Low Income Home Energy Data
For Fiscal Year 2016

U.S. DEPARTMENT OF
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Division of Energy Assistance
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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
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) 2016 residential energy consumption and expenditures figures for this report have been derived from the 2009 RECS data that were adjusted to reflect FY 2016 weather and fuel prices, as described in Appendix A.

Residential energy data

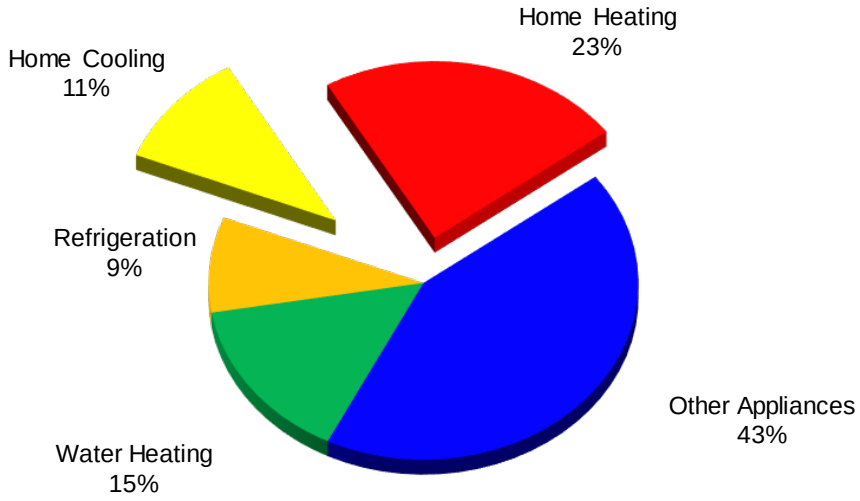
In FY 2016, average residential energy expenditures for all households were $2,004, and the mean individual energy burden was 7.9 percent of income.[1] Low income households had average energy expenditures of $1,709, about 15 percent lower than the average for all households.[2] The mean individual energy burden for low income households was 17.1 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 $1,854, about 8 percent higher than the average for all low income households. The mean individual energy burden for LIHEAP recipients was 17.2 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 2016. 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 43 percent of residential energy expenditures.

[1] The mean is the sum of all values divided by the number of values. The mean is also referred to as the average.

[2] 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 2016



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.

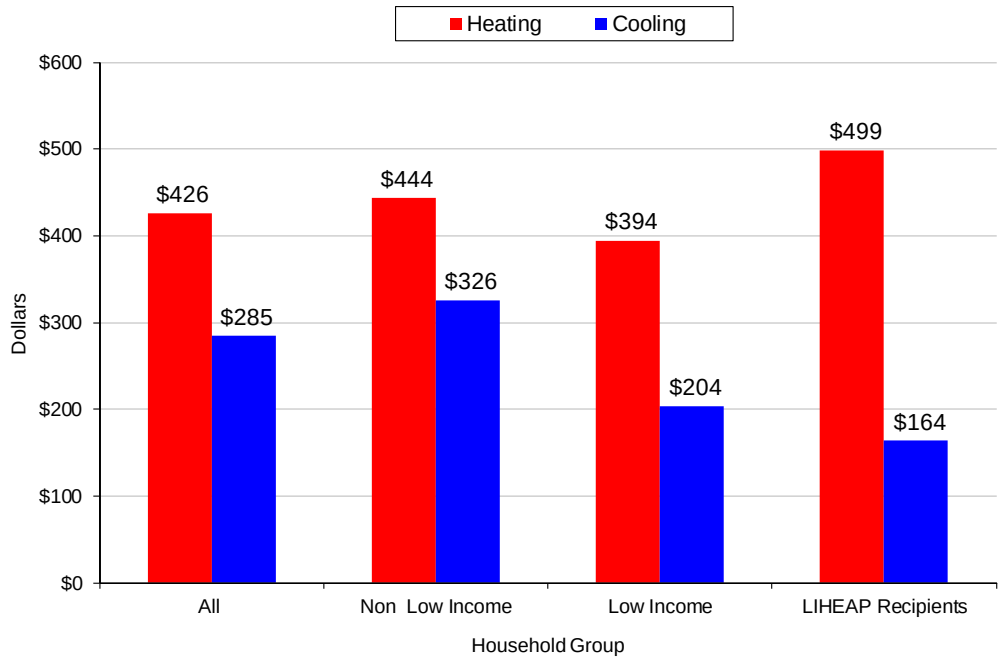
In FY 2016, as shown in Figures 2 and 3, average home heating expenditures for all households were $426, and the mean individual home heating burden was 2.2 percent. Low income households had average home heating expenditures of $394; this average was about 8 percent lower than that for all households. The mean individual home heating burden for low income households was 5.0 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 $499, about 27 percent higher than the average for low income households and about 17 percent higher than the average for all households. Mean individual home heating burden for LIHEAP recipient households was 5.8 percent, more than two and a half times the average for all households, and 0.8 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.[3] 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.

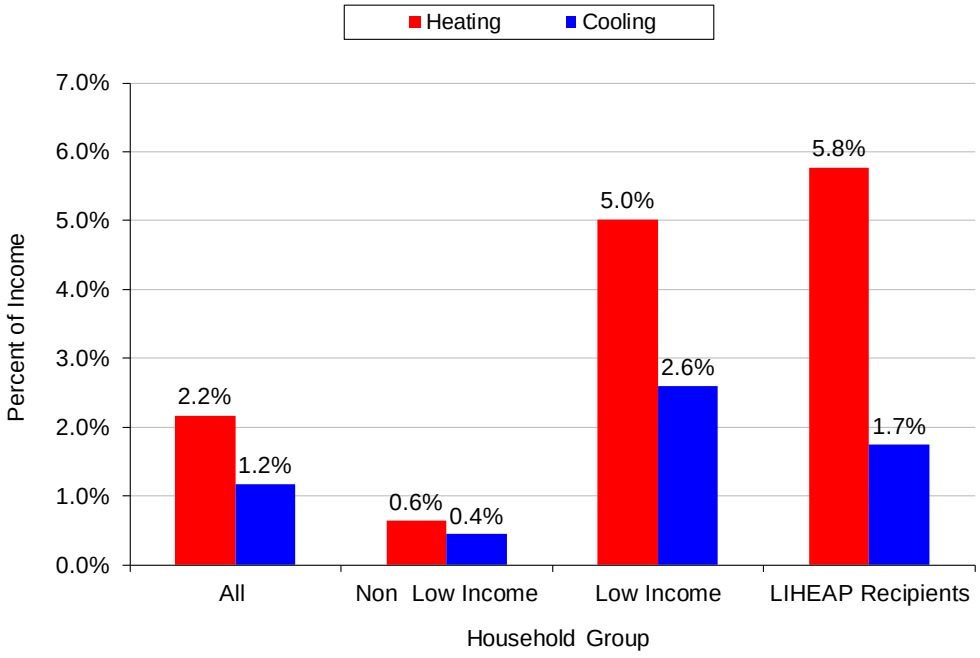
As Figures 2 and 3 show, in FY 2016, for households that cooled, average home cooling expenditures for all households were $285, and the mean individual home cooling burden was 1.2 percent. Low income households had average home cooling expenditures of $204; this average was about 28 percent lower than that for all households. The mean individual home cooling burden for low income households was 2.6 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 $164, about 20 percent lower than the average for low income households and about 42 percent lower than the average for all households. The mean individual home cooling burden for LIHEAP recipient households was 1.7 percent, about 42 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 2016



[3] 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.

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 2016



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 2016 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.[4] In FY 2016, average residential energy consumption for all households was 85.3 million British thermal units (MMBtus) and average expenditures were $2,004. The mean individual residential energy burden for all households was 7.9 percent of income.

Low income households had average residential energy consumption of 73.9 MMBtus (about 13 percent less than all households) and average energy expenditures of $1,709 (about 15 percent less than all households). Their mean individual residential energy burden was 17.1 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 $1,854, about 8 percent higher than that for all low income households. The mean individual residential energy burden was 17.2 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 2016, home heating was 23 percent of the residential energy bill for low income households, and home cooling made up 11 percent.

Table 1a. Residential energy: Average annual household consumption, expenditures, and burden by all households, by main heating fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumption (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	85.3	$2,004	7.9%	3.6%	2.5%
Natural gas	102.5	$1,979	7.1%	3.2%	2.5%
Electricity	59.7	$1,881	8.8%	3.8%	2.4%
Fuel oil	108.8	$2,704	9.1%	4.2%	3.4%
Kerosene	61.4	$1,736	11.8%	7.7%	2.2%
LPG[6/]	103.4	$2,768	9.5%	5.2%	3.5%

[4] 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.

Table 1b. Residential energy: Average annual household consumption, expenditures, and burden by non-low income households, by main heating fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumption (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	91.4	$2,163	3.0%	2.6%	2.1%
Natural gas	106.9	$2,102	2.7%	2.4%	2.0%
Electricity	65.1	$2,063	3.1%	2.7%	2.0%
Fuel oil	116.2	$2,936	3.4%	3.1%	2.8%
Kerosene	67.7	$2,031	3.9%	3.2%	1.9%
LPG[6/]	110.3	$2,940	4.4%	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 2016[1/]

Main heating fuel	Fuel consumption (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	73.9	$1,709	17.1%	8.1%	8.9%
Natural gas	93.0	$1,713	16.3%	7.8%	8.9%
Electricity	51.1	$1,588	18.0%	8.0%	8.3%
Fuel oil	95.1	$2,278	19.5%	9.9%	11.8%
Kerosene	58.9	$1,618	15.0%	8.2%	8.4%
LPG[6/]	89.3	$2,412	20.0%	11.8%	12.5%

Table 1d. Residential energy: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by main heating fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumption (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	85.4	$1,854	17.2%	8.4%	11.1%
Natural gas	102.0	$1,812	16.7%	7.6%	10.8%
Electricity	54.4	$1,603	17.1%	8.2%	9.6%
Fuel oil	102.7	$2,441	17.1%	9.5%	14.6%
Kerosene	77.4*	$2,272*	13.9%*	10.4%*	13.6%*
LPG[6/]	90.9	$2,529	23.5%	14.4%	15.1%

[1/] Data are derived from the 2009 RECS, adjusted to reflect FY 2016 heating degree days, cooling degree days, and fuel prices. Data represent residential energy used from October 2015 through September 2016. See also Tables A-2, A-3a – A-3c, Appendix A.
[2/] 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.
[3/] Mean individual burden is calculated by taking the mean, or average, of individual energy burdens, as calculated from FY 2016 adjusted RECS data. See Appendix A for information on calculation of energy burden.
[4/] Median individual burden is calculated by taking the median of individual energy burdens, as calculated from FY 2016 adjusted RECS data.
[5/] 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 2016; and (3) dividing the adjusted figures by the average income for each group of households from the 2016 CPS ASEC.
[6/] 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.

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 27 percent of their annual residential expenditures for space heating, 4 percentage points more than did the average low income household. LIHEAP recipient households spent 8 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 2016[1/]

End Use	All households	Non-low income households	Low income households	LIHEAP recipient households
Space heating	21%	21%	23%	27%
Space cooling	13%	14%	11%	8%
Water heating	13%	12%	15%	15%
Refrigeration	8%	8%	9%	8%
Appliances	44%	45%	43%	42%
All uses	100%	100%	100%	100%

[1/] Data are derived from the 2009 RECS, adjusted to reflect FY 2016 heating degree days, cooling degree days, and fuel prices. Data represent residential energy used from October 2015 through September 2016. 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[1/]

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

[1/] Data are derived from the 2009 RECS. Percentages may not add to 100 percent due to rounding. See also Table A-4, Appendix A.
[2/] 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.[5] 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 2016, average home heating consumption for all households was 31.6 MMBtus, average expenditures were $426, and mean individual home heating burden was 2.2 percent.

Low income households had average home heating consumption of 28.2 MMBtus (about 11 percent less than the average for all households) and average home heating expenditures of $394 (about 8 percent less than the average for all households). The mean individual home heating burden for low income households was 5.0 percent, over twice as much as the average home heating burden for all households and more than eight times the average home heating burden for non-low income households.

[5] Findings from the 2009 RECS, Energy Information Administration, U.S. Department of Energy.

Average home heating consumption for LIHEAP recipient households was 37.0 MMBtus (about 17 percent higher than the average for all households), and average home heating expenditures were $499 (about 17 percent higher than the average for all households). Mean individual home heating burden for LIHEAP households was 5.8 percent, about 16 percent higher (or 0.8 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 31 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 2016[1/]

Main heating fuel	Fuel consumpton (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	31.6	$426	2.2%	0.7%	0.5%
Natural gas	45.1	$451	2.2%	0.7%	0.6%
Electricity	9.3	$291	2.0%	0.6%	0.4%
Fuel oil	62.6	$921	3.8%	1.4%	1.2%
Kerosene	29.9	$497	3.9%	1.9%	0.6%
LPG[6/]	45.2	$906	3.8%	1.7%	1.1%

Table 4b. Home heating: Average annual household consumption, expenditures, and burden by non-low income households, by fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumpton (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	33.5	$444	0.6%	0.5%	0.4%
Natural gas	45.7	$454	0.6%	0.5%	0.4%
Electricity	9.7	$300	0.5%	0.4%	0.3%
Fuel oil	66.5	$979	1.2%	1.0%	0.9%
Kerosene	30.7	$524	0.9%	0.8%	0.5%
LPG[6/]	47.6	$953	1.5%	1.2%	0.9%

Table 4c. Home heating: Average annual household consumption, expenditures, and burden by low income households, by fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumpton (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	28.2	$394	5.0%	1.7%	2.0%
Natural gas	43.6	$445	5.4%	2.0%	2.3%
Electricity	8.6	$277	4.3%	1.4%	1.4%
Fuel oil	55.4	$815	8.7%	3.9%	4.2%
Kerosene	29.6	$486	5.1%	3.0%	2.5%
LPG[6/]	40.5	$810	8.5%	3.9%	4.2%

Table 4d. Home heating: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by fuel type, United States, FY 2016[1/]

Main heating fuel	Fuel consumpton (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All fuels	37.0	$499	5.8%	2.2%	3.0%
Natural gas	50.3	$517	6.5%	2.1%	3.1%
Electricity	9.7	$310	4.4%	1.9%	1.9%
Fuel oil	59.1	$880	7.1%	3.7%	5.3%
Kerosene	37.5*	$621*	4.1%*	3.0%*	3.7%*
LPG[6/]	42.1	$862	8.3%	5.3%	5.2%

[1/] Data are derived from the 2009 RECS, adjusted to reflect FY 2016 heating degree days and fuel prices. Data represent home heating energy used from October 2015 through September 2016. See also Tables A-5, A-6a – A-6c, Appendix A.
[2/] 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.
[3/] Mean individual burden is calculated by taking the mean, or average, of individual heating energy burdens, as calculated from FY 2016 adjusted RECS data. See Appendix A for information on energy burden calculation.
[4/] Median individual burden is calculated by taking the median of individual heating energy burdens, as calculated from FY 2016 adjusted RECS data
[5/] 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 2016; and (3) dividing the adjusted figures by the average income for each group of households from the 2016 CPS ASEC
[6/] 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[1/]

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

[1/] Data are derived from the 2009 RECS. See also Table A-7, Appendix A.
[2/] 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).
[3/] 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 2016, average home cooling consumption for all households that cooled was 7.4 MMBtus, average expenditures were $285, and mean individual home cooling burden was 1.2 percent.

For low income households that cooled, average home cooling energy consumption was 5.4 MMBtus (about 27 percent less than the average for all households) and average home cooling expenditures were $204 (about 28 percent less than the average for all households). The mean individual home cooling burden for low income households was 2.6 percent, more than twice the average home cooling burden of all households and six times that of non-low income households.

For households that cooled, average home cooling consumption for LIHEAP recipient households was 4.4 MMBtus (about 41 percent less than all households and 19 percent less than the average low income household), and average home cooling expenditures were $164 (about 42 percent less than all households and 20 percent less than the average low income household). Mean individual home cooling burden for LIHEAP recipient households was 1.7 percent, about 42 percent higher than the average for all households.

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 2016[1/]

Household group	Fuel consumption (MMBtus)[2/]	Fuel expenditures	Mean individual burden[3/]	Median individual burden[4/]	Mean group burden[5/]
All households	7.4	$285	1.2%	0.3%	0.4%
Non-low income households	8.5	$326	0.4%	0.3%	0.3%
Low income households	5.4	$204	2.6%	0.7%	1.1%
LIHEAP recipient households	4.4	$164	1.7%	0.5%	1.0%

[1/] Data are derived from the 2009 RECS, adjusted to reflect FY 2016 cooling degree days and fuel prices. Data represent residential energy used from October 2015 through September 2016. See also Table A-7, Appendix A.
[2/] 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.
[3/] Mean individual burden is calculated by taking the mean, or average, of individual cooling energy burdens, as calculated from FY 2016 adjusted RECS data. See Appendix A for information on energy burden calculation.
[4/] Median individual burden is calculated by taking the median of individual cooling energy burdens, as calculated from FY 2016 adjusted RECS data.
[5/] 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 2016; and (3) dividing the adjusted figures by the average income for each group of households from the 2016 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 2016. 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 years. The most recent RECS was conducted in 2015; however, consumption and expenditure data for the 2015 RECS will not be published until January 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.[6]

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

[6] 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).

[7] 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 2016.

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:[8]

- The 2009 RECS data for calendar year 2009 were updated to FY 2016 (October 1, 2015 to September 30, 2016), using procedures that adjust the 2009 data to reflect the weather and fuel prices for FY 2016. These procedures are comparable to those used for the FY 1986 - FY 2015 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 2016 CPS ASEC

[8] 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.[9]

- 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 2016 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 2016 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.[10]

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).

[9] Note that household-level energy and income data from RECS are used to calculate mean and median individual energy burden.
[10] 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.[11] 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.[12] 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.[13] 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

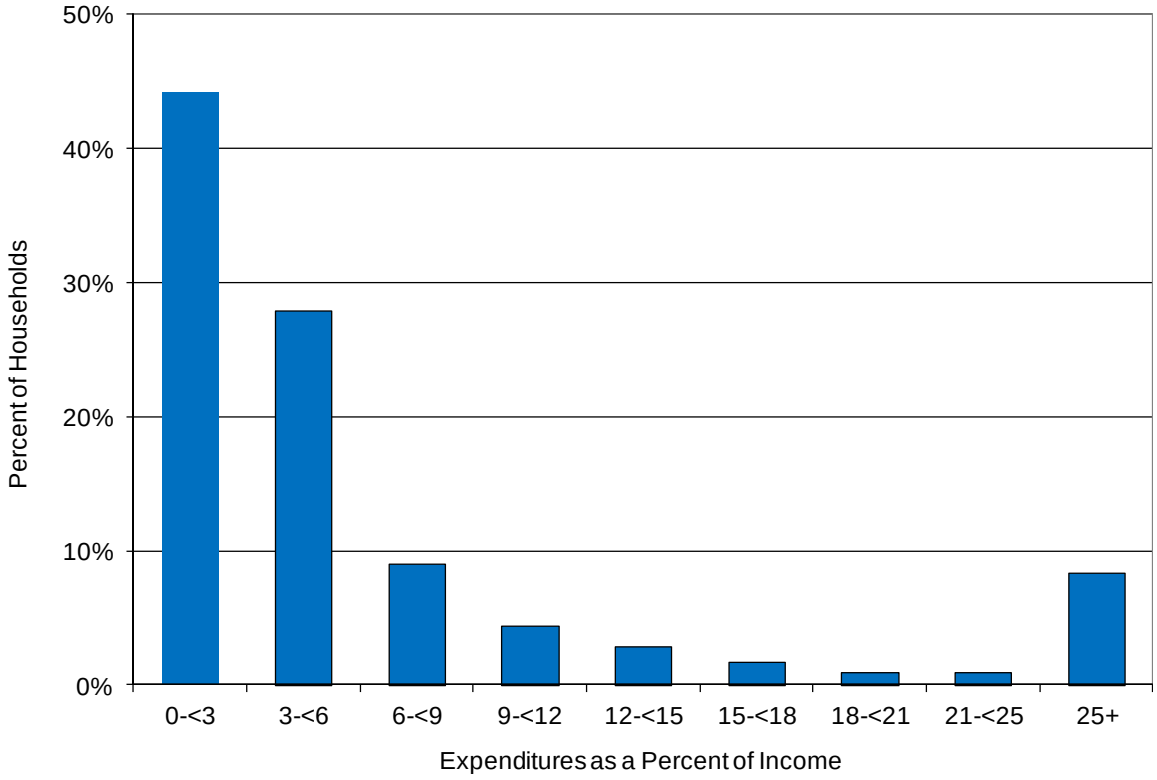
[11] The mean is the sum of all values divided by the number of values. The mean is also referred to as the average.

[12] 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.

[13] 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.[14]

[14] 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

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 2016. The following equation was applied to each household in the microsimulation data file.

FY 2016 Projected Btus = (2009 estimated heat use * HDD change) +
(2009 estimated cooling use * CDD change) +
(2009 estimated water heat use + 2009 estimated appliance use)

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

Preliminary Expenditures = 2009 Expenditures *
(FY 2016 Projected Usage/2009 Actual Usage)

Final Expenditures = Preliminary Expenditures * 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 2016. For example, electricity prices increased by about 9.2 percent from 2009 to FY 2016.

Table A-1. National price factors for FY 2016

Fuel	Price Factors for FY 2016 Projections
Electricity	1.0927
Natural gas	0.8252
Fuel oil / kerosene	0.8147
Liquefied petroleum gas (LPG)	0.9016

Expenditure data were adjusted using national price factors for FY 2016. 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.

[15] 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*, December 2016, and electricity consumption data is from the *Electric Power Monthly*, November 2016. Natural gas price and consumption data used for calculating price factors are from the *Monthly Energy Review*, December 2016. Fuel oil/kerosene price data for calculating prices 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*, December 2016.

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 2016[1/]

Census Region	All Fuels[2/] (MMBtus)[3/]	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	85.3	102.5	59.7	108.8	61.4	103.4
US - Non-low income households	91.4	106.9	65.1	116.2	67.7	110.3
US - Low income households[4/]	73.9	93.0	51.1	95.1	58.9	89.3
US - LIHEAP recipient households[5/]	85.4	102.0	54.4	102.7	77.4*	90.9
Northeast - All households	100.2	108.8	49.7	110.3	65.1	107.7
Northeast - Non-low income households	107.2	115.0	54.9	118.6	71.5	116.5
Northeast - Low income households	87.9	98.2	41.3	94.3	62.4	84.1
Northeast - LIHEAP recipient households	91.8	96.9	44.4	103.7	80.1*	87.3*
Midwest - All households	104.3	115.0	64.8	99.1	NC	116.3
Midwest - Non-low income households	110.2	119.5	74.3	101.1	NC	119.9
Midwest - Low income households	93.4	106.5	51.1	97.5	NC	108.2
Midwest - LIHEAP recipient households	98.0	109.7	57.0	87.5*	NC	95.3
South - All households	74.1	98.5	61.0	102.0	55.9	89.2
South - Non-low income households	80.5	105.5	65.4	104.4	64.8*	98.5
South - Low income households	62.5	82.9	53.4	97.2	53.6*	73.3
South - LIHEAP recipient households	72.8	104.8	58.2	107.9*	61.0*	96.5*
West - All households	71.9	85.0	55.3	108.2	50.7*	99.3
West - Non-low income households	77.9	88.3	61.3	107.4	50.7*	104.3
West - Low income households	60.0	75.3	47.2	110.6*	50.8*	89.5
West - LIHEAP recipient households	65.3	88.3	44.7	107.9*	NC	58.0*

[1] Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2016 for heating and cooling degree days.
[2] Weighted average of natural gas, electricity, fuel oil, kerosene, and liquefied petroleum gas consumption. RECS consumption data are not collected for other fuels.
[3] 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.
[4] Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.
[5] Includes verified LIHEAP recipient households from the 2009 RECS.
NC = No cases in the 2009 RECS household sample.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$2,004	2.5%	$1,979	2.5%	$1,881	2.4%	$2,704	3.4%	$1,736	2.2%	$2,768	3.5%
US - Non-low income households	$2,163	2.1%	$2,102	2.0%	$2,063	2.0%	$2,936	2.8%	$2,031	1.9%	$2,940	2.8%
US - Low income households[3/]	$1,709	8.9%	$1,713	8.9%	$1,588	8.3%	$2,278	11.8%	$1,618	8.4%	$2,412	12.5%
US - LIHEAP recipient households[4/]	$1,854	11.1%	$1,812	10.8%	$1,603	9.6%	$2,441	14.6%	$2,272*	13.6%*	$2,529	15.1%
Northeast - All households	$2,425	2.8%	$2,340	2.7%	$1,850	2.1%	$2,757	3.2%	$1,837	2.1%	$3,382	3.9%
Northeast - Non-low income households	$2,638	2.2%	$2,523	2.1%	$2,030	1.7%	$3,004	2.5%	$2,128	1.8%	$3,649	3.1%
Northeast - Low income households	$2,048	9.5%	$2,029	9.4%	$1,558	7.2%	$2,279	10.5%	$1,710	7.9%	$2,667	12.3%
Northeast - LIHEAP recipient households	$2,093	11.8%	$1,980	11.2%	$1,543	8.7%	$2,428	13.7%	$2,324*	13.1%*	$2,651*	14.9%*
Midwest - All households	$1,891	2.5%	$1,853	2.4%	$1,599	2.1%	$2,232	2.9%	NC	NC	$2,824	3.7%
Midwest - Non-low income households	$2,002	2.0%	$1,947	2.0%	$1,758	1.8%	$2,324	2.3%	NC	NC	$2,917	2.9%
Midwest - Low income households	$1,688	8.7%	$1,671	8.6%	$1,369	7.0%	$2,158	11.1%	NC	NC	$2,610	13.4%
Midwest - LIHEAP recipient households	$1,762	11.0%	$1,666	10.4%	$1,474	9.2%	$2,170*	13.5%*	NC	NC	$2,454	15.3%
South - All households	$2,116	2.9%	$2,222	3.0%	$2,050	2.8%	$2,608	3.6%	$1,586	2.2%	$2,563	3.5%
South - Non-low income households	$2,299	2.4%	$2,411	2.5%	$2,219	2.3%	$2,726	2.8%	$1,828*	1.9%*	$2,747	2.8%
South - Low income households	$1,780	10.2%	$1,797	10.3%	$1,756	10.0%	$2,361	13.5%	$1,525*	8.7%*	$2,246	12.8%
South - LIHEAP recipient households	$1,914	13.0%	$2,105	14.3%	$1,772	12.0%	$2,980*	20.3%*	$1,960*	13.3%*	$3,184*	21.7%*
West - All households	$1,579	1.9%	$1,620	1.9%	$1,495	1.8%	$2,556	3.0%	$1,449*	1.7%*	$2,543	3.0%
West - Non-low income households	$1,718	1.6%	$1,720	1.6%	$1,684	1.5%	$2,522	2.3%	$1,840*	1.7%*	$2,725	2.5%
West - Low income households	$1,300	6.5%	$1,320	6.6%	$1,243	6.2%	$2,653*	13.3%*	$1,031*	5.2%*	$2,186	10.9%
West - LIHEAP recipient households	$1,228	6.7%	$1,329	7.2%	$1,134	6.1%	$1,949*	10.6%*	NC	NC	$1,424*	7.7%*

[1/] 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 2016. 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.

[2/] Represents the percent of household's income used for residential energy expenditures. National and regional mean incomes are calculated from the 2016 CPS ASEC, which reports income for calendar year 2015. 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.

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

[4/] 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.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$2,004	7.9%	$1,979	7.1%	$1,881	8.8%	$2,704	9.1%	$1,736	11.8%	$2,768	9.5%
US - Non-low income households	$2,163	3.0%	$2,102	2.7%	$2,063	3.1%	$2,936	3.4%	$2,031	3.9%	$2,940	4.4%
US - Low income households[3/]	$1,709	17.1%	$1,713	16.3%	$1,588	18.0%	$2,278	19.5%	$1,618	15.0%	$2,412	20.0%
US - LIHEAP recipient households[4/]	$1,854	17.2%	$1,812	16.7%	$1,603	17.1%	$2,441	17.1%	$2,272*	13.9%*	$2,529	23.5%
Northeast - All households	$2,425	8.4%	$2,340	7.7%	$1,850	9.5%	$2,757	9.2%	$1,837	14.0%	$3,382	8.3%
Northeast - Non-low income households	$2,638	3.1%	$2,523	2.9%	$2,030	2.6%	$3,004	3.4%	$2,128	3.9%	$3,649	4.3%
Northeast - Low income households	$2,048	17.9%	$2,029	15.8%	$1,558	20.8%	$2,279	20.4%	$1,710	18.4%	$2,667	19.3%
Northeast - LIHEAP recipient households	$2,093	15.9%	$1,980	14.5%	$1,543	17.1%	$2,428	18.0%	$2,324*	15.0%*	$2,651*	17.4%*
Midwest - All households	$1,891	7.9%	$1,853	7.6%	$1,599	8.8%	$2,232	11.0%	NC	NC	$2,824	8.5%
Midwest - Non-low income households	$2,002	2.9%	$1,947	2.8%	$1,758	2.6%	$2,324	3.8%	NC	NC	$2,917	4.0%
Midwest - Low income households	$1,688	17.1%	$1,671	16.8%	$1,369	17.6%	$2,158	16.9%	NC	NC	$2,610	18.9%
Midwest - LIHEAP recipient households	$1,762	19.7%	$1,666	19.4%	$1,474	19.1%	$2,170*	13.8%*	NC	NC	$2,454	20.6%
South - All households	$2,116	9.2%	$2,222	8.5%	$2,050	9.6%	$2,608	5.5%	$1,586	8.9%	$2,563	10.7%
South - Non-low income households	$2,299	3.4%	$2,411	3.2%	$2,219	3.5%	$2,726	3.1%	$1,828*	4.9%*	$2,747	5.1%
South - Low income households	$1,780	19.8%	$1,797	20.4%	$1,756	20.2%	$2,361	10.7%	$1,525*	9.9%*	$2,246	20.4%
South - LIHEAP recipient households	$1,914	19.4%	$2,105	19.4%	$1,772	18.6%	$2,980*	11.3%*	$1,960*	7.8%*	$3,184*	54.8%*
West - All households	$1,579	5.3%	$1,620	4.4%	$1,495	5.9%	$2,556	13.2%	$1,449*	3.9%*	$2,543	10.2%
West - Non-low income households	$1,718	2.2%	$1,720	2.1%	$1,684	2.3%	$2,522	3.7%	$1,840*	1.8%*	$2,725	4.1%
West - Low income households	$1,300	11.5%	$1,320	11.3%	$1,243	10.8%	$2,653*	40.0%*	$1,031*	6.1%*	$2,186	22.2%
West - LIHEAP recipient households	$1,228	9.4%	$1,329	10.5%	$1,134	8.7%	$1,949*	7.7%*	NC	NC	$1,424*	16.7%*

[1/] 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 2016. 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.

[2/] Represents the percent of household income used for residential energy expenditures. For individual households, FY 2016 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2015 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2016 residential energy burden for each household is computed as estimated FY 2015 residential energy expenditures divided by estimated FY 2016 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.

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

[4/] 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.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$2,004	3.6%	$1,979	3.2%	$1,881	3.8%	$2,704	4.2%	$1,736	7.7%	$2,768	5.2%
US - Non-low income households	$2,163	2.6%	$2,102	2.4%	$2,063	2.7%	$2,936	3.1%	$2,031	3.2%	$2,940	4.1%
US - Low income households[3/]	$1,709	8.1%	$1,713	7.8%	$1,588	8.0%	$2,278	9.9%	$1,618	8.2%	$2,412	11.8%
US - LIHEAP recipient households[4/]	$1,854	8.4%	$1,812	7.6%	$1,603	8.2%	$2,441	9.5%	$2,272*	10.4%*	$2,529	14.4%
Northeast - All households	$2,425	3.8%	$2,340	3.7%	$1,850	3.4%	$2,757	4.1%	$1,837	7.9%	$3,382	4.5%
Northeast - Non-low income households	$2,638	2.7%	$2,523	2.5%	$2,030	2.2%	$3,004	3.1%	$2,128	3.1%	$3,649	3.8%
Northeast - Low income households	$2,048	9.0%	$2,029	8.7%	$1,558	7.6%	$2,279	10.5%	$1,710	9.9%	$2,667	8.8%
Northeast - LIHEAP recipient households	$2,093	8.4%	$1,980	7.5%	$1,543	5.8%	$2,428	10.5%	$2,324*	10.8%*	$2,651*	9.1%*
Midwest - All households	$1,891	3.5%	$1,853	3.4%	$1,599	3.4%	$2,232	6.4%	NC	NC	$2,824	4.5%
Midwest - Non-low income households	$2,002	2.5%	$1,947	2.5%	$1,758	2.3%	$2,324	3.8%	NC	NC	$2,917	3.6%
Midwest - Low income households	$1,688	8.0%	$1,671	7.7%	$1,369	6.6%	$2,158	9.5%	NC	NC	$2,610	13.1%
Midwest - LIHEAP recipient households	$1,762	8.6%	$1,666	7.6%	$1,474	8.2%	$2,170*	5.8%*	NC	NC	$2,454	14.4%
South - All households	$2,116	4.2%	$2,222	3.8%	$2,050	4.3%	$2,608	3.5%	$1,586	7.5%	$2,563	6.2%
South - Non-low income households	$2,299	3.0%	$2,411	2.9%	$2,219	3.1%	$2,726	2.9%	$1,828*	4.3%*	$2,747	5.0%
South - Low income households	$1,780	9.4%	$1,797	9.9%	$1,756	9.0%	$2,361	6.3%	$1,525*	7.9%*	$2,246	12.3%
South - LIHEAP recipient households	$1,914	10.0%	$2,105	11.4%	$1,772	8.7%	$2,980*	5.5%*	$1,960*	7.8%*	$3,184*	14.8%*
West - All households	$1,579	2.4%	$1,620	2.2%	$1,495	2.8%	$2,556	4.8%	$1,449*	1.9%*	$2,543	5.9%
West - Non-low income households	$1,718	1.9%	$1,720	1.8%	$1,684	1.9%	$2,522	3.2%	$1,840*	1.9%*	$2,725	3.7%
West - Low income households	$1,300	5.3%	$1,320	5.3%	$1,243	5.4%	$2,653*	42.4%*	$1,031*	6.0%*	$2,186	8.3%
West - LIHEAP recipient households	$1,228	6.2%	$1,329	5.8%	$1,134	5.4%	$1,949*	7.7%*	NC	NC	$1,424*	8.9%*

[1/] 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 2016. 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.

[2/] Represents the percent of household income used for residential energy expenditures. For individual households, FY 2016 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2016 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2015 residential energy burden for each household is computed as estimated FY 2015 residential energy expenditures divided by estimated FY 2016 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.

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

[4/] 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.

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[1/]

Census Region	Natural Gas[2/]	Electricity	Fuel Oil	Kerosene	LPG	Other[3/]
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[4/]	44.4%	36.7%	6.1%	0.9%	4.6%	3.0%
US - LIHEAP recipient households[5/]	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%

[1/] 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.
[2/] The sum of percentages across fuel types may not equal 100%, due to rounding.
[3/] This category includes households using wood, coal, and other minor fuels as a main heating source and households reporting no main fuel.
[4/] Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.
[5/] Includes verified LIHEAP recipient households from the 2009 RECS.

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 2016[1/]

Census Region	All Fuels[2/] (MMBtus)[3/]	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	31.6	45.1	9.3	62.6	29.9	45.2
US - Non-low income households	33.5	45.7	9.7	66.5	30.7	47.6
US - Low income households[4/]	28.2	43.6	8.6	55.4	29.6	40.5
US - LIHEAP recipient households[5/]	37.0	50.3	9.7	59.1	37.5*	42.1
Northeast - All households	50.3	54.4	12.2	64.5	35.5	49.4
Northeast - Non-low income households	52.4	55.5	13.3	68.6	37.3	51.2
Northeast - Low income households	46.6	52.6	10.6	56.6	34.7	44.7
Northeast - LIHEAP recipient households	48.7	51.1	9.6	61.3	42.3*	45.2*
Midwest - All households	47.6	56.8	13.8	54.3	NC	56.6
Midwest - Non-low income households	49.5	58.0	15.3	54.3	NC	57.3
Midwest - Low income households	44.1	54.3	11.5	54.3	NC	54.9
Midwest - LIHEAP recipient households	46.8	58.1	12.4	43.8*	NC	43.9
South - All households	17.1	32.2	8.1	53.2	19.8	30.0
South - Non-low income households	18.6	33.6	8.4	56.4	18.7*	33.6
South - Low income households	14.5	28.8	7.6	46.5	20.1*	23.9
South - LIHEAP recipient households	18.2	36.3	9.2	50.4*	8.4*	34.7*
West - All households	23.9	34.9	9.3	51.9	22.9*	47.4
West - Non-low income households	26.6	36.0	9.6	53.2	14.6*	48.3
West - Low income households	18.5	31.8	9.0	48.5*	31.6*	45.7
West - LIHEAP recipient households	22.9	39.8	8.4	58.6*	NC	27.2*

[1/] Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2015 for heating degree days.
[2/] Weighted average of natural gas, electricity, fuel oil, kerosene, and liquefied petroleum gas space heating consumption. Consumption data are not collected for other fuels.
[3/] 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.
[4/] Households with income at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.
[5/] 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.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$426	0.5%	$451	0.6%	$291	0.4%	$921	1.2%	$497	0.6%	$906	1.1%
US - Non-low income households	$444	0.4%	$454	0.4%	$300	0.3%	$979	0.9%	$524	0.5%	$953	0.9%
US - Low income households[3/]	$394	2.0%	$445	2.3%	$277	1.4%	$815	4.2%	$486	2.5%	$810	4.2%
US - LIHEAP recipient households[4/]	$499	3.0%	$517	3.1%	$310	1.9%	$880	5.3%	$621*	3.7%*	$862	5.2%
Northeast - All households	$724	0.8%	$664	0.8%	$496	0.6%	$949	1.1%	$581	0.7%	$1,189	1.4%
Northeast - Non-low income households	$756	0.6%	$680	0.6%	$516	0.4%	$1,007	0.8%	$646	0.5%	$1,211	1.0%
Northeast - Low income households	$666	3.1%	$638	2.9%	$463	2.1%	$837	3.9%	$552	2.6%	$1,131	5.2%
Northeast - LIHEAP recipient households	$690	3.9%	$610	3.4%	$394	2.2%	$907	5.1%	$700*	3.9%*	$1,103*	6.2%*
Midwest - All households	$515	0.7%	$502	0.7%	$373	0.5%	$758	1.0%	NC	NC	$1,022	1.3%
Midwest - Non-low income households	$529	0.5%	$507	0.5%	$393	0.4%	$787	0.8%	NC	NC	$1,042	1.1%
Midwest - Low income households	$490	2.5%	$491	2.5%	$344	1.8%	$735	3.8%	NC	NC	$979	5.0%
Midwest - LIHEAP recipient households	$518	3.2%	$530	3.3%	$369	2.3%	$601*	3.7%*	NC	NC	$802	5.0%
South - All households	$307	0.4%	$356	0.5%	$260	0.4%	$819	1.1%	$350	0.5%	$666	0.9%
South - Non-low income households	$322	0.3%	$369	0.4%	$266	0.3%	$869	0.9%	$300*	0.3%*	$732	0.8%
South - Low income households	$279	1.6%	$325	1.9%	$248	1.4%	$713	4.1%	$363*	2.1%*	$552	3.2%
South - LIHEAP recipient households	$333	2.3%	$394	2.7%	$289	2.0%	$871*	5.9%*	$147*	1.0%*	$763*	5.2%*
West - All households	$287	0.3%	$309	0.4%	$275	0.3%	$770	0.9%	$369*	0.4%*	$908	1.1%
West - Non-low income households	$306	0.3%	$319	0.3%	$284	0.3%	$776	0.7%	$224*	0.2%*	$945	0.9%
West - Low income households	$249	1.2%	$280	1.4%	$264	1.3%	$753*	3.8%*	$523*	2.6%*	$836	4.2%
West - LIHEAP recipient households	$275	1.5%	$330	1.8%	$256	1.4%	$808*	4.4%*	NC	NC	$520*	2.8%*

[1/] 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 2016. 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.

[2/] Represents the percent of household income used for home heating energy expenditures. National and regional mean incomes are calculated from the 2016 CPS ASEC, which reports income for calendar year 2015. 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.

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

[4/] 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.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$426	2.2%	$451	2.2%	$291	2.0%	$921	3.8%	$497	3.9%	$906	3.8%
US - Non-low income households	$444	0.6%	$454	0.6%	$300	0.5%	$979	1.2%	$524	0.9%	$953	1.5%
US - Low income households[3/]	$394	5.0%	$445	5.4%	$277	4.3%	$815	8.7%	$486	5.1%	$810	8.5%
US - LIHEAP recipient households[4/]	$499	5.8%	$517	6.5%	$310	4.4%	$880	7.1%	$621*	4.1%*	$862	8.3%
Northeast - All households	$724	3.3%	$664	2.9%	$496	3.5%	$949	3.9%	$581	5.0%	$1,189	4.1%
Northeast - Non-low income households	$756	0.9%	$680	0.8%	$516	0.7%	$1,007	1.2%	$646	1.1%	$1,211	1.5%
Northeast - Low income households	$666	7.4%	$638	6.5%	$463	8.2%	$837	9.1%	$552	6.7%	$1,131	11.2%
Northeast - LIHEAP recipient households	$690	6.6%	$610	6.6%	$394	4.5%	$907	7.7%	$700*	4.7%*	$1,103*	6.9%*
Midwest - All households	$515	2.8%	$502	2.7%	$373	3.3%	$758	4.1%	NC	NC	$1,022	3.6%
Midwest - Non-low income households	$529	0.8%	$507	0.8%	$393	0.6%	$787	1.4%	NC	NC	$1,042	1.5%
Midwest - Low income households	$490	6.5%	$491	6.5%	$344	7.1%	$735	6.4%	NC	NC	$979	8.4%
Midwest - LIHEAP recipient households	$518	7.3%	$530	7.7%	$369	7.2%	$601*	4.2%*	NC	NC	$802	8.5%
South - All households	$307	1.8%	$356	1.9%	$260	1.7%	$819	1.9%	$350	2.1%	$666	3.1%
South - Non-low income households	$322	0.5%	$369	0.5%	$266	0.4%	$869	1.0%	$300*	0.8%*	$732	1.4%
South - Low income households	$279	4.1%	$325	4.9%	$248	3.9%	$713	3.7%	$363*	2.5%*	$552	6.1%
South - LIHEAP recipient households	$333	4.6%	$394	6.0%	$289	4.2%	$871*	3.7%*	$147*	0.6%*	$763*	11.7%*
West - All households	$287	1.3%	$309	1.1%	$275	1.4%	$770	8.6%	$369*	1.5%*	$908	5.3%
West - Non-low income households	$306	0.4%	$319	0.4%	$284	0.4%	$776	1.2%	$224*	0.3%*	$945	1.5%
West - Low income households	$249	2.9%	$280	2.9%	$264	2.8%	$753*	29.5%*	$523*	2.9%*	$836	12.9%
West - LIHEAP recipient households	$275	2.2%	$330	2.5%	$256	2.1%	$808*	3.2%*	NC	NC	$520*	6.0%*

[1/] 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 2016. 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.

[2/] Represents the percent of household income used for home heating energy expenditures. For individual households, FY 2016 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2016 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2016 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.

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

[4/] 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.

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 2016

Census Region	All Fuels[1/]	All Fuels[2/]	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	$426	0.7%	$451	0.7%	$291	0.6%	$921	1.4%	$497	1.9%	$906	1.7%
US - Non-low income households	$444	0.5%	$454	0.5%	$300	0.4%	$979	1.0%	$524	0.8%	$953	1.2%
US - Low income households[3/]	$394	1.7%	$445	2.0%	$277	1.4%	$815	3.9%	$486	3.0%	$810	3.9%
US - LIHEAP recipient households[4/]	$499	2.2%	$517	2.1%	$310	1.9%	$880	3.7%	$621*	3.0%*	$862	5.3%
Northeast - All households	$724	1.1%	$664	1.0%	$496	1.0%	$949	1.4%	$581	2.3%	$1,189	1.5%
Northeast - Non-low income households	$756	0.8%	$680	0.7%	$516	0.6%	$1,007	1.0%	$646	0.9%	$1,211	1.1%
Northeast - Low income households	$666	3.0%	$638	2.6%	$463	2.4%	$837	4.2%	$552	3.3%	$1,131	3.8%
Northeast - LIHEAP recipient households	$690	3.0%	$610	2.0%	$394	1.8%	$907	4.6%	$700*	3.0%*	$1,103*	5.1%*
Midwest - All households	$515	0.9%	$502	0.9%	$373	0.8%	$758	2.4%	NC	NC	$1,022	1.9%
Midwest - Non-low income households	$529	0.6%	$507	0.6%	$393	0.5%	$787	1.4%	NC	NC	$1,042	1.3%
Midwest - Low income households	$490	2.3%	$491	2.3%	$344	1.9%	$735	3.5%	NC	NC	$979	5.3%
Midwest - LIHEAP recipient households	$518	2.6%	$530	2.6%	$369	2.2%	$601*	2.2%*	NC	NC	$802	5.3%
South - All households	$307	0.6%	$356	0.6%	$260	0.5%	$819	1.2%	$350	1.0%	$666	1.6%
South - Non-low income households	$322	0.4%	$369	0.4%	$266	0.3%	$869	0.9%	$300*	0.8%*	$732	1.2%
South - Low income households	$279	1.4%	$325	1.7%	$248	1.3%	$713	2.4%	$363*	1.9%*	$552	3.0%
South - LIHEAP recipient households	$333	1.8%	$394	2.1%	$289	1.8%	$871*	1.7%*	$147*	0.6%*	$763*	7.1%*
West - All households	$287	0.4%	$309	0.4%	$275	0.5%	$770	1.2%	$369*	0.4%*	$908	1.7%
West - Non-low income households	$306	0.3%	$319	0.3%	$284	0.3%	$776	1.0%	$224*	0.4%*	$945	1.2%
West - Low income households	$249	0.9%	$280	1.0%	$264	1.1%	$753*	18.2%*	$523*	4.1%*	$836	3.5%
West - LIHEAP recipient households	$275	1.5%	$330	1.7%	$256	1.5%	$808*	3.2%*	NC	NC	$520*	3.3%*

[1/] 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 2016. 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.

[2/] Represents the percent of household income used for home heating energy expenditures. For individual households, FY 2016 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2016 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2016 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.

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

[4/] 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.

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 2016

Census Region	Percent that cool[1/]	Consumption[2/] *(in MMBtus)*	Expenditures[2/]	Mean group burden[3/]	Mean individual burden[3/]	Median individual burden[3/]
US - All households	92.5%	7.4	$285	0.4%	1.2%	0.3%
US - Non-low income households	94.3%	8.5	$326	0.3%	0.4%	0.3%
US - Low income households[4/]	89.1%	5.4	$204	1.1%	2.6%	0.7%
US - LIHEAP recipient households[5/]	88.6%	4.4	$164	1.0%	1.7%	0.5%
Northeast - All households	89.0%	3.3	$172	0.2%	0.6%	0.2%
Northeast - Non-low income households	93.4%	3.7	$193	0.2%	0.2%	0.1%
Northeast - Low income households	81.1%	2.5	$129	0.6%	1.4%	0.4%
Northeast - LIHEAP recipient	79.9%	2.9	$144	0.8%	1.2%	0.4%
Midwest - All households	95.0%	4.4	$148	0.2%	0.6%	0.2%
Midwest - Non-low income households	97.1%	5.1	$168	0.2%	0.2%	0.2%
Midwest - Low income households	91.3%	3.2	$109	0.6%	1.3%	0.4%
Midwest - LIHEAP recipient households	91.2%	2.8	$96	0.6%	1.2%	0.3%
South - All households	98.7%	12.5	$464	0.6%	2.1%	0.7%
South - Non-low income households	99.4%	14.4	$539	0.6%	0.8%	0.6%
South - Low income households	97.3%	8.9	$323	1.8%	4.5%	1.5%
South - LIHEAP recipient households	99.5%	7.7	$268	1.8%	3.1%	1.0%
West - All households	82.2%	4.6	$187	0.2%	0.6%	0.1%
West - Non-low income households	83.7%	5.2	$213	0.2%	0.3%	0.1%
West - Low income households	79.3%	3.3	$131	0.7%	1.2%	0.3%
West - LIHEAP recipient households	81.8%	3.0	$107	0.6%	0.8%	0.3%

[1/] 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.)
[2/] 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 2016. Expenditures represent billed costs for electricity used for home cooling.
[3/] Represents the percent of household income used for home cooling energy expenditures.
[4/] Households with annual incomes at or below the maximum in section 2605(b)(2)(B) of Public Law 97-35.
[5/] 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 recipiency targeting performance statistics.

State-level estimates of the number of income eligible households for FY 2016 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.[16] 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 three-year average of the 2013-2015 single-year ("3-year average") ACS Public Use Microdata Sample (PUMS) data are 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.[17]

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,[18] derived from the 3-year average of the 2013-2015 ACS, using the federal maximum income standard and the FY 2016 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 3-year average of the 2013-2015 ACS, using the using the federal maximum income standard and the FY 2016 state income standards, respectively.

[16] For an explanation, and to better understand the differences between the ACS and CPS ASEC, please visit "Guidance about Income Sources" at http://www.census.gov/hhes/www/income/method/guidance/index.html.

[17] The Census Bureau recommends multi-year data estimates from the ACS instead of estimates from the one-year ACS when precision of the estimates are of primary importance. (See http://www.census.gov/acs/www/guidance_for_data_users/estimates/.) 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 2016 Notebook*, the methodology chosen to develop state-level estimates of the eligible population was the three-year average of the 2013-2015 1-year ACS PUMS files was chosen to maintain consistency with prior *Notebooks* and because the 5-year (2011-2015) ACS PUMS file would have a lag affect from earlier years.

[18] 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*.

Table B-1. State-level estimates of the number of LIHEAP income eligible households using the federal maximum LIHEAP income standard by vulnerability category[1/] [2/] [3/]

(Three-Year Average of the 2013-2015 ACS)

State	Total number of LIHEAP eligible households[4/]	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[5/]	LIHEAP eligible households with no vulnerable members
Alabama	600,044	227,106	102,622	271,918	165,393
Alaska	63,425	19,576	14,982	21,993	21,272
Arizona	653,338	239,911	135,849	221,556	206,794
Arkansas	343,462	127,589	67,445	160,339	85,616
California	3,774,978	1,392,942	792,688	1,281,523	1,222,061
Colorado	583,409	206,926	107,755	188,455	203,571
Connecticut	434,957	185,256	64,228	155,202	131,516
Delaware	101,355	42,398	17,208	37,405	29,019
District of Columbia	87,721	30,191	12,612	33,798	31,429
Florida	2,064,399	910,404	323,767	733,471	611,065
Georgia	1,083,988	369,351	220,865	400,075	345,467
Hawaii	113,015	49,414	21,846	38,485	32,869
Idaho	154,560	52,945	31,452	57,589	47,010
Illinois	1,471,574	576,957	254,480	514,331	475,675
Indiana	733,638	260,446	137,620	294,421	219,932
Iowa	356,306	142,352	58,312	130,412	108,070
Kansas	322,302	117,042	64,452	116,780	100,132
Kentucky	560,478	210,775	93,520	279,733	136,814
Louisiana	599,077	223,448	106,417	248,351	177,124
Maine	175,531	79,824	20,875	83,331	40,065
Maryland	661,791	265,368	117,621	225,464	208,518
Massachusetts	859,731	386,425	115,216	355,917	234,486
Michigan	1,180,137	438,775	200,191	501,057	334,041
Minnesota	623,763	250,847	108,559	221,346	184,129
Mississippi	367,054	137,382	70,194	168,670	98,413
Missouri	711,241	274,145	118,201	301,395	198,292
Montana	121,517	48,617	18,448	45,402	37,300
Nebraska	207,659	77,474	40,794	71,389	65,613
Nevada	263,360	91,595	51,783	92,698	85,692
New Hampshire	150,662	65,686	20,109	61,749	41,478
New Jersey	1,058,924	457,053	173,594	357,844	325,467
New Mexico	226,427	84,170	43,947	90,483	66,511
New York	2,357,917	982,407	386,536	870,924	701,012
North Carolina	1,140,173	425,084	204,796	452,192	345,871
North Dakota	90,368	33,273	15,625	30,693	31,197
Ohio	1,432,591	548,146	243,292	601,696	395,088
Oklahoma	410,358	146,760	81,981	175,979	114,311
Oregon	423,031	160,674	74,113	175,315	120,387
Pennsylvania	1,563,909	700,802	226,256	660,621	402,185
Rhode Island	138,167	55,646	20,940	57,039	39,436
South Carolina	530,111	204,244	94,170	221,200	151,991
South Dakota	94,369	39,166	17,131	35,283	26,468
Tennessee	742,210	278,101	137,957	334,610	193,944
Texas	2,626,278	861,702	606,455	915,380	857,250
Utah	205,055	60,961	57,179	68,089	62,478
Vermont	76,655	35,581	8,927	34,013	19,885
Virginia	929,976	365,701	162,578	337,147	287,354
Washington	769,809	286,088	143,786	299,760	226,583
West Virginia	242,360	100,804	33,645	126,432	55,226
Wisconsin	689,222	278,659	108,053	253,863	208,044
Wyoming	57,626	22,063	9,939	19,031	20,289
All States	35,230,006	13,628,250	6,361,010	13,431,849	10,529,322

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

[2/] 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.

[3/] A household can be counted under more than one vulnerability category.

[4/] The three-year average of the 2013-2015 ACS estimate of the total number of all U.S. households is117,252,869.

[5/] 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.*

Table B-2. State-level estimates of the number of LIHEAP income eligible households using state maximum LIHEAP income standards by vulnerability category[1/] [2/] [3/]

(Three-Year Average of the 2013-2015 ACS)

State	State Income Guidelines for 4-Person Household as % of HHS Poverty Guidelines	Total number of LIHEAP eligible households[4/]	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[5/]	LIHEAP eligible households with no vulnerable members
Alabama	150%	529,929	193,463	97,239	240,291	144,219
Alaska	150%	49,213	15,484	11,851	18,653	14,979
Arizona	157%[6/7/]	653,338	239,911	135,849	221,556	206,794
Arkansas	146%[7/8]	338,856	126,941	65,253	159,045	84,020
California	190%[7/8/]	3,771,178	1,391,753	789,525	1,279,938	1,221,893
Colorado	165%	409,981	139,244	81,015	137,650	138,166
Connecticut	258%[7/8/]	434,957	185,256	64,228	155,202	131,516
Delaware	200%	90,566	37,302	15,841	33,774	25,656
District of Columbia	248%[7/8/]	87,721	30,191	12,612	33,798	31,429
Florida	150%	1,796,409	770,344	301,074	644,782	525,465
Georgia	168%[7/8/]	1,082,547	368,981	219,686	399,528	345,294
Hawaii	150%	85,835	37,507	17,276	30,925	23,928
Idaho	150%	144,129	47,242	30,492	53,605	43,927
Illinois	150%	995,447	353,022	193,428	364,211	316,220
Indiana	150%	572,613	185,283	118,438	232,084	170,787
Iowa	175%	307,585	116,329	52,489	114,028	94,654
Kansas	130%	187,570	60,556	41,920	70,307	57,161
Kentucky	130%	410,919	141,570	74,151	214,338	96,276
Louisiana	172%[7/8/]	598,830	223,373	106,196	248,258	177,097
Maine	170%	135,773	65,088	16,512	68,611	26,366
Maryland	175%	393,424	152,519	74,715	148,793	112,804
Massachusetts	259%[7/8/]	859,731	386,425	115,216	355,917	234,486
Michigan	110%	603,886	178,345	119,463	269,900	173,599
Minnesota	185%[7/9]	495,622	195,296	88,690	183,538	141,126
Mississippi	140%[7/8/]	353,051	133,471	64,690	163,102	95,053
Missouri	135%	483,564	169,858	88,576	211,916	131,819
Montana	172%[7/10]	121,517	48,617	18,448	45,402	37,300
Nebraska	130%	124,782	43,225	27,802	45,528	37,075
Nevada	150%	224,662	74,108	47,441	79,910	72,360
New Hampshire	200%	112,830	48,011	16,164	48,786	29,318
New Jersey	200%	767,353	323,366	137,131	273,052	223,593
New Mexico	150%	224,825	83,342	43,947	89,900	65,884
New York	209%[7/11]	2,357,917	982,407	386,536	870,924	701,012
North Carolina	130%	816,853	280,980	162,379	332,510	240,970
North Dakota	213%[7/8/]	90,368	33,273	15,625	30,693	31,197
Ohio	186%	1,432,122	548,061	242,823	601,534	395,088
Oklahoma	110%	244,733	75,211	51,011	107,192	70,775
Oregon	171%[7/8/]	422,300	160,462	73,549	175,155	120,271
Pennsylvania	150%	1,031,823	419,741	166,453	461,412	259,686
Rhode Island	222%[7/8/]	138,167	55,646	20,940	57,039	39,436
South Carolina	150%	482,567	179,105	90,287	202,332	137,957
South Dakota	175%	86,828	34,922	16,818	32,641	23,984
Tennessee	150%	671,978	241,944	130,323	305,034	175,957
Texas	150%	2,231,624	706,464	549,570	784,838	711,662
Utah	150%	168,174	47,675	48,949	56,603	50,440
Vermont	150%	46,909	20,601	6,172	22,469	11,371
Virginia	130%	457,085	162,519	86,999	183,276	133,168
Washington	125%	389,970	128,013	78,172	163,689	111,999
West Virginia	130%	178,255	63,988	27,860	94,482	41,410
Wisconsin	199%[7/8/]	689,177	278,659	108,008	253,843	208,044
Wyoming	189%[7/8/]	57,622	22,063	9,934	19,027	19,777
All States	Not applicable	29,443,113	11,007,160	5,559,770	11,391,018	8,714,473

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

[2/] 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.

[3/] A household can be counted under more than one vulnerability category.

[4/] The three-year average of the 2013-2015 ACS estimate of the total number of all U.S. households is 117,252,869.

[5/] 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.*

[6/] 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.
[7/] 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.
[8/] These states use 60 percent of the state median income as the state income guideline for all household sizes.
[9/] 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.
[10/] 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.
[11/] 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.

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[1/] [2/]

(Three-Year Average of the 2013-2015 ACS)

State	Total number of LIHEAP eligible households[3/]	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	600,044	319,178	105,866	104,885	70,115
Alaska	63,425	29,348	10,033	9,832	14,211
Arizona	653,338	346,139	122,356	126,467	58,376
Arkansas	343,462	191,771	74,523	70,654	6,515
California	3,774,978	1,661,123	594,402	571,920	947,533
Colorado	583,409	204,539	78,374	78,746	221,750
Connecticut	434,957	128,001	43,540	47,441	215,974
Delaware	101,355	36,932	12,191	13,125	39,107
District of Columbia	87,721	39,185	9,730	8,111	30,696
Florida	2,064,399	1,016,511	387,984	391,914	267,990
Georgia	1,083,988	558,619	185,940	177,306	162,123
Hawaii	113,015	50,658	17,835	17,341	27,181
Idaho	154,560	77,403	33,180	33,546	10,430
Illinois	1,471,574	593,357	196,757	205,333	476,127
Indiana	733,638	323,507	122,880	126,226	161,024
Iowa	356,306	132,739	53,808	62,861	106,899
Kansas	322,302	127,419	47,165	53,525	94,193
Kentucky	560,478	286,310	100,914	95,670	77,584
Louisiana	599,077	307,104	99,706	92,020	100,246
Maine	175,531	66,843	28,445	28,697	51,547
Maryland	661,791	189,618	65,875	65,326	340,971
Massachusetts	859,731	272,386	97,145	87,288	402,912
Michigan	1,180,137	529,013	180,490	183,623	287,012
Minnesota	623,763	195,737	79,330	80,006	268,690
Mississippi	367,054	227,838	70,249	68,967	0
Missouri	711,241	318,497	116,036	116,983	159,724
Montana	121,517	53,584	23,199	20,971	23,763
Nebraska	207,659	78,493	38,116	32,909	58,141
Nevada	263,360	124,851	50,822	48,989	38,698
New Hampshire	150,662	38,411	15,898	19,048	77,306
New Jersey	1,058,924	314,291	110,247	116,171	518,215
New Mexico	226,427	139,241	45,824	39,760	1,602
New York	2,357,917	993,960	318,745	311,666	733,546
North Carolina	1,140,173	554,997	211,420	204,042	169,714
North Dakota	90,368	32,098	12,701	12,640	32,930
Ohio	1,432,591	621,466	218,885	215,641	376,598
Oklahoma	410,358	209,475	80,652	76,998	43,233
Oregon	423,031	196,166	74,650	71,637	80,578
Pennsylvania	1,563,909	584,507	221,061	226,254	532,087
Rhode Island	138,167	52,312	17,771	17,744	50,339
South Carolina	530,111	280,817	102,412	99,338	47,544
South Dakota	94,369	37,842	17,048	15,921	23,558
Tennessee	742,210	389,517	144,009	138,452	70,233
Texas	2,626,278	1,310,489	469,724	451,411	394,654
Utah	205,055	92,688	35,895	39,590	36,881
Vermont	76,655	23,709	12,041	11,159	29,746
Virginia	929,976	311,580	119,691	114,530	384,175
Washington	769,809	284,658	105,313	108,555	271,284
West Virginia	242,360	120,525	45,857	42,679	33,299
Wisconsin	689,222	245,420	98,566	105,227	240,009
Wyoming	57,626	21,120	8,677	9,216	18,613
All States	35,230,006	15,341,992	5,533,979	5,468,359	8,885,675

[1/] State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.
[2/] 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.
[3/] The three-year average of the 2013-2015 ACS estimate of the total number of all U.S. households is 117,252,869.

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[1/ 2/]
(Three-Year Average of the 2013-2015 ACS)

State	State Income Guidelines for 4-Person Household as % of HHS Poverty Guidelines	Total number of LIHEAP eligible households[3/]	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%	529,929	319,178	105,866	104,885	0
Alaska	150%	49,213	29,348	10,033	9,832	0
Arizona	157%[4/5]	653,338	346,139	122,356	126,467	58,376
Arkansas	146%[5/6]	338,856	191,771	74,291	66,279	6,515
California	190%[5/6/]	3,771,178	1,661,123	593,944	568,578	947,533
Colorado	165%	409,981	204,539	78,374	78,746	48,322
Connecticut	258%[5/6/]	434,957	128,001	43,540	47,441	215,974
Delaware	200%	90,566	36,932	12,191	13,125	28,318
District of Columbia	248%[5/6/]	87,721	39,185	9,730	8,111	30,696
Florida	150%	1,796,409	1,016,511	387,984	391,914	0
Georgia	168%[5/6/]	1,082,547	558,619	185,783	176,022	162,123
Hawaii	150%	85,835	50,658	17,835	17,341	0
Idaho	150%	144,129	77,403	33,180	33,546	0
Illinois	150%	995,447	593,357	196,757	205,333	0
Indiana	150%	572,613	323,507	122,880	126,226	0
Iowa	175%	307,585	132,739	53,808	62,861	58,178
Kansas	130%	187,570	127,419	47,165	12,987	0
Kentucky	130%	410,919	286,310	100,914	23,695	0
Louisiana	172%[5/6/]	598,830	307,104	99,706	91,773	100,246
Maine	170%	135,773	66,843	28,445	28,533	11,953
Maryland	175%	393,424	189,618	65,875	65,326	72,604
Massachusetts	259%[5/6/]	859,731	272,386	97,145	87,288	402,912
Michigan	110%	603,886	529,013	74,874	0	0
Minnesota	185%[5/7]	495,622	195,737	79,288	79,709	140,888
Mississippi	140%[5/6/]	353,051	227,838	69,927	55,286	0
Missouri	135%	483,564	318,497	116,036	49,031	0
Montana	172%[5/8]	121,517	53,584	23,199	20,971	23,763
Nebraska	130%	124,782	78,493	38,116	8,173	0
Nevada	150%	224,662	124,851	50,822	48,989	0
New Hampshire	200%	112,830	38,411	15,898	19,048	39,473
New Jersey	200%	767,353	314,291	110,247	116,171	226,644
New Mexico	150%	224,825	139,241	45,824	39,760	0
New York	209%[5/9]	2,357,917	993,960	318,745	311,666	733,546
North Carolina	130%	816,853	554,997	211,420	50,436	0
North Dakota	213%[5/6/]	90,368	32,098	12,701	12,640	32,930
Ohio	186%	1,432,122	621,466	218,852	215,206	376,598
Oklahoma	110%	244,733	209,475	35,257	0	0
Oregon	171%[5/6/]	422,300	196,166	74,591	70,965	80,578
Pennsylvania	150%	1,031,823	584,507	221,061	226,254	0
Rhode Island	222%[5/6/]	138,167	52,312	17,771	17,744	50,339
South Carolina	150%	482,567	280,817	102,412	99,338	0
South Dakota	175%	86,828	37,842	17,048	15,921	16,017
Tennessee	150%	671,978	389,517	144,009	138,452	0
Texas	150%	2,231,624	1,310,489	469,724	451,411	0
Utah	150%	168,174	92,688	35,895	39,590	0
Vermont	150%	46,909	23,709	12,041	11,159	0
Virginia	130%	457,085	311,580	119,691	25,814	0
Washington	125%	389,970	284,658	105,313	0	0
West Virginia	130%	178,255	120,525	45,857	11,873	0
Wisconsin	199%[5/6/]	689,177	245,420	98,566	105,182	240,009
Wyoming	189%[5/6/]	57,622	21,120	8,673	9,216	18,613
All States	Not applicable	29,443,113	11,007,160	5,559,770	11,391,018	8,714,473

[1/] State estimates are subject to sampling error, and may not sum to U.S. total due to rounding.
[2/] 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.*
[3/] The three-year average of the 2013-2015 ACS estimate of the total number of all U.S. households is 117,252,869.
[4/] 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.
[5/] 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.
[6/] These states use 60 percent of the state median income as the state income guideline for all household sizes.
[7/] 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.

[8/] 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.
[9/] 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.