846	79,832	70,938
New Hampshire	200%	110,523	47,168	15,522	48,374	28,386
New Jersey	200%	755,705	319,872	135,263	270,025	218,467
New Mexico	150%	220,932	81,795	43,240	88,054	64,892
New York	213% <sup>7/11</sup>	2,370,954	992,816	391,901	876,915	699,169
North Carolina	130%	808,623	281,250	160,414	330,270	235,966
North Dakota	219% <sup>7/8/</sup>	91,616	34,047	14,683	30,552	32,578
Ohio	175%	1,447,534	557,428	247,205	605,283	399,533
Oklahoma	130%	307,772	101,197	64,480	134,353	85,031
Oregon	174% <sup>7/8/</sup>	422,822	161,091	73,230	173,772	121,582
Pennsylvania	150%	1,020,677	412,739	166,006	459,082	256,334
Rhode Island	221% <sup>7/8/</sup>	137,700	56,652	19,585	57,638	38,477
South Carolina	150%	476,739	177,164	89,647	198,808	135,610
South Dakota	175%	83,262	33,106	16,213	31,460	23,086
Tennessee	150%	658,865	237,609	128,582	297,250	172,643
Texas	150%	2,208,681	700,299	552,458	779,851	695,476
Utah	150%	166,517	46,868	47,696	54,793	51,311
Vermont	150%	47,954	21,685	5,798	22,315	11,718
Virginia	130%	449,747	162,119	84,607	180,111	130,618
Washington	125%	379,396	125,329	74,305	157,742	110,066
West Virginia	135%	184,384	68,841	28,796	99,409	41,386
Wisconsin	203% <sup>7/8/</sup>	691,073	277,674	110,468	254,401	207,402
Wyoming	197% <sup>7/8/</sup>	61,137	23,683	10,058	20,495	20,723
All States	Not applicable	29,293,161	10,993,526	5,554,304	11,353,465	8,619,837

<sup>1/</sup> State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.

<sup>2/</sup> State income guidelines can vary from 110 percent of the HHS Poverty Guidelines up to the federal maximum LIHEAP income standard and can be different for different components of LIHEAP assistance. The table shows the estimates of LIHEAP income eligible households for heating assistance. The state maximum LIHEAP income standards for a family of four were obtained from ACF's *LIHEAP Grantee Survey* and confirmed with other program resources.

<sup>3/</sup> A household can be counted under more than one vulnerability category.

<sup>4/</sup> The 2012-2016 ACS estimate of the total number of all U.S. households is 117,716,238.

<sup>5/</sup> The Census Bureau changed the questions on disability in ACS in 2008. The definition above includes individuals aged 15 years and older with any of the six difficulty types (hearing, vision, cognitive, ambulatory, self-care, and independent living) reported in ACS and individuals ages 15 through 64 who received Supplemental Security Income in the past year, and non-widowed individuals ages 19 through

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61 who received Social Security income in the past year. The reader should exercise caution in comparing these estimates with those in previous *Notebooks*.

<sup>6/</sup> The state income guideline is 60 percent of the state median income for households with 1-6 members and 150 percent of HHS Poverty Guidelines for households with 7 or more members.

<sup>7/</sup> These states use a percent of state median income as the state income guideline. The figures reported are the conversion to a percent of the HHS Poverty Guidelines for four person households.

<sup>8/</sup> These states use 60 percent of the state median income as the state income guideline for all household sizes.

<sup>9/</sup> The state income guideline is the greater of 50 percent of the state median income and 110 percent of HHS Poverty Guidelines, depending upon household size.

<sup>10/</sup> The state income guideline is 60 percent of the state median income for households with 1-7 members and 150 percent of HHS Poverty Guidelines for households with 8 or more members.

<sup>11/</sup> The state income guideline is 60 percent of the state median income for households with 1-10 members and 150 percent of HHS Poverty Guidelines for households with 11 or more members.

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**Table B-3. State-level estimates of the number of LIHEAP income eligible households using the federal maximum LIHEAP income standard categorized by income as a percentage of HHS Poverty Guidelines<sup>1/ 2/</sup>**  
(2012-2016 ACS)

State	Total number of LIHEAP eligible households <sup>3/</sup>	Number of LIHEAP eligible households at or below poverty guidelines	Number of LIHEAP eligible households >100%-125% poverty guidelines	Number of LIHEAP eligible households >125%-150% poverty guidelines	Number of LIHEAP eligible households over 150% poverty guidelines
Alabama	597,533	314,918	106,242	103,624	72,749
Alaska	63,445	28,278	10,379	10,743	14,045
Arizona	655,219	339,901	120,649	121,729	72,940
Arkansas	336,480	189,482	73,581	70,882	2,535
California	3,716,264	1,631,088	579,451	567,586	938,139
Colorado	583,310	203,577	77,959	80,675	221,099
Connecticut	433,877	126,687	42,862	44,805	219,523
Delaware	100,045	36,303	11,836	13,428	38,478
District of Columbia	75,822	39,272	9,548	8,016	18,986
Florida	2,050,786	1,000,024	385,125	392,415	273,222
Georgia	1,077,243	550,355	184,749	177,830	164,309
Hawaii	114,245	51,400	17,634	17,156	28,055
Idaho	152,227	77,402	32,381	33,376	9,068
Illinois	1,472,442	588,344	196,304	206,871	480,923
Indiana	735,341	319,700	120,242	124,528	170,871
Iowa	361,096	131,635	52,087	59,071	118,303
Kansas	315,572	125,933	48,340	52,064	89,235
Kentucky	573,913	289,308	98,051	94,831	91,723
Louisiana	609,045	305,999	98,391	92,624	112,031
Maine	170,798	66,794	27,307	27,286	49,411
Maryland	658,770	187,757	64,237	65,241	341,535
Massachusetts	856,746	271,653	92,001	88,043	405,049
Michigan	1,198,808	527,686	175,130	183,216	312,776
Minnesota	628,945	192,799	78,329	79,874	277,943
Mississippi	360,762	223,029	71,160	66,573	0
Missouri	710,750	313,695	116,629	117,294	163,132
Montana	118,213	53,029	22,316	21,399	21,469
Nebraska	208,681	76,778	36,266	32,454	63,183
Nevada	260,317	123,410	50,161	48,938	37,808
New Hampshire	149,408	37,593	16,168	18,355	77,292
New Jersey	1,047,284	309,751	109,345	113,420	514,768
New Mexico	228,270	134,285	45,952	40,695	7,338
New York	2,370,954	986,442	308,309	303,511	772,692
North Carolina	1,134,929	549,522	210,244	199,206	175,957
North Dakota	91,616	31,138	11,560	12,252	36,666
Ohio	1,447,973	620,704	215,977	213,366	397,926
Oklahoma	417,094	208,150	81,247	79,719	47,978
Oregon	423,372	191,226	73,602	71,806	86,738
Pennsylvania	1,579,900	578,325	217,131	225,221	559,223
Rhode Island	137,700	52,263	18,205	17,742	49,490
South Carolina	524,221	275,944	100,601	100,194	47,482
South Dakota	92,779	36,176	16,449	15,964	24,190
Tennessee	755,699	382,367	138,268	138,230	96,834
Texas	2,656,922	1,294,991	462,899	450,791	448,241
Utah	212,553	90,436	36,182	39,899	46,036
Vermont	77,045	23,301	12,506	12,147	29,091
Virginia	922,930	307,462	115,130	113,783	386,555
Washington	763,153	277,748	101,648	105,034	278,723
West Virginia	246,316	120,523	45,055	42,914	37,824
Wisconsin	691,229	241,893	98,240	103,987	247,109
Wyoming	61,148	21,288	8,897	9,573	21,390
All States	35,229,190	15,157,764	5,442,962	5,430,381	9,198,083

<sup>1/</sup> State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.

<sup>2/</sup> The federal maximum LIHEAP income standard is the greater of 60 percent of state median income estimates or 150 percent of the HHS Poverty Guidelines.

<sup>3/</sup> The 2012-2016 ACS estimate of the total number of all U.S. households is 117,716,238.

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**Table B-4. State-level estimates of the number of LIHEAP income eligible households using the state maximum LIHEAP income standards categorized by income as a percentage of HHS Poverty Guidelines<sup>1/ 2/</sup>**  
(2012-2016 ACS)

State	State Income Guidelines for 4-Person Household as % of HHS Poverty Guidelines	Total number of LIHEAP eligible households <sup>3/</sup>	Number of LIHEAP eligible households at or below poverty guidelines	Number of LIHEAP eligible households >100%-125% poverty guidelines	Number of LIHEAP eligible households >125%-150% poverty guidelines	Number of LIHEAP eligible households over 150% poverty guidelines
Alabama	150%	524,784	314,918	106,242	103,624	0
Alaska	150%	49,400	28,278	10,379	10,743	0
Arizona	161% <sup>4/5</sup>	655,219	339,901	120,649	121,729	72,940
Arkansas	150% <sup>5/6</sup>	328,202	189,482	73,343	62,842	2,535
California	190% <sup>5/6/</sup>	3,712,296	1,631,088	579,126	563,943	938,139
Colorado	165%	409,733	203,577	77,959	80,675	47,522
Connecticut	262% <sup>5/6/</sup>	433,877	126,687	42,862	44,805	219,523
Delaware	200%	89,520	36,303	11,836	13,428	27,953
District of Columbia	207% <sup>5/6/</sup>	75,808	39,272	9,548	8,002	18,986
Florida	150%	1,777,564	1,000,024	385,125	392,415	0
Georgia	169% <sup>5/6/</sup>	1,075,905	550,355	184,673	176,568	164,309
Hawaii	150%	86,190	51,400	17,634	17,156	0
Idaho	150%	143,159	77,402	32,381	33,376	0
Illinois	150%	991,519	588,344	196,304	206,871	0
Indiana	150%	564,470	319,700	120,242	124,528	0
Iowa	175%	300,663	131,635	52,087	59,071	57,870
Kansas	130%	186,750	125,933	48,340	12,477	0
Kentucky	130%	410,291	289,308	98,051	22,932	0
Louisiana	172% <sup>5/6/</sup>	608,637	305,999	98,366	92,241	112,031
Maine	170%	133,202	66,794	27,307	27,193	11,908
Maryland	175%	386,361	187,757	64,237	65,241	69,126
Massachusetts	262% <sup>5/6/</sup>	856,746	271,653	92,001	88,043	405,049
Michigan	110%	598,929	527,686	71,243	0	0
Minnesota	190% <sup>5/7</sup>	499,685	192,799	78,303	79,613	148,970
Mississippi	141% <sup>5/6/</sup>	347,868	223,029	70,744	54,095	0
Missouri	135%	481,582	313,695	116,629	51,258	0
Montana	170% <sup>5/8</sup>	118,213	53,029	22,316	21,399	21,469
Nebraska	130%	121,466	76,778	36,266	8,422	0
Nevada	150%	222,509	123,410	50,161	48,938	0
New Hampshire	200%	110,523	37,593	16,168	18,355	38,407
New Jersey	200%	755,705	309,751	109,345	113,420	223,189
New Mexico	150%	220,932	134,285	45,952	40,695	0
New York	213% <sup>5/9</sup>	2,370,954	986,442	308,309	303,511	772,692
North Carolina	130%	808,623	549,522	210,244	48,857	0
North Dakota	219% <sup>5/6/</sup>	91,616	31,138	11,560	12,252	36,666
Ohio	175%	1,447,534	620,704	215,897	213,007	397,926
Oklahoma	130%	307,772	208,150	81,247	18,375	0
Oregon	174% <sup>5/6/</sup>	422,822	191,226	73,583	71,275	86,738
Pennsylvania	150%	1,020,677	578,325	217,131	225,221	0
Rhode Island	221% <sup>5/6/</sup>	137,700	52,263	18,205	17,742	49,490
South Carolina	150%	476,739	275,944	100,601	100,194	0
South Dakota	175%	83,262	36,176	16,449	15,964	14,673
Tennessee	150%	658,865	382,367	138,268	138,230	0
Texas	150%	2,208,681	1,294,991	462,899	450,791	0
Utah	150%	166,517	90,436	36,182	39,899	0
Vermont	150%	47,954	23,301	12,506	12,147	0
Virginia	130%	449,747	307,462	115,130	27,155	0
Washington	125%	379,396	277,748	101,648	0	0
West Virginia	135%	184,384	120,523	45,055	18,806	0
Wisconsin	203% <sup>5/6/</sup>	691,073	241,893	98,240	103,831	247,109
Wyoming	197% <sup>5/6/</sup>	61,137	21,288	8,895	9,564	21,390
All States	Not applicable	29,293,161	15,157,764	5,337,868	4,590,919	4,206,610

<sup>1/</sup> State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.

<sup>2/</sup> State income guidelines can vary from 110 percent of the HHS Poverty Guidelines up to the federal maximum LIHEAP income standard and can be different for different components of LIHEAP assistance. The table shows the estimates of LIHEAP income eligible households for heating assistance. The state maximum LIHEAP income standards for a family of four were obtained from ACF's *LIHEAP Grantee Survey*.

<sup>3/</sup> The 2012-2016 ACS estimate of the total number of all U.S. households is 117,716,238.

<sup>4/</sup> The state income guideline is 60 percent of the state median income for households with 1-6 members and 150 percent of HHS Poverty Guidelines for households with 7 or more members.

<sup>5/</sup> These states use a percent of state median income as the state income guideline. The figures reported are the conversion to a percent of the HHS Poverty Guidelines for four person households.

<sup>6/</sup> These states use 60 percent of the state median income as the state income guideline for all household sizes.

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<sup>7/</sup> The state income guideline is the greater of 50 percent of the state median income and 110 percent of HHS Poverty Guidelines, depending upon household size.

<sup>8/</sup> The state income guideline is 60 percent of the state median income for households with 1-7 members and 150 percent of HHS Poverty Guidelines for households with 8 or more members.

<sup>9/</sup> The state income guideline is 60 percent of the state median income for households with 1-10 members and 150 percent of HHS Poverty Guidelines for households with 11 or more members.